Moderator: Courtney Chambers
October 25, 2011
12:30 am CT

Courtney Chambers: Okay, I believe we're going to go ahead and get started. Hello, my name is 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 Everglades' adaptive management by Andy LoSchiavo. This series of Web meetings on ecosystem restoration topics by ERDC and Ecosystem Restoration Planning Center of Expertise is designed to address a variety of topics, including training, lessons learned, research and development and emerging issues.

The Web meetings are recorded and our archived files are posted on the environmental gateway under the learning tab. So please do reference those in the future if need be.

All right, and now to -- I'll give you today's speaker on Everglades' adaptive management. Andy LoSchiavo is a biologist at the Jacksonville district in the restoration coordination and verification of system wide analysis branch.

His current work is focusing on implementing comprehensive Everglades restoration plan adapted management program which he's going to be sharing with us today -- a little bit about today.

All right, Andy, without further ado, please share your presentation.

Andy LoSchiavo: All right. Thank you, Courtney.

Courtney Chambers: You're welcome.

Andy LoSchiavo: Appreciate it. So I'm guessing I have control.

Courtney Chambers: Yes. I just made you the presenter and I've got your presentation up here or if you would like you could do the share desktop feature.

Andy LoSchiavo: Let's go to -- I don’t see a presentation coming up just yet. Maybe we'll opt for the share desktop presentation.

Courtney Chambers: Is that what you were going -- was that what you were going to do was the share desktop, Andy?

Andy LoSchiavo: No, I'm -- we aren't seeing the presentation up yet.

Courtney Chambers: Oh, I'm sorry.

Andy LoSchiavo: That's okay.

Courtney Chambers: I may have changed it too soon, given you the role too soon.

Andy LoSchiavo: There we go.

Courtney Chambers: Okay, now let me give you the presenter rights back. Here you go.

Andy LoSchiavo: Okay. Thank you, Courtney.

Courtney Chambers: You are welcome.

Andy LoSchiavo: Appreciate it again. Thanks for those attending on the phone. I just want to welcome you again. We're hoping to share this information on how the

Everglades is implementing adaptive management and hopes that other districts would gain from this and other divisions and headquarters as well.

Go on to the next slide here; I'm going to go over an overview of Everglades to help you understand what the problems are in Everglades, what we're trying to address as well as the need for adaptive management to help address the many questions we have with implementing that program.

I'll go over that -- the adaptive management program for the Everglades both at the program level and project level aspects as well as go through a detailed project level example.

Just to give some background here -- hopefully people can see my little mouse cursor here. This is a map of the South Florida Everglades ecosystem and here we're seeing the Kissimee River head waters.

The water flows south in the system into Lake Okeechobee which under the current system is connected to (unintelligible), (Clewiston) (unintelligible), (St. Lucy) as well as there's a series of canals that are connected to the lake that are really effective as part of the central and southern Florida project to drain the system in that area.

There are levies that protect from seepage and flooding along this eastern urban core here. West Palm Beach is right up here. You've got Ft. Lauderdale here and Miami over here. And Everglades currently consists of these water conservation areas right here.

Everglades National Park is down south, Florida Bay as well as Big Cyprus National Preserve and this can be a national park. They're all part of the same system.

This area is about 18,000 square miles and the current population today is about 6.5 million. This project currently provides flood control for that population as well as some drainage aspects for agriculture.

The project was really effective when it was implemented back in the (unintelligible) through the 60s but it had several unintended consequences.

Right now, during the wet season or during hurricanes, it gets too much water and it can't handle it. Water gets shifted from the lake to the (unintelligible) and in dry season there is not enough water and we see fires in the Everglades and water supply issues. We'll see salt water intrusion even into the water supply.

There has also been a 50% reduction in the extent of the Everglades system. It's been developed for urban and agricultural uses.

We've seen a massive reduction waiting for populations. Some estimate we're about 10% of historic populations of waiting (curves). We have degraded water quality in this system coming from agricultural and urban sources and ultimately we're seeing cat tails form in the Everglades and monotypic (stains) that we would not normally have seen in historic conditions as well as (unintelligible) in (unintelligible) Bay.

There has also been an invasion of numerous exotic species and it is also home to approximately 68 federally listed threatened and endangered species.

An example of some of these problems here are the tree island losses that we've seen over the past 70 years. And this map depicts the tree islands which are a component of the Everglades landscape.

And those areas that are red right here represent where we've seen them lost over this timeframe. Green is where we haven't seen any changes and they still remain but -- and generally you can see in this area we've had too much water. It's been ponding up along these levees. And in this area we've had a lot of drainage and fire that's impacted the tree islands.

Man: Hey, Andy, we're not able to -- at least I'm not able to see your cursor. So you might have to describe a little bit more.

Andy LoSchiavo: Okay, I will do that. Thanks for letting me know. So ultimately, in order to address these problems, a comprehensive Everglades restoration plan was pulled together.

So ultimately the goal is, if you look over on the left, there is the predrainage Everglades. The water used to flow through the Kissimmee Valley into Lake Okeechobee and would overflow and (peak) flow through historical Everglades.

With the current system, the middle picture, the flow has been cut off. The Everglades National Park, for example, gets only remnant flows. A lot of the water doesn't come through the system as it used to.

With the plan, we hope to restore these connections between the Everglades areas and restore (peak) flow as well as minimize damaging flows of excess water to the (unintelligible) while maintaining existing flood control purposes.

The plan consists of 68 project components that will be implemented over 35 years. They involve surface water storage reservoirs to capture that excess

water during the wet season and help retain it so that it can be delivered in the dry season to improve conditions in that period.

There's (also storage) and recovery projects that are basically deep wells that also store water and (that) store water treatment areas that are key to filtering out excess nutrients from agriculture and urban areas.

There's seepage management projects that as we get water moving through this area and remove some of the barriers to the flow such as levees and canals we're able to control any excess seepage that might occur.

In addition some urban areas are looking at waste water reuse in order to improve environmental health as well as some of the existing water supply. And there will be operational changes to basically reconfigure the system to not only provide the existing flood protection and water supplies but also provide water for the environment in the Everglades.

Now with this plan, it was understood early on in the development that there was a lot of things that, from the science, that we knew about the problem and a lot of ideas about how to address this.

However, there were many questions we didn't know. With ecosystem restoration projects it's not just about being the water (right), which in traditional Florida projects, you're looking at loss of physics, measure with mass and there's a lot known about how water moves.

In this case, you're not only looking for how the water moves but how ecosystem will respond, how the habitat and birds will respond. As you go up that additional level of complexity, you get more uncertainty and hence, the

adaptive management, what's called for in this plan, and use of those principles.

It was ultimately authorized by Congress in 2000 as part of the Water Resources Development Act as well as an adaptive management monitoring program.

Congress, they recognized that we're going to be using new information to update implementation of this plan and improve the performance of this plan as we're moving forward.

In addition, it calls for outlining an adaptive management program as part of regulations that was done in 2003.

Now, to describe the Everglades adaptive management program, just in a general sense and up close, we're talking about integrating science into programs and project planning and implementation.

We're doing this by helping support this project in system wide planning with developing models and predictive tools to understand what benefits we're going to get from these projects, what the restoration target should be for Everglades as well as interim goals that help measure incremental projects and basically provide us a way to check our status as we're moving along with this plan implementing.

In addition, monitoring assessment is a key component of that management, not only monitoring what's going on in the current state but what's happening as you implement projects and looking for reporting ecosystem restoration success and also performance issues.

Another component of this overall program is it's a peer review process and in this case, the National Research Council review Everglades restoration progress and they've endorsed the overall Everglades adaptive management approach.

And the key thing for all other districts and programs out there that are implementing adaptive management, it's very important to identify a team that has general responsibility for implementing adaptive management.

And in the case of the Everglades, a lot of that responsibility lies with RCVT, the Restoration Coordination Verification Team.

Now, talking about integrating science and planning, one of the examples that we use is conceptual ecological models. In summary, they basically explain how a system works.

This graphic isn't showing up very well probably on this slide but in general, we're looking at drivers, water management as a driver of the system that affects different stressors that end up shaping the system.

And in this case, what I've highlighted here is volume, timing and (unintelligible) of regional hydro patterns. Those in turn, affect some of the processes that go on in the system such as ground water and dynamic water storage or sheet flow, in this case, those middle diamonds.

And as you go down to the bottom, you can see some of the -- what are called ecosystem attributes that then respond to these ecosystem processes and affects such as seeing changes in the landscape and vegetation patterns to be restored.

It's useful in helping understand the problem that project plans are formulated to address but also in identifying what performance metrics you might want to consider in evaluating the project benefits and monitoring project implementation success.

Evaluation tools are very important, understanding what historic Everglades was. This graphic here, I'm just going to speaking -- will be speaking from -- this graphic here is basically a hydro period looking at depths across the year.

As you can see, here's an estimate based on hydrologic model of what historic Everglades look like. And this is based on a lot of data and modeling to understand the historic Everglades.

In addition, we develop targets based on information to understand what it could -- should be in existing and with the current extent of the natural areas. In addition, some of these targets are interim goals that measure incremental progress.

We use these performance measures and models to evaluate project plan benefits to recommend a best plan. And so down at the bottom here you can see what the current conditions are estimated for the hydro period in this one part system.

The red here shows the future without project, indicates that there's some other projects that are being implemented. They're helping improve getting some lift and it's basically the first of 10 projects being implemented with Everglades to ensure that there's a greater lift of water moving into the wet season and into the dry season to get closer to this historic Everglades target.

Now, as far as implementing the project that we planned and designed, we don't implement them all at once, we implement them in incremental fashion because we only have a certain amount of budget.

But also, there is some pilot projects that we implement early on to learn from as well as you need to have some in the storage and seepage control in place before you start bringing a lot of additional water in the system.

And as we implement these projects incrementally, we're monitoring the (testing) status of the system describing what it is today. And that monitoring assessment program that we have is based on a set of hypotheses, basically what do we expect from the projects as they're implemented?

In some cases, we have tolls that can predict the hydrolyses, what we think will happen and it indicates when you're talking about (waiting) birds or alligator species we don't have tools and we have to use best professional judgment to best identify what we're expecting in response.

We then monitor what's going on when the projects are implemented and then afterwards to identify are we getting the restoration success that we hoped for? Are there issues that we're seeing that need to be addressed? In addition, this new information that we get from monitoring can be used to basically inform what adjustments we need to make to plan the different projects for operations to improve implementation.

Right here is just an example of some graphics from the systems status report, very simple, basically giving the status of different indicators in the system. Red is basically indicating that they're doing poorly. Yellow means that they're all right but they're not at the target they should be. And green meaning that they're heading towards that target that's desired for that species.

So in summarizing why do we use adaptive management, I mentioned there's a lot of uncertainty with ecosystem restoration projects. If you're just heading down a path of implementing a plan and not considering that uncertainty, most likely you would not get to your end restoration goal.

So in implementing adaptive management principles, the goal is to reduce the risk of not meeting the system restoration goals and actually increase your chances of getting it right.

The overall process in this collaborative learning of shared understanding amongst stakeholders as well as optimally formalizing activities done in good planning and project management.

Optimally, in generating new information, it'll help use the improved current projects program implementation so that optimally you're putting forward the best projects and spending your resources wisely to best achieve your goals and objectives.

Now, I mentioned what the authority is for Everglades. But just to give some background. For Corps wide in 2007 the adaptive management principles for authorized for the Missouri River, the Louisiana Coastal area and upper Mississippi programs.

In addition, headquarters released some guidance in 2009 interpreting more of 2007 that basically required development of document management plans for ecosystem restoration projects.

In addition, Corps civil works programs that have mitigation plans where there's uncertainty with those, you're also supposed to include a monitoring and adaptive management plan.

Now, as far as national technical guidance, the National Research Council released some guidance that generally described that adaptive management could be a tool to be used in Corps water resources project planning.

The Department of Interior has released a national technical guide as well. There's some good things that you can look at in that guide. However, it's very much from their mission standpoint.

In addition, this yearly council of environment quality is working on guidance for looking at adaptive management benchmarks for (climate) teams. At this point, we don't have a national technical guide yet for implementing adaptive management Corps process and so I recommend and encourage folks to take a look at the different products we've developed on adaptive management, implementing it.

There are some things that will apply and other things that won't. But in general, we have monitoring assessment plans, originally developed in 2004, that is available for folks to reference and use.

We have an overall adaptive management strategy done in 2006. In 2010, we developed a technical guide that basically explained how do we do this in the existing Corps project planning and project life cycle and which resulted in some formal guidance memorandums and integrating those nine adaptive management activities in a project and program management.

In addition, we have some examples of project level adaptive management plans, which we can share with other districts, so that's something to follow up with me on if you have questions or want to see some examples.

Now, going into this technical guide, the nine adaptive management activities basically occur throughout the project lifecycle process. Some folks often when I talk with them about adaptive management, they say, yes, that's something you implement after the project has been built.

And we have taken a look at implementing adaptive management. It's very important to incorporate some activities up front in the planning process. One, consistent with collaborative planning, engage stakeholders and collaborate with agencies.

It shares information considering you have more information about what you know as well as builds trust with those who are going to help support your program in moving forward.

In addition, you can't implement adaptive management if you don't have clear program or project goals and objectives, number one step in the planning process.

In addition, you might have new information that comes from the process to update those tools and objectives, which we'll talk about in one of the examples.

Now, early on in this planning process, probably when you're identifying inventory and forecasting conditions, identifying what you know about the system and what the problem is, you also need to understand what you don't know.

What are the key uncertainties that might affect you from implementing this project? Prioritize what that list is and evolve strategies to address them during planning, design, construction or operations. This is, again, intended to help you be successful in implementing this project.

We use conceptual models to understand the system, help us develop what we expect to see, our hypotheses and performance measures, how we're going to not only evaluate the project success, predicting it but then measure actual restoration performance.

In the end, depending on that level of uncertainty, you're going to integrate certain principles into your plan and design. There's a lot of uncertainty and you're able to justify it. You may consider a more robust design that's capable of performing over a variety of future conditions.

You may also want to consider incorporating some flexibility in your project to allow you to be able to adjust. Again, you want to get this in your decision document up front so that you have these options as part of your adaptive management plan or your implementation process so that when Congress authorizes them, they're doing it and you don't have to go back in the end and seek an additional authorization.

The next step, of course, after you implement this project is monitoring (post) base line and then post construction monitoring. You need to implement that as well as assess your results and synthesize it so that you have the information available to feed back into the decision making process.

I'll go through these in more detail with the project level example. Ultimately, providing information on what issues need to be addressed, potentially what the options are for decisions.

Now transitioning from program level approach, there are many project level documents and examples in the Everglades. A lot of them went through the planning process, have achieved support are being implemented at this point before a lot of this guidance came out.

And so they may not have an adaptive management plan but that doesn't mean they're not principles of adaptive management incorporated.

We have pilot projects. We may have contingency options as part of an adaptive management plan or we may look at updating the sequencing of these project increments.

But as far as examples I talked about today, we'll go through decompartmentalization of water conservation (area three). Excuse me. This is zoomed in here -- as well as (Z111, the spreader canal) and (picyune strand), just different case examples.

Now, the (Z111 spreader canal) project, if you can see in the southern part of the system, you can see the (Z111 spreader canal). It operates for flood control purposes or water supply purposes.

It has an affect of lowering the ground water table and sucking water from Everglades national park. And the goal of this project, which includes the pond right in this area, which is right next to Everglade National Park.

Yes, it's right next to -- you'll see the pond listed right next to the arrows pointing eastward. And this project is an attempt to (alleviate) some of those issues.

One of the key aspects of this project is that key stakeholders were involved early on in the project and their values were incorporated to understand what issues need to be addressed.

Our local sponsor was able to lead some workshops, engage some of our non-governmental stakeholder and more one-on-one discussion.

In addition, we have an interagency support through the project delivery team and so that there's equal exchange of information across our partner agencies so that we can implement this project in an informed way.

One of the things that came out from that exchange was that the goals and objectives for this project were actually updated. Rather than focusing on the eastern part of the project, looking at fully the spreader canal at this point, it was recommended that you take care of this issue going on with operating (Z111 spreader canal that affects the western side of this project and ultimately (Taylor Slough), which is that blue area that you can see where water flows through in Everglades National Park.

Again, we used conceptual ecological model in this case. I'll give an example here of water management change that we're making to improve the regime, one of the stressors in this area to help improve sea grass communities as well as other performance measures, ultimately resulting in a more healthy sea grass community.

Now, some of the questions that came up as part of this project were how effective will this project design, the pond be controlling seepage? And will that ultimately increase the hydro periods in (Taylor Slough)?

In addition to operating that project, are we going to run into issues with violating flood control constraints or running into endangered species issues where too much water is going into critical habitat there?

As well as ultimately the second part of this project would be looking at the spreader canal. What can we do to inform the best design for spreader canals in (Z111)? Though the other uncertainties are bigger ones that are more problematic, looking at how much water quantity and timing is needed to restore project periods in (Taylor Slough) as well as will those hydro periods result in anticipated changes?

So these were a priority in certainly thinking about in this project. There are certain strategies developed to address those questions that we'll talk about in a moment and after we, you know, got management concurrent on how to address those questions.

Now, some of the hypotheses, which are basically -- we're stating that what we expect from this project. We expect that we won't increase agricultural flooding risk and that we will reduce (Z111) canals influenced on (Taylor Slough).

In addition, we expect to see a vegetation community shift in the upper fresh water parts of the slough towards more natural marsh species as well as downstream, in the near shore, we expect to see some changes to help the condition for key indicators such as sea grass, crocodiles and fish.

Now, just to give you an illustration of this project, again, on the left side of -- is the (Taylor Slough) in Everglades National Park, the pond and the canal as illustrated there and the (Z111) canal.

And as stages arrayed in (Z111) canal, we're able to pump water in to this pond and canal. Ultimately that water infiltrates to ground creating a hydraulic bridge, which will keep water in (Taylor Slough). It will reduce, basically, the flow of water from operation (Z111) canals.

From that, we're going to measure success by looking at our expectations that when we operate this canal we aren't going to see those dramatic changes in the (Taylor Slough) stages.

In addition, we expect once we achieve that we'll see some improvement in hydro periods in (Taylor Slough). The goal is getting them to be up for 30% longer

From that, we should see a vegetation change and as well as 10 to 20 parks per thousand range. This result will increase SAV that 'were looking for as well as the area in the Bay.

Now, what are some of the strategies that were incorporated into this project? Some are related to operational tests, or basically, developed arrays with stages incrementally and basically look at how well are we doing with the restoration goals as well as avoiding our project constraints related to flood control.

In addition, there has been a design test that's been implemented for the (Frederick) canal and ultimately these two efforts, implementing the first project implementation report, which is a feasibility study for folks that don't

know what that term is, and the design test will help inform the second phase of this project.

Now, this project, because of adaptive management plan, wasn't required at the time it was being implemented, There was an effort her to conceptualize what we're talking about and linking our performance measures, a stress for metrics on the left and their targets to what we expect when we're monitoring with this management option or contingency options as the headquarters guidance talks about it for this project.

For example, if you're not achieving the goal you're looking for based on the proof from maintaining stages in (Taylor Slough), if you aren't able to do that, you need to look at tweaks to operations for the (Z111) spreader now.

You may implement those and still not achieve the result and realize that there may be some greater system wide rejoints. There may be a need for more water, something to do with (Taylor Slough) in general or there may be a need for system wide operations.

Again, this is where an Everglades program, the program level aspect interacts with the project level.

Monitoring, ultimately these plans are developed to confirm, reuse policies, what we expect as project -- verified project success. What are we seeing from these indicators? Does it relate back to what we expect for benefits for this project?

In addition, there's also a need that we've been able to do in the Everglades with coordinating monitoring efforts with the grand system wide monitoring

that we're implementing, in addition with the monitoring that's being done by other agencies.

The project was able to use a lot of the monitoring for this effort.

Now, it's important for those project managers out there thinking about monitoring assessments post construction process and during the baseline process, you need to budget for the resources for not only implementing contracts but also managing and housing that data.

If you don't have the data easily accessible, it's going to be harder to synthesize it and report it to folks and understand whether you've reached success. That's an important part.

And in this case, here's an example based on the 2009 system status report issued for the Bay area. You can see a lot of red and yellows in this area that the project is going to be implemented in the current 2011 from then on.

Now, as far as decision making, it's very important to not just produce a report and hand it over to managers or folks who would be able to use information but actually synthesize it and have discussions with managers, program and project managers about what are the issues, what are the potential options to address these changes.

Now, the nature of the report and the timing of the report will depend on a few things. What's the timing of when these restoration (leaders) should respond? Some are going to respond really quickly, maybe next to operation. Others may take a longer time since it's vegetation issues.

So you need to manage expectations from what you expect from the performance of these projects. In addition, the spatial scale of the restoration performance issues, is it a small issue related to this project? Can we improve it by implementing that project? Or is it a greater regional need and would require a more system-wide look at solving that problem?

In addition, once the timing is correct on this performance issue, are we seeing a negative trend that's going to be hard to reverse and we need to focus a lot of resources to implement changes to address it quickly? Or is it something that we have time to do some better analysis to figure out what is the right solution?

In addition, you have to consider the type of management action. Continuing existing operations document, that's something that easier to make a change with. If it's part of your adaptive management plan that was approved by Congress, that's something that would take a bunch of time to make adjustments for to coordinate up the vertical team.

If it's something that's not included in your adaptive management plan, then that's something that's likely going to take a longer time to address that type of action.

It's important to understand what is your decision making process. This is an example of the Everglades I won't go over too much but basically understanding what your stakeholder feedback forms are and what your management forms are to bring new information about restoration success or performance issues.

In addition, when you consult with agencies and tribes and when are your public review process here and ultimately decision being brought up the vertical chain both within the Corps as well as your local sponsors' agencies.

Now, just to give a graphic again of the interaction of program and project level, we're going to see operational changes in the system in this right along the top of this graphic as well as additional (non-served) projects to modify water deliveries and the implementation of the (Z111) spreader canal project.

And this is why it's important to have monitoring not only at the project scale but at a system wide scale if you're trying to identify the effects of the project versus other things that might be going on in the system.

This example shows where the monitoring is located across the Everglades National Park and (Porta) Bay, the latest that would be useful for this project. And as you can see, as an interagency effort, although the coordinator in Jacksonville plays a huge role in implementing this monitoring.

Now, I'm going to go through one project. It's an example of a project with high uncertainty using fiscal model to inform planning and design.

The full name of this project is Decompartmentalizing Water Conservation Area 3. And what you saw back in the graphics earlier, there's been a series of canals and levees that basically split up the conservation area.

This is -- the goal of this project is improved (sheet) flow, hydro patterns in conservation Area 3 as well as Everglades National Park as well as restoring the (rich and) slough communities that are unique to the Everglades and one of the defining characteristics of the Everglades.

We hope to increase habitat function, improve channel condition and restore those tree islands that we saw in the previous graphic that we were losing. In addition, we hope to restore some of the peat soils that we've lost from fires and rebuild some of the (private green) in the system.

So the key questions that came up with this project are relating to what is the best design to achieve these goals? We know we have to do something with the affect of the canals and levees but do you need to back build them completely or just partially to get the ecological and hydrologic response that you desire?

In addition, what are the quantifiable ecological benefits of (sheet) flow in ecosystem connectivity? This is important to help with the planning and design of the future project basis for this project.

What's the risk of not implementing an adaptive approach with Decomp? Well, one of the things is that you might not implement the best design and key restoration goals. You may implement something that's either too little, that doesn't achieve what you're looking to achieve in the system or you may implement too much.

In addition, not having this information would potentially put a challenge on standing on your decisions and defending them in court because we know that certain stakeholders use these canals and would like to see them kept in place.

Now, just to give you context of where this physical model appears, it's right located in these canals and levees here where you can see the green. That's the local of the physical model.

And the goal is looking at (sheet) flow by removing a levee in this area and backfilling the canals using different treatments. We have two control sites on the left and right and one treatment is looking at completely backfilling that canal. The other treatment in yellow is partial backfill. And then we have no backfill in the blue treatment.

Again, this is to help determine the best design. We'll be using that information to also update models and to help evaluate benefits of future project implementation reports.

We're going to be looking at marsh stages and flow velocity. The hypothesis is when you achieve a velocity of three centimeters per second to actually start shaping the landscape to get water moving through.

Transporting sediment, what are the changes that we're going to see in the vegetation in dissolved oxygen as well as are we seeing the desired fish species and (crane) species respond based on the water moving into this area?

Now, (Picyune Strand) is an example of a restoration project with lower scientific uncertainty. I'm trying to move on to the next slides here. It's slowing down a little bit, Courtney.

Courtney Chambers: All right, let me see if -- maybe if you select the quick down arrow, that one that has the slide number in it, you can click that slide you want from there. Maybe that would work quicker. Do you see what I'm talking about?

Andy LoSchiavo: Yes. We're trying it. Well, just to give you some background about the (Pickalion Strand) project -- hopefully this is just taking a moment to show this slide -- it's basically in an area adjacent to Everglades National Park and, again, similar situation.

There's canals in this area that are draining the landscape and have changed -- altered the hydrology. This has affected the vegetation that's there moving from a (Cyprus) forest to more of a drier forest species, such as pine forest and different hammocks that were being more conducive to a drier area.

There's not a whole lot of uncertainty with this project with respect to -- we know that if you plug the canals we'll be able to restore the hydrology in this part of the system.

In addition, there's not a whole lot of flexibility in this project to implement changes to operations or project designs as we move forward. However, the key question that is out there, we could restore hydrology and not achieve the restoration goals that we were looking at because we have a lot of these forested communities that have moved in, that their vegetation will be remaining and they would basically prevent any of the new vegetation that we're looking to see respond -- grow in that area.

And so -- let's see. I'm not seeing the rest of these slides. But one of the things that they're looking to do in coordinating with the partners is looking at vegetation removal, removal of nuisance and invasive species so that when we get the hydrology moving into this area, which we're seeing, we'll start getting the vegetative response that we're looking for as well as when they manage the fire with (Picyune Strand) park, the fire regime will be able to get a more natural fire pattern to also manage some of the order vegetation that we want to get removed from the project so that we can get the (Cyprus) forest responding over time.

Courtney Chambers: Andy, what slide would you like to be on now? I think I can control it.

Andy LoSchiavo: Okay. Go to 46.

Courtney Chambers: Okay.

Andy LoSchiavo: Is anyone else seeing 46?

Courtney Chambers: Is that uncertainty and risk?

Andy LoSchiavo: Yes.

Courtney Chambers: You don't see that slide?

Andy LoSchiavo: No. For some reason we're not seeing it here in Jacksonville, at least.

Man: We see it here in Seattle.

Andy LoSchiavo: That's great, can you move through to the last slide?

Courtney Chambers: Yes. All right, the next one was a vegetation management and map and then was that the last one?

Andy LoSchiavo: Yes, that is the last one.

Courtney Chambers: Okay. All right.

Andy LoSchiavo: And you can see on the left slide -- I'm also opening a presentation on my desktop here for folks here in Jacksonville.

Courtney Chambers: Okay, thanks.

Andy LoSchiavo: This blue area that's part of the left graphic shows the Cyprus forest that was there in 1940. We implemented this project. These canals right here in the right, you can still see, have then changed the landscape to get more pine, flat woods and more drier hammock forested species.

And the goal is through vegetation, fire management, we'll be able to restore the wetland species that we're looking for as well as achieve Cyprus forest over decades of implementing this project.

So ultimately there's still some uncertainty with this project and some options to address that as part of an adaptive management process.

So that concludes my presentation. Again, you can get a lot of this information on evergladesplan.org and I'll just type that out for folks who are on the call here. And I believe the presentation is going to be made available for folks, right, Courtney?

Courtney Chambers: That's correct. At the Gateway Learning Exchange we post the presentation as well as the recorded presentation so they can access those. Probably at the end of this week we'll have the recorded presentation. I think the PowerPoint is already posted there.

Andy LoSchiavo: Okay. Does anyone have any questions?

Courtney Chambers: Do remember to take your phone off of mute if you're going to ask a question so we can hear you. Thanks.

(Marvin Huffle): Good afternoon. This is (Marvin Huffle) from (Rock Island) and I was wondering if you could just say a few words about how you integrate project and program management with adaptive management.

Andy LoSchiavo: Well, part of that is looking at the effects of your project. There may be some questions specific to that project that you can address within the planning or design and develop some features to give you some flexibility to be able to adjust in the future.

The project effects that you're looking for, if you have a program level approach and some system-wide monitoring, your project may not need a whole lot of additional ecological monitoring. But if there are some gaps, you may want to consider that as part of your project and developing and monitoring plan.

In addition, the interaction with -- at the program level is your project is probably going to be one of several projects that you're looking at seeing a response from and the monitoring at a system-wide level helps capture the sum of those changes going on in the system from multiple projects or operational changes.

And that can also provide information to ultimately inform back what are your options? Do you have flexibility in that project plan that you developed or is it something that you're going to have to make changes to your more regional system-wide operations plan or are there changes that you're going to have to make to the overall arching programmatic plan that you have for all the projects that you're looking at?

(Marvin Huffle): As a follow-up, so do you end up selecting say a representative project to do an intensive adaptive management evaluation on and how is that budgeted? And then how are the results integrated back into the rest of the planning process?

Andy LoSchiavo: Okay, it really varies in different cases. In some cases when knew right up front using a certain technology such as (Storage and Recovery). It's something that's pretty new. We had a lot of uncertainty.

It was part of the plan that went up to Congress, this overarching plan and they authorized pilot studies for that. And so we went through the process of developing those pilots, implementing them, getting information on how effective they are and doing some more regional sensitivity modeling to see how well, based on information, we know we can use them.

We may not be able to use them as much as we had hoped for. Where is that mix? How much water and storage is it going to provide for the overall system?

Now, you might look at other projects and realize early on in planning that while the level of uncertainty here is maybe not as high as that, you may just need to include some changes into the project such as with (15 Big Coastal Wetlands).

They developed an adaptive management plan that had some close construction adjustments be made and that's what they're focusing on. However, in the case with Decomp, we knew very early on there's a lot of uncertainty with this project. It's a very complex project and it really -- I mean, there's competing views from stakeholders on what design would be best to achieve restoration.

And that really calls for a larger investment in a physical model test, again, coordinating up the chain. We had a -- what I would call a Lexus version plan for that physical model but coordinating with the stakeholders, our local sponsor and up the chain, we realized that we could only afford with an

overall budget probably more of the previous version of the physical model and that's what we're implementing and going forward with.

It's still going to be valuable. And basically working with, you know, your biologists and scientists out in the field, you can do power analysis to help identify given the -- what you're trying to do, you can have a certain amount of samples and what your confidence is going to be in getting information from it.

And that's part of what you coordinate with management saying how certain do you want to be with information you get from this project. And that -- if you want to be more certain, that's going to cost some more money. If you just want to have some information it proves that you're on the right track and it's more than just a hunch, then you may need less monitoring.

Did that answer some of your questions?

(Marvin Huffle): Yes, thank you.

Andy LoSchiavo: Any other questions out there?

(Matt Trader): from Jacksonville. The adaptive management plan, is that a separate approval process, kind of like a review plan? I'm just not familiar with it.

Andy LoSchiavo: Actually, the route we've taken is to integrate is as part of the PIR, integrating some new steps early on PIR, identifying the uncertainties but also as far as developing the plan.

In some cases, it gets incorporated into the monitoring plan. They're in the same document but it's a part of the overall project report that ultimately gets approved by congress.

(Matt Trader): The feasibility study. (It's) just part of the feasibility study.

Andy LoSchiavo: Exactly.

Courtney Chambers: Anybody else have a question for Andy?

Andy LoSchiavo: All right, it sounds like I'm successful in addressing everyone's questions.