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Courtney Chambers: Hello everyone. For those of you who are new today, I'm Courtney Chambers and I work at the ERDC Environmental Laboratory and Technology transfer for Ecosystem Restoration.

I'd like to welcome you all to our web meeting today on the aquatic plant information system demonstration by Ms. Sherry Whitaker. This is a web meeting on Ecosystem Restoration topics by ERDC and the Ecosystem Restoration Planning Center of Expertise. It's designed to address a variety of topics including training, lessons learned, research and development and emerging issues.

The web meetings are recorded and archive files are posted on the Environment gateway under the learning tab and I would encourage each of you to go look at that sometime and take advantage of that library.

And just a brief word about the learning exchange notification system. The way it works is that an initial email notification of a webinar is sent two weeks in advance from the Corpslake email address. And if you're not currently receiving those notifications, you can go to the gateway, which I have the link up here on the page. I don't know if you can click it as a live link. But if you do visit the restoration gateway and go the learning tab, you can sign up there to be notified of upcoming webinars and then if you registered for a webinar, you will be sent a reminder webinar that day before the date itself. If you have any questions about that, please feel free to email me too.

Okay, our next scheduled web meeting will be on the 26th of July on MAWI, which is a Multiscale Assessment of Watershed Integrity tool. And that will be presented by Mr. Dan Smith from the Environmental laboratory.

And just a few more notes before we begin today's session. We will have a question and answer session that'll last 10 to 15 minutes after the meeting. If you think of a question during the presentation, just send your question via the chat feature or you can ask it verbally if it's appropriate throughout the presentation and our speaker can address it either at that time or at the end of her presentation. And we are going to cover as many questions as time allows and then if we need to follow-up with any remaining items, we can do so.

Alright, if your using your speaker phone, I ask that you remember to keep it on mute while you're listening and please do avoid putting us on hold with background music. We had a brief example of that before our meeting started today and it can be very distracting.

And then lastly, in order to have a more comprehensive list of attendees, I do ask that if you're calling in as a group, you take just a moment to write down the names of your attendees, you can use the chat feature over on your right hand side of your screen for that. Thank you very much.

Okay, and now I would like to give you today's speaker on the aquatic plant information system. Sherry Whitaker is a computer scientist with the US Army Engineer Research and Development Center, Environmental Laboratory here in Vicksburg, Mississippi.

She is personally responsible for the development and maintenance of several information and expert systems in the area of aquatic plant management. Sherry also served as the treasurer of the National Aquatic Plant Management

Society and the secretary of the Mid-South Chapter of the National Aquatic Plant Society.

Sherry Whitaker: Yes. I'd like to thank all of you for coming and listening today. I'm sorry that we couldn't do it last month. But, you know how technology sometimes lets us down.

First of all, listed below are the programmers and graphic artists that helped out in the system. But I want to mainly thank the ERDC Aquatic Plant Control research program for their funding for this project.

Okay, the ability of aquatic plant managers to successfully control aquatic plant infestation is highly dependent on their ability to obtain pertinent and up-to-date information on a plant or a topic concerning biology, ecology, distribution, problems, rules and regulations and identification of invasive plants as well as information on available management techniques including chemical, mechanic and biological control.

The task of finding this information can sometimes be very cumbersome and time consuming, due to the vast knowledge base that is available in the form of technical publications, journal articles, reports, oral communication such as conferences and meetings, posters, books and internet pages. This knowledge base is already sizeable and continues to increase rapidly.

So an efficient mechanism is needed to access such diverse and important information. In light of this goal, the researchers here at the environmental laboratory at the Engineer Research and Development Center have created this aquatic plant information system.

Some of you might be wondering what is an information system? Well, it's a system that runs as stand-alone program on a PC or it can be accessed from the web. It is highly interactive and allows a user to quickly obtain access to information in a variety of different formats such as text, photographs, hyperlink text, identification programming and video.

All this information is located in one location. I first wanted to give you the beginnings of our system so you can see how much it's grown and why we went to the direction that we are now.

The creation of the ERDC information and expert systems began in the late 1990s with the development of an aquatic plant identification system with funding provided by the US Army Corps of Engineers Jacksonville District located in Florida.

The first system was developed using the object oriented programming language C++. After the creation of the plant identification module, information on the individual plant species was incorporated. This system became version 1.0 of the aquatic plant information system. Initially the system was disc-spaced and utilized only 256 color graphics. So due to the limited graphic capabilities, photographs were limited, so line drawings were mainly used.

Because of the growing capabilities of personal computers, the ability for full color graphics, higher power, faster speed, increased memory in storage and the advantage of more power programming languages, several revisions have been made to the system to benefit from these increasing technologies.

They have allowed the use of full color images, more standard information across computer hardware with increased information content and a more

interactive graphical user interface. The current version of APIS is being distributed on the CD rom as version 3.2. This version is Windows Vista compatible. A version is also available for download that runs on a Microsoft based personal data assistant or PDA. The original APIS started with 9 species and now contains information on more than 70.

For the past years, the main focus in the development was to increase the content. This includes adding information on additional plant species, updating the information, mainly the chemical information since it changes regularly, and other general revisions.

The programming of the system was revised as we needed for new operating systems and for the handheld application. Of our many new electronic technologies that have been created such as smartphones and iPhones, etc., we have favored updating information over reprogramming for new technologies.

So now we think it's time for a change. Especially with the ever increasing information being incorporated into the system, it was becoming harder to keep up with information. Organization became a problem and updating the system became more and more tedious. Some information such as plant names were repeated in many different areas, so updating a plant name would require in depth searches to find all instances of a particular name.

Therefore, there was a need for a more flexible way of accessing the information. This involved a complete reprogramming of the system. Through research by the team, it was determined that the best method to use would be a relational database.

A relational database is simply a set of highly organized data that is related by common information. The data base contains a series of tables and each table

contains many records. These records are what hold all the information or the actual content of the system.

Common identifiers are then used to relate the information that is contained within the table. And for an example, let's look at a species profile, because that was currently in the system. In each species profile, information on the common scientific names, synonyms, home range and introduction, distribution, description and problems all can be found.

Each of these would be included in one record and each plant would be a record. So if we look at this diagram, you can see that each of these groups would contain a set of tables. And these groups are related to each other by a particular plant name.

I want to excuse the bad photograph here but I wanted to give you a visual of how all the information is laid out. Each box represents a table. Notice how there are lines that connect many of the boxes. These lines represent the relationships between the different tables.

That gives you a close up view of the plant information where I was saying it was all in a table and record. So, what does this relational database structure allow us to do differently? It allows for better organization of information. We know where every piece of information is located and how it's related to the other pieces.

We have limited use for static webpages. In the past, the help files contained in the old system were just converted to static pages. And now these pages are created dynamically as the different information is requested. This allows for easier and faster updates. Information needs to be updated in only one spot instead of having to query many pages.

In return, updating or adding information becomes more economical. It also gives us more flexibility in displaying information and I'll discuss that later in this presentation. Another benefit to utilizing the new programming language is the ability to program a web based identification system.

Until now, the identification portion of the system had only been available on the CD version. Now, not only do you have the classic form of the identification system, but there's also a great online identification system available. And I will demonstrate those to you shortly.

Okay, now I'm going to walk through and show you the system. Here we go. Okay, this is the home screen of the online version of the aquatic plant information system. Up here, this is your major tool bar, you have your home, which is this screen. The next screen is our plant information overview. Here it gives you the overview of this system and also on the left side, gives you access to a glossary which gives you definitions of words that are used often in the textual information.

We also have a total list that gives you all the plants in the system in alphabetical order by scientific name. If you click here, you can also switch to a common name. You can also view these plant lists by plant type. They're broken down into dry land, floating on the water surface, submerged or trees or shrubs. So if I just click on dry land, it lists the plants or you can also search by scientific or common name.

Once you click on a plant, plant specific information is shown including the scientific name, common name, range, descriptions, growth characteristics and problems associated with the plant. Numerous high quality photographs of each plant are available.

I'm phasing in so you can see a population shot, as well as close up. And they're also are available on the detail maps. It illustrates the US distribution. The photographs used are collected by researchers and experts in the field of invasive plant species. And the distribution information is obtained by the USDA's plants data base found at http\\plant.usda.gov. If you see here, in the previous systems, once you had identified a plant species, then you had to back to the main menu screen in order to find out different management control options that were available.

But with programming, we were able to list it right on the plant page. You have your chemical control, it lists all the pertinent herbicides that are available. Of course, we have operational bio controls as well as the herbivore and chemical control that are available.

Alright, now if you're not sure what plant you have, included in this system is what we call the expert ID system. If it's, like I said, a species of interest - unknown, the plant identification module allows you to rapidly and efficiently identify numerous plant species obtained in the system

The identificat6ion system utilizes expert system type programming which constantly simulates interaction between technical and non-technical personnel. The question is asked, what is the general type of plant? I'm not sure exactly what they mean by that question, it gives you a brief description of what the question means.

Also, if you're not sure which is the answer, you can choose answering no. Over here it's remaining plant count. This lists all the plants that are currently in the system. Notice here, we have 81. Each time a question is answered, say

we say herb not a vine, it goes down to 71 and it will do that each time you answer a question.

So let's say, next question. How is the plant growing? I would say beneath the water surface. Does the plant look like a grass sedge or rush? We going to say no. Anytime if it's none of the above, if none of the above is listed, you can click that and it will go to the next question.

And let's use simple without segment. What is the arrangement of the leaves on the stems? Notice each time I flagged an answer, my remaining plant count is going down. Stuff to know. Notice when I pick that, we only have one plant available. So if I say next question, it tells me that I have identified Hydrilla verticillata. And it asks me if I would like to verify.

Verification is performed. It just goes through and asks more specific questions based on a given plant's unique characteristic to insure that the initial identification was correct. So if I say, would you like to verify, it would go through and ask the questions that you hadn't answered but that are pertinent to identifying Hydrilla.

And then it will keep going through the verification questions. Once it gets to a verification, it will then go to the plant page. It goes directly to this page. And at any time, I can restart the system. Anytime you want to see information on a particular plant while you're in the ID system, you can click on the plant name and click select and it will take you to that plant page.

Okay. Here's the the control options. Like I had said, in your own plant screen, you can go directly to the information for a particular plant. But say you want to come and look at a particular control method, herbivore is listed

here, you have the total list or by-plant species. It will list all. Notice that the red asterisk denotes optional bio controls.

Once you click on those, for each agent's information provided, it includes scientific and common names, description, damage the agent may cause, collection technique and strategies for implementing their use and they're imbedded with a description and on some of them, there are links to videos that depict agent activity.

Also provided are photographs of the life stages of the agent plant damage that might be observed as an agent becomes established. And those are located on the top of the page. Go back to the control options and to the chemical options.Here you can get a chemical list once you click on it. It will give you the list of plant species with a given herbicide plant combination and significant information on chemical control options is available for each plant species. The chemical control information includes available formulations, click on that, and associated manufacturers, application rate, toxicological data and use restrictions.

This information is derived directly from the manufacturer's Environmental Protection Agency approved label. In addition, there is an identification system for selecting the best herbicide based on site specific characteristics. The water condition, water use, restrictions on irrigation and individual state law requirements.

And that's how you would get to the chemical identification system to choose which plant you're looking for and it says "will the herbicide be applied to the shore or the water?" And based on your answer, it will bring down the best herbicide for your condition.

We also have a herbivore identification system that's included and it runs the same way as the plant identification. It asks you what type of plant species where the organism was found. And based on your answers, it will narrow down and give you the list of the herbivores where you can get information on them and view pictures.

Alright, we also have the chemical control information and it's given by a total list of the different methods or by plant species. You click on a plant, it will give you a listing. And photographs of many of the mechanical control options are available along with a visual concept of the control function.

These are also detailed text-based information describing the equipment and its use. And there's also a section on ecology that's given. And they have the cycle of plant communities on water temperature and dissolved oxygen. This is all just text that you can click through and it has a nice table of contents up top where you click to the section that you would like to view.

Alright, we also have, in addition to the traditional expert system for identification, we also have what we call the free selection ID system. What that allows you to do, if you know the color of a plant's flower, you can look the plant up by flower color.

Based on your answer, let's say greenish, it will narrow down the list of plant species that have greenish flowers. Or you can change it to red, or blue or white and you can see them changing down at the bottom.

If you would like to keep that answer, you can submit and then it will let you go and select a different question to answer. See how it changes at the bottom and it will, anytime you can delete a particular characteristic that you are

looking at, say I want to delete that one, it will go back and just list the ones for the characteristics on land.

If you like a CD, there is a link here to the request the CD of the version 3.2 and we also have a download for the handheld version. And any updates that have been made to the CD version.

Is there any area that you would like me to go into further on the identification system. A certain plant you would like to try to identify?

Courtney Chambers: Be sure to remember to take you phones off of mute before trying to speak so we can hear you. Thanks.

Sherry Whitaker: Okay so now that we talked a little about what we planned to do in the future, currently the information that is displayed is basically static in that it is based on the programming. The power of the relational database allows for what we call dynamic query and using dynamic query for the user can specify the particular information that they would like to see.

For example, say you want to look at, you want to create a management plan for a particular species but you only want the species with yellow flowers and the ones that are distributed only in the South East, you only want the contact information for the chemicals. You don't want all the information and you only want operation biological or only harvesters.

Well, this allows you to pick exactly what information you want, customize it and then it filters out the information you want, puts in a report form where you can save it or print for future use. And as many of you know, more and more electronic devices are being created.

A system has been created for use with PDAs. The problem is that these are not being used as much anymore. These devices are created using a variety of operating systems. iPhones, Android and others. And to try and program for each operating system would be costly and very time consuming, so it is our hopes that our next step would be to program a mobile internet version.

This will allow any mobile devices to run the system regardless of the operating system they are running and this would expand the access to the systems to many more people. And I know I went through rather quickly, so if you have any questions, I will be happy to answer them or go through some more details. Some parts of the system.

Courtney Chambers: Sherry, LDP had a question and maybe your last slide was the answer, but what's the current handheld version that you can request?

Sherry Whitaker: The only handheld version we have is just for the IPAC PDAs.

Courtney Chambers: Okay.

Sherry Whitaker: And it is available on the CD and on the website as a download.

Courtney Chambers: Okay thanks. Does anyone else have any questions for Sherry or would like her to show them more about the system.

Sherry, you must have been very thorough. We'll let everybody think for another few minutes.

Sherry Whitaker: I will go back to the slide that has the website on it where you can go to the, can you all see that. It was a hyperlink and I think it turned purple on me. That way you can get the website where the system's located.

And if you have any questions, please feel free to email me or call me and I will be happy to answer.

Courtney Chambers: Alright, if there is no other questions, Sherry, thank you very much for sharing that system. It looks like a very valuable tool. And with that, I would like to thank everyone else for participating today and I hope you can join us for our next web meeting which is going to be the 26th of July and again that will be on MAWI, which is the multi-scale assessment of watershed integrity by Dan Smith from the environmental lab here.