

ArcGIS for Ocean Use Planning

Esri staff demonstrate the benefits of using ArcGIS for ocean use planning and present available resources.

<http://video.esri.com/watch/1100/arcgis-for-ocean-use-planning>

Video Transcription

00:01 I'm Jeff Donze with Esri's federal sciences team joined by my colleagues Dan Zimble and Bonnie Stayer.

00:07 And the ArcGIS for National Government is a collection of online resources...

00:13 ...organized through some various user communities that leverage our ArcGIS system.

00:19 These resources are geared towards any level of user who may be working in your agencies to support specific missions.

00:30 This morning, we have two of these communities we'll be introducing.

00:34 First, the ArcGIS for Ocean Use Planning that Dan and Bonnie and I will be presenting.

00:41 And then secondly, another group of colleagues will be presenting the ArcGIS for Aid Transparency...

00:47 ...and there'll be a short gap between the two.

00:49 So there'll be a little bit of time for questions for the first one for Bonnie, Dan, and I.

00:57 We recognize that GIS is not really your specific mission.

01:01 Rather, within your organizations, you manage facilities or you do health research or support coastal zone management...

01:11 ...or perhaps emergency response.

01:13 In support of these missions, you want to utilize GIS to help you tackle your problems.

01:23 And when you address these problems, you look at the solutions to sort of solve these problems on various projects you're working on.

01:30 And then, perhaps, look for where's the data that's going to support these particular problems you're trying to address.

01:37 And where's the, what perhaps are other examples of somebody working with similar data and analysis in the type of work that I'm doing?

01:49 That's what ArcGIS for National Government is intended to bring to you, these kinds of maps, configurable applications, and solutions.

02:04 A bit of a delay there between slides, sorry.

02:06 We'll deliver these solutions through our ArcGIS Resource Center.

02:12 Perhaps you've already looked at the resource center and seen these areas in the past...

02:17 ...where there's local government ones that we've had up for a while.

02:22 Now you'll see the new national government area that we're going to be introducing today.

02:29 So one of the first ones we'll drill into here is the ArcGIS for Ocean Use Planning.

02:34 Why is planning in our oceans important?

02:37 Because we increasingly have activities in our ocean that potentially conflict with each other.

02:43 For example, off-shore oil drilling or siting new renewable energy in the form of wind energy, sustaining our fisheries...

02:54 ...which is, of course, a critical food source, and maintaining our recreational pursuits as well as the age-old shipping and trade industry,...

03:06 ...which is very vital to our commerce.

03:09 All these activities potentially conflict with our sensitive marine habitats.

03:15 So we have to plan properly for the use of these various resources in our ocean space.

03:25 So how can ArcGIS for Ocean Use Planning help?

03:29 By providing you the resources that help you accelerate your experience.

03:34 So maps that are already configured for your particular disciplines or applications.

03:40 They're all ready to work with, rather than have to start from scratch.

03:45 So let me turn it over to Dan. Dan's going to give you a quick tour of the ArcGIS Resource Center for Ocean Use Planning.

03:53 Thanks, Jeff. Can everybody hear me okay?

03:57 So like Jeff mentioned, we've been working on a number of...you're good, okay.

04:03 So like Jeff mentioned, we've been working on a number of these communities, and you can see how we have a launching page...

04:09 ...to get into each of the communities that all of you choose to look into.

04:14 This is our starting page.

04:16 We'll have a number of featured stories.

04:18 Here you can cycle through the different stories that are relevant to that community...

04:23 ...and have articles about each one of those featured stories as well as quick links into areas

that are related...

04:29 ...the marine cadastre, examples of the [unintelligible] ocean data portal, things like other related sites...

04:36 ...and also have a gallery that's linked to some content that we've going to go through in a few minutes...

04:42 ...as well as other access to other blog posts, things that are relevant to those specific communities including videos.

04:49 So that's one example of the ArcGIS for Ocean Needs Planning community site.

04:56 What now I want to do is take you through a tour of some of the content.

05:00 And some of you may recognize the configuration of this site.

05:04 We're using ArcGIS Online for Organizations as a launching page for us internally...

05:10 ...to work with this new content that we're trying to create and provide user examples for.

05:16 And the main thing we're trying to do now is, you know, over the last several years, 10 years or so...

05:23 ...we've been pushing all this data online and making it more and more available.

05:27 And what we want to do now is evolve it to that next step where we want to make it not just more available but more usable.

05:33 And what do we mean by that?

05:35 So let's take a couple...let's take a look at a couple of examples.

05:38 We'll go into the conservation protection group that we have within our ocean use planning site.

05:43 And you see a number of different items here, thumbnails, descriptions.

05:48 I'm going to go through a couple of different things.

05:50 One, we have these web maps. These are these intelligent web maps. That's one type of content.

05:55 We have map services, that's another type of content as well as map packages.

06:00 So let's look at this map service of usSeaBed grain-size data.

06:06 Anyone familiar with the usSeaBed dataset?

06:09 It's pretty vast. It's over a hundred years' worth of data and extends quite a bit collection of samples that have been taken over time.

06:18 So here you can see in the description, and this is what I mean by more usable, the description is really well written and laid out.

06:26 It gives you human readable content. You know exactly what you're looking at.

06:33 But it also gives references to the much more richer, fuller, detailed information that's being hosted from the original site.

06:40 In this map service we want to portray what that looks like in the description.

06:45 So why don't you put the legend in the description.

06:47 So here, before you even look at the map, you can see what the map is telling you.

06:53 Also other information here, you could put in other graphics and things that help describe what that is before you access it.

07:01 So let's go ahead and look at this map service.

07:04 So this is a single map service of that particular dataset from the usSeaBed data.

07:10 Now note, it's grain size, and the seabed covers a wide variety of different attributes, and that's just one of them.

07:16 So we're telling that story here with this map of grain-size data, and we're also configuring pop-ups.

07:24 So pop-ups are another way of having us be able to interrogate the map that we're looking at...

07:30 ...and we all now expect that kind of behavior.

07:32 So I click on a point or a feature on the map, and I get a nice description of what I'm looking at for that feature.

07:38 So there are ways and best practices for you to help portray those products and services in that manner.

07:46 We're also enabling time on this dataset.

07:48 Like I mentioned, it's over a hundred years' worth of data, so time is relevant to what you may or may not be looking at.

07:54 So we can represent that entire amount of data through that type of capability.

08:00 Let's take a look at another example real quick.

08:02 So that was a map service which was a single data published with cartography...

08:07 ...and symbolized and you have the legends and you have the full description.

08:11 But oftentimes we still need to do some more analytics, so you want to be able to provide the data to then be accessed.

08:19 So here is a map package, but in that map package you can download it right into your desktop application.

08:25 Again, you have a full description of what's in there.

08:28 This is not the grain size. This is everything.

08:30 So we provide geodatabase along with a schema along with the legends and the layers and other information, you know...

08:39 ...portrayed in our best practices for how best to deliver that content.

08:45 And then, let's look at another example.

08:47 This is an example of an intelligent web map.

08:51 And what we mean by that is we're building in some of that logic, and this is a very simplistic case.

08:56 We're building in some of that logic for a mashup, a smart map that you can portray and share online.

09:02 So this is not just one map service. It's several map services that are related to each other to tell a story.

09:08 In this case, the story is US offshore protected habitats, and there are several different types of layers that can help portray that story...

09:16 ...and we've combined all those and represented those as a single map product that's also enabled for pop-ups and other those kinds of things.

09:26 So you can start immediately using this for that purpose.

09:30 So here you can see, the legend tells you the different types of layers that are in this map...

09:36 ...but it's portrayed as one story, one piece, one product and then as you click into the different features...

09:42 ...you get that nice format and information with descriptions, images, graphs, things like that...

09:49 ...that you want to enable others to have access to to that content.

09:53 So this is just a quick example through some of the different types of content that we're working on...

09:57 ...building out for the ocean use planning site, and with that, I'm going to turn it back over the Jeff.

10:03 Thanks, Dan, and hopefully you're getting an introduction to some of the intelligent maps and...

10:09 ...applications that we're starting to develop in these resources.

10:12 And sort of imagine that if you're also working in the marine conservation area...

10:17 ...being able to utilize some of those same map services for the work you're doing...

10:22 ...or perhaps one of the other areas we're going to drill into.

10:25 So right now, for the ArcGIS for Ocean Use Planning, we have a few groups that we organize within it

10:32 ...fisheries, Dan was just showing you conservation and protection, energy, shipping and trade...

10:38 ...and those are a few of the areas that we've considered that are important sectors in the ocean use environment.

10:46 But now imagine in this in...we're going to drill into one of the areas that we've spent a fair bit of time on...

10:51 ...particularly with contributions from our friends at the Bureau of Ocean Energy Management and NOAA...

10:59 ...a couple who I see sitting here, and they were very instrumental in helping teach us...

11:03 ...about some of the best practices in the process of siting wind energy.

11:08 So we're going to look at this particular area first.

11:12 And just as Dan was showing, the sediment layers that were used in conservation protection...

11:19 ...those could also be used in energy sector in siting offshore wind.

11:24 So what are some of the things that you want to consider in offshore wind?

11:27 Well you want to know what the depth is. The turbines can be located at only certain maximum depths.

11:33 Or, of course, you don't want to try to situate wind farms in the middle of active shipping lanes.

11:39 And, of course, wind speed. That's key, right?

11:42 So these are all important layers in maps.

11:45 So what if those maps were really already available to work with?

11:50 And that's the purpose of ArcGIS for National Government is to have those types of map services...

11:55 ...and map packages like Dan was just showing that you could work with.

11:59 Yesterday, the deputy of the Department of Interior mentioned, and I was really appreciative that he already introduced this.

12:07 We had this slide ready ourselves.

12:10 The Smart from the Start program...this is a new initiative from Department of Interior...

12:16 ...to really accelerate the leasing of offshore wind to energy companies that want to

participate and potentially develop this.

12:26 So the way that some of these offshore wind areas are being implemented is through regional task forces that are reviewing the allocation...

12:39 ...of wind energy areas that can developed for wind energy.

12:43 And the task forces are made up of the federal government, state agencies, and also, of course...

12:50 ...the public and some of the meetings they hold are allowed to sit in on and listen to some of the proposals from the wind energy companies...

13:00 ...that are the ones that are interested in developing the resource.

13:04 And so this sort of provides us an end-user community look at...

13:09 ...and next we're going to have Bonnie assume one of the roles of one of these folks in this community to show you an example...

13:16 ...of how you'd use ArcGIS for Ocean Use Planning for the energy sector.

13:21 Thanks, Jeff. Can everyone hear me okay in the back? Good? Right.

13:26 So as Jeff said, I'm going to assume one of the roles in this wind energy development process...

13:30 ...and that role's going to be that of an engineer that might work for an energy company...

13:34 ...and so I'm interested in looking for resources that will help me get started setting a new wind energy development project.

13:41 So I'm going to use the ocean use planning resource page, and I'm going to go into the energy group...

13:46 ...and I'm just going to search for content related to wind development.

13:50 I've got a list of results back, and as Dan walked through, there's, you know, different types of content here...

13:55 ...there's map services, there's packages, but I want something that's really ready to use right now.

14:00 So the first result that I see listed here is an intelligent map for the developable potential for offshore wind energy.

14:08 So that sounds like a good place for me to start.

14:11 So I'll read more about this resource and, again, we get a great description here.

14:16 This tells me where this data is coming from using wind velocities from the National Renewable Energy Laboratory...

14:22 ...as well as other datasets for marinecadastre.gov, and I can continue reading to find out how

this data was processed into this final product.

14:31 So specifically, I see the equation that was used to calculate the energy potential in each offshore lease block.

14:38 So this is really great because now I don't have to do all these calculations myself.

14:42 It's already built in for me into this final product.

14:44 So I'm going to go ahead and open this map in my viewer, and I see I have three main layers in my map.

14:54 I have marine jurisdictions, the outer continental shelf lease blocks or OCS blocks, and the developable potential layer.

15:01 So I'm just going to turn off the jurisdictions for clarity right now and zoom into my area of interest...

15:06 ...which we're looking around sort of New Jersey, Delaware, Maryland area.

15:10 So now I can see those individual OCS blocks.

15:14 And if I look at my legend, it tells me that these areas that are in darker green represent areas of higher energy potential.

15:22 So that's good to know in exploring this map.

15:25 If I go back to my content and expand my developable potential layer, I see there's actually three sublayers in here...

15:31 ...so I can drill into each of these individually to see what they mean.

15:34 The first one is the raw NREL wind velocity data.

15:38 So I can see what that data looks like at the start.

15:42 The next one is the developable areas where we subtracted out areas such as shipping lands, military practice areas, dumping grounds...

15:52 ...things like that that are considered sort of unusable.

15:55 And then finally the developable energy layer represents where those wind velocities were joined to the OCS blocks.

16:05 So now if I click on a block in my area of interest, I get a nice readable pop-up, again echoing what Dan said.

16:11 This tells me what the potential power out of this OCS block might be.

16:15 So for a standard turbine, I could get 53.93 megawatts of power.

16:20 And if I scroll down and continue reading, it also quotes a wattage for the largest turbine in production...

16:27 ...and in that case, I could 148.24 megawatts.

16:30 This is really useful information to help me get started.

16:33 So now I want to go back and see if there's any other resources to help me dive a little bit deeper and do...search and do my own analysis.

16:40 So I'm going to go back to my results list from my search, and if I keep reading through the different types of content...

16:46 ...I find one down here that's a web mapping application for doing site suitability for wind energy.

16:51 So I'm going to go ahead and open this application, and I will see my same OCS blocks and same shoreline information on my map...

17:02 ...but I can see instead that...instead of the previous map that was, you know, sort of precalculated for me...

17:09 ...I have more tools available in this application that allow me to dig a little bit deeper and create my own analysis.

17:17 There's our OCS block, and my tools along the top allow me to adjust criteria, such as the depth, the distance from shipping lanes...

17:27 ...excluding areas such as these DoD boundaries and dumping grounds and also adjusts what my wind speed is.

17:36 So then I can execute this query to return areas that meet my criteria.

17:41 So those areas are shown in red and I get a summary of my criteria over here on the right.

17:47 Furthermore, I can also choose to select one of these resulting areas and create a report that gives me even more detailed information...

17:55 ...such as the average depth, the sediment types present, and whether there's any intersection with protected areas.

18:04 So, again, you know, this gave me more flexibility to site-specific areas.

18:09 Now I might want to go back and start to build my own intelligent web map product.

18:13 I'm going to go back and see if the federal agencies that maintain these datasets have provided the individual map services...

18:21 ...for these layers so I can start to build my own products.

18:24 So I see one here as a map service for ocean depth thresholds for energy development.

18:30 So maybe I want to examine sort of the geophysical criteria that go into siting wind farms.

18:35 So depth is a very important consideration.

18:37 So I'm going to open this map service again in my map viewer, and if I look at my legend...

18:45 ...it shows me that the area with the crosshatching is places where it's shallow enough for wind energy development.

18:52 Then maybe I want to add in another service, so I want to add in from my energy group maybe that sediment layer that Dan was looking at.

19:00 So I'll search for sediment. Here's the usSeaBed Grain Size service, and I can start to build my own intelligent map product.

19:11 And then finally if I want to even, you know, go further with this, I can always go back to my resource page...

19:17 ...and see if there's any local content that I can download and do my own offline analysis with in my desktop environment.

19:24 So just to summarize, I started with a sort of pregenerated intelligent web map that helped me get started in my siting of a wind farm.

19:33 Then I used a more robust web application with more tools to allow me to create filters based on specific criteria.

19:41 Then I used well authored map services from authoritative federal data to create my own intelligent map products...

19:49 ...and then I can, again, go even more detailed with local content for an offline analysis.

19:56 So these are just a few examples of the types of reusable templates and applications and map products...

20:02 ...that we want to try and provide you guys through this ocean use planning community.

20:06 So now I'm going to turn it over to Dan who's going to assume another role in the wind energy development process. Dan.

20:11 Thanks, Bonnie. So carrying on with Bonnie's example, we want to also take note of a lot of other users out there that aren't GIS professionals.

20:21 So we saw another...those examples that if as a GIS professional or a professional that's using GIS for a variety of purposes...

20:29 ...there's a lot of resources here for me to use.

20:31 But I'm also a concerned citizen, and I've learned that there is this effort to develop offshore wind energy around the country...

20:40 ...and, you know, I have some concerns over where those are going to be and how that might impact me.

20:46 So one thing that we want to look at is all this content can be used and geared towards the generic user, the public user, the concerned citizen...

20:54 ...someone who isn't really that familiar with all the nuances of geographic information systems and all the data and analyses...

21:01 ...but they do read articles in the news, for example, and they do see things that interest them...

21:06 ...or what if they ran across this idea that there was going to be an offshore wind energy site somewhere near where they live...

21:15 ...or vacation, so we want to try to take a stab at that.

21:18 So this is an example of something worth exploring as a type of application to reach out to the generic user.

21:26 Here, again, you could find it through the same resource center and launch that as a web application, whether it's, you know...

21:34 ...in a computer in a web browser or possibly tablet, of course, those things.

21:39 So right away we're presented with enough information to get us started on what we're looking at and what this is about.

21:46 We start immediately exploring a map.

21:48 We tailor it so that we see that these are the potential areas where their first candidates for where offshore wind energy can be listed...

21:59 ...or sited within this particular area of the country, and we see a description of what those areas are.

22:07 But right away we can go ahead and look into this area in more detail.

22:13 We have presented to us a more intuitive interface for selecting the scenario, and, in this case...

22:21 ...I'm someone who has an interest in seeing from shore what areas will be visible to me.

22:28 And you also have controls over, you know, how high the...the height of the wind turbines are going to be within that farm.

22:35 So once I've selected that criteria, I can select a location on the land, and then I can run.

22:43 And, of course, it's leveraging all of the ArcGIS Server capabilities and providing us back output.

22:49 So these are the areas that are visible.

22:51 Now I have to caveat this by saying that, again, this is our first stab at this type of an application.

22:56 What we haven't done yet is look into describing is that feature that we see offshore one inch on the horizon, a hundred feet on the horizon...

23:07 ...what does it really look like to the user? So that's something to consider.

23:10 But you get the general idea.

23:12 And then we can also go the other route which is selecting from a location offshore, say, for example...

23:18 ...I know that this particular OCS block here has been selected and approved for doing wind energy farm.

23:26 So I know for a fact that there's going to be something there, and I can then reverse and see what communities might be impacted by that area.

23:33 So you can see, again, the idea here is to be a highly focused, very tailored application that's highly intuitive for concerned citizens...

23:43 ...or the general public that's not familiar with all the nuances of geographic information systems.

23:49 So with that, I'll turn it back over to Jeff.

23:54 Thank you Dan and Bonnie.

23:59 I think what we're going to talk about next is just really what are the next steps in our work on developing out these...

24:05 ...ArcGIS for Ocean Use Planning areas and community areas.

24:09 And, of course, we've gotten started with some assistance from our friends at NOAA and Bureau of Ocean Energy Management...

24:16 ...to help teach us about some of the aspects of wind energy development, but we want to continue.

24:23 This is a collaborative environment we're working on, so we want to continue getting your inputs, your contributions to these sites.

24:30 These are collaborative sites as well as fashion some smart maps and applications ourselves like you've just seen...

24:39 ...so we can make those available to broad communities.

24:43 But, you know, think about what else this could be used for.

24:46 So we mentioned that there's another group that will be working on in the fisheries area, so aquaculture site analysis as an example.

24:53 I mean, wouldn't it be great if and maybe perhaps today when somebody's working in the fisheries area...

24:59 ...they start developing some of the same maps but for different uses.

25:03 What if there's the same...the same maps that could be used for wind energy, for example, like, again...

25:10 ...you're probably concerned with depth and may not be as far offshore that you're siting aquaculture, for example...

25:15 ...but maybe closer to shore as well as, again, you don't want in active recreational boating areas or shipping lanes.

25:25 So some of the same considerations. Some of the same maps could be reused.

25:28 That's sort of the beauty of having one central location to go to no matter who you are and what sector you're working in...

25:35 ...if you're doing some things related.

25:38 Another really interesting sort of success story in the marine spatial planning arena is that of the...

25:46 ...Stellwagen Bank National Marine Sanctuaries program.

25:49 They have a challenge up in the waters off Massachusetts of a very active whale feeding area that also happens to be in a...

26:00 ...right in the entrance to the Port of Boston so there's a lot of active shipping.

26:05 And so you'll see, they've developed a series of maps to help them analyze, is there a better way to avoid whale strike...

26:14 ...because, really, any whale strike is unacceptable in an endangered species.

26:20 So what you're looking at is first a map they developed of the shipping traffic.

26:26 Then this is sort of a spatial analysis of the hot spots of where whales are feeding, and whales feed off of the sand lance...

26:36 ...that's one of their main food supplies, and you'll see that the current shipping lane goes through some fairly sandy areas...

26:42 ...where it coincides with the active...of whale feeding.

26:47 So the resulting map was to propose a new shipping lane that was six nautical miles to the north...

26:54 ...that goes through a gap of where the whales are feeding.

26:57 So this is a wonderful example of applying GIS to marine spatial planning.

27:05 But what if they had some of these maps already available?

27:09 They could have been focused on the analytics that they wanted to do and not have to go out...

27:15 ...and find the sediment maps and the shipping maps had those already available.

27:21 So the ArcGIS for Ocean Use Planning will be that kind of resource center that we'll be working on.

27:27 We're really interested in your contributions.

27:30 Again, this is a collaborative site, and we're really excited to be working in this area.

© Esri 2013 <http://www.esri.com>