INT: To just ask for consent.

c: yeah.

INT: Brilliant so just to start off, I think, maybe, if you just tell me the name of the organization you work for, any others that you're affiliated to and your role within that.

DEU22: yeah sure. I'm the principal ecologist at [County council], so the upper tier authority in [Local Authority].

And we also have a service level agreement with [district council], [district council and [district council] and that's for the provision of ecological advice in relation to planning applications.

INT: Are you part of a small team or do you work with lots of other people.

DEU22: yeah so our main team is part of growth and heritage services so we've got strategic planners and sustainability type officers, archaeologists, landscape architects and then as myself, and one other ecologist.

INT: Have you been involved in large scale projects or more small-scale projects.

DEU22: Yeah so we can get involved in some quite large scale projects in relation to planning or planning development, and so we do a lot of minerals and waste so quarries, sand and gravel and hard rock quarries as the determining authority and advising. And highway schemes so certainly road schemes, highways maintenance, bridge maintenance and then for some of the work that we do with districts, we do some advisory work on the district local plans so we've been advising [district council] on the ecological assessments that they do when they get their call for sites for the housing allocations coming forward and any sort of new towns or new villages and the sort of the strategic approach to those.

INT: So, I think, maybe I’ll move on to the species data that you use and does this focus on single or groups of species.

DEU22: It very much depends on the application or the project that we're working on, so when it comes to planning, it tends to be very focused really on the legally protected species that are particular sort of trigger points or constraints for developers, bats, great crested newts, otters, water voles and increasingly sort of the section 41 of the NERC Act, which can have less well known, but sort of starting to, particularly I would say on the major schemes section 41 species, as opposed to smaller projects, household type applications and it does tend to be sort of habitat led I think it's fair to say so, you know very much consultants and ourselves are looking at the types of habitats on site to identify whether there's a need for a more specialist survey. Whether that's things that are a bit more intensive and particularly needs are planning in from their client's perspective so things like a suite of wintering bird surveys need to go with all three of those winter months particular terrestrial or aquatic invertebrate surveys, for example. So, looking at the types of habitats, that are present to see whether there’s likely to be. We've got to try and be reasonable and proportional and the things that we're asking for we can't ask developers to survey for everything that you know might possibly be present in North Yorkshire so we try sort of home in on that we’ll use our own knowledge of sort of species distribution across North Yorkshire. Working with the data Centre at York, but I think it's sort of it's fair to say that you know records are quite underrepresented in a lot of areas so there’ll be a lot of bird data for example lots of bird surveyors and bird recorders still submit their data probably less on the invertebrates and quite sparse outside of designated sites and sort of key interest area so outside of nature reserves sync sites SSSI’s, we do tend to find that records are quite sparse so it's quite difficult to rely on those. Those are the sorts of groupings and the sorts of ways that we sort of think about which species to include in our decision making.

INT: Sure, in terms of you just mentioned, there about the SSSI’s and the sort of record data there is that because of the restrictions that are on there or collector effort.

DEU22: I think it's a little bit of both, so I think there's often access and interest there you know people like to go and record where they have a good chance of stumbling across whatever it is they're looking for whether that's birds or botanically and that tends to be a reasonable sort of botanical record, for SSSI’s, so you tend to find a little bit more data in and around those. It’s the same for nature reserves and so I think it is, is a little bit of both really is bad legislative protection and also they attract people to go and survey them.

INT: And in terms of the spatial extent of the species record data that you focus on is that predominantly Yorkshire, I guess.

DEU22: yeah predominantly North Yorkshire, we potentially look at some of the boundary areas if we were doing some larger scale sort of strategic work. I know that Simon works at the data Centre, the north and east Yorkshire ecological data centre, [Name] works quite closely with West Yorkshire ecology, for example. The sharing of records on the boundaries, if we were doing something more looking at sort of ecological networks and sort of spatial planning.

INT: That’s great. Could you talk me through what use that data for does this inform any decisions.

DEU22: yeah like I say predominantly the data helps us to target any concerns that we might have in relation to the development that might get missed in a sort of standard walk over survey or a standard phase one habitat survey that would maybe be looking for signs of badgers, great crested newts. We'd be maybe looking for, I think you know, particularly sort of things like waders and wintering birds we would be looking for habitats that support those or proximity to sites for things like invertebrates we would be looking at maybe sort of brownfield sites or open mosaic habitats, sandy substrates things like that where there might just be something that wouldn't necessarily be picked up in a standard survey, where we might need to just to focus a little bit more effort or if there's you know if there's freshwater streams coming through the site, again, we might want a little bit more focus there crayfish and obviously invasive species as well we haven't sort of talked about but, again, we'd be looking to identify if that was a concern for the risk of sort of spreading. On the flip side of it and on the more kind of future planning and thinking and looking forward we're now starting to look more at with the environment bill coming forward this biodiversity net gain and any compensation areas there's a lot more focus on networks and habitats of connectivity, the climate change and trying to focus a bit more on that kind of general white space outside of those designated sites so I’d say we've got a lot of information about what's going on in those very small areas, but actually we really don't know what's happening in the areas between those and we sort of know that moving forward, there are going to be local nature recovery strategies that are going to need to cover a whole areas. Those are kind of spatially mapped so again, we need to start to think about and I think that's where it becomes a lot more sort of technical, we need to really understand where different groups of species are, how far they can move, are they moving, you know things like climate change and records, invertebrates that we wouldn't have expected to say in North Yorkshire 20-25 years ago, actually, we might need to start to plan for and that will help us to plan out of habitat connectivity and so it connects live networks of woodlands, for example, or wetlands. So that then we can try and prevent breaks in those networks through sort of inappropriate planet in inappropriate development. Or we can at least try and accommodate them and also when we've got investment for the project so we've got investment through developer funds from something like biodiversity net gain, we can target a loss in one place with actually enhancing something in a kind of strategic part of the network for those habitats and species, rather than just something anywhere that won't necessarily contribute, so I think that's more where we're going I think it's fair to say we've probably used data as a kind of constraint check in the past where we're going now is and it's very much moving a pace at the moment is actually trying to look and be a little bit more forward thinking a little bit more strategic in our in our work.

INT: Absolutely, and just on those sorts of the future planning side. With the biodiversity net gain and the environment bill things like that, with is the thing sort of alluded to it briefly, but will the approach be different, and will you have to use a different strategy.

DEU22: I think there will be a different strategy, I think there will still be the kind of basic legislative requirements to undertake and deal with, but like I say I think they'll be much more of a focus on exactly what that site, the site that's the focus of the development, exactly what that site offers in terms of that wider ecosystem function at wider network actually taking that piece of the heart of the network out what level of impact will that have further around and is that, then a reason for the development not being in that place. I think it helps developers if they know that, as early as possible, so if they can understand where the strategic network is they can hopefully avoid those areas because they know it's going to be more costly to them, more difficult they might not be able to put as many housing or employment units on or we might be looking for more habitat on site and then where something sits maybe just outside of that strategic network there's a good opportunity to look for where there are gaps in the network and use that investment from the developer to actually start to either restore habitat or create habitat in those areas so again, where we've already got an eye on the future of perhaps where we want to target, so that we can buffer existing sites connect sites. And at the moment we're really doing that, on a habitat basis, so I think we don't really have the species data and the understanding of species range and movements. And their requirements, particularly in light of climate change, so biodiversity net gain is all about habitat and habitat being used as a proxy for species. I think what we've got to be cautious of is that we don't lose at requirements for some species that have maybe got actually quite niche needs and specialist requirements, and I think we do need to sort of understand where they are and make sure that we don't lose those keeling's. I think that's very much the thinking that will be looking at and in using data moving forward and also using data to have a kind of record moving forward, I think it's fair to say, we can't really look to the past, unless you start going back to areas. We don't really have a kind of actually how much have we lost our gains in the last 20 years, so I think there's this idea of quite a bit of detail to understand the importance of a site and its position in a network. And how important that is, but also that kind of broad mapping, to be able to do what I think the environment bill is going to be asking, which is a kind of balance sheet of gains and losses in kind of broader habitat term so woodlands, grasslands, wetlands and obviously the target is to try and uplift and move towards having kind of more of those habitats better connected.

INT: yeah it's about with data you're wanting to focus more on site specific level, as well as a broader scale as well.

DEU22: yeah it's a bit of both I think they naturally work hand in hand together, and that would be part of the challenge really is being able to provide figures across the board so like I say across all of that White space where we haven't really got any and that might be quite crude it might be quite basic. In terms of percentages of certain broad habitat types and it might be as simple as woodland, wetland, grassland, URBAN and the percentages of going up and down, but actually then underneath that I think you know that there are certain areas in this sort of strategic network and biodiversity net gain metric talks about a sites position in the strategic network and it assigns a multiplier So if you take a site away from the strategic network, it will cost the developer more and equally if you add your compensation back in the critical part of that strategic network it kind of it gains you multiply so we need to understand where these important areas are in order to be able to do that and do those calculations so it's yeah it's going to be a sort of having something at both ends really the detail, and also the kind of broad overview.

INT: I think, just to quickly touch on it now. I guess modelled data can help in that sense.

DEU22: yeah I think it would, I have to admit, right now, I am one of the least techy person around to understand, the data Centre sort of does all of that, but from what I understand it's going to really help, and you can see things moving towards that, so my kind of first and main experience today has been with the great crested newt district level licensing which you may be aware of and that's why they're using survey effort and eDNA mapping existing known populations and then sort of the environmental parameters that great crested newts rely on to kind of come up with this sort of red and the greens of the heat map. So, sort of extrapolating that data to understand the likelihood of coming across great crested newts in a certain area. And I think with something like great crested newts it's relatively easy to do that, we've got quite a lot of data we've got quite a lot of knowledge on their requirements. And we come across them quite a lot in North Yorkshire so and also, I think we just we don't have the financial or kind of manpower efforts to survey everything within an inch of its life for every taxonomic group and so it's about utilizing those resources. As they've done in the great crested newts sites so utilizing those on the ground resources in order to actually allow in a model to give us the best sort of guest, and I understand that, again with models is that they gradually improve so as you add more data and you test those models that they evolve and they get gradually sort of better and better, so I think it's certainly something that I can see being used much more. And I think there are kind of the results of rules in inverted commas that natural England, for example, put out there, standing advice to try and guide people as to when a survey may or may not be needed. So, it's like with a great crested newts again, if you're within 250 meters of an unknown breeding pond, then you survey if there's a major barrier to dispersal, so there are all of these kind of parameters that could be fed into models and I know that [Name] and has been doing some work at [city] university with regards to bats as well and trying to model the best sort of attributes and parameters for where you're likely to find bats distance to water, distance to foraging and commuting habitats, to start to build up similar models so yeah certainly think it's something that will be extremely valuable for both sorts of the planning of the networks and the importance of certain areas for species moving forward, but also it helps us with justifying asking for something so if we're asking a developer for a particular survey and we can justify why using a model and existing data that that then behind that has reasoning, so you know well it's because it's within a certain distance to these woodlands or these wetlands, then I think again that helps to sort of confirm and justify the position that we're making and potentially saves time and you know it potentially save us time, rather than having to seek out and make those decisions that if there's something there that kind of bounces that information back to you to kind of flag up then again the consultants could be using that much earlier stage with their clients before it's even getting to the local authority because quite often, by the time they come through to the local authority for planning applications it's quite late in the day and they're quite reluctant to start going back and changing things or adding in additional surveys.

INT: Brilliant you talked about utilizing resources and manpower and would you say the replicability of surveying is important as well.

DEU22: yeah I think is, certainly when we do we do this sort of mainly habitat, mainly botanical surveys for the local wildlife sites are important for nature conservation. And you know there's a standard methodology for that, and I think that's really important, because we need to be able to compare both against the thresholds and the criteria for epicyte qualifies but also over time it's quite important, so using something that standardized like a phase one methodology or the next stage and VCs in quadrant sampling. Whoever goes out whichever surveyor goes out if they're skilled and experienced in that methodology will hopefully produce the same result, so that if something's changed you can kind of you've got that level of confidence that actually is a real change it's not that they've surveyed in a slightly different way. And they'll always be some flexibility, but even down to the you know the time of year, you know, will always try and sort of survey the woodlands in April, may well you know differences between years you know you guys are saying what London first week in May one year and first week of May. And another year and actually again the climatic changes mean that it can be different, but I think, as far as you can control surveying in nature, then that's quite important in terms of my say replicability in order to know that the changes that you're seeing down the line, are true changes and either species distribution, species abundance or habitat coverage and the different changes in the percentage I think again it works at the detailed level and it will it works at this of high level why we're just looking at broad coverage.

INT: Excellent, so I’m just going to move on to your data requirements now So where do you obtain your data from.

DEU22: So, our data is partly held in house and certain data we've got available, but the majority of our data is with the north and east Yorkshire actual data centre and then we have a kind of an annual agreement to access that data as an when we need it and that might be an individual request for a sort of a planning development site, or it might be a broader and we get like an annual GIS, for example for all of their local wildlife sites that if there have been any changes, and we can have it on a set of constraints layer so there's a again a range of services that we that we might require.

INT: A new start on an exchange sort of agreement, so you can like two ways.

DEU22: yeah yeah absolutely so data again I’m not quite sure exactly how much data, there's different aspects so again things like the local wildlife size data goes to them I think it's fair to say that there are probably sort of planning application data and other data that's may be collected, as part of different Council operations that could probably go and I think that's the kind of resourcing matter at both ends, I think it's fair to say.

INT: Great. And the format that it comes to you is that a real product or has it been processed in any way at all.

DEU22: yeah it's mostly been processed so for example, something like the local wildlife site data is held in in a mapping system and then all of the species records are held in a kind of recorder type database. But then when that when that kind of comes out to us, it comes in a kind of like a form something a citation something that looks good enough that you could give it to a developer or give it to the landowner and then understand it and the records that come on a site basis again you'll get a boundary and those are those are more like a list a kind of an ordered list. We don't we don't tend to have a need for raw data from the data centre, it tends to come to us and a product touches that quick and easy to access and that's because again they’re used to sending data to consultants or two members of the public, where they need a kind of a reasonable interface, and then like say we're getting GIS layers as well.

INT: Great. And do these come at a different resolution at all and does this differ for different purposes.

DEU22: yeah I suppose it does like I say we get some site based data across the entire county and I think the resolution in terms of species depends on how it's been collected. So I think the species data that we get is pretty much as it arrives with them, so it, you know it might be a very old record. That only had a kind of partial grid reference, it might have just had a sort of one kilometres grid square attached to it and, equally, it might have been a kind of quite an intensive survey effort and the data is very, very fine resolution we know exactly what was what was collected from a kind of six figure grid reference, so I think it very much depends on how it's arrived with them and how it's been collected and I think it's fair to say that the fine resolution data is more beneficial it's more valuable for us again if there was a single record from 1986 and it was somewhere in that five kilometres radius it's a little bit more difficult to justify then if we've got you know records from records from five consecutive years, exactly within that site or directly adjacent to the site, so it certainly more valuable to us, the finer the resolution.

INT: Also, the guessing the timeliness of the data record is very important as well.

DEU22: yeah the more recent the better again if you're looking at change over time, which isn't something we really do for spaces at the Council level. But if you know those old records at least give you an indication that something was present, over a long period of history, but actually for us we're really looking at the much more recent records.

INT: That's great. You talk about this might seem a silly question, but you talked about how you receive a processed product, do you yourselves do any additional analysis of that data.

DEU22: No, I don't think we do most of the time we're just using it to sort of inform a judgment and I don't think there's any particular time that we would process, I think, generally, the data centre are so good at what they do, if we want something to be kind of more resolved or we want further analysis so actually we just want them to send us all of the sites which contained an mg five grassland a particular community, they will be able to do that, you know, in the time I could click my fingers. We don't have those sorts of skills in house. And they do so, generally, we would go back to them if there was further processing, that would be useful to us.

INT: yeah sure. I would then just ask how you deal with data gaps and how does this inform your interpretation of the data.

DEU22: I think, in a way from it from a planning point of view data gaps are relatively easy to deal with because the onus is on the developer to sort of prove to us that something is absent, rather than us having to prove that it's present. And like say we use habitat as a proxy generally the records can help and help to justify that decision, but ultimately, we can sort of push that back to the consultant to provide us with the evidence that's missing. When we're looking, and this is kind of a new area of work really and it's something that's been raised as a concern. When we're looking at more sort of forward planning, the environment bill, biodiversity net gain those gaps do concern me and they do concern us, because we don't at the moment have a way of doing those broad calculations, we don't have a way of sort of scientifically setting out where that strategic network is so the way that we've always looked at networks in the past has been a group of similarly minded people sat around tables with giant maps on them sort of drawing lines and making best guesses using people's knowledge. And I think really moving forward, we need to be a little bit more scientific and a little bit more justified particular if it's going to cost the developer more to compensate for a site that sits within that strategic network that we need to be able to justify why that's in there, either because it holds I think it's easier to say when it holds that habitat, now that we can sort of say that it's got that value. And it's there, but actually when it's a gap that we're trying to close it becomes part of that strategic network, but actually what's there at the moment might actually be quite poor but it just particularly important in that sort of future connectivity it's going to be really important, I think, to have that data to back up those sorts of decisions to be able to very clearly demonstrate why certain areas of land that actually at face value don't appear to be very valuable. But if we lose them, it creates a major barrier to those sorts of network so we've been exploring with the data centre and with other local authorities at two tier at the moment with the county and the districts and looking at biodiversity net gain. And then the network mapping that's needed and the reporting that's needed back to government about your gains and losses over five-year period. We need to, we need to work out what data we're going to need so we're working with the data centre at the moment to look at different solutions to. And I think it's fair to say in the beginning, that might be quite simple and quite crude like I say you know a few habitat broad categories, so that we can at least get something in place. But then gradually sort of refining that as we go and we're in a little bit of a period of time at the moment, the environment Bill hasn't gone through we're waiting for a lot of guidance we're waiting for a lot of advice from natural England and DEFRA about the local natural recovery strategies exactly who will lead on those. And what will be expected, will there be any sort of investment from government to help to develop those yeah data is like top of the list, whenever we're talking about it.

INT: That's great and you talked about sort of scientifically backing up. Would you say that's even more important with climatic variations more prevalent now and so that knowledge is perhaps disrupted.

DEU22: I think it is, I think we need to start to think about this of the climatic differences and the changes, even things like how invasive species and moving as well, and also how things like plant diseases so ash die back was a critical one in terms of how we look at woodland and woodland structure for bats, and what we may be would have thought of as a sort of a typical woodland, for example, an NBC type in this part of the county actually there might be a need to start to change the think and some of those areas and particularly when we're thinking about sort of filling in some of those gaps, so you know what types of species, might we want to be planting. And I think we do need more knowledge on that, I think we can make some relatively informed decisions at the moment, but actually we want to be kind of beyond that we want to know with certainty that what we're doing will be sort of beneficial now and sort of moving forward.

INT: that's great. So, in terms of things like this goes back to the data gaps little question, how do you consider confidence accuracy and precision in the data.

DEU22: And I think it really comes down to what we already talked about so age at the sort of whether it was part of a kind of bigger program or a bigger survey, so it was a YNU, Yorkshire Naturalists Union sort of specialists out on one of their field meetings it's a high degree of confidence there so and the sort of the age, the kind of the recorder, you know so who submitted the data and the resolution as opposed to a record from a long time ago we don't really know quite where it's coming from, or who the person was and it was somewhere within this grid square, so I think it's those things really age, competence of the person who submitted the record hasn't been sort of checked and the resolution that we can pinpoint really where it comes from it's not so much of a problem with habitats, but I think for specialist species and it's really it's going to be really valuable to have that kind of fine resolution on those.

INT: that's great. So you talk about in terms of your data communication, you talk about planning applications and are there any other sort of say reports or documents that you sort of share your data with.

DEU22: Planning applications is probably the main one that kind of the local wildlife sites surveys is the other key one and we do have some in House so things that don't require planning applications, but are still sort of county functions things like bridge maintenance, flood management, flood works those sorts of things where we’re called upon for our advice that data would be used and but it's yeah main planning is to have the main function rarely forward so spatial planning and then sort of development management.

INT: yeah that's good. So just the last bit I’m just going to focus a bit more and modelled data, and so I think we've obviously alluded to it quite a bit and but how would you feel about using model data and how would this affect how you interpret data.

DEU22: I think it's a bit of a learning process really I think it's about understanding, I think what's behind the model I think that's from my point of view it's understanding exactly the same as if you receive raw data, you know we're talking about the age and the competence of the person it's what's behind the model. A model is sort of extrapolated data with certain set of rules and ready requirements it's got to have a core of decent well obtained recent records in order to undertake those kind of all the techy bit I don't understand to extrapolate out those rules and requirements you've got to have something that's this kind of decent, to begin with, in order to do that, and so it will be about understanding, I think if that confidence is there that the data is drawn into it or at least being honest that this is an early model that the data that's gone into it isn't perhaps as good as we would like it to be, this is what it's showing at the moment, then it would be how you would how you would use that so you'd use that to generally inform your strategy as opposed to maybe standing up a public inquiry and absolutely being confident in it so you'd use it at the kind of starting point to help you work out what you might need to do what surveys, you might need to do on site or what your strategy might be, and then gradually as the modelling grows and more data goes into it, then the level of confidence in that model increases and to the point where actually you may you may be in a position where you're utilizing it and you're using it to defend the decision that's been made, and I think it is a process that takes time and as its as its tested and you see the kind of the outcomes, so how good is the model at predicting that you can sort of start to see that actually if it's got high percentage rates of being correct, as you move forward, then confidence in it is much higher, but I think we're at a stage where we've got so little data about such large areas that you know modelling I think is the kind of best way to go even if it's not the best model, to begin with its giving us a starting point and actually I think what it will do is it will start to help to identify further gaps. So even if the what the model does is identify gaps or identifies aspects of the model that are not great at predicting or we don't have a high level of certainty that actually could start to put some effort into supporting whether it's that particular taxonomic group or it's a particular geographic area of the county that's just we just don't know anything about and we it's too much of a push to extrapolate into that area then we've got some resources or we can obtain some resources through project funding. We collectively as a community that we can put that into that area to then go back in and the model becomes better again. So I think it's sort of twofold really, I think you've got to embrace the model route in order to then be able to otherwise, if you just put it off and put it off we’ll still be in the same situation. In 10 years we might have more data, but we still won't have data across the board so I think there will be a reasonable degree of confidence in the models, because I think they've got a good kind of background in other areas, it will just be a case of being very open and honest about what the model can do and what the model is still working towards.

INT: that's great and so modelled data, in essence, will help, as you say, to fill those gaps, but there will be constant updates of the model itself to determine regularly where those gaps needs to be addressed.

DEU22: yeah and how successful so for example, where surveys are being undertaken like I say with the great crested newt one, our surveys or undertaken we’ll then know more about where great crested newts are and we can compare that to the model well yeah that was a red zones, we expected to find great because to me that's great it's predicted or actually we're finding a lot of great crested newts in these green areas where we didn't expect to find them so we're actually need to, we need to really address that and actually now that that green zones, now the commander because of the surveys that have been undertaken or actually, great crested newts it's just spread they've been very successful in that area and their distribution has spread and the model, the model keeps adjusting today's moving parameters, because ultimately we are in, in doing all of this we are attempting to expand the range of a lot of species so we're attempting to reverse the decline in biodiversity and actually expand and cause net gain. That we actually want the model to change because we want to, we want to demonstrate that we're now finding the species that were very limited in range over a broader area. So, I think nature is a dynamic system, and therefore the model approach works quite well because the model is also dynamic.

INT: That's brilliant. That's great Thank you. So just as the final bit I’m going to show you some examples of modelled data and sort of ask if you can interpret them and then whether you find them useful. So yeah, I'll just share my screen now. So hopefully that should pop up. Are you able to see that is that zoomed in enough.

DEU22: yeah yeah I can see the top tier.

INT: yeah that's good yeah brilliant, and so we’ll concentrate on the one on the left, but then, if you can see my mouse. Brilliant, and so this is a raw probability distribution for a five-spot burnet moth. So, I think just to start off with I’ll just ask if from face value, are you able to interpret that and whether you find that useful.

DEU22: yeah I think so from my own knowledge, I would be looking at the higher distribution is the darker colour the green the green colours and the lightest of pinky colours is low or next to no distribution and from my background I prefer the axes to be labelled. Yeah just because you automatically go to have a look to see what was on the kind of the X and y axis. I think immediately at face value, you can see the distribution.

INT: that's brilliant and you'd find this sort of model useful.

DEU22: yeah definitely it's almost akin to a kind of distribution atlas. So you know the old fashioned you read a giant book on the shelf and you'd go to that particular species and you'd look at why the dots were on the map and see whether they're actually even exists in our county or ever has, as well as looking at sort of early record, so this is kind of doing the same thing, it gives you that immediate I wouldn't be immediately concerned about this species in North Yorkshire, for example, I’d be thinking well it's going to be a while before that reaches us that's not one for us to be adding to our priority list.

INT: So that's brilliant and I’ll just scroll down for the one again on the left here, so this is again a raw probability distribution model but around a point in Wallingford in Oxfordshire at a five-kilometres scale. And would you find this sort of a sort of more localized scale useful as well and are you able to interact with it.

DEU22: yeah definitely, so I think this one, in a way, is easier to interpret it because you've got the grid references. That if it's an area that's reasonably local to probably able to you know pick out any sort of key landscape feature so, for example those paler areas where kind of urban areas or particular feature if there was a river running through again, you can see, the higher the areas of higher density and the areas of lower density.

INT: And just concerning both of these on the left, would you add any extra information or change anything to make it easier for you to interpret.

DEU22: I don't think so, I think it does what you want it to do at the scale that it's represented at, for example, at the Great Britain scale or at the closer in scale as a specialist using it, I think it's fine I think if it was going to be used as more of a sort of public document then I think you need a little bit more in the way of referencing or maybe you'd want it overlaying a base map also with some points of reference. So it very much depends how you're going to utilize it I think if I was using it internally that this is, for example, a GIS layer that I could navigate to an open up, then I probably have lots of other layer behind it, so I could have a look at the aerial photo and then have a look at this and I could use it, along with other data for whatever those purposes were whether we were looking at planning application and the application was right in the dark green or whether the application was in the sort of pale pink that would give me that would give me an indication as to whether I was looking for survey information or looking for mitigation or compensation in relation to that particular species.

INT: I'll just move on to the one on the right now. So, this is a variation model again for the five-spot burnet moth and are you able to interpret this model, and do you find it useful.

DEU22: I find that one much more difficult to interpret than the distribution, I'd need to have it explained to me what it was showing.

INT: No problem well I’ve got a description for the model, so I’ll just provide you with a bit of the background and how it was calculated and perhaps that will have a deep understanding of it, and so the variation is calculated using a sample of the background data to give a range in the predicted probability. So, for this model, it was run 10 times on 10 different data samples which include some points where there are targets species records and some where there are records for other lepidoptera species, but not the target species. Okay, so in essence, the where the dark areas and you've got less confidence in the species distribution model.

DEU22: So you use the two together so actually what you're looking for what you're looking for on this one is the trailer colour in the same location where the green colour is really so actually if all of that southwest area was also green you be a little bit more dubious whereas if you focused on the southwest and then you can look over and compared to the other one and you can have a reasonable degree of confidence that that model is predicting correctly so yeah that helps to understand what that one’s showing.

INT: Brilliant, would you find this useful for your work.

DEU22: Yeah I mean, I think immediately we would go to the distribution one for that kind of quick, is it there is it not there? The one on the right would be the one that we would be using to determine whether actually we're confident in it, along with all the other kind of decision-making processes, having a quick look at that one yeah what we're confident in putting the model forward as justification for whatever piece of work we might be doing.

INT: that's brilliant and like with the ones forward to add anything to these models, this one is just on a local scale again and the variation, but would you add anything to these models. But just the sort of OS base map for like a lay perspective.

DEU22: yeah and that kind of that short description that you gave was really helpful in just understanding the difference. I don't know whether using different colours would help, so you don't immediately think you're looking at the same map, so your eyes go green’s good on the left and actually green is not so good on the right. So actually, it's quite difficult if you go for a quick glance that you want to be making sure that if you're using them on a day to day basis and you're chopping and changing that you might be looking at the wrong one whether it's a like a black on white or Gray scale or just a completely different colour range, because I think green gives a very clear indication on this one whereas actually green gives different information, so I think that will be mine when you're busy and you're really quickly and also when you're trying to explain, so if you're using the data to justify it to somebody else. And again, you're sort of saying well the green areas demonstrating to us that there is a high distribution or high likeliness of distribution in this species to them and then you might say, well, green is on the other one.

INT: slightly confusing.

DEU22: So, I think it's again it's about who you're who your target audience is and making it as easy for them to decipher on the go really.

INT: yeah absolutely that's brilliant. So, I’ll just stop sharing my screen now unless you had any other comments on that. that's great. Well that's everything that I wanted to ask which is great, and just before we finish was there anything else that you want to ask me or you thought that I would have asked.

DEU22: Now I don't think so I was, I was completely sort of open to what your questions might be and it's a really interesting sort of topic area for you to be investigating with the other partners so now I don't think there's anything else that I would have expected to add.

INT: That's great so we just ask is my final sort of wrap up question and the next stage will involve working with people like yourself to help co design these models so with your input and perspective and would this be something you'd be interested in at all.

DEU22: yeah absolutely, I think, as somebody who would be more of the user end of the model, as opposed to the either inputting the data or undertaking the sort of the baseline survey work, certainly, I think that perspective would be would be good.

INT: that's for that. Well, if there was anything else that you want to say thank you very much DEU22. Great speaking to you and yeah I’ll keep in contact with you have any developments that we have.

DEU22: Okay that's lovely.

INT: Thank you very much.

Take care.