INT: Okay. So it should just pop up on the screen. Brilliant. So just to start off with a bit about your background. So I know you work for [wildlife charity], could you tell me a bit more about your role within the organization.

DEU17: Right. I’m Chief Executive there so I tend to have a like a higher-level overview on the detailed engagement and all the schemes, although data monitoring are very much my hobby horses I must admit. I’m perhaps more disproportionally excited about those than about other areas so I’m very keen on looking at that. I’m particularly interested in the interface between policy and science so we're actually applying data and also my concern is about where the organization it's how it functions and that wider picture of the importance of data is part of defining the role of an organization to some extent, I suppose is a way of putting it. If you weren't doing it, you know what gaps, how does that impact on our business and all the rest of it, so I will see data very much as a tool for conservation, but also looking at it as a component of an organization's integrity in our business so that's sort of where I’m coming from. My background, I did a PhD on smooth snake, so a slight scientific background and I also worked for [nature environment public body] as their reptiles and amphibians specialist and obviously part of that was around data stuff, and have been involved over timing engagement, we set it up with various monitoring schemes, usually at the high level world and the detailed level. So we are very much focusing on the rare species reptiles and amphibians, but more recently to make your got that widespread species in element more transparently identified is what we're doing as opposed to being somewhat below the radar, which is what it's tended to be.

INT: That sounds great. So, I’ll now move on to purposes for using species records data so and obviously, I can gather that you focus on amphibians, and reptiles, but in terms of spatial extent, how does this concern with you as an organization? The spatial extent of the data that you use.

DEU17: I mean, I think, just to let you know I’m also involved with this [nature conservation] partnership and [nature conservation]is a group of species, NGOs, which includes RSPB, bugs, bumblebees and a few others, and through that we also look more wider than just the species individual species and the ‘[nature conservation] project’ I don't if you're aware of that, which is a big lottery funded project that's coming towards the end now. The big emphasis there, was looking at cross tax or engagement, because obviously people tend to think of these species as silos. And a lot of us were writing projects we were particularly engaged with the Merseyside ‘[nature conservation] project’. We’re involved in a project down in [place] and the theory behind that is that we don't just look at one species are in one taxi in that environment we look at them much more broadly, so we are looking beyond that, so we do have experience of other species and at some point, I might remind me to mention work has happened in Jersey, which one of my colleagues has been working on which involved multi species mapping as well. In essence just before I answer that question, among other things, the way we like to look at species conservation and it's probably true for anything very naively is if you know what you've got you know what you want. You know how to get there, or, conversely, the reasons what's pushing you back into the pressures and threats going in one direction, and the majors pushing in the other and you monitor it, that to some extent defines what we're about. And the advantage of that very simple model even if it sounds bleeding obvious in many ways, if you look at each component what you tend to find is that, historically, there was a great focus on the doing, the getting things done. And you might find this when you talk to lots of nature conservation organizations, they focus and say will Agri-environment work, does this happen, is that going to do any good. And they're sort of missing a couple of important parts in that equation is. Where are you now, but more importantly, what are you trying to achieve. And we're involved in a much bigger project now, around individually and sort of concept of stable conservation status, that said it's very much been embedded in the European habitats’ directive. It started off in the Bonn convention, where the relevance of that is twofold; one is it the components of looking at species status are fairly well spelled out and there are key elements there around the range and distribution. You know, so you need a big range and he did that's part of what you too, and that you have a certain population level. And you have sort of certain habitat conditions and you're aware of the prospects and the impacts on the species. And we've tended to use that quite a lot as a framework for thinking about monitoring and, in part, by definition, and monitoring been you know working against the target status. Because we’ve liked the idea that's defined very much and habitats directive of working to when these conditions are favourable and defining what a favourable reference values for each of those parameters. And the advantage of that, it means that you wouldn't be tied in your thinking to the same assumptions. Okay, yes, because there's 1000 of them. You'd have to say there are thousands of them, they were occupying a good range their habitat is in good condition and you start layering on these ways of making assessments of first status. And all of those components of the status are important because, otherwise you'd miss the point, the more we came to look at it, and what are the components of status that meaningfully define what it's like. Okay, we know we've got a lot of them, but are they breeding? Okay, there are lots of them breeding. Do they apply the range they suggest they do? What else do we need to know about them, but if we say yes, yes, yes, yes and yes it's in good condition and I was involved with the [organisation] looking at this stable conservation status in the days when we used to be part of Europe. Because that is one of the basic parameters when people report on this sort of 6-yearly cycle, this article 17 reporting cycle. They should not only be saying what status they're beasts are in but for each one of those parameters that haven't defined a reference value to see if they have achieved it or not, what they call their fable reference value. So is the spatial impediment important yes, it is for two reasons, one is that it's very much a component to this status assessment. But the other part of something required to think about is often the status, so this spatial element is often more important for the practitioner. Because one of the things if you look at a national level, if I was worried about, Should I put smooth snakes on the priority list all I really want to know is what's their overall status are they threatened and are they declining. yeah Okay, yes and yes, priority they don't really care where they are, what they’re doing or the impacts where we're seeing it from the other end of the telescope and where we are involved in projects if this district licensing work I don't know if you've seen any of that where basically great crested newts are a species that are pain in the neck for developers. They're turning up all over the place just where they don't want them so there's a sort of a simplified licensing system which allows you to lose them in one place, providing you accommodate them somewhere else. Obviously, there's a big risk of you end up this picking all up and dumping them somewhere else so we've had to define success for you to say how much you. And that's something in this whole district licensing approach and the very key elements behind that are the spatial mapping and spatial modelling. Because the whole thing is based on risk, are you in a zone where you're likely to bump into newts in which case you need to do more, pay more. Or do you pay less and that’s done largely through modelling of distributions and the whole associated stuff with that, so the district licensing stuff has been quite a nice demonstration of how you use this or spatial modelling to build in to very much the status assessment and how you're talking conservation work and then, if you wind right the way down to the site level. The bit that matters to the site manager, where are the adders is because, if I know that the Bank to their hibernating on. If I remove that completely I walked away as simple as that so I’ve got to keep these small so we tend to find that the spatial scale tends to be very if, like practitioner led, local policy led now when you put things we've as opposed to the other, and the sketch, which is the High Level policy which is generally more high level status and trends, so we can tend to arbitrarily.

INT: Okay, in terms of the you mentioned about the statuses and components. Is that, correct me if I’m wrong, talking about criteria that needs to be met.

DEU17: yeah I mean the actual way it's worded in the Habitats Directive which we've tended to use as a guide because it’s pretty clever because it was stolen from the bond Convention and it took some people quite a while to work it out for us 40 years ago, probably signed in 1979 so it's taken that long and it's now mainstream thinking in [nature environment public body] as of about two years ago. But the way it's worded is something like, the conservation status of species is in suboral parts, you know that's what it says all influences everything that's acting on it, whether it's biological condition in a status and condition.

Or the influences, such as hunting, shooting, fishing, building houses, climate change, so that's your status. And then it words, in the next part it says, and you know there's the status should be considered favourable when things such as the population dynamics data indicate that it's population is stable or increasing over time, so it brings in so what it's doing is it's articulating goals in word form. And it sat there quite nicely and because nobody needed to worry about it for 20 odd years and then, when people needed to report the habitats directly, they said well Okay, it says here that the population is stable, how do we put that into a number that you can put into a reporting things to see if you passed or failed that test and that's when these idea of the fable reference values came in and what they've looked at through this is when you look at the range of species that are covered by the directive, which is immense. There are some things where you can sit and say right what we want is to have 32 breeding pairs of wigeon or whatever that happens to be. But then they started looking at wood boring Beetles and also thing he can't even see them can you see them, let alone count them. And how do you set these parameters for that so there's been quite a lot of discussion over time, both on how you measure current status. You know that's a bit of a journey of what is the current status of the wood boring Beetle, which is a Habitats Directive highly protected species, which is apparently diverting motorways in France for them to know. Is that kind of impact his head and I don't even notice there you know it's living in a way that oak tree, so how would you actually tell me if that status is favourable or not. So they've had to think laterally about how you define the actual status, how you measure that and how you'd set and, in some cases they've admitted they couldn't do it, they just have to it's going to be greater now so we just put greater down so clearly as unfavourable at the moment. In others they were able to come with all sorts of different metrics and one of the more common species metrics for the population, where you can't count the damn things. Seems to be something like the 1km Square. And they use a spatial measure as a proxy for population. Because it's relatively easy to get your head around how many squares are occupied, but if you had to count me smooth snakes there are that's a lot more difficult so we are looking at, sometimes with these major sort of slightly overlap, because you tend to say, well a 1km square is more of a distribution measure that. So, you do tend to get people looking at, but the idea is that you get a parameter to describe each one of these or series of parameters. That you know if you can tick them like an MOT test, if you pass each one of those. So that's how it works, it’s about putting parameters, it’s about putting numbers, it's about some real data, if you like, something go out measure and then compare that against what they call the favourable reference value for those parameters. It's quite a nice framework for thinking about monitoring and surveillance it's not be all, because obviously it's not intended to be applied, because you then look at it sign it will actually we just had a workshop to look at with you can do it a site level. And that's something that we're doing with [nature environment public body] to look at how you start setting these targets, if you like, and favourable conservation status isn’t the target it’s an ambition. Pedantic terminology around targets being policy driven and therefore time limited, so they've never had the word target associated with SCS because it implies spending money. But ultimately, it's an ambition and it's an ambition that you use to base to set your targets and that should have a spatial element and certainly when we're looking at reptiles and amphibians. Because we’re trying to articulate what we were trying to achieve, the description is more likely to be sort of a spatial one, it was probably some like we want to see robust populations throughout its range, you know that's probably the driving factor, the fact that we're losing the range is probably the biggest issue. Rather than talking about individual population status or you know, like that are not numbers of individuals, so you know the distribution viable populations. It’ll probably be the bit that floats my boat more than the number of individuals so that's another way we look at this picture with them and then to.

INT: Okay, so following that then would you regard completeness of data over accuracy.

DEU17: I’m going to be cavalier, so I’ll probably say yes. But I think there's obviously various ways of looking at, because if you're just looking at a number of occupied squares, you can do on a sampling basis and you can scale up and you've got 13% multiplied by the number of squares and all that kind of stuff. And that's where obviously you need the accuracy, you need to make sure you've got good presence or absence data if you're going to do that, except to make it scalable. When you're looking spatially to try and say, well, where are these things, the tendency might be to go the other way, so see what we tend to look at is this sort of hierarchy between the national to the local you do see not only a different scale that you're working at, but you know, possibly a different level of rigorousness. I think you probably do find there's a sort of a hierarchy of different approaches but generally I’d like to get a feel that you know really what's going on. If you're looking at a spatial component is probably better to have rough and ready data on a map. Rather than something that is too precise, but if you're looking at trends and stuff you need to go to the other end of the spectrum probably.

INT: In terms of the data that you collect or use, what do you specifically use that for?

DEU17: For a number of things, I mean that basically we've got a range of data that's collected and a lot of it isn't quite as fit for purposes, we like and that's, you know as you really look at the way people have done surveys in the past, but a key part of the new monitoring scheme that we're trying to set up. Our surveillance scheme is around looking at trends. And I’d say what we've tended to look into the wall widespread species, so that will be looking at that more sample based that larger geographic area. That representativeness of sites, so if you get 400 sites, and this is where all the stats come in, is 400 enough and how many samples so that's one of the areas that we're looking to build on, we did a big national survey some years back, used to be under the name of [WILDLIFE CONSERVATION], national amphibian and reptile survey or recording scheme, I think it was then. On that particular thing looked at sampling sites, the difficulty, there was the method of sort of looking at different randomized sites, when people read the power analysis haven't got the basic you realize that it was such a stupidly large sample so it was very difficult to get something. So, we've re-looked at that, then, if you repeat your monitoring all the same, so like time and time again on the same site. It makes it more statistically robust you get away with a smaller sample so that's a big shift. The principle is very much the same it's about trying to work out. Although in the national thing was more about occupied squares now when we're more looking at changes within population indexes so you go away, to say that overall 50 sites, we found your net reduction of X percent in providing. So that's one thing that we want to look at is the trends within populations, for a national statistic the others are more spatially relevant here we like the idea of the one km square occupancy because it does the metric which is useful, but it also helps us understand where things are geographically. And the other element is to look at how you would use some kind of assessment of either the site level, and we do a thing called rapid cycle assessments or services, which is just an expert view of whether it's accurate or not. That's falling apart isn't it that one, and the idea that is when you've got your red site, so your red green and amber and it's failing because of something that you can then identify priorities and conservation work so it's all very much that point you made about the completeness versus quality. versus the other end of the spectrum, which is about trends which should be more statistically robust scientifically and again it's like different approaches. And so the trend data tends to be more about Status policy type into the spectrum, you know these pieces are going down the pan messaging versus the you know we really need to get so and so sorted out, because otherwise. We have to look at both in and again very locally, we use it for identifying sensitive areas on sites and for communicating with land managers what they have on their land and how to try to get running up the priority list they do more for our species and they previously did before.

INT: Excellent. that's great I’m going to move on to data requirements now. So where do you obtain your data from?

DEU17: it's a mishmash really, what we're trying to do is for the rarer species we basically do it. that's where we get most of the data from its work commissioned through us or by ourselves with [nature environment public body] working with us. To go away survey in quite detailed to look at those populations are. The natterjacks their current about 50 sites Just to give you some indication of that, so we run that monitoring program where we get volunteers out to go away and count the spawn strings and train them on and all that stuff. But as we move more towards the more widespread and as we look at the reptiles and amphibians such as the smooth snake they are occupying. it's basically heathland so it's not a huge range but there's a lot more, so we start from… a lot of it's collected by us, but others are collected by partners. And we've been running and this is where we making sure we're trying to get a much better data collection systems, make it easy for people to input that we use this is really helpful and if you know the ESRI to make our GIS life they've run, they also sort of produce products to allow people to develop data collection and so we've got this hub that we’ve invested millions in it seems a little bit more being spent on it, but the nice thing about, that is, it much easier system for people to put data in and get it out. And that is the new we feel like that's the new part and what we're doing now is really noticing that focus on how we're collecting data. And what we intend to do with it and the advantage of this because it's a hub you can also feedback much easier, so as well as putting your data in it you get little storyboards and maps and diagrams, and this is very much someone else's territory. So they get that data from there, where we get data from more widespread species varies at the moment the engagement we have with district licensing. And this is from great Crested newts is there've been particular projects set up through that sort of developer funded licence and where there's been a lot of a eDNA survey. In fact, [nature environment public body] had about 7 million quid from DEFRA to go away and do set up this thing and they spent a huge chunk of that doing eDNA survey of areas and in other areas, we were involved throughout other partnerships to get that so there's been a huge amount of presence absence data assuming that's exactly what it does show us but let's say it does for great crested newt and increasingly people say well what about this metabolic code in my work you're going to take the water sample. Why don't we sample everything that's in it, by meta barcoding and so, and I can see, over a period of time that this combination of volunteer led collective data and professionally run survey could end up producing a huge amount of information about aquatic diversity. I could see there will be a national network of about 1000 ponds where they sample everything and that really will give you a good baseline and it will be affordable. So, we've been involved in some of that otherwise we're looking at local data it can come from a number of sources and we end up with all sorts of data agreements with various local records centres. They are variably whether they even bother to respond and if they do respond what they’re prepared to charge, and if they do respond and do charge what you're allowed to use it for, so there are issues around that but certainly we do exchange data with them, there are local amphibian reptile groups. we've got a joint project record pool which is just the bucket for standard checked up in random records. If you've bumped into an adder or say yes to go record pool and it just goes into this and that's a shared project so got. And that's collected a fair amount of data, but some of these other local groups collect their own, but what we tend to find is it's the land owning body's, the national trust will have some of the really useful data for the rarer species. And, otherwise it tends to be on a project specific basis where we need to know great crested newts in London so we'll go to London record Center and say can we have some great crested newt data and then it becomes expensive and difficult even though they are great mates at the London record Center we don’t really like them and have done for many years. They are still a pain to get data out of them.

INT: that's great I was just going to ask you which one you found more useful.

DEU17: They’re very variable but it's down to the individual setup I mean certainly some of the records in particularly local ones we deal with on a regular basis. I mean comfort in North Wales, for example, our data goes straight in there, just because of strange historic reason it goes to them and then to us rather than us to go to them again. But it is not a problem because we work really well with then, and there just isn't an issue. Other record centers where we deal with them less than there is a more specific request. And then they’re trying to see if it’s commercial or not because there's you know, some people define commercially if you've got a grant it’s commercial you know, really? No it's not. You end up going through all sorts and we just set up a new project through that's lottery funded looking at smooth snakes and you seem to spend more time sorting out data agreements to partners and managing collecting data and that's probably a slight exaggeration. You know that there's quite a lot of thought goes into the data exchange.

INT: Probably a silly question but presumably the data, you collect is raw data?

DEU17: Yes, I’m trying to think if there are exceptions to that. I mean, some of the data we collect which I suppose is the environmental data from that we do some modelling so that will count as data, so we are involved in seta [mapping agency] God bless their cotton socks. CEH for things like land cover you know all that, so we will get that kind of data and the eDNA will be raw data we often get sort of habitat data that comes with that physical exercise habitat suitability in two cities, they often come in as part of that So yes, most of I’d say will be counted as raw data I’m trying to think if we ever use any kind of analysed data, other than that land cover obviously yeah I don't think we do.

INT: that's great. So what resolution of data do you use and does this differ for different purposes, I think you've alluded to this already yeah.

DEU17: It does. I mean, certainly in the modelling stuff I can’t quite remember the value and it needs to be sub hundred meters, but I think it might even be more precise than that, and certainly the land cover stuff tends to be 20-25 meters, I think it was 25 and now 20 or something so really if you've got resolution less than that it's like you're probably still sticking the dot in the wrong place. yeah we try to collect data as precise, the resolution as we can until we see typically and put GPS data or data off grid reference finder and stuff like that has really is inherent randomness sometimes but yeah generally we try to collect as accurate as possible. There might be exceptions, because one of the things we are looking at where we get inquiries coming in I’ve been trying to encourage. So if you phone up with a grass snake in my garden, you can you spend two hours talking about whether it is a grass snake or an adder or in all the rest of it. We have on a number of occasions and I’m hoping they give us their postcode. So we can then pick up at least we definitely know there's a grass snake in that postcode people generally don't mind that if you said, could you give us a grid of reference, they have no idea and it becomes a bit intrusive so there might be cases where you'd look to record at a different resolution. And we do have this [APP] thing that was produced I’m trying to think whether or not postcode is an option, there you know for people who don't want to say I live exactly there with rare animals in my garden. Generally where we might collect it at a greater resolution, we will not always show it at it.

INT: How do you deal with data gaps?

DEU17: Sometimes they stay gaps. The big driver behind the modeling is very much around that comes around trying to get something that allows us, so we have got a predicted distribution mechanism for great crested newts in the whole of England so that would include, for example, what that was produced in a number of different models, because you can just use a single one. But, in essence, that is a large data gap filling exercise because it obviously it's pretty packed you the data you've got but at least it gives us a feel for they’re like. Others, we are occasionally targeting stuff and that's increasingly what we want to do to try to target filling those gaps. And you know where we're looking into but we haven't quite gone as far down the line is you know producing maps of this is what we know about your patch, then you sit and say, well, I know there are [species] up there, so they're going to fill them in for you. There is sometimes you know bites you give you feedback. And people like to fill gaps so that's why they do it, I know, certainly, some of the local reptile amphibian groups rely on that quite a lot. 1 km square distribution and you realize your house with a garden with all these things you are sitting in an empty square so. Well, I didn't mention about data is the national biodiversity network, which is the nbn it's an interesting beast I’m not quite sure how useful it is because you end up come on how many pages of acknowledgment we had to give her a single dot on a map, you know you obviously all the data source you meant to acknowledge every single data supplier and it was something stupid like 20 pages of acknowledgment for one dot so one tends to think of this system is almost beginning to be self-defeating if it's meant to give you ease of access all it actually does is bring you a lot of issues around that and that was probably our data anyway, that we went in there in the first place. If you're looking at something that needs a little bit of a rethink, and I think the NBN needs a bit of a shot in the arm for different reasons, not that it's not a bad idea intuitively it's just I don't think it's as effective. And then you just can't use their new interactive map it’s never been useful feel but anyway that's might just be me. And, and I think that would be one point where we might want to use interrupted data is if we wanted to simply get a distribution map produced fairly quickly, then the things like the NBN would be the obvious place if they weren't making themselves not an obvious place to provide that kind of information.

INT: So I’m going to move on to data communication now. So, what kind of audiences, do you share your data with?

DEU17: The it's a range of audience, I mean we were we sort of started out years ago was our main points of influence were those who are land managers or policy people, so our main audiences would have been people like the government. Land owning organizations, they would have seen as our target audience. Who needed to know both of the high level of changing status but also what's important about their land and what they needed to do about it? Increasing now it is much more general and when we're looking at much wider group of people. Still wanting to influence policy so we're still going to want to look at those status thing still looking at the land owning audience so we're trying to find ways of communicating you know where things are which is you know around the whole idea about trying to make the website data, making the portal data more accessible and there's a lot of stuff there. Increasingly it is looking at a more general audience. Obviously people like a lot of trustees like to have status reports of things, but you know I said what's the point in producing the status report for our trustees we should be making these status state of nature. The [wildlife data report] itself there that aren't sure if you're aware of which is producing [wildlife data report] we’re part of that. So some of our data, not as much as we like, because it's you know not quite as robust, as that will end up there, I think it’s mainly adders and natterjacks that we feed into that particular process, so you know again that's the higher level stuff. And I mean we used to, and probably still will is the article 17 the reporting mechanism that was 6-yearly reporting cycle, we use data to feed into that so again, it was quite keen to hear that pragmatic level, as well as the policy and the reporting. They’re possibly our main audiences, other than the feedback loops that you need to try to keep volunteers and people engaged. To show that it is all relevant, otherwise you know they wonder why they're doing it for, so I think that's mainly it trends and stuff at high level policy in them or spatial extent.

INT: So you talked about your data going into the [wildlife data report], are there any other examples of perhaps, how you process your data does it go in other reports.

DEU17: Yes, trying to think of specifics, I mean. I say the big things have always been on biodiversity reporting, I mean we used to do what they call the bat reporting round every three years, they used to report at a national level and it went into their 6 yearly cycle went into the national report. We are looking to create our own sort of state of the nation report for reptiles and amphibians, looking at different parameters. We’re feeding to saturate and season and local sites definitely with the [nature conservation] projects which are locally based projects, they wanted to get the data to feed into local communication. Around what's needed for where things or how numbers are changing locally into that kind of stuff so it had a very local application. The other very obviously sees when they go into systems where they used in development control. And that kind of stuff is great crested newt. Along with all the other billions of records on crested newts, you know are used in that sort of local site conservation and defence and we will use it in that term that applied sense as well. I think, those sort of highlight the main points, and then there are more academic things that are produced. Just to mention the work [Name] has done, it is a contract we did with [Place] government. He looked at land mapping for 17 different species, very different species from fungi right through to mammals and a few reptiles and amphibians as well, and what he was looking at is the important areas of [Place], so he was mapping and basically you got a threshold is this area important or not, for the species. And then overlaid over the important areas for the different species and was able to say these particular hotspots are important for so many species so we're able to do that. And then looked at corridors because that's something that we played around with lots of connectivity mapping and modelling and stuff I don't understand it one iota, but the clever ones do. And we've used those in looking at impacts of development in looking at focusing where you could conservation effort. And a good example is up in Wales, there’s a big development and they going to stick on top of newt similar connectivity and say words like loss of habitat is breaking the connectivity and if you position upon their then it connected all in a certain way and that's in a way we used and analyse data in an applied sense and then apply that at a bigger spatial scale, as before, was done in [Place]. But as we've also done county level design work out where you get connectivity between areas and that can feed into local planning theoretically and it does but theoretically it does. And then, obviously with a district licensing stuff is very applied there because it's used in a, so working out where impacts of links are working out where you put your conservation effort that's mostly model stuff you know started off as manageable and then got incredibly complicated. GLMs and God knows what else I have no idea what they're talking about. I mean that's just looking at the way we reflect on that is, we now employ two people that are quite you know very much models that's what I do as a key part of their job, whereas in five years ago we were invented a version of modelling by just putting things in spreadsheets now we've moved on as the world as advanced.

INT: Because you value modelled data then?

DEU17: Absolutely that's part of you know, in some ways, when you're looking at where we sit in the realms of all the other people that collect amphibian and reptile data. We think that next stage of the interpretation, the analysis, the complicated stuff and anyone can sort of stick dots on the map and give you 1km square distribution map, you used to do it with those sticky dots. That's probably the level I can work at, but I think when you move to that next level of the mapping and modelling you start doing a lot more sort of clever stuff in terms of sort of setting species target looking at where things go working out also understand it impacts and in due course into not only look at modelling current status and what we want, as a target status, but then looking at what happens with climate change and sea level rise and I just think the combination of the you know raw data of simple dots on the map and the ability to model it and improved environmental data, particularly through things like drones remote sensing data increasing availability things up one day we'll get soil data, maybe not. That kind of information that you will get in you can start coming up with really good stories about the ecology of an area based on that. And I’m, not only do it for the one species or two species were interested we're doing all the species that people might be interested in. And part of what we're exploring through the new NRN Perbeck and the civil partnership with project with [nature environment public body] and other species people and National trust is to try to get how you might set define what you've got there at the moment they're looking at using drone technology and all God knows what else help this map the habitat. And what we said, you could then describe the current status quite nicely you could define target statuses. And because they repeat this on the drone flight thing you can come up with some pretty powerful ongoing monitoring and change. And that align with sort of a bit of ground truth and exercise will end up giving you a really powerful tool for seeing how things are changing in a very passive way, it seems to be the traditional interest but more importantly where it fits in with your targets. There is grazing stuff being put in there going to increase the grazing and grazing is a very interesting tool that if you get it even slightly wrong and invariably is it wipes out reptiles simple as that, if you overgraze it, reptiles go. And the plan is to give a lot more free-range grazing on this most important site in Britain for reptiles and you know the things we need, we can't say at the beginning that's a disaster, well we can. But we also if you do the right level of crazy it actually helps reptiles, so if by chance you stick these cows that you've set yourself targets what it's meant to look like. And over the years that you're monitoring it it's achieving and working towards those targets that's great if it's going to be the other way, then you've got something very tangible to feedback. So that's how we would see that you serve raw data, modelled data, environmental data being tied in a very specific site level application, but you obviously scale that up. To look at county level, district level, country level what have you have to do to those different metrics at different scales. Well, I think, importantly, they did we will almost certainly never have enough of our own data we're always going to need some kind of dependencies on working with other people to do stuff and equally to try to get a better interaction with people who are also doing this kind of stuff. To see how it's developing, we do have a fairly good, long working relationship with [research centre] in Kent and, indeed, I think, maybe everybody employees into. One of our trustees has been based in there for a while, anyway, and they do a lot of work on the mapping and modelling and you know, the more theoretical end of that spectrum and the biodiversity hotspot type stuff and we tend to like to see the more applied sites so we’ve had quite a relationship there, but we are looking more widely with the university of [place], for other sorts of application such as remote sensing stuff. And I can see, this is where you know that kind of evolution of thinking, because it's going on quite rapidly in quite a few different places. It will be very interesting to see how you coordinate that sort of thought process, otherwise and the left hand on take-off and someone will be doing the right hand. We are actually involved with a consultancy called [environmental consultant] who are based out in Anglesey who their main function is looking at sense data Okay, they be very expensive to pay them but we tried a few projects and it has never quite taken off, but we are very happy with them, and so, but, but I think they've been paid by JNCC and natural resources wales royals to go away and do serious mappings gigabit such a phase one man show them, things will mapping through the remote sensing modelling and ground truth, make sure you got the right species and all that stuff. So that's a bit of a direction of travel we are taking.

INT: I was just going to say you’ve covered the aspirations; you have for data in the future, was there anything else you want to add to add at all?

DEU17: I think the, almost from an organizational point of view, one of the real problems that people are talking about, because if there's a great pressure for open access data and depending on which side of the fence you're sitting on its an incredible difficult concept, where every time we try to do mapping or modelling we'd love the world be totally open access data it’s a pain in the ass trying to pay for it, chase it up and rest of it. The flip side to that is when you're trying to run these monitoring or run the small teams of volunteer schemes, nobody will pay for that. You know, if you want to get people out there, collecting data you pay out your own pocket. So, the only way you're going to make that sustainable is by tying the two elements together, so you almost by definition, have to make it not open access to all you can do that lays the golden egg you know you just wouldn't get the data collected, if it was all freely available because it just headed straight out. Nobody could control it, and some University in Germany will go and publish it so I’ve just spent 30 years paying for that research and those buggers have gone away got a massive free one to publish it, Thank you. So, you do find there's this sort of schizophrenia approach where there's this general ambition to see more open access data, I think all data organizations, would like to see it. But there is that constraint and part of the way we're trying to address that is by saying well if we do more than just data. You know, just as we're not just the dots on the map with the guys that interrupt that we can stay ahead of the game. Then you remain relevant because we know from having picked up emails we shouldn't have seen in the distance past if we didn't appear to have data that was out of our control, we know we wouldn’t have been consulted by some government agencies on certain aspects, they wouldn't have needed us. It almost you know what we shouldn't have read was so shame we can't get there from data for nothing, because then we could have let them out the discussion. And although that's slightly unkind to word it that's not far from the truth, and if you want to stay relevant unfortunately to keep a few trump cars. And that's part of the reason we're very keen and very open about the fact that we really like the idea of open access stuff but in order to remain viable, we need to make sure we can hang on to a USP. It's a message people don't want to say bluntly but I’m just rude.

INT: that's a very interesting point I mean the people that have spoken to before they talk about this access and they talk about the troubles that they have getting the data, but then you made a very interesting point about how it sort of works both ways in order for it to exist you've got to have this element to it as well.

DEU17: yeah, and I mean there are various discussions about the data models in Scotland where trying to bypass that whole process by making sure the effectively the organizations that collect the data paid for it, so they can afford to go open access. Which is great if you're one of the ones they're paying, but if you're you know the woodlouse society of Norwich or something like that. No one's ever going to buy you into the they're just going to steal your data and then tread you into the ground so, so I think it's that sensitivity that is very difficult to articulate because it sounds very egocentric you know I hang onto my data, because I need to exist. But that goes back to the whole organizational sustainability and if we think we need to exist at all, then we need to be sustainable, we do think we need to exist. And that's part of it and historically I know data has been used as a power tool. And people have deliberately not provided data so that, when it came to the public inquiry they had the data they could stick on the table and say look told you, they were there, and if it was other things have you told us before we would have done a planning application. So, it's a funny commodity data, and I know that you're sort of picking up on based on who you are speaking to. If everybody wants it, no one wants to pay for it seems to think you're just sort of come naturally become some idiot volunteer who likes collecting it. And I think just to highlight that, where people get very sensitive about is if volunteers were collecting data that they thought was just going to facilitate development. They will be really, really unhappy, and I think if you sort of look at the open access flow on that data that's exactly what it’ll be used for. So, you know that's you know so check my balance that people might want to think about.

INT: No, that's a very interesting point. So I’ll now move on to modelled data, but I’m getting the impression you're very for modelled data.

DEU17: Absolutely yeah. There is a caveat to that which I will add if you don't mind. That is that is properly verified, and ground truth and that modelled data cannot and should never be considered replacing field survey. And what you have to do is the optimal balance between field survey and modelling to provide the right information and what the optimal level is I don't know it's probably less field survey than there is at the moment. Probably more sampled and directed than it is at the moment, but certainly not missing, otherwise you end up. But my scenario of the adders in [Town], I used to live in [Town] and adders used to be in [Town] and they had a superb adder habitat in [Town] one minor problem there aren't any adders there they went extinct, and nobody put them back. So, if we were just looking at modelled data based on historic data and current habitat its heaving with them. But if you actually go out there and look you won't find them. That might have changed because I think somebody might stuck some out there, either way the scenarios that that's the danger, you might end up with during the wrong conclusion, unless you have a good supporting mechanism but you're never going to get the scale. And even the accuracy and the sensitivity of stuff. Just by looking you're going to need to do both.

INT: This is just because we're talking about adders. A few years ago it was longer than that I went to [forest] in Norfolk. I saw an adder there, just as I was walking.

DEU17: All sorts of things, but yeah I think. You see adders up in that corner of the world. It’s a very interesting beast because they're the kind of thing that you know, some people think are everywhere, some people they're nowhere they're tricky to see and when they really see one they scare the life out of you.

INT: I'm now going to show you some examples of modelled data that part of the team have created. And, essentially, I just want to know whether you can interpret them. And whether you find them useful.

DEU17: That's handy because our tech expert could say yes easily so it's probably useful it’s not them.

INT: I’ll just share my screen. It should pop up.

DEU17: Right yep. Thank you.

INT: Can you see that. So, this is for six spot Burnett.

INT: Are you able to interpret the one on the left.

DEU17: I think if someone said what particular colours mean what were there, because the we've worked ironically, the other way round we’ve tended to look at red as a high risk, high probability whereas green is safe but providing someone said, this is the green is greater to be here, that means a lot so yeah again get that one.

INT: Okay I’ll just give you a bit of information on that as well. So, it uses 21 land cover variables and 19 climatic variables. Along with the understanding of the conditions in which this particular species is found along with literature. And, most of the variables that the model users are at a scale of 100 meters.

DEU17: yeah I mean that's a that would be the sort of caveat to work out how they done whether it's done work for certain types of sampling or whatever, but yeah that's in terms of what it what it's trying to say I get it and see if it's that it's around environmental variables. Because I mean that's very much the sort of stuff we spend a lot of time doing at our end.

INT: So, this is just a starting point.

DEU17: The caveat I’d add is I always find it difficult when you're arguing about the likelihood of occurrence between habitat suitability of probability of occurrence and likely of occupancy and occupancy. The actual precise terminology there is often a little bit tricky. So I get the idea the probability of finding it probably based around habitat suitability, yes, but sometimes when you get that kind of thing it's whether or not it's based on a general probability of occurrence, as opposed to measurement of habitat suitability. That might be the other kind, because there is all sorts of words around occupancy that I struggle a bit with.

INT: So this was on a national scale, as you can see and then this one on the left is around a point in Wallingford in Oxfordshire on a five kilometer scale.

DEU17: I think what you need there to make it meaningful is the underlying base map information, so somebody can read it. Again, something fairly similar to that for the crested newt stuff and you look at that and say well there's quite likely high likelihood of them in that area and as I say we produce very similar things in areas in North Wales, which are very, very similar to that so that but you know it's that contextual stuff rather than just points that would help. You don't have a spatial context.

INT: I'm now going to move to the one on the right, so you've got same again for the six spot Burnett moth and you've got a variation model here.

DEU17: I need you to do some explanation as to what they mean by variation.

INT: What we found is that people prefer to read it read rather than it being told to them. So the variation is calculated using a sample of the background data to give a range in the predicted probability, and so, for this model, it was run 10 times on 10 different data samples. which include some points, whether our target species records and some whether our records for other lepidoptera species.

DEU17: It’s considerably less clear than the other one in mind.

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.

DEU17: Right.

DEU17: yeah.

DEU17: It’s like a lot of the more clever modelling stuff isn't it you sit and say not fully sure I understand the underlying logic behind it, but I think I can see what it's trying to say at the high level, so I think the explanation there, are like a lot of the sort of discussions we have so yeah so you're just saying that you validated it. And so I think that second one is a lot less clear to understand what it means, I think that's the bigger problem. I think one other just slight observation I’d make on the left is clear to me because I’m not red green colour blind. And that is a point that one of our modellers is very keen to pick up on is the visual ability to see it. I'm struggling. I wouldn't be able to explain that variation model.

INT: That's fine unfortunately my understanding, myself, I understand the one on the left, but my knowledge of the one on the right is not probably not to the standard that would be beneficial to you.

DEU17: That’s good. That reinforces that pointing to public understanding that's probably not the best.

INT: Was there anything else that you wanted to talk about these maps at all, anything that would be useful to interpret them.

DEU17: I mean, sometimes could do with a bit more background, as to why they've got this distribution what the what the overriding features are because I mean you could look at the one on the left and think it's entirely climatic you know that's the main feature. Because, although it's looking at lots of variables there is invariably one or two overriding variables that get that distribution. And it's likely to be one of two things either that's where the habitats are for the species or it's that's because the right climate space. And it might be and in terms of interpreting it that extra sort of level of messaging yeah This is where they’re currently, this is where they’re likely to be. That might be the question why, what are the driving features, with newts it’s very easy it's entirely down to ponds that is the factor in terms of where things are going to be within a certain range. And that is quite often the useful additional information that you want to understand what the maps particularly as you move to the more local levels. It's on the right source type with the right kind of pond and that could go right, I get it, I can finally see what the maps are telling me, but I can understand why they’re telling me that. So that can be a useful addition. Then that's you know, usually what the text of the things about anywhere isn't it.

INT: That's brilliant I’m going to stop sharing my screen. So I covered all the questions that I wanted to ask and just to wrap up was there anything else that you wanted to tell me that you perhaps I haven't asked about.

DEU17: Not certain there is really. I mean there were loads of issues around maintaining and sustaining and motivating volunteers, particularly if you're trying to get them to collect the right kind of data that’s statistically robust. That shift between using volunteers to professional surveys in some areas is things that people consider only to consider and how you would collect the data. There's lots of practical stuff but that's presumably outside the scope of where you're looking at the moment is it's assuming the data is collected. I suppose we discussed that a bit with the data gaps type question isn't it now, how do you because certainly that was one of the issues we we've raised with the very first type of survey, we had was it was a randomized square so technically, you might be asking people to go back into a car park. And they’re just not going to want to do it, you know that they would, if you pay them near enough money you certainly could have data going to help us with loving. A very much, but if they're volunteers, motivated by something else, so you are going to get problems with the way data is collected and how you motivate it to get the right kind of information for the modelling and all the rest of it, you might need to use something that's not entirely volunteer driven and certainly as I say with the eDNA survey that was nearly all professionally done and it costs an absolute fortune. But because it's been done it's been done to a sampling regime, rather than to a of what the volunteers want to do. I think there's a big issue around data.

INT: Essentially, you don't want to put all your attention into modelled data, you want to keep your attention on the volunteers that get this data.

DEU17: It depends, because again the motivation behind data collection is various, a goal that the government has at the moment is to get volunteers out doing things simply to get volunteers out doing something. So, the very fact that you got a load of people collecting data is completely useless but having a bloody good time and they’re quality of life is improved because of all those parameters that. That might be not only good enough that might actually be the sole purpose of seminaries exercise. And if you lose that and you break that link because it becomes too automated too professional too whatever. Then you do so at your peril we tend to think well that's it's the other way round is you've got these guys going out and doing stuff having a jolly good laugh you've told them is for conservation, but when you actually look and they say, well, show me how does it work you’re quite often left flailing around, but if you ever pull a model out and say look, your data has created this as well. Wow. It doesn’t matter if they don’t understand it it’s bloody impressive that map and the way we're using this is in order to do this, this and this. Suddenly it's part of something much bigger and it's you've got that spatial component which people really get it also gets that national level which people also get whereas a lot of them, you have to be a certain kind of person to do a BTO survey. And just keep doing it, year in year and have blind faith that the BTO are going to do the right thing. They do and let’s not knock them for that. They do rely on a certain level of dedication, whereas if you're trying to reach a much broader in probably needed more rapid bit of feedback on that I think modelling is a huge potential tool in communication. It's so easy to slap that diagram up and nearly everybody gets the idea of a heat map. Where things are you know whether it's a covid diagram or whether it's in and whatever. People can see it is potentially really powerful for getting bigger engagement and in turn feeding into the modelling fitting all sorts of things, so I think. The use of it for just scientific or analytical purposes is being missed, because I think it's a communication tool.

INT: Absolutely. Was there anything else at all?

DEU17: No I was just a wondering where you're taking your project the certain way what you want to do with it going forward, I mean they gave us that little summary, is there any more you can give us about the ambitions of where you're taking this and what ideally you want to see at the end of it that's sometimes impossible to write on a piece of paper.

INT: There's not much more than what was on that what I sent you. The problem is I’ve only started on the [science research project]of the project about a month ago, so this is quite new to me in terms of the project itself but we're having a meeting after Easter and there will be a lot more information discussed in the direction that we're going in fact we received an email today talking about the potential of where this could go so once we've had that I could definitely get in touch with you and provide you with a bit more information regards to that.

DEU17: Because I gather there's this sort of sense that what you'd like to see is that you might be providing the data interpretation service is that sort of where it says go. As I would imagine there will be a call for that and obviously the reason we're interested is because well that's our patch leave that to us, so I think that's an interesting area to look at is the where it adds value, as opposed to possibly competing with other schemes and, equally, I mean people might say the same back to what's going on we're doing that we're all chasing around we're the national data providers. People like CEH obviously you know that's sort of what they do for a living isn't it so it's only right, we should be competing with each other, but, as you say, I think there probably is that market and that might be very interesting to see where that particular niche would be for an interpretation service for these kinds of more citizen science thing. I sort of sense increasingly you get the more specialist organizations you may well see that trying to be held within but maybe, I don't know whether you spoken to wildlife trust people. I wouldn't know where wildlife trust would see itself on that continuum, I mean they are clearly the people that do their county that you know that they're there for. But whether the data side is something they're territorial about whether they work very closely with the record Centre where they're very territorial about it. Because they're all sort of worried about their niche to some extent I think that's quite an interesting topic to try and sort of think about and whether you be looking to add value to that end of the spectrum you're lending a hand with a record centres. To get them up to speed in that next tier of academic input up very much the sort of thing we're looking to dice and whether you look water direct support of the citizen science now which particular level we're getting really, really technical. Because you're the only guys are going to be a follow those latest trends in modelling because their local record Centre isn't or shouldn't be following. The latest trend in whatever the latest population modelling thing is but academic areas can, and you can say how we can improve modelling generically and that's the kind of service we'd be interested in although as I said, we have that relationship with dice but that's what we see that's about we don't want to get involved in the academic stuff we want to talk to you, but we want to be the guys that use it. Whereas, you might find other people local volunteer groups have no idea it's about the tools they just want the products. Let me see if you can work out which niche to go for and then how you might form collaborations with organizations such as ours, that will be interested in that lead role. And maybe creating a more level playing field amongst similar organizations and say we do work with [nature conservation] partnership, although we're doing lots of the sort of leading on some of the thinking around the modelling. Partnerships like that wouldn't necessarily have that level of technical support with them, although this one's got the RSPB and says a reasonable job there is. Another little group is like that might not and, particularly, one of the areas might be worth thinking about is through the local nature recovery strategies, these new tools that are going to come out of the Environment bill, and they are being challenged with coming up with certain bits of information. A lot of that's going to be special and, although a lot more dive straight into their local nature partnerships within basically the wildlife trust and the record Center. Is there a consistency of quality across them that that higher level that's really taken advantage of this new technology guarantee they won't be not across I want to be a complete Goldstein they'll be one or two that happened to have some real with our academics on the local panel and mostly the others will be using applications and match boxes to do this stuff. So, so that might be another area, you might see if that the new structures that are coming up the environment but and things offer an opportunity where that's going to be [nature environment public body] become one thing we will do yeah fair enough if they do.

INT: Well, well, my last question then. You mentioned it briefly, and so the next stage of the project will be working with people like yourself to co design. Would this be something you would be interested in.

DEU17: Trying to think I mean one level definitely because we're likely to be trying to design something, and it would be a shame if we designed it in complete vacuum with each other. The converse is always a difficulty around capacity. And we've we tend to get our tend to over commit or guys by promising all sorts of things, I think, realistically, is the kind of thing we'd like to keep in touch over. If there's an area where these clearly overlap and where there's a synergy, then it will be worth us trying to reach out and make that link, but I think it's just slightly strong to say yes, we would simply because struggle to do it, but I think the principle is yes. It might be practicality will be less so.

INT: I completely understand, I think will say after the meeting that we have after Easter if the information that I get from that and I, forward it to you, and that is of more interest to you, and you can see from that whether.

DEU17: yeah well what would I do, that is, share it to all our monitoring guys [Name] who is our monitoring manager and [Name] particular is the GIS modelling type guru behind it and so runs lots of things together, and just say, you know how do they how do they think you're not going to fit in and it might be totally Syngenta and absolutely brilliant or it might be something no, no more. Let me get on with my day job, so I think what i'd be very keen to see pass it on. Maybe create some kind of dialogue between you and them because. I wouldn't want to predict exactly whether he became the best thing since sliced bread or just a little bit of hard work for both of you so.

INT: You know, unless if you haven't got anything else.

That was it was great speaking to you and thanks for taking your time to speak to me so.

DEU17: Well, hopefully, hopefully it's useful so know we sometimes have a slightly different perspective than others.

INT: definitely no it's been very.

DEU17: very similar perspective from some others who.

DEU17: Say land is we do so.

DEU17: that's great well thanks for saying you have a good weekend.

INT: Have a great Easter.

DEU17: yeah and maybe catch up later so interesting, so you.

INT: Know i'll inform you after that meeting.

DEU17: Definitely.

INT: that's going to.

INT: buy so much.

bye.