

Overcoming Wind Siting Challenges: Overview and Wildlife

February 18, 2015

Coordinator: Welcome and thank you all for standing by. At this time all participants are on a listen-only mode. I would also like to inform all parties that this call is being recorded. If you have any objections please disconnect at this time. I would now like to turn the call over to Mr. Patrick Gilman. Thank you sir, you may begin.

Patrick Gilman: Thank you very much. This is Patrick Gilman with the US Department of Energy's Wind and Water Power Technologies Office. I'm excited to welcome you to this wind exchange webinar. Today and for the next several webinars in fact we'll be talking about wind sight challenges and some of the tools and approaches that people are taking to help address them. Next slide please.

I think it won't be a surprise to most in this audience that siting wind projects is one of the most challenging problems facing the industry today. I think the American Wind Energy Association Board has stated that second to a stable policy environment siting challenges are a major issue for them going forward. And so that's one of the reasons why we're taking the time in our

next few webinars to address some of the facets of those issues and look at some of the approaches that people are taking.

With that in mind we have presentations from a number of experts in this field. First we'll have Suzanne Tegan from the National Renewable Energy Lab who will be talking about some of the work that she's been doing for us to try to get out hands around the magnitude and the import of siting challenges in the wind deployment process and development process and then we'll have presentations from (Brian Woodbridge) from the US Fish and Wildlife Service and Taber Allison from the American Wind and Wildlife Institute on specific tools that they are developing and approaches that they've pioneered to help wind developers and others sort of think through siting issues in the preconstruction phase.

We'll have a question and answer period after those presentations are done. To ask a question you've got a little Q&A bar at the top of the LiveMeeting window. So type your question in the Q&A box and we will field those on this end and I'll be asking them out to the presenters at the end assuming there's time. Note also -- a frequent question we get asked -- we are recording these webinars and the presentations along with those recordings will be posted approximately one week from today on our wind exchange Web site at wind.energy.gov/windexchange. Next slide please.

As I mentioned this is the beginning of a little miniseries for lack of a better term of wind exchange webinars on siting challenges. So in April we'll be having another webinar talking specifically about challenges due to wind turbine radar interference. And then in June we'll be talking about siting challenges related to public acceptance and land use. And then after we finish our little siting miniseries in August we'll be talking about the forthcoming DOE wind vision. Next slide.

So for contact information about any of these issues as well as for general wind exchange questions I encourage you to reach out to us. And thank you so much for joining our webinar today. So without further ado I will introduce our first speaker. Suzanne Tegan manages the Wind and Water Deployment Section at the National Renewable Energy Lab. She's a policy analyst by training and researches siting issues that we'll be talking about on these webinars as well as other issues such as the economic impacts of wind deployment and the domestic wind and water power workforces.

So without further ado Suzanne take it away.

Suzanne Tegan: Great. Hi everyone and thank you Patrick. As Patrick knows we'll be talking about one of my favorite subjects today and in sum and in the big picture that's really creating better understanding and ways that people can work together toward appropriate wind development. This presentation will give a taste of my current work and my current research and also it'll briefly introduce tools and resources that are out there on this topic of siting wind projects.

And of course with most projects at NREL I work with a great team of people so this isn't just my work but just happen to be giving this presentation. So what we found a few years back when we started really diving into this was that regardless of cost and performance some wind projects can't proceed to completion as a result of competing multiple uses or siting considerations. So we use these terms kind of loosely but what I mean is I'm trying to describe uses for the same land or airspace that you could put a turbine in.

So this includes like prairie chicken habitat would want to be in the same space that the turbine would want to be. So we're trying to figure out ways

that - synergistic ways to use that land. Obviously the prairie chicken is there so what can we do about that. Can we put the turbine in a nearby space? That kind of thing; problems you guys are all familiar with.

That's on the ground. And then one example of the airspace use is radar interference. And Patrick just was talking about how we're going to have another webinar on that but that's one of the things that I considered in this research too. And even if the wind energy projects are unquestionably competitive, even if they make so much sense economically developers still wouldn't build in many places in the US due to various issues that don't have anything to do with technology but they have to do with other siting issues -- there's a protected area or something like that -- and this is appropriate.

And we shouldn't put wind everywhere. So the goal of this is to get toward - work toward appropriate wind energy siting. So current methods for understanding these technical issues we thought failed to characterize the cost to the industry from siting considerations. So this was things like delays of projects and increased permitting times and failed projects. So how much do these individual siting considerations cost the developer in terms of time, in terms of money?

A few other things there; and so we decided that wind energy siting issues must be better understood and also quantified and so we really are trying in this research to quantify how much time, how many dollars do these issues cost.

And so some of the research questions, DOE as Patrick said asked us to look at the deployment process and then answer some questions. And there are a lot of them but they include how much money and time the developers spend on these issues and are there some areas that are no longer developable in the US

due to these siting considerations. And the three that we looked at - we looked at transmission a little bit but the three main ones that we looked at were radar, public engagements and wildlife. We included birds and bats in that.

Of course there are many, many other issues. We've talked about some of them on the wind exchange webinars including system integration, transmission, including policy, including politics, but those are the three main ones that we looked at.

And I won't go through all the stuff that we did here but we talked to the industry, really in-depth interviews with them. We are really appreciative of their time and I'm currently trying to finish the technical report and that'll go through more validation with industry so we are sure that we're getting the results that they - we want to make sure we're getting it right, whatever they told us.

We hope to have a report out by the late spring for you all and for everybody else. And we did listen to developers as they said it's getting harder to site and permit wind projects. Siting complications can halt or greatly delay the development which of course adds money and time. And then one of the big picture issues of course is that the more wind we install as we want to reach these DOE goals and industry goals, the more wind we install, the closer we are to wildlife, the closer we are to people.

The more wind we put in the ground the closer we are to radar and these other issues that could be difficult. So the first thing we did was try to understand the deployment process and we worked on this flow chart with the people that we interviewed and this is an aggregate of the flow charts that the developers gave us. And it's from desktop review to project operations. I'm not going to go through every part on this but in our research we really carefully went

through each of these steps and we listened to developers about how they had experiences delays and cancelled projects in each of the different phases.

And so you can see here, you know, when a project doesn't work because for example in early development you can see there communication with agencies and stakeholders. If you've got protests, if you've got something that's not working on a public engagement level that can lead you have to have a delayed project and it can either go in that discarded project box there with the x or on hold for future consideration. You can think about doing it at another time when things change or after you've worked on them.

Here are some of our results. One of our main take-aways is what you see here in the yellow box. And you may already know this but developers really crave certainty like any good business people. The development timeline ranges a lot and so we do think the uncertainty even if you don't reduce the timeline, even if you can say all right this is going to take you seven years that would greatly benefit the developers and accelerate wind deployment. They just need to know what's coming. They need to know what's expected of them.

That was a big one. So going through some of the bullets here the typical project is planned on a five-year time horizon and there are lots of things that could increase that but more and more companies are having a difficult time justifying timelines that are more than five years. People who are financing them are less willing to finance the project if it's more than five years.

And then from developers we heard the second bullet here, that Fish and Wildlife guidance indicated a movement toward longer lead times and more up-front data collection. A lot of that was the eagle rules that we've heard about on these wind exchange webinars. And as a result some developers are reluctant to develop on federal land. And luckily we'll hear from the Fish and

Wildlife Service today and they hear this too and are offering some tools and solutions and working with other agencies.

We did hear about one project, a 60 megawatt project that's been in development for eight years with over \$6 million in costs so far and the result of that is a cost of about \$100 per kilowatt just in development cost alone with still no assurance of a successful project. So this can be a difficult process. And we will try to sum up our research for you in a useful way and the publication will be announced in the wind exchange newsletter and through other channels when we do have it ready.

So these next slides are going to introduce you to a few of the tools that exist to visualize areas of the country where wind development could be possible. And so many of the tools have a GIS component where you can apply data layers over physical features and characteristics including wind speed and terrain. And I'm not going to go through each of the tools but I'll just - I'll show you one and then I'll show you a list of resources.

So Wind Prospector is one that NREL hosts. You've got the Web site there at the top of the page. This is to make GIS-based data layers available to the public, everybody, and the data overlaid with the wind resource maps and those are at different levels. And then the siting issues are kind of laid on top of those. I'll just show you one example here.

We looked at North America and we're looking - focusing in on the US and you've got - this happens to be the (unintelligible) wind resource data. And then what I clicked on over on the left were - so areas of critical environmental concern and some critical habitat areas and wilderness areas and study areas. And so those are the blacks and the greens in there on the

screen that you can see. And you can zoom in, you can zoom out and then there are all sorts of layers. These are not the only layers over here on the left.

Wind Prospector has a lot of layers and you'll find and the next two speakers will also talk about different tools like this. We also have a tool called the System Advisor Model or SAM. This is a performance and financial model designed to facilitate decision-making for people who are involved with renewable energy, so not just wind but other renewables as well. And it does lots of things including predicting cost of energy and performance. So SAM is amazing and right now we're able to add the siting consideration layers onto SAM.

And the ones that I'm researching right now are not on there yet but hopefully will be there but we do have a lot of layers there. And you can download SAM; it's also a free model. Some of the other resources that are out there, and there are many. Up on the top left here is the USGS Wind Turbine Map. And so this is a map of almost every utility-scale turbine in the country. And when you roll over one of the turbines, one of those little red dots it'll come up with what wind site that is and what they know about it, for the capacity, the online date.

I'm not sure if you can see that. It's kind of small on your screen but it really has information on almost all of the wind turbines that are out there, so pretty amazing. And Argonne National Laboratory has a tool as well they affectionately call Icepick right here and this is - let's see, the Argonne tool hosts commercial GIS data for wind energy and related siting factors. So it's a map-based tool for identifying areas within the eastern United States that could be suitable for clean power generation.

And they have layers for wind; they have layers for other resources as well. And then you can overlay with these ones also. Over on the right here most people know this but of course it's important to make sure you're in touch with all the appropriate federal agencies such as the EPA and the Department of Defense, all the other agencies that are appropriate and of course your local zoning and permitting agencies and departments. So Open EI is a great resource for wind project siting tools and you can click on either one of those there on the right kind of in the middle there and they will give you the information that's already - that's up here and much more.

The lower right is a screenshot of the DOD Siting Clearinghouse. So that one is to address the potential impacts for air, land and sea space. It's what the Department of Defense calls readiness activities. And so they want to make sure they're really coordinating reviews of proposed energy projects and this clearinghouse will guide you through that and tell you how to do that. I mentioned the EPA. They have information on screening and permitting as well.

And so do many others. The Western Governors Association has their Crucial Habitat Assessment Tool. So Open EI is a good resource for this. You can see that a lot of these are from federal agencies. They do hear wind developers that it's hard to develop on federal land and they're designing methods to help people, bring people together on these siting topics and again we'll hear about that from (unintelligible) next.

I wanted to show you though the federal land overlaid with the wind resource. He's a shot of the wind resource is the color there and the federal lands are in gray. And you can see in the western US how much land is federal land. So it is very important that we work together -- the developers and federal agencies -- if we want to have wind installed in some of these areas, and some of them

are really windy areas. It's really important to keep this conversation efficient and alive.

So with that let's hear from some other folks on their great tools and hopefully I'll get to talk with you all later in the year about my findings. Thank you.

Patrick Gilman: Great. Thank you so much Suzanne. Just a reminder to everyone if you have questions type them into your webinar window and we will address them at the end. I remind our speakers to be efficient with their time so we can get to questions. But next up we have Brian Woodbridge who is a Wildlife Biologist with the US Fish and Wildlife Service and is the lead for the Western Golden Eagle Conservation Team which is developing conservation strategies for golden eagles and energy development in the four western Fish and Wildlife Service regions. Brian?

Brian Woodbridge: Thank you Patrick. Good afternoon everyone. This is going to be a very rapid shifting of gears from Suzanne's overview to what will be a very specific set of products that the Fish and Wildlife Service is working to develop. And by specific I'm talking about a single species, golden eagles, which are increasingly important as a siting consideration and really trying to produce some tools to get folks out ahead of the planning situation that often occurs with sort of late development surveys and things like that for golden eagles.

So the objective of our product is to develop reliable predictive models. And I'll get into the reliable thing a little bit later. And these models are intended to support project siting so they come in the form of decision support tools and also to support effects analysis. And this is at landscape scale. So we're not talking about placement of individual turbines. We're talking about project

footprint, local area population, where in a large landscape is risk relatively higher versus lower.

These tools have broader purposes in terms of conservation, prioritization, land management planning by BLM for example and other agencies. And they're intended to be useful in risk assessment, so overlaying our eagle predictions with other potential risk factors or energy resource development potential such as some of the ones that Suzanne described earlier.

And one aspect of golden eagles that makes modeling and making predictions about their distribution in the landscape a little more complex is that the distribution and abundance of golden eagles and subsequently their potential for interaction with any kind of energy production or transmission infrastructure varies quite a bit seasonally. There is no one model that will predict the degree of risk in a given landscape unless it incorporates this variability.

So we're incorporating it by developing models separately. The primary three sort of seasonal aspects of golden eagle distribution. The first is their breeding distribution and habitat, where are their nest sites, how are they distributed; winter distribution and habitat which winter brings a very different population size and distribution of golden eagles to much of the western United States. And then movement and migration; not all eagles move extensively but a significant proportion of most populations do move around quite a bit. It has a very strong influence of the distribution of risk spatially.

So these are subjects that typically take me hours to go through in a webinar or presentation so this is going to be a very quick overview and the first of these models that I'm going to talk about is looking at breeding distribution. And this is just a typical schematic for any modeling process and I'm really

not going to focus on this very much except to point out a couple of aspects of this particular modeling exercise which gets at the endpoint reliability. We're very, very focused on creating models that have a lot of utility, not just another model that gets put on the shelf that was nice to get it done but we don't really know what it buys it.

So we start out with putting a lot of time frontloading what we call a conceptual model. And part of that is we do a lot of landscape analysis in GIS just looking at and exploring what variables are most likely to be correlated with the distribution of eagles. And a lot of this comes from expert elicitation and then just trying to look at that in a GIS environment to explore how to best capture that in the models. Another aspect that's very critical to this are the nest locations data.

The team has spent the last year and a half really digging deep for nest information, spatial information and in many cases we have uncovered data sets whether from research or land management agencies that have never really seen the light of day before and it's probably one of our most focused long-term efforts and it really is in support of this modeling. But the primary aspect is this evaluating model performance, what do these models buy us or do we need to continually iterate through refinement.

And to do this we conduct expert reviews, locate independent data sets for testing models up to and including underwriting the cost and leveraging additional surveys to get new data to evaluate how well the models work and refine them. And this is just a very quick example, conceptual model development describing a lot of the different features that we explore trying to get a really good fit with the local population. And the example here is we spent a lot of effort coming up with different indices, cliff indices to try to best align the topographic data with where we knew eagles were nesting.

So all these black dots on this map are eagle nest sites in a particular landscape, in this case in eastern Oregon. This is a very GIS and data-intensive process. And the end result are these relative habitat suitability or probability density maps -- some people call them a heat map or a mood map - - that really just show you the distribution of probability of golden eagle occupancy in this landscape, in this case green being the better habitat, red being lower habitat.

Models like this don't necessarily - aren't saying there is no chance that an eagle will turn up breeding in a red area. It is really a probability-based approach but the test of models like this is really well how low is that probability, how reliable is the model. And as I mentioned before we spent a lot of time evaluating exactly that and this is just one example of how this works.

We received a set of 25 randomly sampled areas with nests in the Wyoming basin and the curved line on this graph just shows you the distribution of habitat value across the Wyoming Basin, and 24 of the 25 random nests fell within the top 10% of the Wyoming Basin landscape.

Those are the vertical lines that are all crammed over on the right side of this graphic. And what that tells us is at least by this view this is a pretty reliable model. It's really showing us it's minimizing the area in the landscape where it's making this prediction. So at this point in terms of progress these are preliminary model results. They have not been through extensive - well Wyoming Basin has but the Northwestern Great Plains, Colorado Plateau and Arizona and New Mexico plateaus are still in that review and refinement stage.

And we're creating these models on an eco-regional basis so we're developing them separately sort of marching across the West developing models at this eco-regional scale. So these are the four that we've completed to date. So the second of those three sort of functional categories or seasons that I described before is golden eagle distribution and habitat use in winter.

As I mentioned before the distribution of eagles and their propensity to interact with energy infrastructure has very different distributions through time seasonally so we're developing a separate model for eagle distribution probability of occurrence in winter.

This is a very different modeling process from breeding. The data sets are very large and very messy and there's quite a few of them so we're working with partners at Point Blue Conservation Science to basically contrast and compare models developed from these four different sources of information, eBird data which is citizen science kind of data, Christmas Bird Count, midwinter eagle surveys and satellite telemetry hoping that through that process we can come up with a model with a pretty high degree of reliability, at least with showing us the relative distribution of eagles in landscape.

And the last part of this three-part process is looking at golden eagle movements and migration. And there have been numerous efforts to do this in the past. This is the first one that really focuses on pulling together all of the satellite telemetry data for golden eagles in North America in an attempt to develop predictive models that really their primary utility will be to highlight landscapes that are used disproportionately.

Where are the areas where we're going to have increased risk to a development because this is an area that's used disproportionately for movement by golden eagles? And our project status for telemetry project right

now is we've obtained telemetry data for over 425 individual golden eagles. This is a lot. Most studies have 10 to 20 that they look at in a more regional view. This is going to be North America-wide.

In the last two years the Fish and Wildlife Service has deployed an additional 100 PTTs which will also go into this analysis staggered over the next one to two years. So we'll develop a model now and then there will be a refinement in another year or two.

And we're also pursuing additional data sets to keep building out this model. And one thing that we are looking into is working with different renewable energy developers that have deployed telemetry to look at eagle use of an area and pulling in some of those scattered data sets to add to this big collaborative meta-analysis.

And we expect to begin analysis of this data in March. We're still pulling in a last few data sets now before sort of doing this preliminary analysis. So in general I know that was a whole lot of glossing over a whole lot of detail. These are products that are - in particular the breeding models are - some are nearly ready for primetime. We expect to start posting them individually by eco-region as they're completed beginning in - most likely in May of 2015.

And then the west-wide composite of all these models, we anticipate having that completed this fall. And depending on where a given development is that means there may or may not be a model available for that geographic region sometime this summer but the full composite will be available in the fall. And the models will be publicly available through the US Fish and Wildlife Service administered ECOS Web site and also through the Western Golden Eagle Team's Web Site.

And we've had a number of inquiries about adding these model layers to other development siting tools and we're very interested in doing that. Again these are meant to be used so they'll be made readily available as each one comes online. And again I realize this is very brief so if you're looking for more information or you're sitting there scratching your head here's my contact information and, you know, welcome your inquiries. Thanks a lot.

Patrick Gilman: Great, thank you so much Brian. That's a great introduction to what you guys are doing on the golden eagle front. Finally last but not least we have Taber Allison who is going to talk to us from the American Wind and Wildlife Institute. Taber is Director of Research and Evaluation for AWWI where he oversees their research program and the development of their wind and wildlife assessment tools.

Taber has a broad background in conducting and leading ecological research in a variety of faculty positions and work with NGOs including organizations such as Mass Audubon, the Rocky Mountain Biological Lab and now AWWI. Taber has an M.S. in Forest Ecology from the Yale School of Forestry and Environmental Studies and a Ph.D. in ecology from the University of Minnesota. Taber?

Taber Allison: Thank you Patrick and welcome everyone. I'm glad to be invited to present to you some of the tools that AWWI has developed or is developing to address some of the wildlife challenges that Suzanne referenced in her opening presentation. What I'm going to do is talk about two of our tools, the Landscape Assessment Tool and what is now known as the American Wind Wildlife Information Center.

The Landscape Assessment Tool is developed and available for public use and the information center is under development. But first what I would like to do

is just briefly describe AWWI. I don't know how many of you are familiar with the organization but AWWI is collaboration between the wind industry broadly defined in this case as both project developers and operators but also suppliers to the industry including turbine manufacturers.

And the leading national conservation and science organizations. And they share the mission - AWWI partners share the mission of facilitating timely and responsible development of wind energy, protecting wildlife and wildlife habitat. AWWI has approximately about 30 partners and friends and you can see on this slide the list of the industry partners as well as the environment and all state and science organization partners in AWWI.

One of the key features of how AWWI functions is that we represent the interests of where - of the individual organizations where those interests overlap but we don't represent the industry, we don't represent the environmental organizations. We represent their combined interests. And we have a board that is composed equally of representatives from the industry and our environmental state and science partners.

Just to talk first about the Landscape Assessment Tool this was one of the first products produced by AWWI. It was launched in January of 2011. It was developed by AWWI in partnership with the Nature Conservancy and its principle function is to serve as a tool for preliminary landscape-level screening.

And in the event that you're familiar with the US Fish and Wildlife Service Land-Based Wind Energy Guidelines and their tiered approach, tier one which is the first step in the risk assessment of a potential project, tier one involves preliminary landscape-level screening and the LAT or Landscape Assessment Tool was built to support the tier one analysis that a developer might conduct.

The tool is not intended for siting but for doing preliminary landscape-level screening or also teeing up tier two studies or site characterization once a site has been chosen and I can say a little bit more about that later.

But what you can see over on the right hand side of the screen or left hand side of the screen, excuse me, are the various data layers that are available in the landscape assessment tool, both species data layers and other data layers that are of conservation importance or data on wind energy potential and disturbance data layers.

The database is intended to be - to provide a scan if you will, a screening of potential conservation issues that a developer should consider as it considers potential sites. The principal set of data layers are the species distribution data layers. There are more than 1,000 species represented in the Landscape Assessment Tool.

And these species are included on the basis of what is considered a species of concern whether it be a state or federally-listed species or a species that is thought to be or known to be affected by wind energy development.

So in the process of using the Landscape Assessment Tool the developer can look at individual data layers and can also generate a report that I'll talk about but for each of the species you can see here for example we have the distribution of the American wigeon and a variety of other information that is provided about that species. And each data layer within the Landscape Assessment Tool comes with metadata and also can be downloaded. So all of these tools are publicly available.

Another example of a species data layer; this is Greater sage-grouse showing both its year-round distribution and also overlaid with that are the Bureau of Land Management sage-grouse core areas that a developer can use and reference. Most of the vast majority of the data layers in the database are based on the species distribution models created by the US geological surveys GAP program.

Additional data layers of conservation interest include the TNC priority conservation areas outlined in green here and then also Audubon important bird areas. But additional data layers include the Protected Areas Database that was also I think referenced in some of the tools that Suzanne was talking about that you can see the different data layers for protected.

And then one of the other pieces of information I wanted to point out was if you see here where this chain is up in the (unintelligible) indicating that there are links to other Web sites, particularly the Western Governors Association Crucial Habitat Assessment layers can be accessed through the Landscape Assessment Tool.

And we're always looking to add additional layers and additional functionality to the Landscape Assessment Tool and provide links to those other tools and potentially we might - you can talk to Brian about linking to some of the work that the Fish and Wildlife Service is doing with golden eagles.

But the heart of the functionality of the Landscape Assessment Tool is its reporting function. As I indicated a developer could look at individual data layers but what the landscape assessment tool allows is for a developer to scan an area where they might - are considering a proposed project and in doing so they can scan the database, the more than 1,000 data layers and generate a

report showing what species and other conservation values their potential project overlaps with.

And if you look at this slide here you can see a polygon which has been drawn on the map here. So you could either hand draw a polygon or you can download a shape file to indicate a potential project location and then automatically the Landscape Assessment Tool generates a report.

A portion of which you see here on the screen which a developer can download and then use that information to determine whether or not they should continue with exploring the site and to use that information to tee up tier two studies or site characterization as it's defined in the Fish and Wildlife Service Wind Energy Guidelines so that they can use this information when they go to visit a site to help them determine what conservation and habitat features they should be looking for.

So that tool as I mentioned is publicly available on our Web site and can be used by anyone. And as I say primarily developed or created for developers seeking preliminary landscape evaluation. Another tool that we are developing is what we are calling the American Wind and Wildlife Information Center.

And the information center is intended as a secure and confidential database to host wind wildlife data collected by the industry both during preconstruction risk assessments and post-construction impact assessments with the goal of increasing the understanding of wind energy's impact on wildlife and improve our ability to identify strategies that avoid and minimize those impacts and better predict risk.

So here this slow diagram shows you where we are in the development process. We have built a prototype post-construction fatality database that is

capable of storing the raw post-construction fatality data and associated metadata collected by a developer. So this includes fatality incidents as well as information on searcher efficiency and carcass removal trials and other important metadata for interpreting that information.

We are in the process of working with our partners to input their data into the information center and that process is nearly complete and we will also be seeking data from non-AWWI partners as well with the intention of conducting a first analysis of the data sometime later in 2015. At the same time we're going to be beginning the scoping for a preconstruction database so that we will be including data collected during the preconstruction risk assessments, the wildlife surveys that developers are carrying out in the process of siting a project.

And we're also going to be including a searchable publicly-available literature database for the grey literature, reports that are produced but not published, preconstruction reports and post-construction reports. So our vision for the information center as it applies to siting and permitting is to have the database serve as a secure and confidential repository for risk and impact assessment data and support consistent data collection and management protocols as appropriate across potential project sites and to provide comparable data potentially reducing the need for data collection so that a potential developer might at some point in the future we hope working with AWWI would query the database and collect data on comparable sites that would help inform them of the potential risks of developing at that site.

Also with the goal of refining preconstruction risk assessment. Having both pre and post-construction data in the information center will enable us to evaluate the ability of wildlife data collected during the preconstruction phase and its ability to predict post-construction impacts to make sure that we're

collecting the right data, to make sure we're collecting the appropriate - data on the appropriate risk predictors.

And then finally leading to improved ability to determine the appropriate duration and intensity for post-construction monitoring; high-risk sites or high-impact sites may have different recommendations than low-impact sites. So as I mentioned this database is still in development although the post-construction prototype has been completed and we intend to conduct our first analysis later in 2015 with a goal of completing the pre-construction database in 2016. So that's just a brief overview of the tools that we're developing at AWWI and I'm happy to answer any questions that you might have.

Patrick Gilman: All right. Fantastic. Thank you Taber and thanks again to Suzanne and Brian for their useful presentations. We do have a number of questions at this time and I'd encourage everyone to keep those flowing. First up sort of a question or comment to us that Alaska is not included in the Wind Prospector or some of the other tools that DOE has on its Web site or in the Landscape Assessment Tool.

I guess I can't speak for the AWWI and the LAT but from the DOE perspective I guess I would say quite frankly that we're - I think that's driven by the relative lack of interest in utility-scale development in Alaska, that's not a - if it's not a happy answer I think we're always looking for ways we can improve those tools and so if you have any specific suggestions on how we might be able to address Alaska and the unique needs there I think we'd be happy to hear those.

Suzanne Tegan: Can I add something to your comment? This is Suzanne.

Patrick Gilman: Yes, absolutely Suzanne.

Suzanne Tegan: So we don't have - right now the wind speeds are not showing up and the potential wind capacity is not showing up in Alaska however there are a lot of layers that do show up in Alaska. So you might have to click around a little bit but if you kind of zoom in on Alaska you will be able to see restricted land, brownfields, national parks, hill shades, slopes, lakes, rivers.

Also wilderness areas and (unintelligible) areas and things like that so there are critical habitats so there are a lot of layers that you will be able to see but the wind speeds right now are no showing up and I have a question into our Wind Prospector guru to ask him about that.

But maybe check back on that but I think you are going to be able to see some layers in Alaska.

Patrick Gilman: Great. Thank you Suzanne. Next question we got multi parts. The first is is there technology that can deter eagles from wind facilities. I will say for DOE's part that we're very interested in - we've heard about a number of things that have been tried that might be promising for deterring eagles from facilities and we're interested in exploring opportunities to fund further development of those technologies. So stay tuned on that. I guess I'd ask - refer the question also to Taber and Brian to see if you have any thoughts or know of anything specifically there.

Taber Allison: Brian do you want to go first?

Brian Woodbridge: Sure but I don't really have a lot to offer other than to echo what Patrick said. There's a number of things that have been explored but really nothing that is particularly promising right now. The primary deterrent wraps back

around to siting, is this an area that eagles naturally do not use as opposed to deterring them from using an area that they are naturally predisposed to use.

Patrick Gilman: Taber anything to add there?

Taber Allison: I don't have much to add. There are some technologies out there that are being used in Europe on similar raptor species like (unintelligible) vulture and white-tailed eagle but they haven't been evaluated in the US.

Patrick Gilman: Great, thank you. So another question related to eagles. Maybe Brian first and then Taber. What's the status of golden eagle populations and what's the relative impact of wind energy on those populations compared to other sources of anthropogenic mortality?

Brian Woodbridge: The status of golden eagles in the US at this point looking very broadly at the whole population appears to be a stable population but I'll throw in the caveat that there's a lot of uncertainty wrapped around that. It's a very difficult thing to study and come up with a precise estimate of and fish and wildlife service is very focused on trying to do that.

And also that's different from saying all populations are doing well. We really don't know if there are areas that are expanding versus contracting. The relative impact of wind on golden eagles is compared to other sources of mortality at this point is unknown. We don't know enough about what's currently or what would be projected to happen at existing wind facilities and other sources of mortality are at this point pretty poorly known.

Again a lot of folks in the Fish and Wildlife Service are scrambling to pull together information and conduct research to try to get a handle on that as well.

Patrick Gilman: Thanks Brian.

Taber Allison: This is Taber. The only thing I would add to that is just to echo something that Brian talked about earlier with the satellite tagging of a lot of eagles. At least one of the groups that Brian is connected to is gathering mortality data that I think we all hope will provide a more unbiased although maybe not completely without bias estimate of the relative sources of mortality.

Patrick Gilman: Great. This is a great question. DOE is sponsoring some work that is going to - that's aimed at enabling deployment on taller towers, so getting wind up higher and that will - just for DOE's part we're aiming to - the aim of that work is to get wind deployable in more parts of the country. So for example you could see more energy development possible in areas like the Southeastern United States. And the question is about is there research or other insight that we know about how as wind moves to - as wind turbines get bigger and higher up how those changes might impact wildlife.

And I guess I'll toss this one to Taber first.

Taber Allison: Sure. That's a great question and the short answer is we don't know. We can speculate. One of the things in particular, there's this strategy that has various names but I just give the shorthand of curtailment where turbines are feathered, turbine blades are feathered at lower wind speeds in order to reduce bat fatalities and that's been shown to be a fairly successful mitigation strategy for reducing bat mortalities and it also comes with the cost of reducing power production.

And as turbines become taller and turbine blades become longer and turbines become more efficient and they're able to operate more efficiently at lower wind speeds and in areas that they haven't operated before it raises some

questions about how that will affect curtailment as a potential mitigation strategy. But the questioner is right; we'll be potentially developing in areas with species combinations that haven't interacted with wind energy before so there's a lot we have to learn there.

Patrick Gilman: Great. Thanks Taber. We're approaching the top of the hour. We do have a few more questions so understand if people have to go. I think our presenters are available. We only have a few more so maybe we can run through these even if we go a little bit over. So next question is for Taber. Will the pre and post-construction databases be open to the public and government agencies and if not how do you envision those databases changing current project evaluation approaches used by the government.

Taber Allison: In the foreseeable future the database will not be accessible to the public. AWWI will serve as the gatekeeper to the data in the database. We anticipate that any analysis conducted would be expert or peer-reviewed and the results would be made publicly available. In the future I think we're hoping that the - even as the database itself might not be accessible by the public or directly by government agencies there would be the opportunity to arrange a query of the database to answer particular questions that an entity might have whether it be a developer or a state or federal agency.

But that as I say is at some point in the future.

Patrick Gilman: Great, thank you Taber. Now a question for Suzanne. You mentioned coordination with DOD on gathering some of the data for the work that you're doing on deployment challenges. Who in DOD or the services are you getting data from in terms of where they think there may be impacts from wind energy on their missions?

Suzanne Tegan: Okay yes, great question. So I would actually recommend going to that Web site, the Department of Defense Siting Clearinghouse. There is a lot of information there. There isn't any one particular who is telling us that there are necessarily adverse impacts from wind turbine installation. The DOD is one of the federal agencies that developers confer with when siting a project. So you need to talk with the FAA to make sure that you're not interfering with some airport or flight path or something like that.

You need to talk with the EPA like I said before. And so DOD is just one of those. DOD in general and then they'll let you know if there are organizations within DOD. You mentioned Navy. We did talk with folks from the Navy about this and so really this is a project by project clearinghouse and so what they do is they look at each project that is - a developer says we want to build a project here and the DOD says oh well we need this military airspace or oh, actually that looks fine and I think their record is something like 96% of the projects that come across their desk are fine.

They're kind of approved pretty much right away. And then there are a few that there might be some interference with a flyway or something like that. So that just leads to further discussion. It doesn't mean that the wind turbines can't go up in that space. It just leads to further discussion with whatever military branch or the DOD in general.

And that goes for others as well. So there are other radars, not just Department of Defense but there are weather radars and other radars out there that sometimes what'll happen when you're siting a wind project is that you'll - the developer will just replace a radar.

So they'll say well we want the turbine that would be line of site with that radar so instead of having to move my turbine I'll buy a new radar for

whomever the radar belongs to and then they just solve it that way. So there's lots of different ways that these issues can be mitigated and solutions definitely are happening all around. It is getting easier than it used to be because people are talking to each other more I think about these issues. So that was kind of long winded but there's no one person and there's no one agency who is saying you can't build here at all.

It's really not like that. People are open to it. You just have to follow the process.

Patrick Gilman: Great. Thank you Suzanne. One last question and that's what about vertical access wind turbines. Do we have data on the difference in wildlife impacts between vertical axis machines and the typical horizontal axis machines that are currently deployed in utility-scale facilities? Taber any insight you can offer there?

Taber Allison: I'm not aware of any studies that have compared the two turbine designs in terms of their wildlife impact. So if anybody is I'd love to know.

Patrick Gilman: Yes. Okay.

Suzanne Tegan: I'm not either. There aren't very many vertical axis turbines out there and not many new ones being proposed that I know of but I haven't seen those studies. I don't know of them.

Patrick Gilman: Great. So it's five after the hour so just to be respectful of everyone's time I think I'll conclude questions and answers. I want to give another thank you so much to our speakers today, Suzanne Tegan, Brian Woodbridge and Taber Allison. I remind you that the webinar recording and presentations will be

posted on our Web site wind.energy.gov/windexchange about one week from today and they'll be archived there along with all of our other webinars.

And encourage you to join us next time in April when we're going to be talking about radar and wind which we talked a little bit about today. So once again thank you so much for joining us today and we look forward to seeing you next time.

Coordinator: This concludes today's conference. Thank you for participating. You may disconnect at this time.

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