

ERDC-EL

**Moderator: Courtney Chambers
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12:48 pm CT**

Courtney Chambers: Okay, at this time I'd like to give you today's speakers on ecosystem goods and services. First we have Janet Cushing, who is a biologist and environmental planner for the US Army Corps of Engineers at the Institute for Water Resources where she's been since 2009. Janet works on a number of issues, including managing the prospect course titled Planning for Ecosystem Restoration, investigating the implications of climate change effects on Corps programs, especially ecosystem restoration, writing planning documents on incorporating environmental justice analysis into the course planning process and ecosystem services.

Janet is a recent graduate of a national conservation leadership institute which focuses on leadership development in the context of natural resource management. Janet's prior experience includes time with the Corp's Jacksonville district in the Regulatory and the Planning divisions, where she gained field experience and worked on the Comprehensive Everglades Restoration Plan Projects. Following her Jacksonville work and prior to coming to IWR, Janet also worked at the USGS headquarters in Biological Resources, managing the fisheries program, research and acting as a travel liaison.

Our next speaker, Elizabeth Murray, has worked as a wetlands scientist for 20 years, specializing in wetlands assessment, ecological restoration and resource management. Elizabeth currently works as a research biologist in the Wetlands and Coastal Ecology branch of the Environmental Laboratory at the US Army Engineer Research and Development Center.

She has co-authored eight hydrogeomorphic functional assessment regional guidebooks for wetlands in various parts of the country, covering over 40 regional subclasses. She has also developed spreadsheet functional capacity index calculators and interactive data forms, as well as scientific illustrations for many others. She has performed wetlands functional assessment on large civil works projects. And although she is most involved in HGM assessment approaches, she has also researched, helped develop or reviewed several wetland assessment methods, including California Rapid Assessment, CRAM, landscape development intensity approaches and remote sensing techniques.

And then last but not least Dr. Denise Reed is the chief scientist for the Water Institute of the Gulf. She is nationally and internationally-recognized expert in coastal marsh sustainability and the role of human activities in modifying coastal systems. She has worked on coastal issues in the US and other parts of the world for over 30 years.

Dr. Reed has been extensively involved in coastal restoration planning in coastal Louisiana since the early 1990s, with a focus on bringing scientific knowledge to bear in developing sustainable solutions. Dr. Reed has also been engaged in ecosystem restoration research and planning in the California Bay Delta. She's served on numerous boards and panels concerning the effects of alteration - human alterations on coastal environments and the role of science in guiding ecosystem restoration, including a number of National Research Council committees. Dr. Reed is currently a member of the Chief of Engineers Environmental Advisory Board and the Ecosystem Sciences and Management Working Group of the NOAA science advisory board.

Additional information about these ladies can be found in their bios posted on the learning exchange, along with the rest of today's meeting documents, such

as the powerpoint and the recorded meeting. We're very happy to have the three of you with us today. Thank you for sharing with us. So at this time, Janet, I'm going to make you the presenter and we will listen - we will enter into listen-only mode.

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

Janet Cushing: Thank you, Courtney. Again, my name is Janet Cushing and I am with the Institute for Water Resources. And I want to give you all a hearty welcome to part two of our research into incorporating ecosystem goods and services into restoration planning. So what this particular webinar is mostly going to focus is on the policy review and analysis piece of this work unit.

But before we dive into that aspect I want to first give you an outline of what we're going to be talking about. And that is a brief overview of our ecosystem goods and services work unit to provide the context of this particular policy review and analysis piece. And then Elizabeth Murray will be providing you a review - a brief review of the principles and best practices webinar that was previously held, just so that everyone at today's webinar is on the same page. At that point, Elizabeth will be handing the presentation over to Dr. Denise Reed, who will go into the meat of the policy review and analysis paper, as well as some of the inter-agency coordination efforts that we've been involved with.

So first, the broad context of our work unit: this work unit is a joint effort between the Institute for Water Resources and the Engineer Research and Development Center. And so Elizabeth and I are the principle investigators on this. And as you can see from the slide we've got quite a mix of folks from IWR, from ERDC, as well as some academics like (Lisa Wanger) from the University of Maryland. We're very lucky to have Denise Reed with us today

and involved in this, as well as some folks from different districts, so we have that reality check. And this work unit is being overseen by Dr. Cofrancesco and Miss Renee Sherman.

So the way we're approaching the investigation into ecosystem goods and services is really through a six-pronged approach. And as you can see here, we've done the principles and best practices activity and we published two reports on that. We've also published a report on the policy review and analysis, and that's the focus of today's webinar.

But we've also are involved in looking at the types of ecosystem goods and services tools that are out there, and particularly those that might be helpful to folks in the field who are I think increasingly thinking of using ecosystem goods and services. So we have a web-based catalogue that is nearly complete and will eventually be on the Ecosystem gateway and we have a companion report that is currently undergoing review. Our inter-agency coordination, as you'll soon hear, is ongoing. And we're also preparing a report on case studies of those attempts in the Corps where folks have either directly or indirectly tried to consider ecosystem services.

And this is all leading to the preparation of a framework that folks could use to consider ecosystem goods and services at various steps along the planning process. And so our goals - our overall goal is to really provide ecosystem goods and services tools and methods that are really meant to advance the Corps capability to capture the full range of relevant benefits and losses resulting from Corps projects.

And at this point I am going to turn the presentation over to Elizabeth and she can give you that brief review.

Elizabeth Murray: Thank you. Can everybody hear - or can you hear me, Janet?

Courtney Chambers: Yes, we're hearing you, Elizabeth.

Janet Cushing: I can.

Elizabeth Murray: Okay, great. So again, my name's Elizabeth Murray. I'm with ERDC and I will be giving just a brief review of that first bullet from the last slide, the first products that came out of this work unit, which were - I kind of summarize it as the state of the science, what is going on in the ecosystem goods and services field and how can it be related to our Corps processes.

Two products came out of that effort, a tech note and a tech - supporting tech report. The report was a fairly lengthy fiduciary review and then the tech note was a shorter, more compact assessment of that information and tying it more directly to Corps - the Corps planning process and what we would need to do to operationalize that information. These reports were published mid-summer and since then have gotten a fair amount of positive acknowledgement, most notably probably Miss (Rachel Jacobson), who was the Acting Assistant Secretary of Proficient Wildlife and Parks.

And the US Department of Interior gave a preliminary session to the fifth (unintelligible) conference where she cited our reports as being able to act as foundational documents for how we in the Federal government should be looking at informational goods and services.

Now as stated previously there was a webinar on most of the findings of these reports and how some of those could be incorporated into a framework for the Corps that was done back in March. And I have the URL listed for that here but I'm sure that Courtney or Julie can forward that to everyone as well so if

you want some in-depth information on that you can go see that. But I'm just going to summarize a few key points here so that we're on the same page as we move forward with the policy stuff.

So the field of ecosystem goods and services can be considered a fairly new field, but actually its underpinnings come from much older and more - well, older fields of study. As early as maybe the 50s but definitely by the 70s both the fields of ecology and economics were coming to the conclusion that in order to really capture the benefits of the natural world to humans some combination of the concepts of ecology and economics were going to need to be combined in order to address that.

And they came to this conclusion, you know, somewhat independently, really. And so as a result, two independent new fields of study were born. Out of ecology came Ecological Economics, which were - had very robust ecological theory and perhaps less robust economic principles incorporated. And then from the field of economics came Environmental Economics, which had very robust economic theory but fairly simplistic views of ecology.

And so, as one does literature review of the literature underpinning - published underpinnings of ecosystem goods and services, there's really this sort of mix of papers out there that come from these two traditions that use terminology rather differently and sometimes exactly the same terms to mean actually quite different things. As part of the review of that technical report that we showed you the cover of earlier we reviewed something like 15 different definitions of ecosystem goods and services and the only two words that all of them shared were the word 'ecosystem' and the word 'human.'

So there's a wide range of what different papers define as ecosystem goods and services, ranging basically from "any ecological output at all" to "only

final services that have markets” and pretty much everything in between. Also, they can have different definitions to things like functions and system and things like that. So the point is that as we move forward in order to come up with a cohesive strategy for the Corps we really need to define our own terms, because there’s not a standard definition out there really for any of this. Although, you know, all of the definitions are similar in a lot of ways.

So in the tech report we proposed this working definition for Corps planning use, which is “Ecosystem goods and services are socially valued aspects or outputs of ecosystem which rely on self-regulating or managed ecosystem structures and processes.” The importance of having managed ecosystems involved is that a lot of definitions talk about natural ecosystems or pristine ecosystems.

And natural’s a vague term and certainly mature ecosystems can reach a self-regulating state, but many of our ecosystems now are managed. And they are managed maybe for a particular use, such as the Mississippi River is managed for navigation, but they provide services far in excess of just that one. But they are being managed for it, so we need to be able to capture that.

Also within the tech note, we provide a conceptual model for quantifying or addressing ecosystem goods and services. And this is really a flow of information from the very physical to the very economic, essentially. So we start out with the management activity: maybe we in the Corps do something on the landscape. We restore a wetland in a flood plain, or we plant some vegetation over a mountain stream or we restore some coastal marsh off the coast of one of our states.

And that activity results in an ecological outcome via a response function. So if you plant native vegetation that will lower the temperature of that stream by

a certain number of degrees. And that can be measured and that is an ecological outcome, not a service. Likewise, if we restore a mile of offshore habitat in a marsh, that could have the ecological outcome of decreasing wave height by about a foot. That's one of those numbers that's thrown out in the newspapers a lot.

Again, that's not a service. That is an ecological response, because in order to be considered a service, you have to consider some other things. Is that one foot of decrease of wave height in a range that's going to actually decrease flooding of a community? Is there something that is - needs to - it needs to interact with? So for instance, if we have a four-foot sea wall and we decrease our wave height from one foot to zero feet we haven't really provided a service.

That same one foot change in height from, say, five and a half feet to four and a half feet when there's a five-foot flood wall, you know, provides tremendous service. And likewise with the temperature decrease: if we're hitting now a threshold where fish populations can use that stream whereas they couldn't before we've hit a threshold that humans actually care about.

So that's where we really change something from an ecological outcome to an ecosystem goods and service. And you can stop there: you can stop at box three and you're really considering ecosystem goods and services that goes beyond just the strict biological or ecological concepts. To get to social benefits is where you actually then take that decrease in flooding or increase in fish populations and then tie it to a monetized value. And that is desirable in some cases but not in all. So that is not always the end-game there. Box three can be the end-game.

Moving on. So ecosystem goods and services can be divided in a number of different ways or classified in a number of different ways. This is one way that economists tend to divide them, into use and non-use values. And I'm not going to go into a lot of details here, but one reason that this is - can be very useful is that as we move from direct use, things that maybe have markets, to all the way to the right, where things are non-use and looking into the future, it gets increasingly difficult to value those. And so that's something we need to be aware of as we try to decide how we're going to be dealing with ecosystem goods and services.

Another thing to look at is whether or not you're looking at intermediate goods and services or final goods and services. As you move from left to right on this chart we move from things that are very much in the scientific realm, very easy to measure, through a sort of intuitive step to something that might have a market.

And there's two things to notice here. First of all it's important to know whether you're dealing with an intermediate or final goods and services, because if you mix them - and especially in an accounting kind of situation - you run the risk of double-counting your benefits, which is something that economists get really ornery about. But more so when you're dealing with the final good and service it's much more easy to communicate the value of that, even if you don't qualify it with dollars, to the public. It's usually tied to things that they can really understand.

Finally, we made a list of the types of ecological goods and service categories that our projects can impact. And I just want to emphasize here that the breadth of impacts or implements that our projects can have on the - a variety of services. So as we move forward and start trying to look at a more comprehensive list we're definitely - our projects are definitely influencing

those. And so as - if we can move in a direction to capture some of that we'll be in a better position to make good policy decisions.

And with that I am going to hand off to Denise Reed. I've just been going over some of the topics from this first bullet, but now we're moving on to the second bullet, which is the policy review and analysis report. Go ahead, Denise.

Dr. Denise Reed: Great. Thanks very much, Elizabeth. This is Denise Reed. And so I'm going to talk about this report, and I think one of the first things I want to say is really acknowledge the role of (Lynn Martin), who retired from IWR, who really pulled lot of the weight on pulling together the work in the report related to the Corps planning process and particularly the process for planning aquatic ecosystem restoration projects, which I'll talk about in a moment. I participated in this while I was a visiting scholar up there at IWR a year or so ago.

And so bottom line out front here what we set out to do was to look at how the Corps could ecosystems goods and services within their planning process and really what other agencies were doing that could provide ideas for the Corps. And when we looked at other agencies we were really looking at how they used ecosystems goods and services to make decisions about their projects on the ground.

And one of the things that we found was that with the exception of the NOAA program on damage assessment on damage remediation and restoration we actually found little - few places where ecosystems goods and services were explicitly used in decision-making by Federal agencies to make investments in projects. They're often used in descriptive - more about this later - but there

weren't very many cases where agencies were really doing this in a decision making - using this in a decision-making context.

Also, described in the report - we haven't spent a lot of time on this in the presentation here today and I would urge you to take a look at the report, which is available through the learning gateway and through the IWR website. We found many instances either where State agencies or governments outside the US were using ecosystem goods and services as a key way to make decisions. So the idea that there was progress on this - even if we weren't doing it yet within the Federal government - was quite promising.

And then the other thing that we noted was that in many of the other agencies compared to Corps of Engineers they actually were - even if they weren't using it in a real decision-making way they had much better - or clearer guidelines and policies relative to EGS. And so we'll look at some of that as we go along.

One of the kind of fundamental things to think about from the Corps perspective is - and frequently there's the idea within the Corps that we can't do this, we're not allowed to do this. And so one of the things that was done as part of this report was to go back and look at the enabling authorities if you like that guide the civil works program within the Corps.

And not really to look at - look for the term "ecosystem goods and services" - which, not surprisingly, one perhaps wouldn't find back in the 50s and 60s - but when you read these early documents listed here what you see is that the concept there is actually really imbedded in there. And there's a lot of places in these early documents from the 50s, 60s, (NEPA), other places, rivers and harbors, various orders, that really can be interpreted in current context as enabling the use of ecosystem goods and services.

So that's quite powerful looking backwards. More recently the Corps has reinvigorated its environmental operating principles. I was part of the team on the environmental advisory board who spent some time helping with this. And if you look at the environmental operating principles, I'm assuming they're very familiar to everybody in the Corps of Engineers who's on the phone.

But there are a number of areas in here where clearly the idea of ecosystem goods and services meshes very well with what we call the 'E-Ops,' these principles that are meant to really guide every action that goes on within the Corps.

And so what you see there is "to proactively consider environmental consequences" there right near the top. And further down, "to make sure that we understand the environmental context for Corps of Engineers actions." There are many places in here where the concept of ecosystem goods and services could clearly be the way that these principles get moved forward.

So in more detail in the report - and again, we're not going to have time on the webinar today to go into a lot of the detail - we spent some time - and again this is where I'd like to specifically acknowledge (Lynn Martin)'s role - really thinking about how various considerations that need to be thought about in the context of - AER incidentally, for those of you not in the Corps is Aquatic Ecosystem Restoration.

When planning an aquatic ecosystem restoration project, there are lots of things that have to be taken into consideration. And what we want to do was look at how those various kind of parts of the planning process influence how ecosystem goods and services can be used.

And so we identified some cost-effectiveness and incremental cost analyses at key parts of how projects are compared in terms of their effectiveness and costs and scale. And clearly, different metrics have to be put together in order to evaluate cost-effectiveness and incremental cost analysis. And ecosystem goods and services can provide a way of doing that.

Significance of ecosystem outputs - either institutional, public, or technical: those are the various categories that this is meant to be considered under - could also really be informed by ecosystem goods and services.

And then there's this idea of acceptability, completeness and effectiveness as these kind of basic criteria that Corps projects have to be checked against when they're in the planning phase. And so we found as we looked at these - and again for more detail in this I'd urge you to go and look at the report, because the details of this really are where the essence is - that these can in many instances be accommodated of using ecosystem goods and services and in other cases limiting. And so there are some particular nuances in the language which, you know, mean that you can go one way in some places and not in other areas.

Another part of the work that we did was to look at the use of ecosystem goods and services in other agencies. And as I mentioned just now this was really just on the use of ecosystem goods and services concepts in decision-making for restoration or land management or something like that. And the - within the presentation here today it focuses mostly on the other Federal agencies that we looked at, but as I said earlier look at the report and there are some good examples from UK and from several states from within the US where there are some more detailed examples.

So third thing to look at - and I think that Janet alluded to this - excuse me, Elizabeth alluded to this just now - is what about the definitions? Well, they are all different as you see them here. The Corps one that Elizabeth outlined earlier at the top there. And even though the words might be slightly different and perhaps the only common terms amongst these are 'ecosystem and 'human' or something like that, I think there is a general commonality in approach here.

There certainly doesn't seem to be too much of a conflict in how they are - how the definitions are used within each agency, if not, you know, perhaps a little bit more general in some areas and a little bit more specific in other areas. But the concept is pretty common across the agencies.

And then the other thing to look at for those agencies relative to how they use that concept is what they use them for. And clearly here our focus was the Corps of Engineers and aquatic ecosystem restoration is only one of the mission areas for the Corps of Engineers. Clearly, there are a number of others in here and we'll come back later to how we think that ecosystem goods and services might be a useful concept in different kinds of planning processes within the Corps.

But those are different kinds of decisions being made within the Corps, as you might find within EPA on the regulator side or on many of the other agencies that are dealing with resource or land management issues. And so to some extent the way in which the concept is used is clearly going to vary according to the different types of missions that the agencies are seeking to fulfill.

So what that means, then, is that we have these different ways in which EGS is used. And so within the Corps the idea that ecosystem goods and services could be used in the planning process, could be used in assessing value to the

nation, this idea of how worthwhile the program is as well as in natural resource management and to some extent in mitigation. Across the other agencies there are different uses.

And you see these briefly summarized here: I'm not going to talk through each of them in any detail. I did mention earlier that the damage assessment restoration planning within NOAA does use - is probably the closest that we could find that came to really using an ecosystem goods and services general decision making about something that was going to occur on the ground.

There are a number of other instances that are summarized here, where for instance within the Department of Defense at the bottom there the idea of integrated - that the ecosystem goods and services are an integral part of the integrated natural resource management plans that need to be developed for DoD lands.

There are a number of examples - increasing, perhaps - of payments to ecosystem goods and services, and the development in environmental markets, the Chesapeake Bay work was - we looked into that in some cases, a couple of other examples of payments for ecosystems goods and services starting to be moved out.

In general, I think that - and I'm not sure that this is reflected in the slides, but my own thought about this as we put the work together was what I found was that many agencies were really starting to get this into their guidelines and their approaches and that it was only in the last couple of years that new initiatives started to say, "Well, we want to use ecosystem goods and services to do this." And it was only just starting to be moved out.

And so to some extent there wasn't much of a record of using ecosystem goods and services in making decisions. But there were a number of instances - forest management plans, for instance - where there was a new regulational guideline that said "In future this will be the way that we will go. We will use ecosystem goods and services."

And so I would expect that doing the same kinds of assessments that we did a couple of years ago reflected in this report now or a couple of years down the line would actually see some of the intent that was expressed when we were doing the research actualized, if you like, and be able to see some examples of how it was used in decision making, more perhaps than we were able to find at the time.

So just some general examples, though, even if we didn't find too many places where ecosystem goods and services were being used to make decisions in the sense of being parallels to how the Corps of Engineers might use ecosystem goods and services to justify a restoration decision. Even if we couldn't find particular parallels there, we did see a number of different uses for ecosystem goods and services, which are summarized on these next few slides here.

And just some characterization as a general one: the idea of trying - of using ecosystem goods and services to describe fully, if you like, the type situational - the type of environment which is being all the different aspects that are being affected by various land management policies.

And so what we see here - Fish and Wildlife Service, National Park Service, Bureau of Land Management - obviously all with an interior but really showing - consistently showing that this is the way we want to think about how resource and how we want to characterize the resource that we have

responsibility for. And within Fish and Wildlife Service that I think was largely the refuge system, which is a parallel to Land Management.

I'm going to move along here, considering time, so that we have some time for questions at the end. EPA clearly has a risk assessment role and the concept of definition of ecological values being important in there. Several areas - and I've talked already about these, there are a couple of these here - where the national forest system and the natural resources program within DoD are using ecosystem goods and services to really inform the way in which the program is going to move forward.

There are several where there were ecosystem goods and services were used to inform specific actions. And again the damage assessment, remediation and restoration program, the habit equivalency analysis procedure that is being particularly - perhaps the most obvious case to me and others of you will have different experiences - in oil spills, for instance to identify and scale the mitigation and compensation for impact services during oil spills, for instance. That seems to be a good parallel example, and one which has actually been used on a number of occasions and has perhaps stood the test of time there.

A couple of other places where we saw it informing specific actions: the conservation reserve program and the Chesapeake Bay strategy that I noted earlier. We have a little bit of text in the report which I'd encourage you to look out about environmental markets there.

And clearly again when we were looking at this a couple of years ago putting this together then the work on environmental markets - I'm sure I know from going to the Aces conference and others - is advancing very rapidly and so something that we could stay on top of, to see how it goes.

But going back to the Corps, though, trying to see how we could put all this together, I think one of the things that (Lynn) and I were very aware of when we started to thinking about how we could really make this information that we'd gleaned useful to the Corps. It all felt like too much: when we were talking to people about it, saying "Ecosystem goods and services, that means we're going to have to do everything. We're going to have to look at every single aspect of our study. And it's just going to mean that the planning process costs more money and takes more time."

And if many of you on the phone are with the Corps and so you'll be aware that that is the complete antithesis of the current planning modernization. And so we do in the report describe how we think ecosystem goods and services can really be quite helpful in the planning process, in the sense of - and the diagram on the left here is familiar to those of you in the Corps, I'm sure, the planners, anyway - the idea of this six-step process that goes through a series of steps. The idea early on in a planning study you want to think very broadly. You want to think broadly about problems and opportunities and think about what the future holds.

At that point one can use the ecosystem goods and services to think broadly that are going on within the problem set, the different kinds of aspects of the ecosystem that might be important to different people. But as you go through the various subsequent stages where you look at alternative plans, you evaluate them and you gradually narrow down to one, then as you narrow down the thinking that you have about the particular solutions or alternatives that will help alleviate the problem that's identified at the beginning, then we can narrow down the types - the list of ecosystem goods and services that would need to be looked at.

However, by thinking broadly at the beginning, especially when thinking about the interests of other agencies, it does enable any particular planning process to really expand partnering opportunities at that early stage. So at the very early stages you might be thinking about all the different things that the project could effect and realizing that the Corps is really only going to be able to look at a few of them.

But by thinking broadly at the beginning one then might be able to identify areas for partnering with other agencies or other parties that might be interested in some of those ecosystem goods and services that the Corps simply doesn't have the resources or the mission area to get their arms around.

And so to some extent this is captured a little bit on this table here. And there's more text on this in the report, where this identifies where there are different components of ecosystem services listed on the - different ecosystem services listed on the left here. And basically the checkmarks under the agencies identify where they may have common interests.

The Fs and the As in the first column under 'Corps of Engineers' identify whether or not this is - for those of you on the Corps planning side, whether or not this is something that could be used in plan formulation or if - whether it was something that was just accounted for, for instance, in - under (NEPA).

But you can see here that if you thought broadly at the beginning of the project about all the different things - even if the Corps team that was doing the planning could only pick up a few and run with them - at the end of the process one might be able to think about other agencies that would be interested in picking up some of those elements and moving them along in parallel, such that at the end of the process we get a more holistic process to

the problem that we set out with and we don't just narrow it down too early to the things that the Corps can carry forward.

We also exert inter-agency coordination: that's a key part of the work unit that Janet described. And Janet is on the phone as you know and can go into more on this but certainly the Corps is very engaged on these three elements of inter-agency coordination that are noted here. Under the NESP - the National Ecosystem Services Partnership - this is a broad-based group of individuals that come together. There's a working group, developing an ecosystem services guidebook for Federal agencies that's planned for release at the end of 2014.

Under the Subcommittee on Ecological Systems, basically that's picking up a couple of pieces from the (picost) report on sustaining environmental capital. One of them is going to address a kind of status and trends report of natural capital in the US. And there's also going to be some work going on there on eco-informatics, open resources and accessibility.

And then on the third one here, the National Floodplains Functions Alliance, this white paper was part of the - part of a work shop that the Association of State Floodplain Manager's conference that was held in Connecticut, I believe, in 2015.

So there's a lot of coalition going on there. And as I said earlier, this is a very rapidly moving area. And so I think there's a lot going on there that we want to stay in touch with and that the Corps is really try to stay on top of and be engaged in these discussions as they move along.

So just briefly a few slides here in summary: I'm running out of time, here. As we put all this information together, (Lynn) and I sat down and really kind of

think about how this information could be used. And we thought about it in two ways: the left side here talks about how ecosystem goods and services could be used in project level and place-based decisions, very specific kinds of things. And you'll see here planning studies.

One of the great things about using EGS in a planning study is you really try to fully capture the benefits and other effects, if you can do that, and can better see the trade-offs between one potential benefit and another potential benefit if you're looking more broadly at the array of outcomes that might come from a project. Water ship planning studies, obviously, and resource conservation and stewardship, the kinds of things we talked about earlier.

Importantly, though, I think there's also a potential use at the program level. This was mentioned on a previous slide, the idea of value to the nation down there, the idea of thinking about how important the program is to the nation in terms of if we can get to the monetization, the last step of the process that Elizabeth described, that would clearly be helpful there.

But even if we can't get there the concept of ecosystem goods and services could certainly help the Corps and its budget process as it thinks about how it determines the significance of the resources that any individual project is going to address. A number of other things are mentioned here on the slide and described in more detail in the report.

So, just a couple of slides here in summary for the findings of the whole thing, you know, should the Corps formulate for the restoration of ecosystem goods and services? Well, that seemed to be a pretty fundamental question as we went into this. It's possible. It requires a little bit of specificity of the services, and it requires a little bit of work there, within the - to make sure that we're consistent with policy guidance that's existing, but it's not out of the question.

Is the Corps authorized to do that? And we found that there were many instances where the usage of EGS information was entirely consistent with project authority.

And foreign policy however there is a little bit between one authority and another. Can the Corps of Engineers consider ecosystem goods and service in its aquatic ecosystem restoration planning or planning for other purposes? And in general we found that the use of some ecosystem goods and services information is consistent with current policy and guidance. However, there are some nuances in that and again there are a lot of “Devil in the details” that I think are outlined in the main report.

How is this different? How does this allow us to move forward in a different way? In some areas ecosystem goods and services information maps directly onto existing practice. In other places we might need new planning tools, and actually given that there is so much work going on in other agencies and within our partners, collaboration may well be the way forward there. And as Elizabeth described another element of this work unit is really looking at the tools that are available.

Is there a need to change or clarify Corps authority plans and guidance to include ecosystem goods and services? Well, for some services possibly, but for others perhaps not. And so - but what that means is that there are opportunities to move forward and to really try to test this concept and move it out.

How can it benefit the Corps? We could do a better job of communicating project effects. And it can really help demonstrate and justify where we should be working with others to achieve certain kinds of outcomes, where there are particular - water quality, for instance benefits are the type of project

that is not something that the Corps can go into in any detail. But this is something could help us point towards a collaboration which otherwise we might be missing, as I said earlier, if we don't think broadly enough at the beginning of a project.

Value to the nation. This is clearly trying to identify how the Civil Works program is of value to the nation. It's something that's quite important to many at the moment. And the idea of accounting more completely for the effects and outcomes of a project, I think is really going to be helpful to enable us to compete across an array of authorities.

Ecosystem restoration can probably more - and Janet provided a few examples earlier - than just provide habitat for fish and wildlife. And the more that we can account and describe those in relation to our projects, the better the - we will understand the effects of our project and also the better others will understand the effects of our projects and their potential benefits.

So Janet, with that quick whirlwind tour of the report, I think we're handing it back to you for summing up here.

Janet Cushing: Yes, thank you, Denise. And so I'm not going to go into too much detail here about the potential benefits. You've heard much of the potential benefits from Denise. And for this wrap-up I - although this is really meant to focus on Corps employees and how these - the consideration of ecosystem goods and services has a variety of potential benefits for the Corps, I want to actually put those benefits out there a little more broadly really for all the other agencies, that there are quite a few benefits possible.

One, as Denise said, that the consideration of ecosystem goods and services might allow for truly a higher possible return on investment. It could be on

such things as where we might site a particular project or the types of designs that we might develop to reach our purpose for the particular project, also in the partnering efforts. And it could also improve communication of the social benefits. Not only for ecosystem restoration projects and for natural resource management but for other types of projects where we take a holistic look at how we try to meet the goals of that project.

And, you know, we've already heard from folks who are working on Everglades restoration and also on looking at water management on the Missouri River that there are an increasing number of stakeholders and partners who are asking about ecosystem services.

And finally, you know, in addition to the army prioritizing its projects, other Federal agencies I think would also benefit from considering ecosystem goods and services. And I notice that there are some of the audience on this webinar who are from other agencies, and I certainly welcome those individuals to provide their own agency insights or updates on what is happening in their neck of the woods for ecosystem goods and services.

One thing I found, just in the preparation and finalization of this policy report is that as Denise alluded to this is a fast-moving initiative and it seems as though other agencies are moving quickly along in considering ecosystem services. And since this report was published, for instance, I - you know, we had heard that BLM I think is - was about to put out a certain type of policy on ecosystem services. FEMA also came out with something on ecosystem services.

And so with that I'm just going to end and open it up for questions. Or I guess Courtney will open it up for questions. Thank you.

Operator: All participants are now in interactive talk mode.

Courtney Chambers: Great, thank you very much. I appreciate just the wonderful presentation, ladies. At this time please do feel free to pipe up and ask your question over the phone line after taking your phone off of mute. Or you can utilize the chat feature again in the lower right-hand corner and please send that message to everyone, thanks. I'm also going to send a link to all participants. This is where the archived files for the web meetings are hosted, and you'll see today's recorded meetings for future reference posted within the next - within the week. However the presentation and bios are already listed there.

(Kelly Keef): I have a question.

Courtney Chambers: Okay.

(Kelly Keef): This is (Kelly Keef), in Jacksonville. Good afternoon, everybody. I'm trying to form the question in my head here as I'm speaking. That's why there was a long pause before I spoke up. I'm in a situation now where we've done an ecosystem goods and services evaluation of a restoration project. It wasn't used in the formulation, so we did the formulation by the traditional methods and we based our formulation decisions on cost effectiveness with habitat units.

But we also did ecosystem goods and services evaluation to show with our tentatively-suggested plan what is it that you're getting in terms of ecosystem goods and services. And one of the things that you can see from our results is that if we had formulated for the ecosystem goods and services we may have chosen a different plan.

So when we based our formulation on habitat units - and those habitat units were based on the features and functions of the habitat that we're trying to restore - based on that we chose one plan that accentuates and maximizes those features and functions that have been deemed to be most important.

But if we had instead - if we had used ecosystem goods and services we may have formulated towards something very different. We might have formulated towards water supply or other things that have high values. And so I'm left scratching my head. And I guess my question is is this an oddball case or have you seen this come up before or would you expect this to come up if the Army Corps takes up ecosystem goods and services as a way of formulating? And what do you do?

If we were formulating and really considering ecosystem goods and services during formulation, what would you do if you got in a situation where the goods and services may take you one direction but the habitat improvement could take you in a different direction for choosing a TSP?

Courtney Chambers: Thank you for your question. Ladies, how would you all like to parse that answer out between the three of you?

Dr. Denise Reed: Well, I think that's - I've obviously done well for the course, so perhaps it's easier for me to comment on it, (Kelly). The - that's a very interesting example. I think that that is perhaps - depending on how one would combine various ecosystem goods and services to do a formulation, then I think that's potentially an inevitable result.

However, one thing I would ask you in the context of the observation I made earlier about planning modernization: do you think you would have been able to formulate on the ecosystem goods and services across the available

alternatives? Would you have been able to tractably develop all of that information for an array of alternatives in order to do the comparison, as opposed to doing it around the single - the TSP?

(Kelly Keef): That's a good question. It would have been very challenging to do that, because as you probably know calculating different ecosystem goods and services values is pretty labor intensive.

Dr. Denise Reed: Yes.

(Kelly Keef): And so to do that for a set of alternatives would have multiplied the work, you know, by the number of alternatives. I think that would have been difficult. But there's nothing easy about using habitat units either, as you know. I don't know. I think that I can imagine a future where we are using ecosystem goods and services but I just think that I've stumbled upon something that we need to think about in - when we're making recommendations about how to include the considerations.

And you're right. The difficulty of calculating ecosystem goods and services for an array of alternatives would have been one more challenge if we had used this in formulation.

((Crosstalk))

Elizabeth Murray: Go ahead, Janet. Go first.

Janet Cushing: Yes, I just wanted to chime in here. So I think one I'm not surprised that you might have come up with a different alternative for recommendation and looking at ecosystem goods and services. And in a way that might part of the

point is if you look at a more holistic set of services for any particular project you might end up going with a different alternative.

That said, you know, since all of our projects are authorized and usually they're authorized for specific - a specific purpose or in some cases multiple purposes and so let's just say it's a single-purpose project. You know, a project delivery team would still have to focus its goals, objectives and formulations around that specified purpose. And so I don't think, you know, that particular purpose would be thrown out in lieu of looking at an array of ecosystem goods and services.

I think in the cases of multipurpose projects, looking at ecosystem goods and services, you know, could definitely help in better decision-making. And, you know, tell me if I'm wrong, (Kelly), but I think that the team that looked at the ecosystem services for the tentatively-selected plans looked at a fairly small group of service that were relatively easy to monetize or at least quantify.

And so it might be that if a different approach was taken in looking at ecosystem services to look at a fuller array you might still have come up with recommending a different alternative than you did in this particular exercise.

(Kelly Keef): Yes, I'm not sure if there's any correction in order, other than just to keep in mind that the ones that we did monetize, we - the ones we monetized versus didn't monetize were those where there was existing data, rather than us having to go out and conduct primary studies or surveys in order to get the data to do a benefit transfer or to otherwise monetize ecosystem services.

So, you know, I don't know. I think in any kind of Corps planning you probably wouldn't be sending people out to do studies or surveys of users to

figure out what their value is of a certain service. I think that would generally take too long, which is the reason why we didn't do it ourselves.

So I'm just commenting that. It wasn't that the ones that we monetized were particularly easy. It was more that they were the ones for which there were models and data available, and I think most people would probably find themselves under those same constraints in other projects.

Elizabeth Murray: Right, so this is Elizabeth chiming in and following up on what Janet said. Essentially, the - if you only look at your report, which was looking at services that could be monetized and actually specifically not looking at the service that you had formulated on - because you had already addressed that in the regular planning documentations - I can how you would be swayed. But I think that if these are going to be incorporated in a more systematic way that we're going to have to not limit ourselves to the services that are the most monetizable.

And if you'll recall one of my slides where, you know, there's certain types of services that by their nature, even though it's hard, even though sometimes there's not data, they're by their nature more possible to monetize than others. And so I think that one of the things that the Corp's going to have to grapple with as we move forward on this and as our reports coming out of this work unit go out to headquarters and get commented on is how to do multi-criterion analysis.

Because we're not going to be able to monetize everything, so we're not going to have a single unit that we can use to get everything under and end up with one number. Just like we don't do that with, you know, anything. So we're still - this is not going to solve the problem of having to make decisions based

on multi-criteria. And so I think you still might have ended up with a different alternative but it might not have been as different.

(Kelly Keef): Okay, that makes sense. That's a really good summary, and it's reassuring to hear you talk about continuing to think in terms of multi-criteria. Because just like you said on your graph - on your slide, there's a range of more difficult to monetize to relatively easy to monetize and I was getting worried that somehow the Corps or others would gravitate - maybe without even realizing it gravitate towards the ones that could be monetized. And so I'm more comfortable thinking of it as a multi-criteria decision matrix that we would move forward with.

Elizabeth Murray: I think that regardless of how we move forward with those that can be monetized we'll still - there will still be some for which we just can't reliably monetize them and we'll need to go do some kind of small criterion analysis. I shouldn't quote that, because we're still in the process of working things out, but that seems to be the direction that things are going.

(Kelly Keef): Well thank you very much. I didn't mean to monopolize the discussion.

Courtney Chambers: Well, thank you providing an example (Kelly) and that was a great discussion. We are over our time right now, so I would recommend that if you have a question that you contact Janet and Elizabeth or Denise with follow-up questions and I'm sure they'd be happy to accommodate. And again please reference this meeting as needing in the future from the website on the gateway there.

And I do have one more request: if you are from an agency other than the Corps - which we have a number of guests, it looks like - would you please

send me a message that identifies the agency or organization that you're with today? Thank you for that, I'd appreciate it.

And ladies, thank you for much, Janet, Elizabeth and Denise, for sharing with us today. It's been a very information-rich presentation and we're grateful for your time. And participants we do want to thank you for joining us to make this a successful web meeting. Please watch for upcoming email announcements for future meetings from the ecosystem gateway. And then if we're not together again before the end of the year I hope you all have a wonderful Thanksgiving and Christmas holiday.

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