

This presentation is going to be a brief overview of the ECOS/IPaC Decision Support System.

The Endangered Species Act (Act) protects both individuals as well as the habitats that they depend on. The very purpose of the Act is to conserve the ecosystems upon which the species depend. A very important aspect of the Endangered Species Act to accomplish this is the Section 7 Program, or interagency cooperation. This is the portion of the Act that involves Federal agencies evaluating the potential impacts of their projects. Section 7A(1) of the Act is, essentially, the planning portion of the Act. The Act instructs federal agencies to develop programs to further the purposes of the Act. Section 7A(2) requires agencies to consult with the Service on any activity that may affect of listed species. This is actually the consultation portion of the Act. Now, the problem that we've had over the years is the Section 7 process has been a black box to many action agencies. They go away, they develop a project in isolation, they put it all together, they submitted to the Fish and Wildlife Service (Service, and then they wait for result not knowing what can happen. Unfortunately, this process doesn't work very well. The Section 7 process works much better when it's a collaborative process and there's a good working relationship between the action agency and the Service. This is important because we evaluate more than 70,000 Federal actions a year through the Section 7 process. However, we've been informed that over the next five years we should anticipate this number moving from 70,000 to somewhere in the neighborhood of 370,000. For this reason the Service has decided that we have to figure out a way of changing how we do business. We've worked with project proponents and we've identified four major desires they have.

1. First is the desire to have early access to listed species information. They need this information so that they can incorporate into the planning processes. They go through and get local permits. They have to get financing. Well, they really need our information in order to incorporate that information into the financing and into the early permits. They don't want to have to get her there local permits, find out that they can have an impact on listed species that requires a project change, and have to come back and go through those earlier permitting processes again.
2. They want meaningful conservation measures. Project proponents have told us they are willing to do a lot for species conservation but they want to know that what they're doing will have an effect that will help to lead to long-term solutions. They don't want to just be doing conservation measures because some biologist told them that is was a neat thing to do.
3. They would also like transparency. They want to know not only what they have to do, but why they need to do it; what benefit is it going to actually result in.
4. They want to get out of this project by project basis and move into the landscape level approach so they can look at what's happening to the landscape as a whole.

The IPaC system, or Information Planning and Conservation decision support system, is the portion of ECOS (Environmental Conservation Online System) that's being developed to address these issues. It has four main goals. One is to streamline environmental reviews. Also, to encourage landscape level planning and conservation and then to coordinate the Service's different programs. We have a lot of different habitat restoration programs and conservation programs. However, they are rarely coordinated towards common goals and priorities. Finally, there are a lot of external restoration and conservation programs as well. We hope that by developing different portions of the system we can help to guide those programs as well.

So, I'm going to show you quickly the system as it exists today. So, we'll launch that. This is the homepage for the ECOS/IPaC system. If you click on the "Initial Project Scoping", it'll bring up a map of the United States and you can zoom in on this map. I'm going to zoom in on the panhandle of Florida because we've developed some functionality that is specific to the oil spill response effort for the Deepwater Horizon oil spill response. You can change your base map so you can look at what's actually on the ground. You can identify a project site. You can close off the polygon and then you can decide "You know, I think I messed up my project site. I need to move it up a little bit." and adjust it and so on. Drop-down to "Continue" and click and the system will bring you to a page where you can identify what you're going to do. So, there's a whole series of project types, I'm going to pick one related to Deepwater Horizon oil spill response which bring up some response-specific activities. You can click as many of these as you want and hit "Continue on" and the system will search through and develop a list of species that could be impacted. This is the Service's endangered species list process, where the project proponent would normally develop a paper map, write up what they're going to do on this project, send it into the local office, and wait thirty days for response. Then if they wanted to try a different area, or change some other aspect of the project, they would do that process again. Now this can be done instantly on the web. If you were to click on some of these links, [for example,] you could bring up information on critical habitat that's in the area and it goes to critical habitat mapper and shows you what critical habitat is in the area. You can back that off. You can look at the different locations of critical habitat. You can click on one of these links, the species information links, and you can get some basic life history information about the species, federal register notices, recovery plans, and so on. If you continue down, if there had been a National Wildlife Refuge, it would show up on this list. We are now in the process of including information for migratory birds and delineated wetlands from the NWI (National Wetlands Inventory) information as well.

You continue on and the system has looked at what actions you are proposing, what species are in the area, and provides design recommendations that we worked to develop. You can take these, incorporate

them into your project design, and hopefully start to address any potential impacts of your action right up front.

So, we're getting to the point where we will have different pieces of information in the system that you can access that can be downloaded by the project proponent that can be incorporated into their NEPA (National Environmental Policy Act) documentation and other environmental review documents. So, it'll have some basic life history information that's appropriate to go into the the documentation and so on. That way, the information that the service decides is particularly important for people to evaluate and be aware of can be developed one time and project proponents can simply use that instead having to develop it themselves. The conservation measures are put into an attachment which can be put in a work order to specific work crews, they are divided by activities so that the roadbuilding crew will get the conservation measures or design recommendations that are specific to road building and so on.

I want to show you real quickly what the system is based on. When we evaluate a species for listing we evaluate five factors, or potential threats. So, for example, habitat loss is a threat to species. Habitat loss has different sources that it comes from. For example, timber harvest can be a source of habitat loss. But when you implement a timber harvest, there is actually a whole series of activities that go on. You build roads, remove trees, cross streams, and so on. Each one these activities has an environmental stressor or series of environmental stressors associated with them. We then go through a process of doing an exposure analysis to figure out which individuals may be exposed to those stressors and then how those exposed individuals will respond. At that point, we look and say "Okay, if the individuals are displaced what effect will that have? Here we have reproductive failure, or they failed to reproduce." Then we look and say "Okay, if that individual will fail to reproduce what does that mean to the population as a whole?" And, finally, "How does that feedback to the threat?" And we then evaluate that against recovery actions for the species. Well, through this process we develop conservation measures. The purpose of conservation measures or design recommendations are to either keep an environment assessor from being produced or keep individuals from being exposed to that environmental stressor or, if that's not possible, then to figure how to mitigate for the impacts of that exposure. When you go through this process, what you end up with is this "Effects Pathway."

So here, following through, you have your project type, activity, or component, that makes up what we call the "PAC chain," that's what you're proposing to do and each PAC chain results in some series of environmental stressors. Then there is an exposure path analysis, where you determine how that stressor can impact what we term the "ultimate resource." That ultimate resource is a resource used by a specific lifestage of the species to complete a conservation need for example breeding, feeding, sheltering, and so one. Then, if the exposure does occur, how the organism responds, what that means in terms of an

effect, and what that means to the population as a whole. Well, when you go through this process, what you have is each of these activities, for example, producing a series of stressors and each activity will have a whole series of stressors and each one of these actually will result in an effects pathway on its own. So, in the end, what we're really doing is developing a library of effects pathways. This library can be used over and over again and by other biologists who are pulling together information for other projects as well. We'll come back to this in a minute and now we use this, but this brings us to the project and document builder portion of the system which is going to be based on expert system. This portion of the system is not in existence right now but is being developed at this moment. What will happen is a project proponent will come in and click on this "Project Builder" link and it'll take him through a series of screens that are based on "Turbo-tax" style where, basically, one line one piece of information, one screen one piece of information, trying keep it simple; don't overwhelm the user, just one thing at a time. They'll go through and identify what different activities they'll implement. We'll develop this with as many drop-down lists as possible to try and standardize everything. And, we'll house all this information in "information packets" instead of template documents. This is really important because, by housing each of these pieces of information as an information packet, we can then combine them in different templates and produce a whole series of different documents, biological assessments, we can actually draft up the associated biological opinions, NEPA documents, permit applications, And, it also allows us to integrate with other agency systems. For example, Federal Highways is developing an online ESA web tool, which is essentially an online biological assessment template with guidance on how to fill it out. This is an interface their engineers and their staff are very comfortable using to develop these documents. And so, they'll go through this, they'll provide information, and by integrating the ECOS/IPaC system with that system, we can actually have their system feed us information about what they're proposing and how the proposing to do it. Then, the ECOS/IPaC system can develop the information that's pertinent to our trust resources and then feed it back into their [Federal Highway's] template document in the right places. That way we can actually be linked and be sharing information and helping each other. The user, during the planning phase, will also be able to look at different data layers on the landscape so here we see is designated critical habitat and, in this way, they'll be able to actually avoid different areas. The local field offices will be able to identify what data layers they would like to see. If, for example the local TNC (The Nature Conservancy) has identified areas of high biological diversity, then the user could decide "You know, I think I want do it out here in Eastern Sierra County as opposed to Western Sierra County where I'm would have greater issues." They will be able to look at vulnerability assessments. So, the Service can go through, identify where the species is particularly vulnerable, the user will be able to zoom down and say "I'm in a spot that's going to have a lot of environmental problem, if I come here. Maybe I should move over to a green [low-impact] area."

Then, there is the expert system aspect of the system. Well, if you remember, there is the effects pathway and then we have the conservation measures which are designed to try and come in and break the linkages of the effects pathways. If you can break the linkage completely, you might be able to eliminate that effects pathway; get rid of the affects altogether. However, you might be able to just reduce that affect. The biologists will go through and figure out to what extent. We'll talk about that in just a moment. Well, when we go through and develop conservation measures, we do this with the portion of the community that is actually going to have to implement these measures because we want to develop conservation measures that are usable, things that aren't outrageously expensive for people to do, will get the conservation result were aiming for, and are technologically feasible to do. So, I'm going to show you a series of shots from our region three expert system which is used to address impacts the bald eagles. We participated in the development of this as a concept to try to figure out how we wanted to proceed. What you have here is the system as a series of questions

“Are you proposing to build a one or two story building or three-story building?”

“In this case, we want a three-story building.”

“Okay, will it be visible from the nest?”

“Well yes. It will be visible from the nest.”

“In this case, is it going to be within six hundred and sixty feet of the nest?”

“Yes. It will be.”

After answering these questions, the system identifies two conservation measures they recommend and then, in this situation, it actually allows them to come up with the determination. The ability to make the determination will be dependent on the field office, how comfortable the field office is, and the level of information about the species, and whether or not it's possible to do that. By going through this process, what you basically have is, every time the system asks a question that the user answers, it serves to filter out some of these effects pathways till you're left with some subset; these effects pathways that are left. Now, you have, essentially, an outline of the effects associated with each of the pathways. So, this is the chain of logic that goes along with that affects pathway. Now you essentially have an outline of the effects analysis. The biologist knows what they have to look at. They may not know whether or not this first effects pathway comes into play at an extreme level or very minor level, that's what they have to evaluate through here, but now they know what they need to look at and what they need to look for.

Also, as the user comes through and starts to design their project they will find links to other agencies. For example, the Army Corps' RIBITS (Regulatory In lieu fee and Bank Information Tracking System) system. RIBITS is the system that they use to manage their mitigation banks across the landscape. They've agreed to also house and manage the information for the Service's conservation banks. Basically they are the same thing as a mitigation bank but often don't involve habitat restoration but maybe involves protection of existing habitats. Well if the user as they are designing a project finds a conservation measure that says that they should look to protect a certain amount of habitat, the system could then query RIBITS and find out if there is actually a conservation bank that would be suitable for this. It would identify the location of that bank, what credits are available, what those credits can be used for, and how to contact the bank to secure credits.

So, this takes us through the design and delivery of conservation measures, but then it leads to the monitoring and reporting portion of the process. This is a portion of the process of the service often has not had the ability to implement well; we just don't have the staff. So now we're looking at the project proponent, once they do their project, being able to come back online and do the reporting associated with that project as well. The reporting module will be customized for each individual project. So, as they went through and developed the design of their project and identified what they're going to do, the system identified those important conservation measures for important conservation aspects of the project and turned those into reporting questions. The user will come back and do the reporting, so it will be self reporting, but it has to be quick and easy because, if it takes more than five or ten minutes, that is just too long for people to come back and spend reporting. It'll be based primarily on the conservation measures. "Did you actually do the conservation measures? If not, why?" because a lot of times when there are perfectly valid reasons for not implementing conservation measures, they got out there they discover that they didn't need to do those. And, "Were the conservation measures effective?" This is important because we can use this information to provide feedback for adaptive management. So, if we suddenly start getting a bunch reports that the conservation measures were not effective, then we might need to look at changing that. If we questions for example "Was it easy for you to implement that conservation measure? If not, how could it be made easier but still accomplish the same conservation result?" things like that, we would like to try and make modifications to the conservation measures that improve the ability to implement these measures. And, this is very important because the IPaQ system is not a static system. The information in it is changing constantly and it's important that changing information be incorporated into the consultation process in the end.

So, you can right now get a reporting checklist that's associated with conservation measures, you can identify "yes/ no." In the future you be able to download the reporting checklist until a handheld Trimble unit, so you could have a biological monitor out on site when the projects being implemented. You

could be answering these questions as you go. When you're done, there is no more reporting required. Then finally, we're looking at the system being linked to the 10(a)1(A) permitting process, the recovery permitting process, so when somebody out there needs to do a survey for listed species that may have an impact the species or they would like to do some research on the species, they apply to us for a recovery permit. They get that permit they go out there that do the research, they put together a paper report, they send that to the Service, who will typically put it in a file and that information often gets lost because we don't have the staff to synthesize other information and incorporate it into our decision-making processes. We lose track of that information. So, now what we're looking at is having people do the reporting for these permits online. That way the project proponent could come along, they could identify the project site, they could click on it and see a summary of research results for that area. If somebody is already surveying this area, there is no sense in surveying again, we'll know, because now all this information will be geographically based.

Finally, looking at the three main phases for system development, the first phase is almost done. Now, you can obtain a trust resource list or species list. Throughout the country, about the twenty five of our offices have currently activated, others are refining their information and should be coming online over time. You can obtain trust resource information for species and you can obtain design recommendations, where the design recommendations have been developed. That's only in a few places around the country and only for some limited number of activities. This is going to be a portion of the system that's developed over time as we get more staff and funding is made available to create these design recommendations. Right now the system provides unfiltered design recommendations. Within the next year we plan on releasing the programming that actually will filter these as we showed in the expert system aspect, so that you can start to get a narrowed down list of the conservation measure. It doesn't give you everything that applies to that species and that activity but you can start to tailor it specifically to how you plan on carrying out the action. The second phase is in development now. It's the project builder, document builder and reporting modules. All of these are anticipated to start coming on line towards the end of 2012. Then, finally, the third phase is geospatial decision-support system where there will actually be analyses of threats on the landscape so you can get a picture of your threats landscape out there and project planners can start to use this information in their project designs. Finally, we're looking at offering up the ability to integrate with state systems, county systems, local town systems, and so on. So if they would like, we'd be willing to present their resource information as well. If they have state sensitive species, or would like to incorporate zoning information, plat information, so that if somebody is looking at developing a conservation area they can get on the could see that perhaps the local jurisdiction has plotted that area for the center of their new town center. And, if that's the case then perhaps is not the best place to try and implement conservation action at this time things like that. So, that is basically an overview of the system. There is much more depth to it than was

presented here but this would be everybody started on the same page and we'll be putting together additional presentations to dig down deeper into different aspects over time. Thank you very much. Have a good day