ERDC-EL
Moderator: Courtney Chambers
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Courtney Chambers: Okay. At this time I'm going to give you today's speaker on engineering with nature's project mapping tool, known as Engineering With Nature Pro Map. Dr. Tom Fredette is a research biologist at the U.S. Army Corps of Engineers (USACE) Engineer Research and Development Center (ERDC), Environmental Laboratory working from Concord, Massachusetts. Prior to joining ERDC, Tom served from 1986 to 2009 as the Program Manager for DAMOS (Disposal Area Monitoring System), the New England District's monitoring program for offshore dredged material disposal sites. His experience includes assessment, regulation and management of dredged material, contaminated sediment management, marine environmental monitoring, environmental impact assessment, seagrass ecology and transplanting, and marine benthic invertebrate ecology. Tom has been a team member on various contaminated sediment remediation projects. He has also served on project delivery teams for many USACE navigation dredging projects. Tom has been a US representative to the Scientific Group of the London Convention treaty since 2001 and has also conducted training on the implementation of the treaty on five continents. He has authored over 80 published papers, technical reports and conference papers and has made numerous conference presentations in the areas of dredged material management, seagrass community ecology, marine environmental monitoring, and improving the environmental sustainability of water resources infrastructure.

More information about Tom can be found in his bio posted on the DOTS page, along with a PowerPoint and the video of today's meeting. All right.

Tom we're very happy to have you with us. At this time I will give you the presenter rights. We will enter listen-only mode and we can begin.

Operator: All participants are now in listen-only mode.

Tom Fredette: Well, good afternoon everyone. My name is Tom Fredette. Today we'll be talking about the dredging operations environmental resource program, the DOER program's engineering with nature project mapping tool. Good morning to those of you who are in the Pacific Time Zone and west of there. Good afternoon to the rest of you.

Today, this is a follow-up presentation to one that was given in the November DOTS Webinar that's part of this same series that was given by Dr. Todd Bridges, who provided an introduction to Engineering With Nature. Today we're going to be talking about a mapping tool that we've developed that allows users to look for sites that have applied the principals of the Engineering With Nature concept. We'll go over some of that a little bit later on during the presentation.

Also, what we'll be doing is we'll be doing a live demonstration of the pro map tool. A number of people are on the engineering with nature pro map tool team. They include (Burton Suedel), (Cynthia Banks), (Austin Davis), (Sam Jackson) and (Michelle Bourne). We'd also certainly like to thank a number of districts who have helped us with gathering information on various sites that they are responsible for or that they know about.

Let me go into a little bit about what we'll be discussing today, again some background on engineering with nature. We'll be doing a demonstration of the pro map. We'll do an overview. We'll look at site tools. We'll provide some site information examples. I'll show you how to screen a site and how to do

searching. Also there is a capability to submit sites. Then, after that I'll talk a little bit about changes that are underway with pro map and also we'll have time for discussion afterwards.

Engineering with nature is the intentional alignment of natural and engineering processes to efficiently and sustainably deliver economic, environmental and social benefits associated with water resources infrastructure. We initially started under the DOER program, which is focused on navigation. Certainly, this is a concept that can be applied to, you know, all of our water resources infrastructure. The key ingredients are science and engineering that produces operational efficiencies. Using natural processes to a maximum benefit, broadening and extending the benefits provided by projects, and also using science-based collaborative processes to organize and focus the interest of stakeholders and partners. Certainly, many of these things are practices that we already do. Sometimes they are, you know, overtly done. Sometimes they are done just as a matter of doing business.

Certainly, we're trying to instill the approach more as a process that we go through when we look at our water resources infrastructure, either during the original conception and design and construction phase or during operations and maintenance with structures. I think we're probably all pretty familiar with, you know, the USACE navigation mission, which is to provide safe, reliable and efficient navigation but also in an environmentally sustainable manner to provide for commerce, national security needs as well as recreation.

Engineering with nature also builds on the Corps of Engineers environmental operating principles. These were recently re-invigorated in the past couple of years. Engineering with nature is trying to take the environmental operating principles and put them into much more practice. The Corps of Engineers has multiple opportunities to apply engineering with nature practices. We have

thousands of miles of waterways that we maintain, over 25,000 miles of navigable waterways.

We have over 1000 coastal structures. We have structures along our navigable rivers. We have more than 200 locks and over 600 dams. We do a lot of maintenance on these projects. As I said, we also design new projects as well. There are multiple opportunities where we can take a new look at some of the work that we do and see whether or not there are opportunities to apply some of these principals to broaden the base of benefits that these projects might be providing.

Engineering with nature pro map is an interactive online catalog of case studies that apply the engineering with nature concept. Certainly, these projects were developed, you know, before the engineering with nature was developed. We selected them based upon the fact that we feel they provide good examples that others can look to for ideas that they might be able to apply in their own projects.

The tool can be found using the link shown on the slide. It can also be found from the engineering with nature Web site, which I'll just--we can just take a quick look at. So it can be found from there under the tools, so that's one way of finding it. I'm just going to go back to the presentation. As well as you can use the normal search tools in your Web browser. Now, what we'll do is we'll go to a live demo. I'll show you some of the features of the pro map tool. We'll look at some of the various sites.

This will launch pro map, which we'll say okay to, and the first thing that happens is a welcome screen will pop up, such as you should see on your map. Then the map will populate. It has a number of different tools. There are some tools up top, an about page, there is a submit a site tool, and there is also

the map widget, which is currently open here. I'm going to close the map widget so we can take a look at the entire map. There is also a slider tool that allows you to zoom in onto the map or to zoom out on the map. That same functionality can be done by using the scroll bar on your mouse as well.

We'll just back out a little bit so that we can see the whole world. We can see that most of the sites that are in pro map are certainly in North America. Those are the ones we are familiar with. We have a few that are in other places in the world. We have a (sand) engine or the (sand) motor, which is in the Netherlands. There is a small project in the Maldives. Then there are a few projects in Australia, which are all in the same harbor. There are four or five projects once you zoom in that are in Australia.

Then these are the various symbols that represent the type of projects that these represent. As you hover over each of these an information window will pop up. Let me just open the map widget again. So some of these projects represent navigation dredging. So if you have a beach management project for example, the infrastructure that's being developed is a navigation channel. The sediment is being used to nourish a beach or to build a berm off of that. You might be building a breakwater and adding additional benefits to that project as well.

All right. Now what we'll do is we'll take a look at a few sites. One of the features that this has is a search tool where you know you're looking for a particular site you can look for it. We're going to zoom in to a site in Buffalo, New York. We put that into the search screen. It will center on the site in Buffalo. This is the Eastern end of Lake Erie. This is our site here.

It's called the Buffalo (Tern) nesting site. Its site owner, the site proponent is the New York Power Authority. The associated infrastructure project type is

at Breakwater, and its primary or the first engineering with nature benefit is for bird habitat to support nesting for the common nesting. Each of these information boxes has a brief project description that will tell you a little bit more about the site. In some cases we have a photograph of the site.

Also, there will be links that will allow you to go to additional information on these projects as well. Right now how this site functions is if you simply left click on these links it will open the window where you are right now. If you right click on that, and actually you need to right click on it twice and open in a new window, it will send you to that information link. There certainly you can then look for more information on the (Tern) nesting, the various reports. They've also done some work with osprey nesting, and those sites are in pro map as well.

Of course, you can also--just going to center the map again. You can also zoom into the full extent, or to the closest extent and you can actually see the project here where this is the end of the breakwater, so I'll scroll out a little bit. We can see that we've got breakwater here outside of Buffalo, must have been a winter photo given all the ice. What the New York Power Authority did is they have added fencing to the platform. That is where the navigation beacon is.

They've added gravel that is suitable for nesting for the common (tern). Common Terns were nesting on the breakwaters naturally, although they were not having great success. This project has greatly improved the ability of common terns to nest in the area. It has greatly increased the number of nesting pairs that are present in the region. One of the things that you will see when you use a mapping tool like this, and this particular mapping tool is using Bing maps as a base map.

In some cases you might see different resolution depending upon what the information source is. So here over the open lake we have an area that has rather poor, pixelated resolution; whereas the aerial imagery over the land is much greater resolution. Okay. We're going to go to another site just to show you another example. Because I'm working one handed here I saved them to the file so that I can cut and paste. We're going to go to a site at Saint Louis on the Mississippi River if the map will center.

Based upon the search on Louis, right here outside of Saint Louis. We'll zoom into the full extent. Actually, I'm going to back out a little bit using my mouse scroll bar. That's probably good right there. Again, we can click on the icon. This is an icon for Chevron. So again there are different icons, there is Chevron's. There is Dykes. There is navigation dredging. There is breakwater's. There is Jetties. So you can see the, you know, what these might represent.

Again, these are the Saint Louis harbor, Chevron's; they are a river training structure. Again we've got a little description here. They are river training instruction designed to maintain channel location and depth, and provide various habitat and recreational benefits. Again, their primary purpose is to, you know, assist navigation, to maintain the navigable depth and to reduce the amount of dredging so it increases sustainability. They also provide a number of different habitat features.

They also, this particular design is a modification from what they used to use, which were dykes, which were rooted in the bank of the river and then reached out into the river. Those had impacts on erosion and accretion on the riverbank and modified a number of different features of river ecology. The Chevron's have very little impact on the riverbank. They also provide additional habitat. There is a weed area that will provide quiet water habitat at

lower water levels. Islands are often formed behind these Chevron's and those islands serve as locations where various wildlife can utilize that habitat. So again they provide a number of different environmental features.

We'll go to another site from my list here just to show you a few different examples of the types of sites that are in here. There are over 200 projects in EWN pro map. Perhaps your favorite one is not here, so we'll talk about how to submit that a little bit later. Again, we've gone to a site now we're on the Gulf Coast. This is in Alabama. We're going to a site, which is Deer Island Restoration Project. Let me just center the map again, which makes it easier to zoom into the closest location here.

Again, this is a project, which is--scroll up information bar. It is an offshore berm created using dredged channel sediment to provide shore protection and beach nourishment and to protect the area behind. This is the work that's being done by the Mobile district in association with others. It's associated with a navigation-dredging project. One of the things that is a current bug in pro map is that sometimes the information from other sites gets carried along in this little information box.

This first one is certainly a Deer Island link. I believe the second one is, but sometimes the later links are actually from other sites. Sometimes that also happens with the photos. We'll talk a little bit later on that we'll be migrating pro map to another platform. One that's going to get rid of some of the existing bugs that are in the program. Right now it's still very information rich. Again, we can back out here a little bit and see the overall site that's being done here.

In fact, you can see the dredged channel that's here. I know that I believe you can actually see the dredge pipe there. This photo was taken when active

operations were ongoing. Okay we'll go to another site here just to show you a slightly different type of project that's in the database. Here we're going to go to Tampa Bay in Florida. So this took us over to Tampa Bay. Here we see there are a number of sites in the Tampa Bay region.

Most of these are various shore protection sites using either precast concrete reef modules, or using wire mesh baskets filled with oyster shells to provide submerged breakwaters that provide also reef-like habitat, or submerged breakwaters that are an oyster habitat. Again, we can zoom into this site. Here we're off of MacDill Air force Base. We go out a little bit further. Here we go. We can see the Air force base. There are a number of submerged breakwaters that are off the base here intended to try and reduce the erosion.

These are made of precast concrete domes. They have holes in them that provide areas for fish and invertebrates and other organisms to live. Then they also act to reduce the wave attack on the beach. Again, we can look at various information sources here that are available. Actually going to look for another one. I don't see it right now. Again, you can explore these to see if that's a project that you have interest in and getting more information on how it was constructed, and how it might be operating.

All right. One more site we'll go to and this is going to be a site in North Carolina, which is Jockey's Ridge. We will zoom into the site again using our slider bar. Again, this is a site that's off of one of the very large sand dunes that occurs on the outer banks of North Carolina. This is a living shoreline site. The reason I wanted to show this to you--let me center the project again. There we go. Living shorelines are certainly an engineering of nature type project that has been in use for some time. This is a good example of one

It involves a combination of offshore breakwaters in shore plantings, and also there are a number of sites, which involve living shorelines that have been assembled and so we're going to open that site that is maintained by the Coast, Oceans, Ports and Rivers Institute. Jockey's Ridge is one and so the external link takes you to that site. Again, there maybe more information resources there. They maintain a database of these and we have added all of those to EWN pro map.

Okay. At this point I think what I--actually I've got one more thing that I do want to show you before I open the floor. One of the other tools is that you might have a project, you might be working on a navigation project, you might be working on a jetty project or a breakwater project. So you're interested in perhaps what other people have done, or what other projects have done. One of the things that can be done with this map widget is you can click on any of the icons and it will screen for those projects that match that infrastructure type.

Again if you're working on breakwaters then you can narrow your search and identify where all the breakwater projects are. You know, sea wall projects, you know, we've got one in the database so far, you know, shore protection projects. You might be interested in perhaps projects that have targeted certain benefits, certain additional benefits. So I'll hit the clear button here and that will clear the site.

Instead you might be interested in looking at the benefits. So I clicked on the engineering with nature benefit one and we have benefit two and benefit three. These are often times an assignment that the team made when looking at the information associated with the various projects. Sometimes it was easy to identify what the intended benefits were. In other cases we made professional

judgment in terms of what we believed the benefits would be from these various projects.

So one, two and three don't necessarily designate any priority. It's simply that we're in many cases able to identify two or three different environmental benefits for a project. Again, if you're interested in things that perhaps targeted bird habitat, you can screen for those, or fish habitat. In some cases you might need to use these other EWN buttons here or two or three to perhaps go a little bit deeper into that again, perhaps it's vegetative habitat you were interested in. So that's the screening part of pro map.

I think now is a good time to open the phone line back up because what I'm going to do is use the submit a site feature and I'd like to potentially use a real example that perhaps somebody might have of a site that, you know, they'd like to see submitted to pro map. Of course that might require you to know what's already here, but if not I have a potential demonstration project to illustrate.

Courtney Chambers: Okay Tom we'll open it up.

Operator: All participants are now in interactive talk mode.

Courtney Chambers: Just a reminder that we'll hear anything that you're sharing if you're not on mute. If you have a question be sure to remove the mute feature off of your phone.

Tom Fredette: So I guess if somebody might have a site example that they might have in mind then, you know, I can use that. I'll just pause for a second and see if anybody might want to try this. I don't hear any volunteers, so why...

(Bob Lomb):   Hey Tom?

Tom Fredette: Yes.

(Bob Lomb):   (Bob Blama) out of Baltimore.

Tom Fredette: Hey (Bob) how are you doing?

(Bob Blama):   I'm pretty good. Thanks. I'm still around. We just built a site at the beginning
                   of the year at the upper bay, Susquehanna Flats the eroding island from fish
                   and wildlife service and we expanded the island and we planted it for
                   waterfowl.

Tom Fredette: Okay so I'm on the upper Chesapeake Bay here. Is that the right location?

(Bob Blama):   Right here. Right where mine is, right here.

Tom Fredette: Well, I can't see what you're pointing at (Bob).

(Bob Lomb):   Okay. Move your arrow to the right, up.

Tom Fredette: Let's just--am I getting close?

(Bob Lomb):   Yeah if you zoom in it'll say Battery Island.

Tom Fredette: Well, one of the things that we don't have here is a lot of--the map right now
                   the map layer doesn't give us a lot of labels.

(Bob Lomb):   Okay.

Tom Fredette: We're simply working off of commercially available labels. Let's just assume (Bob) for example that it was here. So, you know, again you would, you know, we'll close this. So if you had a site you wanted to submit, you would hit this submit a site button. It's best that you zoom into the site; such as we've done here first. So what you would do is you would enter your names. I'm hunting and pecking here. I'm going to skip capitals and we'd say (Bob)@mail.com

Once you've entered your name and your email you can then add a site. That allows you to click on the map, which then allows you to enter additional information on the project. Then you would enter the name, which again we'll just put in (Bob) or (Bob)'s site. Again you had a name for it but you know, you'd put the name of the site. You would put perhaps the owner, you know, perhaps it would be the district, the Baltimore district. Perhaps it's something that's being done in association with the park and the local park authority is the owner.

You would identify the infrastructure project type that it's associated with. Again perhaps it's a breakwater, and perhaps you are targeting bird habitat for this. So you would enter that, and then you might also be saying that you were trying to provide invertebrate or island restoration was one of your goals. Then, you know, certainly maybe recreation was yet another goal. Then you can provide a brief description and any supporting links that you might have.

Then once you have that information, and again, you know, a lot of this stuff is not required, but certainly as much information as you have would be good at the time. Then you hit submit. As we saw a dot pops up on the map, and that won't actually be a live site until after a site administrator has reviewed the information and perhaps has gotten back to you, you know, through your email contact to ask you more about the site, get more details. Then certainly

if it meets the incentive engineering with nature then, you know, it would be added to the database as a site that other people could use as examples.

So that's how the submit a site tool works. I think that provides the general overview for pro map. So I'm going to have a couple more slides after the live demonstration. Before I lead the live demonstration, let me just ask if there are any questions the database itself and the functionality that we have here in terms of what I've just demonstrated?

(John Giles):   Quick question Tom. This is (John Giles).

Tom Fredette: Hey (John).

(John Giles):   Hi. When you put in the engineering with nature benefit one, benefit two, benefit three?

Tom Fredette: Yes?

(John Giles):   For example I just did a quick look at vegetative habitat. There are different sites under each benefit. Can you go through, I didn't quite understand the difference between benefit one, two and three?

Tom Fredette: Well they are not priorities. If you're creating perhaps a reef breakwater that's going to benefit both fish and invertebrates, and it's also going to provide, you know, your main intent is to provide shore protection because you're creating a breakwater. You also want to provide invertebrate and vertebrate habitat, so you'd be targeting. Again under EWN benefit one might put in, you know, fish habitat is your first interests. Under EWN benefit two perhaps is invertebrate habitat. Again, it simply provides a guide for what kinds of added benefits that, you know, the proponents of the project were intending.

It may have many, you know, it may have esthetic benefits. It may have recreational benefits. You know, there could be any number. You know, usually when a project is developed and these added benefits are added on, the proponents have a specific objective or goal in mind. Some of them are obvious such as when you're creating a Tern nesting habitat or a bird-nesting habitat. Others are more broad, so good question (John). Thanks.

(John Giles): Thank you Tom.

Tom Fredette: Any other questions? Okay, not hearing any, I'm going to stop sharing my desktop. We'll go back to the presentation and talk a little bit about, you know, where pro map is going. We are making some changes in pro map. The existing information is there and available to use now. Currently, for those of you who are technical people it's based on ESRI's Arc GIS application using the programming interface for (Lex 3.0). It uses Arc GIS online. As I said the base map is Bing maps.

There are some enhancements that can be made by migrating it to a different platform. It also will allow us to better integrate with a number of other Corps of Engineers information sources by doing this. We're actually currently in the process of moving it to and HTML 5, java script architecture on Arc GIS portal. That's going to allow us to do better photo and document capabilities. We'll be able to do multiple photos that will be able to come up in pop-up windows.

It will give us again greater document capabilities. It's also going to increase the collaboration opportunities and maintenance is going to be easier. You know, we think that it's going to be an easy transition. You know, the basic way that you use the tool is not really going to change in any degrees, so if

you use the current version, and when we go online with the new version you'll see some visual changes but by and large I'm sure that you'll be able to pick it right up. I don't think that from a user perspective there is going to be a big change on that.

With that, I think it's a good point to stop and see if there are any other questions or a general discussion that we can undertake?

Courtney Chambers: All right. Thank you very much Tom. Just a reminder for participants, you can submit your question through the chat feature. If you would, submit that question to everyone so we can all see it, or you can of course ask you question over the phone line after taking your phone off of mute. All right. Tom we've got a question here or I received one in the chat feature. It says are we planning to add any contact information on the projects so people could look up additional information or get in touch with somebody about a project?

Tom Fredette: That is not something that we currently have, is contact information. We do have the site owner and sometimes the district, but we don't have contact information. Sometimes that is present on the external links that you might go to, so that would be one way to get it. That's something that perhaps we need to think about a little bit. I mean one of the advantages of linking to the external source certainly is that, you know, certainly contacts change, phone numbers change, those things change.

If the external source is keeping their Web content fresh then, you know, we don't need to store that. You know, there is always a debate in terms of, you know, whether you capture the information, freeze it, whether you, you know, use the information that's changing and being kept up to date by the, you know, host original Web site. So, a good question and something that perhaps we need to think a little bit more about.

Courtney Chambers: Great. Any other questions for Tom? Tom I had a question, we had a presentation yesterday on our restoration Webinar series about SimSuite abd the Environmental Data System associated with that, when you mentioned just the greater capability to talk with other USACE data sources, has that been a discussion at all? Are they related in any way?

Tom Fredette: I'm not familiar with that particular database myself, but I believe that there is a big push to move to the Arc GIS portal and that is one of the things that is going to allow greater integration of these various databases. Again, you know, I mean restoration is, you know, a different twist on, or a different focus than engineering with nature is. In fact, you know, one of the things that we did in terms of selecting sites for engineering with nature is we, you know, did not include projects that were, you know, purely restoration.

Their goal is, you know, is to restore something, whereas engineering with nature you're looking to broaden benefits. That doesn't mean that during a restoration project you can't apply additional engineering with nature type concepts. For example you might be building a containment wall. You might be building a containment breakwater. You might be doing it in a traditional way, whereas you might be able to look at ways to broaden the benefits of that breakwater as well by incorporating, you know, caverns or materials that will benefit, you know, certain species. Again, there are opportunities there as well.

Courtney Chambers: I see. Thanks.

Tom Fredette: Okay.

Courtney Chambers: All right. Here is another question I received in the chat feature, what type of and how much data do the data links access? I would imagine that's probably pretty variable maybe?

Tom Fredette: Yes. It's very variable. It's, you know, purely based upon what we were able to find doing Web searches of what was provided to us through districts or other sources that we found. So, in some cases there are detailed reports on monitoring and information. In other cases we might not have any links at all simply because the information is not available. So, yeah it's very much a function of the information content that the individual project developed.

For example, I know that you can go to the various projects in San Francisco Bay, the Hamilton Air Field marsh restoration project is a good example where if you go to that project, you know, they have a lot of good content on their Web site in terms of photos and other details on the project. So that's an example where there is a lot of information.

Then, there are other examples particularly, for example on the Mississippi/Missouri River where there a large number of river training structures, the Chevron's that we showed you is also structures, which are called notched dikes. There are literally dozens and dozens of those. You know, in many cases for each individual project there might not be a lot of specific information. There is a lot of information on Chevron's and notched dikes, but not on each individual project.

Courtney Chambers: Okay. Thanks, any other questions for Tom? All right Tom. Well, that may be all for this afternoon. Oh great, you've got contact information. I assume if anybody had any additional questions they can get in touch with you correct?

Tom Fredette: Yes. Well certainly and so I'd like to thank everybody for participating this afternoon. You know, certainly if you have additional questions, you can reach me through email, phone. Also if you'd like additional information on engineering with nature the link to the Corps' Web site is on this slide as well.

Courtney Chambers: All right. Well thank you so much Tom. It has been a very helpful presentation on a very neat tool. Participants, we want to thank you for joining us today to help make this a successful meeting. I would like to remind you if you would like the PDH credit that you send me a chat message with your full name and affiliation if you're outside the Corp. That'll be all for us this afternoon. Thank you very much.

Operator: Your conference is ending now. As requested by the host, please hang up.

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