INT: that's brilliant so just to start off with could you just tell me a bit about yourself. So who you work for and if you're affiliated to anyone else, and then your role within that.

DEU20: yeah sure my name is [DEU20], I am a biodiversity officer at [nature reserve] which is local government so part of [Borough Council] as biodiversity officer, and I have a varied role but probably the three main things I do are to lead projects and on nature conservation and also to help bring in funding for those projects, and I am responsible for our environmental data so most of the surveys that we do I would help to coordinate those and I would help to records and map the results.

INT: So, you do your own mapping of data.

DEU20: Yes, yeah so in either ARC GIS or QGIS.

INT: And do you work with a small team or a big team

DEU20: It's a small team and our work is very much in partnership with different contribution organizations and landowners as well and volunteers, so we am kind of. This is noise in this office and I don't know what it is it's not anything to do with me I haven't been in the Office for about six months and.

INT: It sounds like an ice cream van.

DEU20: I was just saying we are a small organization, but we pull in resources from other organizations.

INT: That's great so in terms of the species records data that you use do you focus on single species or species groups.

DEU20: yeah and we do have some priority species and we've just relatively recently finished, a big project called [environmental action club]and which was funded by heritage luxury. And that looked at trying to record and over 70 different species throughout the landscape and using volunteers, for the most part and trying to get enough data on at least 10 of them species to model their distribution and using habitat suitability. And so that's a quite a large number of species and some of them are species that we feel are a priority, because we know our area has a good population compared to nationally, for example, or there are species that we know are not doing well in our area. And picking, or else the species were sort of looked at as a bit of an indicator, so that if we could understand why that species, it would give us a wider understanding the just the distribution of that species itself, and so there are three different reasons, really to be shoes and we also do have look at habitats, as well as species so again, as part of the same project we tried to do some habitat modelling using aerial photography and environmental parameters and to try to work out if we could get a habitat map for our area. And, and that was not as successful as we would have liked, I think you know anyone who's gone out to survey habitats will know that it's quite ambitious to try and get an mvc map from photography and put that much higher level of Meyer, heathland, grassland and various types of classes that kind of thing and that worked a lot better so we're actually quite pleased at that level that we might have a much better understanding, where our habitats are and how much we have them, even if it's at a broader level than we would have ideally hoped. So yeah so there's mixture of species recording.

INT: Credit because you just explain to me, maybe a bit more about why it was difficult with the habitat project.

DEU20: Yes, so I think part of it is being able to distinguish between different habitats in terms of their visual response on aerial photography so if you're only talking, you know, three bands three spectral bands. The variation probably isn't enough, and so the consultants and projects suggested that actually moved to spectral and photography to use for this kind of project. And the other thing is environmental parameters, whether those are accurate enough so you know, being able to distinguish between calcareous grassland and acid grassland is a lot to do with the soils and if our soils data isn't granular enough, then we can't work out where habitats are on a good enough level, and I think the other thing is those maybe not the areal photography sorry, but the environment parameters don't take into account management, so you could predict that something would be a certain habitats and probably that was what it was at some point, but the management has created a different habitat and so you know something that the model predicts to be heathland but has actually been managed and first lines have changed.

INT: In some.

DEU20: grass and.

INT: So those.

DEU20: kind of things very.

INT: You you mentioned a lot about volunteers to rely on them a lot today and important.

DEU20: We do we've only got a small team and consultants are expensive. So we have a lot of really dedicated volunteers we're very lucky and the [environmental action club]project has left us with a pool of volunteers to use for various things and we have a really dedicated botany group who’ve had a lot of training so there's species ideas really good, and so we can rely on them to do habitat surveys and surveys for plant species, and we have a pool of birds surveyors, for example, and at the moment we have volunteers are doing surveys, for adders.

INT: I had a question, yes, so obviously this project focuses on modelled data and but, obviously, in order to produce that you're going to need the data in the first-hand um so without say volunteers. Would that be a huge loss and that field.

DEU20: yeah if we didn't have volunteers to be huge and one of the things we're trying to do and we're just at the start of this really is to work with the land managers to try and get some results from them. So in our area and we have keeper estates and the gatekeepers there bird ID, for example, is brilliant and so we can work with them to record birds and maybe board and from there to other things they're interested in and also the land managers in terms of the farmers and whether we get information from them and, I think, with the new AGRI environment scheme that's coming through a lot of it will mean that there are payments are linked to how biodiversity habitats are so, for example, they'll get a lower payment for a grassland that doesn't have many species compared to your grassland that has a lot of species, and to do that they've got to prove that. And so I think either we can train them to do that work or it will mean that it's easier for our volunteers to get out and get permission to the surface, so that is something I see is quite a positive up. And, but yes, if we lost our volunteers, it would be, it would be a big problem for us yeah.

INT: yeah with the agri-environment getting those that incentive isn't there.

DEU20: Yes, yeah so normally it's saying, can we come and do some surveys were actually I think it will flip to them saying, can you come. For us so hopefully that will be a big change.

INT: And that'll be good for both yourself and the landowner I guess. I think you've alluded to it already before but can you talk me through what you use your data for this has inform decisions of yours.

DEU20: Yes, it definitely does, and one of the biggest things we've done recently is the woodland opportunity plan for the whole of the AONB on the landscape scale and what we did was look at all the data sets that we have access to and layered them in GIS and in terms of species, the research in species that we wouldn't have wanted to plant trees and their location so wading birds, water voles, adders, for example. And they were put into this layered map as negative factors and other things were put in as positive factors so being close to a hedgerow being close to woodland. So, the habitats were as well, and so they're all layered up and scored and anything that was a good place to plant woodland was scored positively anything that wasn't scored negatively and depending on where and how often those layers overlapped you've got range of scores across the whole of the AONB. And so, it was really important to know how good our data was and what data we can use. And it's you know it's been a long process of getting there in terms of gathering all that data. So that's one of the bigger things that we've done so and we've also made that accessible as a web map so that landowners can look at it themselves. And, and the benefit from doing it that way, is that we would never really were able to release information on web map where bats were or where water voles were or any of our kind of protected important species, but because they are layered and lost essentially within a scoring system that we can flag up that something is red area and don't want plant trees planted there but they don't necessarily need to know why at that kind of public facing level, so it means that those kind of species got a bit of protection but we're not exposing them to any threat by actually releasing where they are, but then at the same time, if we if we hold information, where something is and don't share that with other people, then that doesn't put us any further forward for me coming from other bodies so that that was one way of trying to share the information that we have and but on a sort of more of a case by case basis and we were asked her opinion occasions, for example, so we would use on a species records for that and also again this idea of Agri environment schemes, I think it's going to be more prominent in the future, but even know if we can show that there are particular species on land, then they're more likely to get funded.

INT: Okay, thank you. The data that you do get is that raw data or it has it been processed in any way.

DEU20: On the volunteers you mean no and it comes in as raw data. For our big [environmental action club] project we made the decision to do everything on paper maps from volunteers just with the idea that there's more potential for things to go wrong. So, we did go quite old school on that, and that was all processed by our local data Center and so through Simon. And then for other projects where there's slightly smaller we issue, our volunteers with GPS so the adder survey that's being done at the moment, for example, each of the pairs of the volunteer have GPS to record where the adders were found so in that case you would get just the coordinates where particular species are.

INT: Do you find any benefit in using GPS in some scenarios.

DEU20: yeah and the adders again, in particular the habitat that the volunteers are serving is quite featureless it's hard, it would be very hard for them to accurately mark on a map where the adders are I think, compared to some other locations, they’re usually in sort of Upland gills and they're just really quite inhospitable and one looks exactly the same as another. The GPS and that kind of scenario is really important, less important, in other habitats, I think.

INT: I think just going back to the volunteer aspect is it important to have a range of methods of collecting data to appeal to a wider range.

DEU20: Yes, and I think one of the things we've been talking about recently with Simon from the data Center actually is about instead of requiring a set of kind of set of standard surveys at a place to work out how well it's doing, we might choose some indications for an area. And then you're talking about someone going to do a [species] survey, for example on moorland that's in you know you're talking a top level consultant to do that, but if you're sending out a volunteer to look for two indicator [species] and they know exactly what they look like, that's easier for a volunteer and if we choose the right species, they can tell us as much about the progress at a site as a larger standardized survey so and that's the thing that hopefully will look at in the future in terms of making the best value of our volunteers, but not requiring not requiring too much from them as well.

INT: moving on to the resolution of the data that you use does this differ depending on the circumstance.

DEU20: yeah, and I mean we will use all kinds of data and I work with us national data that comes from the Environment agency, and from Natural England and we'll also use historical data, where the resolution is, you know if you mapped it with confidence, it would be quite big Square on the map down to you know the GPS locations. So, it's a range of things and we, as long as we know the context of our data than anything is usable to a certain level.

INT: You mentioned context, there is, that incredibly important.

DEU20: Yes, and so the confidence that you have data and so for the woodland opportunity time, for example, and the scoring that was given to each layer depended on our confidence and so some layers and were really important to me we're so confident in that we could just say no planting not even give it a score in we just would not support planting. And, whereas other things like our models and wading birds data, for example, we don't have the same level of confidence in it, so that was given a score and a score so it's you know it's possible you could plant there if you do a survey and disprove what we think might be there for example and some data that we had less confidence in was given a lower score because we had an incident, whereas, something that we have higher confidence we could give it a higher score so it had less than if you had less confidence in it, it had less influence in the overall.

INT: And would you then act on those scenarios, where there was less confidence.

DEU20: Yes. So, when we didn't have a lot of confidence in something it was still worth including it almost as a red flag to say at this site to approve tree planting we would require surveys or a visit to the site to rule something out. It was kind of thought better to flag it up, even if we lose confidence in it, than, to leave it.

INT: yeah does that does that inform yourself or other people.

DEU20: yeah and some normally we would look through all those individual layers and it takes a long time, whereas the woodland opportunity plan combines them all together, and then you can pick it pick it apart and say why is that red area and come with it, but it takes a lot less time than individually going through layers so our, we now have a new woodland officer on the back of the plan and she would use that to scope out areas. The other thing we're hoping in the future is that she will use that map to target areas as well. So rather than just evaluate and proposals that are given to us, we would say, these are the areas that we would like to plant and start conversations with the landowners which is something we couldn't we couldn't really do without the data or the information that is based on and so that's a feature kind of scenario at the moment, she just working through a backlog of application. But in the future, because our area has so many restrictions on tree planting so many priority species, so many priority habitats and we think that we might be planting less than some areas but we want to make those areas as valuable as possible so that one hectare here actually contributes much more than one hectare somewhere else, and so again that's all based on the data that we've used.

INT: How do you deal with data gaps.

DEU20: yeah interesting that's a conversation we've been having recently trying to use different data sets to try and do the same thing as woodland for other habitats. And so, for example, looking at heathland and Meyer, at the moment, and for those habitats it's not going to be creating new areas like the woodland its going to be looking internally to look at the quality of the habitat so to prioritize within heathland and moorland. And so I’ve been looking at different data sets like and botanical society for British isles. And they have things, called Axial fights which are again this kind of indication idea that if you have this species, then you can assume you have certain things below it. And that will be very influenced by where the recording is happened not just where those species are. And so I think we can use that data to pick out some of our best sites, but we couldn't use that data to infer that somewhere else is less quality, because it doesn't have those records, because it just might not have been recorded there but where it has positively been recorded, you can use it. You just can't say something about the whole. But there will be some priority areas that will be missed where those species aren't haven't been recorded, and I also think, in a pragmatic way we only have so many resources, and so, if we identify as many priority areas, as we can, we probably could work on all of those areas anyway. So, having more complete picture would make things fairer I think in terms of landowners or that kind of thing. But it probably wouldn't make a huge difference to our work, just because our level of resources is fixed. And so, if we picked out 100 areas or picked out 20 areas, and we can only work on 10 then knowing where the hundred areas doesn't really put us in a better position, because we can only work on so many.

INT: yeah that's good I would then ask to follow up that how you can set a confidence accuracy and precision.

DEU20: I think one of the things we look at is how old data is and so more recent data we have more confidence in and in terms of. You would assume that the management, for example, hasn't changed in the time period in between, whereas older data something could have fundamentally changed at that site. So there's the each of the data and there's also how spatially accurate, it is and but also, I think it comes down to who has recorded the data to so our volunteers we might give less confidence to in something that's a paid survey by a consultant. And even maybe down to the individual volunteer so we know the capabilities of some of our volunteers are excellent but other people asked to do the same survey are not to the same level, so if one survey or came back with a particular species, for example, and in a botanical survey we’ll be more likely to sign that off maybe with someone else and in that case you might contact the surveyor and say if it was a species that jumped is being unusual particular place know how confident, are you in the record, whereas with other volunteers, we might not need to bother.

INT: The data once you’ve processed that. Does it go into any reports or you talk about maps yourself.

DEU20: So, we store our information on our GIS on our own local system and data does get passed on to the data Center. And, but not have to be honest, not everything just in terms of resources and being put that time into things and but, for example, the [environmental action club]project we worked very closely with them so they have all the data from our project and other things, end up being a bit more ad hoc but I think it's something we should probably get better at and also one thing that's been come up quite recently, is the landowners themselves interest in that data probably more so than in the past. And so, that is something we're going to maybe factoring more often, is that we might have more work after a survey and we distribute that to landowners, whereas in the past, they weren’t that interested in the results, whereas now they will be partly because of Agri-environment so that's another you know we're going to have to redo the surveys and then distribute them back to Landowners who own them. If there are particular requests from different organizations and then we'll share them or, again, the scenario of planning permission for something if we know there is a record for species in that area, and we would flag that.

INT: Talk about the relationship with the local record Center. Yes, is that. Does that work on like an exchange basis, or is it just whenever.

DEU20: yeah we are part of [place] Council and the council has an agreement with the data Center and so that they can get data for planning purposes. So we can work with the data Center under the same agreement so to try and get information from our projects, rather than planning and through that agreement, but also on individual projects we would write the Data Center into funding bits so that they will have a proportion of the funding so that they can do elements of work for us.

INT: that's great and do you share your data or the processed data with any other audiences, but other than the ones you've mentioned already.

DEU20: Yes, some of the local naturalist groups and, but we have kind of closer relationships with some rather than others and it's not a systematic thing it's more of the knowing individual recorders, for example, so and again the other surveys that we're doing I’ll be sharing the ones in and part of our area with one of the local naturalists just because he's interested and so that's less formal more of an individual relationship kind of thing you know someone that I would know well, who have no interest in the results and who would share their information with us so it's not really a systematic thing.

INT: Right. So terms of your data aspirations going forward and how could the data that you use help to improve your be improved to help you, with your decision making.

DEU20: And it could be more recent across the board and there is data that we have based on like [environmental action club]project that I would worry that we couldn't replicate or keep up to date, so you know at the moment we're looking at we're in a really great position now and we might be in less of a position in the future just because data gets old so that's why at the moment we're trying to do as much with the data we have now, because we know what's current and we know it's something we can have confidence in. But in a couple of years’ time will be less confident so again that's the timing for the woodland opportunity plan and we're also hoping to do the same with other habitats and one of the drivers, for that is nature recovery network and this idea of prioritizing future conservation work based on evidence and maps which is really great thing to become from government and but, at the moment, it looks like it's going to be a county level not any sort of smaller scale, so we wonder how someone like us, who have quite a lot of data, how that's going to feed into that level, you know, are they going to take only factors that they have confidence across their whole area into a client or are they going to deal with different areas with different levels of information differently and feed them all into one map so that's something that's definitely on the horizon, as to how to deal with that. And, and I guess having the one thing I’m interested in from what Simon saying by project in the modelling media is the idea that the software, on the model could suggest where future surveys can take place that would improve the data, you have overall and that sounds really great because we have certain amounts of data on some species that are quite good, but if we were going to put a bit of more effort into we could maybe get it up to a better level, but to be able to know where to do those for maximum effect would be incredibly helpful. So again, returning to the adder surveys we are surveying based on older information at the moment we're kind of revisiting sites were either there was a good monitoring in the past, or even dying to sort of one ad hoc citing so we're basing it on places where we've had records in the past but to be able to predict new sites, when you know we just don't know about them, because no one's been to look that would be really useful.

INT: So, essentially you're talking about filling those data caps and talking about timing, this sort of real time yeah and the replicability of it. Great so just as the final section just going to focus a bit more on the modelled data so happy to sort of talked about it already, but how would this affect how you interpret the data.

DEU20: Yes. We had an example of that from the [environmental action club] project so that has taken individual records and records on a grid across the AONB and created modelled distributions and moving from knowing where if species are in few locations having a prediction across a big area is a big step change with what we can do with it. And you know those models again are part of our woodland opportunity plan and probably one of the reasons we could do it at that scale is because we have this modelled data of were waiting birds are in particular. Because they cover such a large area to get comprehensive and actual survey results would you know almost be a lifetime's work and so having it at that scale is brilliant and also I'm not sure we've used it entirely to it’s capabilities, yet either, and you know that model data again with nature recovering networks in mind could be really powerful in terms of figuring out where are important species are, but also where the not so if the model predicts something to be there is that the models fault or is that because the environment parameters should be right, but the management isn't correct, and so I think it'd be really useful to for that you know model says everything's right what's missing in the equation, and we can go on site to specific areas and check them like to see why is everything, not as predicted.

INT: So I’m just going to show you some examples of modelled data part of the team have created, and so, initially, I just want to I’ll give you a bit of a description and then, if you can just tell me if you interpret them can interpret them. And then, if you find them useful as well brilliant so just share my screen. So hopefully it pops up. Can you see that.

DEU20: Yes, there’s two maps of the British Isles.

INT: Brilliant yeah, so this is.

INT: The one on the left, so can you see my mouse. Yes, yeah brilliant, so this is a rule probability distribution to the five spot burnett month. So it uses 21 land cover variables and 19 climatic variables showing a raw probability distribution are you able to interpret that.

DEU20: Yes, potentially on a broader level. I presume Green is the highest probability running through to the kind of pale pink colour. And it looks like oh yeah the scale right hand side and it, it looks like there's more of a south Western distribution so wales Cornwall Devon that kind of area and, as the kind of real hot spots for that also looks like a bit of a lowland bit of a coastal association.

INT: yeah that's brilliant. Okay yeah that's excellent and then, so this is replicated on a local scale here. Okay, again, so this is around a point in Wallingford in Oxfordshire. yeah that's a five kilometer scale is this easy to understand and interpret.

DEU20: not really. I think, without the context of knowing where that was me another area if you showed me somewhere within our area, who knew the geography of it having something like that it's pixelated that kind of problem it's understanding the geography behind it.

INT: yeah absolutely so obviously for this to be useful, you need that geography almost as a base layer. that's brilliant. So, I’ll just move on to the one on the right now. Okay, so this one is a variation model. So, I’ll give you the description. That they've given me. So, the variation is calculated using a sample of the background data to give a range in the predicted probability. For this model, it was run 10 times on 10 different data samples which include some points Whether our target species records and somewhere records for other leopard particular species. So, the modellers have recently combined the probability and variation data. So certainly able to show areas where there's both high probability of presence and high uncertainty. And I realized that's quite a lot and it's probably easy to read it. But just did that make it was that useful or.

DEU20: What was the last part of that sentence.

INT: The modellers have recently combined the probability and variation data. So they're able to show areas where there is both high probability of presence and high uncertainty.

DEU20: Okay, so they're looking at areas where they think the probability is high, but actually their confidence is low.

INT: yeah brilliant yeah so that's the premise of the variation but always there's less confidence in the area.

DEU20: Is this the idea that would help you target your areas for survey and so from that map it looks in particular sections of Wales. yeah that would be the most ideal places.

INT: To yeah So those are the areas that you have confidence and great and again, this is a local point around well and.

INT: I would just ask on considering both models, or just generally and other than the sort of geography. Is there anything else, that you would add to these models to make them more useful to you.

DEU20: And I think at the UK scale it's Okay as it is because I’m very familiar with it. If you were to bring it on to somewhere I didn't know for certain and even locally, you would probably need like it to be almost to be transparent, so you can see the OS map behind it.

INT: sure.

DEU20: would be helpful and maybe place names that kind of thing I think potentially on a very local level. But I know that another second map kind of deals with this with the first one on a local level, I would have been interested to know where the actual data points where, as well as the predictions, but I guess that is kind of dealt with in the second map.

INT: I’ll just stop sharing my screen now.

INT: That these are just a starting point yeah so not not the complete. And brilliant so i've sort of asked all the questions, but I wanted to, and was there anything else that you want to ask me or the thought I would have asked you.

DEU20: Now that is a difficult question… what we, and again, from my point of view, I was really interested in kind of second map it targeting future surveys and that would be incredibly useful and I guess. The other thing that Simon said that was different in this level of modelling is that things don't have to be on a grid base compared to habitat suitability modelling so it's more suitable for data that you've collected for another purpose or combining different data sets to try and do this way and just you know I guess confirmation that that is the case, and maybe why it's more possible with this model than it would be with the Habitat Suitability Model.

INT: I believe so, but I wouldn't be able to give you a concrete answer just because perhaps not the right person. I think it's better to give you a more concrete answer so I can find that out with the model is I lost them after this. I'll get back to you soon as I can.

DEU20: that's fine I might not understand their answer anyway.

INT: But I think I can sort of gather your interest in this project and so the next stage will be working with people like yourself to co design these models data output and would this be something you would be interested in.

DEU20: yeah definitely yeah.

INT: that's great. Was there anything else that you want to talk about.

DEU20: No and I guess the project is fairly local is that correct.

INT: So at the moment it's concentrating in sort of Yorkshire and London focus at the moment. Just to start with, I think, like I said we're having a more in-depth discussion next week. And then might be opportunities to broaden it as well that's fine and the models they're producing our national models is that correct. I think some mixture.

DEU20: Okay that's fine.

INT: yeah, so I think they're doing I think they'll focus on Yorkshire in London and then also national models as well.

DEU20: that's that's great. Okay anytime.

INT: Thank you very much for your time and i'll get in touch with you, with the answer to the question, hopefully.

DEU20: Thanks very much.

INT: Thank you very much bye.