

Floodplain Meadows Partnership Conference

Day Two – 14 October 2021 pm

Introduction

Emma: Welcome back everybody to this evening session of Day Two of our conference. Welcome to anybody who hasn't already joined us as well. I just have to say wasn't that soundscape absolutely fantastic. I could happily have listened to it for another 15 minutes. I'd forgotten all about introducing Gethin, but that would have been very naughty. It's one of our Art and Craft competition entries. It's a soundscape called Dawn Chorus At Wheldrake Ings by Simon Elliot. I hope you enjoyed that as much as I did. We'll be playing it again later on in the conference.

We're going to start this session by doing a poll that I forgot to do in the earlier session. I do apologise about that, it relates to soil carbon activity, so please just answer Yes or No to the question. If you're able to say in the chat what you're up to it will be really helpful for us to see what people are doing. The poll asks - Are you using soil carbon data in the land management decisions you're making currently? If you answer Yes would you mind putting a bit of information in the chat about what you're doing.

So while we're just finishing off the poll I'm going to introduce our Chair for this evening who is Gethin Davies. He is a Senior Agricultural Advisor for the RSPB and he represents the RSPB on our Floodplain Meadows Partnership Steering Group. He also helps to manage a livestock farm in mid-Wales. So thank you very much Gethin, let's get the evening session underway.

Gethin: Thanks Emma. Welcome all. Yes it's beautiful listening to that music. The art project seems to have been such a success. So many great things coming up that you've managed to integrate into this conference, it's lovely to see. So this session is themed Case Studies and Opportunities. We have 6 speakers. There'll be 3 talks of 10 minutes, followed by 10 minutes for questions, then a short break. We'll then reconvene for the 2nd group of 3 speakers followed by more questions. I'll do my best to keep to time. We don't want the night going on too far. For the speakers who are here already I'll turn my video off when you speak and we'll turn it back on after 10 minutes. So if you can bring things to a close fairly quickly when you see me again that would be really appreciated so we can keep things to time. So without further ado I'll introduce our 1st speaker and that's Catriona Bass and Kevan Martin who will be speaking about delivering restoration at a landscape scale in the Thames Valley. Catriona Bass has been farming a floodplain meadow of her own, Long Mead, for 20 years and increasingly taken those experiences and the seeds from Long Mead to other sites in the area. She's also a writer and does consultancy work, so I'll hand you over to Catriona.

Catriona Bass and Kevan Martin Delivering restoration at a landscape scale in the Thames Valley

Catriona: Hello everybody. So this is Long Mead, 10 hectares of original floodplain hay meadow just above Oxford on the Thames at Swinford. So yes we've owned it for 20 years. In the last 15 we've been using the seed to help restore neighbouring sites originally just as a donor site and then increasingly helping to do the actual restoration and helping neighbours with the on-going management of it.

So this is the area of our project. You can see Long Mead on the top left hand corner below Eynsham, the urban conurbation, and downstream of us are the great triple SI's of Yarnton Mead that Clare Lawson mentioned this morning, Pixey Mead, Oxey Mead. Then beyond them in Oxford itself smaller fragmented local wildlife sites and triple SI's that are also original MG4 grassland. So of the tiny fragments that are left of MG4 whatever amount you decide there is, this is clearly a hotspot. So also interesting the pink are restoration sites under Natural England's Agri-environment scheme since the 2000s. They hadn't been surveyed until 2020 when myself and Alison Muhldal went and looked at them and then Emma and Irina Tatarenko came this summer, and they're doing very well. So it really makes it an area where you might anticipate connecting up and we're literally working field by field, neighbour by neighbour, as a patchwork to try and get a connected habitat. So at this bottom end, so the yellow are the sites that are part of our project and excitingly the day before yesterday, the landowner, south of the last site on the left, we've been going very slowly with him, he's come in and said that he's interested. So that's all very positive. But I have to think of 2 pieces of important research in this area. Emma and Irina and David's research of last year showing that only 25% of the restoration sites they surveyed demonstrated expected success. Alison Macdonald who was here yesterday and Ben Woodcock's prediction that restoration sites will take 150 years for the majority of the species to colonise. So both qualify with slightly more heartening things. But the thing to say with that is that as we all know, we must protect the originals and that's not happening in this part of Oxfordshire. So a few years ago 11.2 hectares of local wildlife site MG4 was lost to development despite the heroic efforts to try and protect it. The local wildlife site Osney Mead at the bottom middle there is now threatened by the Oxford Flood Alleviation Scheme. The tragedy here is that actually the meadows to the south of those also have quite significant fragments of many of the indicator species, pepper saxifrage, great burnet and those kinds of things. So that's the context in which we're working. Based on what's clearly a difficult job of restoration, we've tried to understand what would give us the best way forward. So this is a local network idea of starting with people coming together in the local area that may hopefully give you the kind of longevity, maybe not 150 years. I'd wanted to use great burnet actually because we know that those plants live for 150 years but it doesn't quite have the connectivity. But the key thing here in the context of the landowners that we're working with who don't have the skills independently or the encouragement, the real importance of hand holding. So the key thing here in this picture is I think the Natural England advisors that were

critical in the early 2000s, Anne Cotton who is now our local advisor, who's now an ambassador for the FMP. Going forward I think there needs to be much more support for landowners to do this thing. Then obviously the kind of science knowledge. We're very lucky now to be working with the Floodplain Meadows Partnership and the carbon research that's funded by Ecover. We're also working with Oxford University. Then this other kind of knowledge, the local knowledge, which Joanna talked about very clearly. What we're understanding and I'll come back to that a bit is that in this area at least these meadows are culturally extinct, both in the public consciousness and in the farming community, and until people understand what they are actually we don't stand a chance.

So here's just a few observations of the need for hand holding going forward if we're going to scale this up. So I'm just going to take a few little examples, you can read some more of them here. So Christchurch Meadow, we turned up and they had got their farmer to cut the hay short as we'd asked, they'd left it at about five inches. If we just cut that and started the process we would have ended up with a compost. So we then spent a week cutting, it happened to be very hot, we cut it incrementally millimetre by millimetre, and it blowed off and actually it was fine. Similarly, our contractor didn't want to come into Oxford with the muck spreader because the big wheels would have mown over cyclists as he said, so we bought it in with a trailer and dumped it in a heap. So the literature says that you can leave the heap for 24 hours. We found after 2 hours if you put your hand into the heap you burnt it off. So clearly we would have ended up with compost if we'd left it for 24 hours.

Flooding is an interesting one. This is Christchurch Meadows 3 months last winter under water. The 2019 restoration we did was also 3 months under water. A lot of people put the failure down to flooding and so there is a connection clearly with flooding, whether it's a stream that blows away the seed but in our experience of the last 2 years, this is Christchurch Meadow now at the bottom in the first year, a spectacular success in terms of yellow rattle. Also really interesting, great burnet came out which you don't expect to see in the first year. Also adder's-tongue fern, but the likelihood is that that was probably there before and nobody had noticed it. Just another thing on this slide is green hay or commercial seed mix. Interestingly, David and Irina and Emma's research showed no difference. Charles Flower who's a commercial seed producer and one of the pioneers of creating meadows from seed, interestingly says that if anybody comes to him for creating floodplain meadows from seed he tells them to go away because in 40 years he's never had any success of creating floodplain meadows from seeds.

So seed propagation. We've also started growing seed by hand. This is also very good for getting in community engagement and raising the profile. We do it also with our care farming group which has another social benefit of bringing in these isolated members of the community back into the mainstream. We also have our collecting the data on best germination times, which times of year are better for germinating which particular species, and also marking the GPS position when we plant them

out. We found that plugs don't work but 9cm pots do, particularly of the slow growing species like great burnet which don't typically take in the first year and are likely to be crowded out by the faster growing species.

Acquiring the knowledge. So central here is the climate for the meadows, getting carbon samples on Long Mead. Mike Wilson and Ryan Mitchell are doing entomological invertebrate surveys looking at the potential increase of quantity and diversity of invertebrates as we restore meadows. Rather wonderfully here that kind of rather grotesque fly in the middle is a very rare *Sarcophaga villeneuvei* which Ryan found in Long Mead in 2020 and is only seen on 7 other sites in the UK. What's really interesting was that it was first identified downstream at Yarrnton in the 1930s. Really critical here is the local knowledge, farmers knowledge, particularly the old farmers knowledge, but also the handful of farmers who have still these rare meadows and they all know where they fit into 21st century commercial agriculture. Upstream we have a dairy farmer who feeds the hay to his dry cattle because they shouldn't get too fat before they give birth and it stops them getting fatty liver disease. Our neighbour takes his hay all the way up to Yorkshire because it's economically viable to do that.

Then finally bringing these communities together. So this was a workshop we had on Long Mead in the summer. We had 5 Oxford head gardeners, farmers, local residents and 3 members of NGOs and it was facilitated by Charles Flower. The farmer on the right is my neighbour. He told the community that every time the meadows flood he rubs his hands with glee because it's free fertiliser. The other farmers were completely astonished to hear that. So, at the bottom here, the other thing I wanted to say, so this is a neighbouring farmer that we went to do the control for Clare's carbon survey to get soil samples. This is his arable field in the winter. He completely lost his crop due to flooding, as did many of our other neighbours. This is our crop on the right. We had a fantastic hay crop this year and the neighbour said, 'Well if ELMs gets it right we'll be coming to you to restore the arable into meadows'. So that's it, on that rather positive note I'll stop.

Gethin: Thank you very much Catriona. That's really interesting. A really important point there about maintaining the cultural integrity of floodplain meadows as well as their ecological integrity. If people can make a note of any questions they have for Catriona we'll come back and take them in the questions session. So next we have Sarah Wells, a Senior Farm Environment Advisor for FWAG Southwest who works with farmers and various projects but will today speak on the experiences of running a farmer facilitation group in the Severn Vale. Unfortunately Sarah wasn't able to be with us live but has kindly pre-recorded her talk.

Sarah Wells - Running a Farmer Facilitation Group in the Severn Vale with a focus on floodplain meadows

Sarah: Good afternoon everyone, and many thanks for joining. My name is Sarah Wells and I'm an Advisor with the Farming and Wildlife Advisory Group Southwest

based in Gloucestershire. The Farming and Wildlife Advisory Group are working with 4 farmer groups in Gloucestershire and today I'm going to spend a short time talking about the Severn Vale Guardians Group specifically, which focuses on the low lying land around the Upper Severn estuary and the River Severn.

Firstly I want to briefly explain what a facilitation fund is. It is part of the funding set aside for Agri-environment schemes and funds a facilitator to work with a group of farmers. In the case of the Severn Vale Guardians, this has funded part of my time over the past 3 years. Facilitation funds should enable better co-ordinated information and support to be available to farmers. There can be many initiatives and strategies across an area and so clearly communicating these and how they relate to one another is an important role. The facilitation fund also places an emphasis on providing training and learning as a group around habitat and land management that is beneficial to the environment and can also be beneficial to the farm business itself. As part of this shared learning we create a forum for farmers to share their own knowledge and fund demonstration events on the farm.

Farms in the group are within the Severn and Avon Vales national character area. The image on the left hand side shows the holdings of the 50 farmer members overlaid on the light purple background which is the Severn and Avon Vales national character area. On the right hand side are flood risk maps. You can see there is considerable crossover of members with the dark blue high risk areas that are predicted to flood 1 in every 30 years. Flooding in this area can be due to surface water, but also tide locking caused by the Severn estuary or River Severn being high, meaning that water from the catchments cannot be discharged. I know water shapes all landscapes, but when you look at the scale of flooding in the Vale, the tidal influence of the Severn estuary, the erosion and the drainage networks that have been designed and implemented, water really does shape this landscape.

So why here? The Severn Vale is a heavily designated area with internationally important wetlands and triple SI sites such as Walmore Common, the Upper Severn estuary and Ashleworth Ham. There's also the Wildfowl and Wetlands Slimbridge reserve. There are known populations of both wintering and breeding curlews relying on this area, and curlew are one of the highest conservation concerns in the UK due to their lack of successful breeding attempts leading to steep declines in numbers. Before the group formed there was existing curlew survey work being carried out by an expert volunteer which had captured the interest of many farmers locally and enabled the initial interest in and set-up of the group. The Severn Vale is also an incredibly important area for European eel with migration into the Severn estuary and the surrounding catchments, and perhaps longer term, WWT have a small number of breeding common cranes on their Slimbridge reserve. So could we by sympathetic management of surrounding sites support their return into the wider landscape? Now is also a good time to mention that WWT have been a key partner in the facilitation fund providing support through technical expertise in wetlands and curlew and seed funding to trial pond restoration.

What we are looking to discover with the group is how far sustainable land use providing clean water and healthy soils can underpin biodiversity recovery, and along with specific habitat interventions provide ecological connectivity or steppingstones between these key wildlife sites.

The group aims are to look from individual holding level to landscape scale around the management of soils, natural flood management, habitats and resource protection. There is a need to look individually at on farms about how soils can be managed sustainably, watercourses kept clean, and habitat managed in the most beneficial way. This links with work at a landscape scale around waterflow across the wider area, natural flood management and connectivity of habitats.

During the first year of the project there was a recognition that in this area of low lying meadows that are a priority for breeding curlew, there is also a good quantity of floodplain meadow with botanical interest, much more than what is officially recorded or known about. We've been very lucky to have an expert volunteer botanist locally who has been key in highlighting some of these sites for us. So now with the recognition that floodplain meadows can deliver for soils natural flood management, species and resource protection, we've taken on floodplain meadows as a key element of the facilitation fund.

Over the last couple of years we've held events to look at topics such as the complexity around timing of hay cutting both for the benefit of botanical species, but also if there is a risk of curlew being present. We've also discussed management issues such as reed canary grass and how this may alter management of a site. Site visits have included visiting very botanically rich fields which have provided a good opportunity for training on botanical identification, and also areas that may have been less botanically diverse but still with indicator species present showing that the hydrology may be suitable for floodplain meadow habitat and restoration and an opportunity to discuss why it may at present not be showing the species diversity.

On the right hand side we can see a map of the old lowland meadow where the ownership is still across many parties shown by the strips on the map. Here the hay cutting is done over a couple of weeks and this range of cutting dates benefits not only curlew, but also the botanical diversity of the site.

On the right hand side you can see a map of my Floodplain Meadow Partnership ambassador study site which I've been lucky enough to take on over the last couple of years. The knowledge and understanding that I'm building from that is feeding back into that.

Alongside the farmers specific events in the Severn Vale there has also been development of a Gloucestershire Floodplain Meadows Group attended by farmers interested in floodplain meadow management and restoration with a focus on the Severn Vale. The map on the right hand side shows the lowland meadow recorded sites when we started marked up in green, showing them as rather few and far between. But as I've already mentioned we had started to realise that this wasn't the

case on the ground and therefore the first aim was to identify and protect existing sites. We also want to identify sites where changes in existing management or restoration may be possible and encourage and provide the right sort of support required for this. Working with farmers in the facilitation fund we can establish the permissions required to access land and have an on-going dialogue around the management of floodplain meadows and potential for restoration in the area. One of the key targets of this group has been to ensure that the surveys that we undertake fit with the requirements that farmers have around evidence required for entering countryside stewardship schemes, and to provide farmers with the survey results so that they can use these to their advantage for entering schemes that support restoration or management of sites.

We're also linking with the Gloucestershire Wildlife Trust HabiMap programme which aims to map all of Gloucestershire field by field with UKHAB, a habitat mapping system, on a 10-year rolling programme to mean up to date, good quality, county-wide habitat data that can be used to inform restoration projects.

Our work on floodplain meadows and indeed any focus of the group has to fit into the wider picture. We're looking at healthy soils, carbon foot printing, nutrient management, flooding and water movement. Engagement with existing and emerging groups and initiatives such as the River Severn Partnership, the catchment based approach or CaBA partnership, Bristol Water and Severn Trent and looking at how policy is emerging through the agricultural transition period, and hoping to place ourselves and the group membership in a good place to be able to take up the opportunities that are coming out of this moving forward. The group has been involved in a DEFRA payments workshop that will feed into ELMs and through FWAG Southwest have had the opportunity to be involved in the ELMs trial on natural capital reporting.

Over the last 3 years we have built knowledge around the different services that land in the area can provide such as species recovery and natural flood management alongside food production. Going forward we need to better understand how we can best support those farming in the area to deliver these services. How can we use the multiple policies and strategies to value the types of farming systems that we need and look at better integrating the capabilities of the land with farm businesses? One way we're looking to do this is through the Flourishing Floodplains project which has just received funding. The project will fund capital costs of the restoration of priority wetland habitats such as floodplain meadows and ponds in the farm landscape. It will also build local capacity for floodplain restoration and management, identifying donor sites, sourcing suitable equipment and ensuring those working locally have the required knowledge. The project will also enable farmers to better understand and utilise natural capital, how it can underpin a sustainable business that is less vulnerable to fluctuations in prices and challenges posed by the climate. We will also look at how natural capital fits with the evolving funding and markets to support farm businesses. Alongside this we hope to develop a shared vision amongst local

farmers and landowners of how nature recovery, flood mitigation and food production fits within this landscape.

Finally, I just want to say thank you very much to the Floodplain Meadows Partnership for having me and a reminder in these photos of how productive these systems can be. Thank you.

Gethin: Thanks Sarah for doing that talk. Sarah is here and will be available to answer questions in the final session. I believe we are going to just do a quick poll next.

So the question is - Are you undertaking any floodplain meadow restoration currently or thinking about it? Simply Yes, No.

Finally in this session we've got Clare Hill who's waiting patiently there. Clare's Director of Regenerative Agriculture at the Farm Animal Initiative. She'll be talking about the floodplain meadow restoration and management on their farm on the River Thames in Oxfordshire.

Clare Hill - Floodplain Meadow restoration and management at FAI Farms on the Thames in Oxfordshire

Clare: Thank you for the introduction. We look after quite a large area of floodplain meadow. I should steal Catriona's map for my presentation I think because our meadows are all on there. We're very lucky to actually have the management although we don't have it under our direct control but of the Yarnton and Pixey Meads meadows which gives us access to the triple SI meadows as well as floodplain meadows on the other side of the river which don't look quite as beautiful. But we have done various restoration work over the years and are looking to do more, which I'll come on to talk about.

So this is our main farm here. On our FBT we are tenants of Oxford University we would have all of this land that goes down towards Oxford and up to Whytham Woods here, but the main bit that we're interested in is this floodplain area. Catriona's would start a little bit further down here and we would have all of this area here that we look after around and then this is Yarnton and Oxey Meads and then Pixey is just here. That Pixey and Yarnton Meads Google marker is actually in the wrong place, that's a field called Kings Lock. The farm is 1200 acres. We're a beef farm. We have had more varied livestock in the past but now we focus just on beef production with both a suckler herd with 90 cows and all of their followers, we take everything through till finish, and also 150 dairy stores. Our reason for concentrating just on cattle are that we also work with large food brands on their regenerative and sustainability strategies and data systems that support those and where they're coming under the most critique or as the farming industry is, is in the ruminant sector, because of the cows and burps and all of that stuff that we all know about. So we made a decision to put all our energy into cattle at the moment. So we got rid of our hens and our sheep which also hopefully will be interesting from the grazing

point of view on the meadows and more widely on the farm because we also actually have Somerford Mead under our management. So it's known to us as Alison's meadow. So this would be Somerford Mead here, the work that Alison McDonald has done over the last 30 years or so which of course showed that aftermath grazing is beneficial and aftermath grazing with cattle is slightly better than sheep. So we kind of take that as our nod towards going more down the cattle route, but also it's for us to focus on ruminant agriculture and the benefits that it can bring. So definitely in the world we've got ruminants wrong in some places. They use feed a lot in America as an example, too many cattle, depleted water resources, lots of pollution, not grazing, etc is not good. Grazing on meadows like we have here and the benefits that they bring both to the biodiversity and to carbon sequestration and the whole cycling ecosystem processes is really important. So what we want to do is focus our energy on looking at improving the benefits of these.

These are wonderful SSSI meadows and a number of years ago I used to view them with almost like what a pain in the backside, and they're there but it's really poor quality hay because we have to cut it too late so the energy value isn't very good. Some are really difficult and challenging, they're not very good access, they're really hard to get to. It's often wet even in the summer, because it's a floodplain obviously, but it was quite hard work. But my perspective has really changed over recent years when I've started to understand much more about cattle health and species diversity and how those 2 things are intrinsically linked and that the more variety we feed, like in our own diets, the better and healthier our cattle are and also the less they eat. So anybody, maybe not in this audience, but others that I would speak to would be fans of sustainable intensification and talk about producing more from less. I say you can feed cattle more species-rich meadow hay and they will eat less of it and grow and gain condition and you'll have to feed them less than you would have of other feed types.

Over the years these meadows here have been grazed more intensively I would say and they don't have the species richness that the other triple SI meadows on the other side of the river have. But that's something that we've definitely looked to fix and we've done a variety of different restoration methods, some of which have worked, some of which haven't. Probably where they haven't worked, there has been some kind of weather related things but I would say often it's come down to our management, I would have to admit. So we've done a number of different things. The use of reseeding. Catriona's got some really good pictures. We would have done something similar to that but mainly picking a few areas, taking the grass down really low, scratching the surface to create a seed bed without actually cultivating and then sowing some kind of purchased seed into those areas. The other thing we have done some of is using green hay, so taking from the triple SI meadow, bringing the hay across the river and spreading that on our land. With those methods that we've done, it was back in a time when we were still set stocking on the farm. I think what we found is that often there was maybe an imbalance between farming and restoration. Of course when we would maybe need to be resting an area and not

grazing it where we had done some of this restoration, sometimes the needs of the farm would overtake that. So if it had been a dry year, for example, and we didn't have enough grass elsewhere, we would end up being like 'oh well, we're just going to have to graze some of those fields because we haven't got grass elsewhere'. But since we started with our regenerative grazing where we're doing the holistic planned grazing or adaptive multi-paddock grazing, or effectively any grazing system where we've grouped our animals up, so a large group of animals for a short period of time, for us that's about 2 days, followed by a long rest period, then we are able to include much better restoration within our management, mainly because rest periods were not something that we may be factored into our thinking previously. What we're learning is so important for the development of species richness. Of course that's why the triple SI meadows have benefited in one way over the years is because we graze them on an aftermath, but they're only grazed for a few weeks a year before getting a full rest. So it's almost like we replicate some of that now, resting depending, we aim for between 3 and 6 months. We don't achieve that on all fields. But because we build that into our grazing planning, it means that if we have to stretch that a bit and graze more frequently, we can certainly avoid areas where we've done any restoration which was something that we just maybe didn't have built in well enough before. One thing that I'm touching on here in our grazing management, what we've also found is across the farm, and I should say that our whole farm isn't made up of floodplain meadow, we do have some higher ground as well although we're in Oxfordshire so nothing's too high, but it goes up towards Wytham Woods where it becomes quite heavy clay up on the hill. We're using the regenerative grazing across the entire farm. But one thing that has really excited us about the combination of these 2 areas of the farm is using the bales from the triple SI meadows with super species richness and using them for our winter feeding. So this is us overwintering on a farm where anybody that had ever worked on or had anything to do with this farm, told us that you'll never overwinter on this farm. But this is us overwintering on the farm and the bales of hay that you see rolled out here are bales from the triple SI meadows. Now David and the botanists amongst us would say that success rates of expecting any of the seeds to still be intact and viable from a hay cut and actually to benefit any new pasture and germinate would be very low. So I don't know whether it is that the seeds dropping out of the triple SI hay that are contributing towards the species diversity that we're seeing in our fields now but in this field we are now seeing huge clumps of birdsfoot trefoil and other plants which we always had in this field, they were always present. So I don't know if it's been a change in our management or the species-rich hay or a combination of both. But we now see huge patches of birdsfoot trefoil and up to knee and beyond height whereas before we would only see them as very shallow, low plants. So that's something that's really excited us and is a way where floodplain meadows are contributing towards the overall benefit and running of the farm. You see these areas here. Don't panic about these, these are slightly muddier areas where the hay bales have been rolled out. But actually what's happened there is the cattle have trampled that in and it's been a great way of feeding the soil microbes with more carbon and all of that

now has disappeared and it's waist height in grass and plants and legumes and forbs again. So that's been really exciting for us.

This is just a demonstration of we're just seeing a little bit of the regrowth in the way in which we manage the animals, rotating them round from one cell to the next on a 2 day shift.

This slide here, I wanted to just demonstrate some of the benefits that we're hoping to achieve on our soils. So this is a sample here that we've dug out of Pixey and you can see the almost compost like structure here with the small lumps of soil and quite porous looking, like water could infiltrate through or does infiltrate through, and the roots go fairly deep. We only dug so deep but the roots keep going down. Then when we look at a soil sample at what I would call our side of the river, so the non-triple SI side of the river, you can see that it is much shallower. It was difficult to dig down any deeper for a start. Secondly, that the root zone is just in the first few centimetres, there are some roots that go down but the majority are all up here. So our water infiltration, our carbon, everything is being held in this part here and we've got a big missed opportunity. The lumps of soil it's more cloddy, so the ability for the soil to absorb water is much less. So what we're trying to do with our management is a combination of things, take it from this, back over to this, and improve it further still.

Then because everybody likes looking at pictures of meadows, this is a picture in Pixey meadow which is just great. I should say as well actually we are Savory Institute accredited with their ecological outcome verification. I don't know whether anybody's familiar with that scheme but that comes from the Savory Institute and Allan Savory's work and his subsequent development of a verification scheme. What I love about that scheme is as a farmer is it's the only scheme that anyone comes to the farm and doesn't want to fill in any paperwork. All they want to do is look at the land and it is an assessment of whether the land is regenerating. I find that really exciting. But in that field I showed you where we were overwintering using the triple SI hay that field this year in only our 2nd year of being part of that scheme got given the 2nd highest score that any field that the assessor has ever given. The improvement in there was absolutely massive in just 1 year which is super exciting and I think one of the benefits, it should be a motivator, it has been for me, it's opened my eyes, this restoration and management of floodplain meadows and actually what they can bring to your farm not just in biodiversity, but economically as well. I know earlier it was mentioned about hay and selling and that's something that we have great demand for. We're selling hay to organic horse feed manufacturers because they want the diversity because it is just so well linked to animal health. It's almost crazy that we're not planting every meadow up as a species-rich one. In fact in our countryside stewardship management we're just entering into a new 10 year scheme because we've just come out of HLS, and species diversity, species richness, is one of the things that we have built into that massively. We want the whole farm to be as species-rich as possible and that's a totally different point from where we were years ago. So for me it's a really exciting time and floodplain meadows are leading the way

for us in our experience and me on my own personal experience with the whole thing. I think that's everything from me.

Gethin: Thank you Clare. That's so exciting to hear, you're doing some great work at such scale on the farm, and really exemplifying that it's less about the cow and absolutely about the how. So well done you and all the other people there at the farm. Right a chance for some questions before we take a quick break. If we can bring all the speakers back on. If we can go to the chat first perhaps, a couple of people have been monitoring that. So if there's any pertinent questions been raised there can we start with those.

Questions

Olivia: There's a question from Ann Cantrell which is – We tend to advise set stocking rates typically at 0.6 LU per hectare for many grasslands. How would your stocking rates compare?

Clare: You've totally stumped me there, that's a great question and it's something that we're just currently working out to make sure that we're clear with people on what we are doing. Basically we've got the same number of cattle that we've always had. In fact we've got more cattle but less sheep, but we worked that out as an equivalent. So the stocking rate on the farm didn't change, just our management did. But we will be publishing those stocking rates soon and over the years how they've changed because we haven't got them. It's a bit silly of me that I don't know that sorry. I'll let you know, get in touch.

Catriona: So we just go with the standard stocking rates that you've suggested.

Alison: I want to say to Clare thank you very much for such a wonderful talk. I'm very excited to hear all the new things that you're going to do on the farm and you've already started to do and thank you for mentioning Somerford Mead. Bye.

Olivia: It was a question really about the future plans. So obviously you're looking at countryside stewardship funding now but going forward, and that'll be different for all of you I suppose, but whether you would look more at the local recovery or if you're actually more interested in the opportunities through the landscape recovery? Or would it be a bit of both? How would you want to shape your approach going forward?

Clare: That's a good question that I don't really have a clear answer to in that we've just gone with countryside stewardship because we had a big financial chunk to replace from our HLS payment, it's worth about £70,000 a year to our farm. So that, like most farmers, is the difference between surviving and not. Most people are talking to us about ELMS and what that will look like with a view to going as a countryside stewardship higher tier, and with all the work that we're doing on everything hopefully putting ourselves in a great position for whatever new schemes look like. So as far as the 2 things you've just mentioned there, I'm not clear. I don't

know. I'm not going to try and pretend I know much detail about them so that's all I'll say on that.

Sarah: So I think with countryside stewardship obviously we know what is going to be available and the agreement starting now they've said they'll carry on with. But if people want to leave for ELMS scheme they can, but I think it's difficult to know between the landscape recovery scheme and local nature recovery. We don't even know yet quite how the 3 different streams of ELMS, the SFI as well, how they can be layered on top of each other or not. So I think it's just keeping an eye on as and when things come out. Also looking not just at government-based funding but other markets or opportunities that may come out, like the farm soil carbon code that was discussed this morning, possibly biodiversity net gain, things like that. But there is still a lot to figure out about what can be layered up together and what's not compatible.

Catriona: In our area there's actually a lot of development going on. So in fact 2 of our landowners are currently putting in for biodiversity net gain funding. So similarly there's a kind of mixture of different kinds of funding. The Oxford colleges, for example, that we're working with are funding it themselves. We're also of course, working with much smaller parcels of land of individual landowners that aren't eligible for any of the government schemes because the areas are too small. So it's always going to be a mixture of funding opportunities and self-funding which actually from our point of view is the most straightforward. With the Oxford gardeners, for example, you go in and have a conversation in the lunch break with the head gardener. He goes and talks to the Gardening Committee and they decide they want to do it. With Merton we had the conversation at the beginning of July and we did it at the end of July. So that's the perfect programme from our point of view. Of course around Oxford the colleges own a huge amount of land. So that's the optimistic side of our project.

Gethin: We'll hear a little bit more about ELMS now in the next session from DEFRA. So we'll have a short break.

It's 6.00 so we're moving on to the 2nd part of this session and we'll begin with Ellen Brown, Head of Policy (Local Nature Recovery) at DEFRA and she'll be talking about the future ELMS schemes. I'll hand you over to Ellen.

Ellen Brown - Future Environmental Land Management Schemes

Ellen: Hello everyone. I just caught the last bit of that presentation there so it's good to see some familiar faces from the visit I did with Catriona and Kevan out in Oxfordshire. So hopefully we can make this relevant to you. I'm going to go through this relatively quickly because it sounds like from the end of the conversation there that you've got at least a rough idea of where we're going. So I'll try and speed through and leave some time for questions.

So going right back to the beginning what we're trying to achieve with our vision for future farming, it's really about recognising that farmers in this country produce world class food both for consumption here and around the globe. But at the moment we really don't think they're rewarded adequately for the other benefits they provide, everything from managing landscapes where we get clean water from, to protecting us from hazards such as flooding. So our vision for the future sector is one that adequately rewards those environmental benefits. It's of a farming sector that's self-reliant and resilient and a much better relationship between industry and government, and also world class animal welfare standards. So it's great to hear you talking about the animal health benefits of biodiversity before. We're huge fans of the of the One Health approach.

In terms of the public goods that we're looking to deliver through our future environmental schemes, we've got clean and plentiful water, clean air, protection from the mitigation of environmental hazards. So we're including wildfire and flooding in there, mitigation of an adaptation to climate change, thriving plants and wildlife, beauty, heritage and engagement.

So it's great to hear that there's people on the call who are in countryside stewardship. Countryside stewardship is a fantastic scheme, it gets better all the time, it really is quite a mature offer. I think it's fair to say there have been quite a few kinks to work out, but it's improving all the time. Some of you will be aware that it's undergoing a payment rates review at the moment. But we basically want to build on that. We want to take what's good about it into the future, and ditch what has been less successful. With that in mind we want new schemes to be more flexible. We want to design them with the people who are actually using them. We want to take an approach to regulation that looks to support land managers rather than penalising them when we know they're trying to do the right thing and also gives farmers flexibility recognising that they're in the best position to understand what they can and can't do on their land.

These are the strategic objectives for the programme. So securing a range of positive environmental benefits, but also tackling some of the negative environmental impacts associated with agriculture.

The 3 schemes, so these were mentioned before, so there's a sustainable farming incentive, local nature recovery and landscape recovery. So I'll go through each of those in a bit more detail in turn.

So the sustainable farming incentive. Open to farmers. This is where we want to really drive largescale uptake. It's about managing land in a more environmentally sustainable way. We're going to group actions into packages in what we're calling Standards to make it as easy as possible for farmers to identify and understand what's best suited for their land and their business. Initially this is going to be open to just BPS recipients but we're looking at expanding that over time. This is the rollout from 2022 to 2024. So as I said that's the eligibility and we'll improve over time.

These are the Standards that we're looking to include initially as part of piloting. So I'll talk a bit about piloting at the very end but as we go through. This is one of the lessons we learned from countryside stewardship, that if you're going to roll out new schemes piloting first is a really good idea. So you've got those Standards there. Ones that might be particularly of interest to anyone who has floodplains are the ones around the low and no input grassland standards, which we're applying to areas of wetland and damp grassland for actions that are increasing botanical diversity and also providing feeding areas for wading birds and contributing to reducing flood risk.

So after the scheme launches in 2022, as we said, we're going to continue to develop it. So we want to continue to co-design that with the animal health and welfare pathway. We're looking at the inclusion of land management plans and how we can explore how earned recognition might work with agreements. So when you're already part of schemes like LEAF, for example, that already have a Standard, what we can do around that to minimise inspections and things like that. That's all part of developing our approach to monitoring and compliance.

Local Nature Recovery, the scheme that I lead up, so it's really about the right things in the right places. I've listed out the activities there that we could be looking to pay for so that's around creating, managing and restoring habitats such as woodlands, wetlands, freshwater, peatland, heathland, species-rich grassland and coastal habitat, as well as connecting habitats to form networks. So really supporting here the Nature Recovery Network and local nature recovery strategies, which I'll talk about in a minute. Other actions include natural flood management, species management and the management of designated sites.

These are some of the elements of the scheme. So we want to make sure we're drawing effectively a golden thread between what we want to achieve at a national level, so drawing our targets from the 25 year environment plan, right through to what people do on the ground, factoring in local stakeholder views. We want to make sure that this dovetails with local nature recovery strategies which are the new system of spatial planning for nature set out in the Environment Bill, just currently making its way through Parliament. It's also about recognising that lots of land managers are already doing amazing things for the environment and we want them to keep doing so. So firstly we want it to be a smooth transition from existing schemes from countryside stewardship through to ELMS schemes, but also continuing to pay for maintenance of those public goods. So it's not just about creation, it is about rewarding on-going maintenance. It's also about facilitating collaboration where this can deliver improved outcomes for the environment. Something that is a bit of a misconception here, which I'm not sure where it comes from, but some people get the idea that that local nature recovery is just about group agreements. That's not the case. We think that local nature recovery is going to be almost entirely individual agreements in the same way that countryside stewardship is now, but the point is that we want to be able to incentivise ways of linking those

agreements together in the sense of linking outcomes. So whether you want to achieve something at a catchment level, or whether you want to do a wildlife corridor, it's about co-ordinating action as opposed to binding people together in agreements. I'm happy to expand on that if I've not made that make sense. As I mentioned before the management of designated sites is really important here. So that's a map of triple SIs in England. We know that there's a lot of work to be done to get those in favourable condition.

Next steps on local nature recovery. So we're going to be continuing to work with stakeholders this year. We're analysing the results of the pilots we did on local nature recovery strategies. Some of you might be aware that that's out for consultation at the moment. There's also lessons learned on gov.uk. Then we're looking to publish more information in the coming months.

Landscape recovery finally. So here we're talking about long term land use change projects. So largescale tree planting, peatland restoration, saltmarsh restoration and that's going to be a competitive process. Some of you might have taken part in the market engagement we've done around landscape recovery more recently which is about looking at opportunities for landscape recovery pilots and really trying to start to understand what the potential is out there. So we've committed to launching at least 10 landscape recovery pilot projects between 2022 and 2024. The theme for that first wave is around recovering and restoring threatened native species and also restoring streams and rivers. What we also did as part of that market engagement that I wanted to show you is we did a bit of a mock-up of the types of projects that could come under these pilot projects so based on entirely hypothetical situations. This is one example of a floodplain project. Those are some of the environmental benefits that we'll be looking to achieve from that and some of the actions that we would expect to be taken to achieve some of those benefits. So around remeandering rivers and streams, woodland where suitable and potentially some limited amounts of grazing there.

This is our timeline. So tests and trials which hopefully everyone's heard about is our programme where we're working with farmers and land managers to design elements of the scheme. That's been running since 2018. Some really interesting projects around things like payment by results and other innovative payment approaches. I'm particularly interested in how they engage with local communities. So we've got some really interesting projects in the Broads and elsewhere.

Sustainable Farming incentives. So we're piloting that over the next couple of years with early rollout from next year. Local nature recovery will pilot starting from later 2022, phased rollout from 2023. Landscape recovery pilot starting from next year, phased rollout from 2024. Worth mentioning that countryside stewardship continues to run alongside that as I think someone mentioned just a bit earlier. Last countryside stewardship agreements can be applied for up until February 2023, with the last agreement starting on 1st January 2024. So you've got options there to consider what's right for you at the particular point in time depending on farm business cycles.

I also just wanted to mention as well that, as I'm sure you've seen in your conference, existing schemes really do support work on floodplains. These are just 2 really fantastic projects that I'm sure you have more information about than me but I just wanted to mention them because I think they're particularly exciting in terms of the way that they have really taken a partnership approach, and engaged with government, with local stakeholders, different land managers. I think they've both been so impressive and it really demonstrates what can be achieved when we can get government and the farming sector and the ENGOs all working together.

Finally, I think as I said, further information is coming on the schemes. So we've had a big push from Wildlife and Countryside Link today in looking for more information so we really appreciate that there's a real hunger for information on new schemes. You can sign up to our DEFRA e-alerts and keep an eye on our landing page which has a lot more information, blogs, etc if you're interested in more information. That's it from me.

Gethin: Thanks Ellen for keeping so well to time. You can keep a note of any questions for Ellen after and we'll move on to Caroline O'Rourke who is going to talk about some work mapping floodplain creation and restoration opportunities in Gwent, Southeast Wales. Caroline has a particular interest in floodplain meadows and in her free time acts as a voluntary ambassador for the Floodplain Meadows Partnership.

Caroline O'Rourke: Resilient Floodplains Gwent: Mapping floodplain creation and restoration opportunities in South-East Wales.

Caroline: Hi there I'm Caroline O'Rourke. I'm Senior Ecologist at BSG Ecology and also a voluntary Floodplain Meadows Partnership ambassador in Southeast Wales. So I'm going to run you really super quick through a mapping project we did earlier this year called Resilient Floodplains, Gwent. So this was essentially an opportunity mapping exercise for areas where floodplains could potentially be restored in Southeast Wales. It was a joint project between BSG Ecology the consultancy I work for and the Floodplain Meadows Partnership. It was commissioned by Natural Resources Wales. So NRW are taking what they call a place-based approach to the sustainable management of natural resources and conservation projects. So since the introduction of the Environment Wales Act back in 2016 they've divided Wales up into 7 regions which they call Operational Areas and each of those areas has an Area Statement which sets priorities for certain conservation actions in those areas.

So this project was in the Southeast area. So you can see that on the right hand side there and within that Area Statement enhancing floodplains is one of their priorities. They want to do what they call build resilient ecosystems. So that's about creating largescale properly functioning ecosystems that are well connected and can help support climate change adaptation and mitigation. So we built a GIS model to help NRW do a high level identification of areas where floodplain habitats could be created or restored. It was quite a broad approach so we were looking at floodplain meadows but also floodplain wetlands and woodlands. Essentially this project was a

desk-based high level way for NRW to be strategic about where they're looking to restore floodplains. So where enhancing them could be most effective in Southeast Wales by not only looking at where it might be physically possible to do that, but where they would get multiple ecosystem service benefits as well. So where can we target our limited resources to get the most benefit for the most people essentially. So that's the main driver of the project.

So how do we do that? Now this is a database project so it's probably not as exciting as hearing about grazing and actual on the ground stuff which is really nice to hear. I really enjoyed those. So I will try not to bore you to tears, but it is a database project so you've been warned, but it's only 10 minutes. So our study area was flood zone 3. So that's the 100 to 1 or greater chance of flooding from rivers in any one year. So you can see that illustrated on the map there. So we clipped that dataset to the boundary of the Southeast Area Statement and we use that essentially as a cookie cutter to extract information from national and regional datasets for the analysis. So, for example, one thing we did is we used it to extract habitat data. So NRW have got a complete set of phase one habitat data for the whole of Wales. I'm not sure if England has the same, I don't think they do, but it's a really useful dataset if anyone is interested. So you can see that actually the baseline situation in the floodplain at the moment is pretty grim with improved grassland overwhelmingly dominating and then the next couple down are buildings and arable. If you look up at the top there you can see the meagre amount of semi-improved neutral grassland and woodland that are currently mapped. So it doesn't look brilliant at the moment. So we designed a GIS model, so I've tried to visually represent this for you rather than me rattling on about data. So essentially we looked at 3 different factors. The 1st factor was biophysical suitability for various habitats. So through the work that the Floodplain Meadows Partnership have done over the last decade or so, we know that certain NVC communities and certain habitats have got particular niches in terms of water table height, water chemistry, soil type, that kind of thing. So we looked at what those were for specific habitats and we looked at what those niches were. Then we looked around for datasets that would show us where those conditions exist essentially. Then we built a model that showed us for each of our target communities where those factors coincided. So the model would then tell you you've got suitable pH, you've got suitable water table height, you've got suitable soil type. Where those coincided would come out as a higher suitability for the target habitat essentially.

So this is a visual representation of the model to show the thinking essentially. So we looked at those different factors, water table height, pH and we looked around for where there were existing datasets that included those things. Where there wasn't a direct correlation we looked for a proxy. So, for example, for water table height we used a proxy and then for a factor that was coincidence of NVC community constants we modelled our own dataset using BSBI data which was really helpful. So that's that. So for each of those factors we then filtered down to the suitable criteria for each one. So we had water table height for MG8, water table height for MG5 and we ran an overlay analysis to show where those factors coincided. Once we'd done

that we excluded areas that were somehow constrained, so any sort of constraint to habitat creation or floodplain restoration, such as existing development or areas of existing priority habitat that it wouldn't be appropriate to interfere with, they were removed from the model. Then we were left with what we called an opportunity space, so an area where there were multiple biophysical factors that are amenable to creating each of the target habitats.

So that's an example of the GIS output. So essentially a set of maps that show levels of suitability through each habitat based on those biophysical factors. So the more positive factors for a particular habitat, the higher suitability it comes out in the model. We chose particularly to run this as a separate model from the prioritisation exercise that we did later so that it could be used as a standalone resource. So if you were to, for example, have a parcel of land that became available for habitat creation you could use this to look up which would be the most suitable habitat to target in terms of creation. So then once we'd worked out how suitable particular areas of land in the floodplain were for certain habitats, we did a prioritisation exercise. So there were 2 factors then combined with the biophysical suitability. So the first was, in which areas are certain ecosystem service benefits likely to be either practically able to be delivered or would be most beneficial to be delivered? So for that again we cast around to see what existing datasets we could use to interpret that and there's been quite a few projects by NRW and other organisations that have looked at areas where there's potential for reconnecting the floodplain, where there is potential for flood water storage, improvement in water quality, improvement in habitat connectivity. So all these factors we collated them and then we ran another overlay analysis which basically shows the more of those factors that coincide in one area the more likely it is that you're going to get multiple benefits. So those were classed as highest priority. The 3rd factor we used was potential influence over land management. So areas that were either owned by NRW or had some sort of environmental stewardship scheme so there's an existing relationship with a farmer, or areas owned by wildlife trusts or other organisations that are somehow likely to want to be involved in habitat creation or restoration schemes because that makes it more likely that you're going to be able to deliver this. So that was then run into a 2nd model and there's another diagram that shows you the workflow there. So these are your different ecosystem services here from various sources via another overlay analysis. Then once we'd run that 2nd model we filtered it down to a list of priority sites for NRW to assess. We did that by using areas of contiguous high or very high priority from the model that were a hectare or more in extent essentially. Then we went and consulted with NRW so that any local knowledge that wasn't available in the datasets could be factored in. So there may be some reasons that it's not appropriate to create habitat in certain areas that you just need to know someone who knows the land locally to do that. So we went through that consultation process and ended up with a set of priority sites for feasibility study going forward. So there's the biophysical suitability model there and there's the prioritised version. So you can see the priority sites highlighted in blue with a spotty hatch there. So we ended up

with 29 priority sites overall, mostly in the Usk and the Wye catchments on the east of the study areas, so the pink and the green there. So that's 23 for grasslands and wetland, and I think 6 for woodland there.

So the next steps in this project. So those sites they cover about 400 hectares overall which if we go back to our baseline if we were to create floodplain habitats in all 400 hectares, it would be a significant improvement, you could double the amount of woodland or quadruple the amount of grassland so that it could be a really big thing. But obviously that depends on resources and availability. There's some sites that are about a hectare but there's also clusters of sites that add up. So you could progress the project on either a single site basis or a catchment basis depending on the resources available. But obviously it's essentially a desk-based exercise and the model is only as good as the data that goes into it. So the very first step that we need to progress is to go out and ground through some of these sites, so take some soil samples, do some vegetation surveys, see how that matches up with the data that we've used and that will then feed into a feasibility study prior to any actual habitat intervention.

So that's a really, really quick whistle-stop tour of our project. We also did a really high level ecosystem services assessment where we showed that if we took areas of improved grassland and converted them to floodplain, wetland, woodland or meadow that there would be a significant uplift in ecosystem service delivery in monetary terms as well. So that could potentially be the basis of future environmental land management schemes for NRW. It's very early days but it's essentially a signposting tool for where potentially resources could be focused in strategic decision-making essentially.

So my details are there. If anybody wants to hear a bit more I'm happy to chat to anyone, give me a call or an email and that's it from me.

Gethin: Thank you Caroline, it's not boring at all. It's really important work in helping to target resources, effort, money, it's great work. So on to the final talk of this session and that's Dr Irina Tatarenko who is the Research Manager for the Floodplain Meadows Partnership and she's going to talk about getting back the lost hay meadows.

Irina Tatarenko Getting back the lost hay meadows - a three-year study into floodplain meadow restoration activity in the UK.

Irina: Good evening everybody, tonight I wanted to tell you about our work we did on the Floodplain Meadow Restoration Project in England and Wales as a part of our partnership activity funded by the John Ellerman Project. The data was collected by myself and Emma Rothero over a 3 year period and this talk was designed as a summary for what we heard about.

Here is our project and the locations showing in blue they were existing floodplain meadows, ancient floodplain meadows and the green dots are the restoration fields

which we surveyed in the period of 3 field seasons in 2016-2018. That survey included slightly over 800 hectares of the restoration sites which we had knowledge about by 2018. That area has greatly expanded since then. So the talk is a little bit out of date and probably should have been presented a couple years ago, but we were all under COVID and couldn't have the conference. So this amount of restoration sites would add quite substantial extent to existing species-rich floodplain meadows if they all would be successful. So the restoration sites were about 1/3rd of existing meadows. What we came across, probably we didn't think about it from the beginning of our survey, there was a diversity of floodplain meadow restoration projects in the UK. Well to be more precise in England and Wales as we didn't go as far as Scotland. That diversity applied to various areas starting from the ownership. Here is the range of various owners we met on those restoration sites and the sizes of restoration fields were quite different. The condition of the sites prior to restoration was also quite a range and quite different situations completely which caused more difficulties for assessment and comparison to get the overview of the meadow restoration situation in the country nationwide. Of course in restoration techniques, there is also a range. There was quite an extensive discussion in the chat about it and in the presentations today. So all this we had to assess, observe and decide whether restoration was successful or not. In order to do that we had to come up with some restoration success criteria. The most formal and generally used criteria is the indicator species. If they are present on a site or not and if there is some indicator species there then many organisations would report it as a successful restoration project. However, we took an approach that we want to restore a meadow, we want to restore a habitat, not just a few species which turn up somewhere and we can say that we have a successful restoration. So the 3 different criteria mentioned here were used. It's all explained in great detail in our published paper which we published at the beginning of this year in the Journal of Vegetation Science and if anybody's interested there is a link to it on the Floodplain Meadows website.

So the species richness, how many species per m² because the meadowland communities we are aiming for they are well known species-rich plant communities and this criterium is central. But on its own it didn't work because we really wanted to measure restoration success as the restoration of diversity. As we heard today in previous talks that diversity is a link to restoration of carbon storage and we are really interested in this diversity. So we took the approach that diversity is a mixture of species and a mixture of functional groups. So species richness is showing a mixture of taxonomic groups and functional types here. It's the Grimes approach, the ratio between competitors, stress tolerant species and ruderal species shows the diversity of functional groups in there on the site. The similarity to National Vegetation Classification was the 3rd criterion. So using this we applied them to all sites we visited. The success categories are along here, and we divided all our sites field surveyed into 5 categories. Here this graph shows how different pre-restoration conditions of the sites were distributed across those success categories. So the blue

colour, for example, is pastures. A lot of sites were restored from pastures initially, very but the distribution for all colours is more or less this bell-shaped one with the medium not very confident degree of success in the middle. So roughly categories 4 and 5 this end is 25% of all sites which we can be quite confident that restoration went very well there and we will have those sites close to the ancient meadows in the future. Categories 2 and 3 are somewhat uncertain. So they are more or less category 2 and still could reverse downhill and just lose its progressive signs and category 1 is 15% of sites, we would call it start again.

What we found was that neither, as Catriona already referred to our work quite extensively, that neither restoration methods or the sites condition prior to the restoration or involvement in Agri-environment schemes as such or the size of the fields, neither of them were statistically significant in terms of restoration success achieved. But what we found was significant was the quality of management as that was really a key to success. This graph shows the 3 largest groups of the ownerships - private companies, private landowners and public organisations, how they were scored for their success from 1 to 3 so it's that scale we used for measuring. The yellow bars was sufficiency of management and was the greatest factor affecting the overall success of the restoration site. Also consistency and adaptiveness or flexibility. They were also significantly different between the 3 categories, but to a smaller extent.

So that's some thoughts on the story very briefly. If we understood how meadows have been formed in the first place historically over the time on the floodplains, we might better understand what we should do in the restoration processes. First we need to remember that floodplains are a very dynamic system controlled by floods and management. We've heard a lot about this today and yesterday. Historically most of the floodplain meadows developed in the place of woodlands removed by humans a very long time ago, but still some woodland forbs can be found on the meadows. They are one part of the story, but it took many centuries for the other species to arrive at the floodplains from wetlands, from dry meadows, from road verges, from openings in the woods. That's what is difficult with restoration, mixing up individual species into the species-rich meadow community. It has been a very long natural process. With restoration sites it's one of the greatest challenges to achieve. But also with management of the existing ancient meadows, semi-natural meadows, it's still a challenge because this mixing should be carried on consistently.

So the messages to take home with you are that floodplain restoration takes time, a lot of time and a lot of patience. Seed limitation is a well-recognised barrier to the recovery of temperate grasslands so generous and multiple applications of the propagules is a way to success and mixing species into the functional and taxonomically diverse communities should be thought about in the management. When I was watching and doing my fieldwork I was watching a lot of the modern way of hay cutting and collecting and rolled in and how much chance the species which do exist on the meadow, how much chance they have to disperse across the site to

mix up and germinate in some new spots and new areas. So what we can do, in my view this hay packed on the site and taken off without any shaking the hay across the site, is restricting that process of mixing species into the community to a great extent. So what can we do about it? It would be good to think about and get some ideas.

Thank you for your attention and this small diagram just to show its actually real data from 5 of our prime meadows with actual frequencies presented in latin names of the plants so that's how the community is mixed up. That's what we have as a community, and that's how different groups are present more or less. So that is our aim to restore and enjoy and take it to future generations. Thank you very much.

Gethin: Thank you Irina. So we have a little more time for questions. We've got a poll quickly so if we can put that up and then we'll take some questions. So if as many people as possible can complete this. Do you agree that floodplains should be identified as a discrete land type to facilitate the delivery of nature-based solutions which they have the potential to provide? Do you agree with this or disagree? If you disagree please tell us why in the chat box.

It's a unanimous verdict there, a completely unbiased audience. But absolutely right. There's so much the floodplains can offer. Brilliant. So if all the speakers can come on the screen and I'll go to Olivia and colleagues in the chat box first to see if there's any outstanding questions there to ask. If you've got questions you could put your hand up and we'll come to in good time.

Questions

Olivia: There's been quite a lot of chat from some of the attendees about the costs that they'll get through from the ELMS scheme. There's a bit of concern about whether actually both the Sustainable Farming Initiative and other payments will actually cover what will be lost from basic payments. I don't know Ellen if you've had a chance to have a look through the chat and if you're happy to respond to that, or you want to respond later on, but there definitely seems a concern there about how it will work. I know there's more to be done on that but maybe if we can take that and give that to you in part of those discussions around how the scheme will work. There is something here around how it will play out in practice, whether schemes can be in the same field for different actions, whether they'll have to be in separate field parcels. I think that was a question that came from Sarah Wells.

Ellen: Yes thanks everyone. I put a brief response in the chat. So there's definitely some points for me to take away there. That is part of what we're looking at in terms of stacking of schemes. I've put in the chat there our payment principles and a link to the government document there. So we absolutely want to make sure that people are continuing to be supported to deliver environmental outcomes. BPS was not the most effective way of doing that. I appreciate that in some circumstances that has enabled people to do really fantastic environmental projects. So it's not the case across the board. We've been talking to a lot of the environmental NGOs who run

high nature value sites. So we've got an ongoing project at looking at how we can make sure those are still supported. Not just for the ENGOs but in general to support high nature value sites, but also looking at how schemes can be stacked and how additionality can be demonstrated where you might want to do something like layering private finance with ELM scheme. So that's part of my team's work in particular, looking at the creation of land management plans and the ways that those outcomes can be demonstrated so that you can make the most of carbon offsets, biodiversity net gain as well as ELM schemes. It's very much all part of our piloting process, but it's really important to hear that feedback. So thank you for your comments there and I've already drafted the email to the CS and SFI teams just playing back your concerns.

Gethin: Thank you Ellen. Anything else standing out there Olivia?

Olivia: A couple of other comments. Obviously just to add in those concerns about carbon payments, some people feel that it's still a bit of a wild card at the moment and there is obviously this discussion around blended finance and how they all work, which again I'm sure Ellen you've been aware of this. So just to feedback that concern. Coming away from that a question to Caroline which asked - Did you look at the evidence for the historic presence of floodplain meadows as a guide to potential restoration?

Caroline: Yes, we used some datasets from a previous project called Working with Natural Processes. There was a dataset that highlighted areas for potential floodplain reconnection and that factored in historical flood outline. So while we didn't pull it in directly, it was factored into one of the datasets that we fed into our model. But it is really interesting actually you could if you wanted to look at that in more detail, there are some quite detailed datasets on historic flood outlines and things. So if you were looking at a smaller scale project perhaps you could pull in archaeological data as well. It was a relatively compact project and when we were filtering down to what datasets we wanted to use, there was a lot that we couldn't pull in in the time and the budget that we had, but actually there's this real potential, and a lot of these are free to use as well. If you can access and teach yourself to use QGIS, which is a free platform, you can interrogate these and manipulate them yourselves. If you've got a particular site and you want to look at the historic flood outline, certainly in Wales on NRW's website there's a whole series of data that's free to access and manipulate and look at. So if you've got a particular site that you were interested in you could certainly do that. But yes, we did factor it in through the use of a previous model essentially.

Gethin: Thank you Caroline. I'm just looking to see if there's any hands. I can't see any at the moment. I'm not missing anything am I? If not I've got a quick question for Irina, that also links to Ellen perhaps. Irina your work suggested that meadows in countryside stewardship, Agri-environment schemes, was not really a big indicator of success. I'm just wondering was there any reasons that you felt for that? Maybe what needs to change in those schemes to make them more successful into the

future? Or maybe that's one we can carry on into the panel discussion after this. But if there's any immediate thoughts, I'd be interested in that.

Irina: Yes thank you Gethin. It was an effect. I think the majority of people wouldn't do restoration if they didn't get an Agri-environment scheme. So it was like a starting point, it did work. But in terms of when we compared sites which were in the scheme, and which weren't, there was no difference in terms of success. We can't say that being in the scheme promoted people to invest more efforts into restoration than some other people who were not in the scheme but they were really enthusiastic. They were really caring. When I mentioned the quality of management, sustainable management and sufficient management, that's where as managers they made the first effort for restoration. They identified that it wasn't quite successful, they need to add more, they need to act and they were consistently applying more propagules, they were developing various approaches and how to enhance their restoration sites. But I think what's happened with some people who were enrolled in the Agri-environment schemes, they were given some idea how to restore the field, they followed the protocol, they applied those seed mixtures or whatever was recommended and sort of forgot about it. So it's ticked the box that it's done and then 3 or 4 indicator species turned up, just one plant each, and that's enough for marking the scheme as successful and they can say that Yes, they have restored their meadow. I think it's probably when we have this very formal approach to restoration, so this is a protocol, we follow it to the point to the very, very last dot and then we have a result. It doesn't work on this very dynamic system because you have to watch it closely, you have to understand what is the limiting factor in your particular area or particular year, particular season, and then address it.

Gethin: So there's a real need for site specific advice and support to make these schemes really deliver their full potential. Is that something that can be built into the tiers of the new scheme Ellen? Or how do you foresee that?

Ellen: It's a really interesting one. I think it's a good space for landscape recovery where that's appropriate, where we're looking at really project-based activities. I think, in general, I think someone's mentioned payment by results, which is something that we're looking at. Payment by results is obviously controversial because sometimes you do all the right things and the results don't happen. So we have to be a bit careful about that one, but it's something that we are trialling through tests and trials. I think it's definitely something worth looking at but you have to balance that with administrative cost and obviously thinking about Treasury and its needs to be able to account for the money that's being spent. So it's a balancing act.

Gethin: Yes undoubtedly, but some habitats definitely need that extra support don't they. Whereas maybe some you can get away with less, so it's going to be a really important thing to factor in and complex habitats like floodplain meadows, Irina's work is suggesting that definitely that that support is something potentially valued there. Okay, we have gone over time, but I think it's been worthwhile because there's been lots of really interesting questions and discussion there. There is one more

session left that Stewart Clarke will be chairing. I don't know if you have a little short break before. All I just wanted to say was thanks for joining us tonight to everyone who have joined the conference. On behalf of everyone involved in the conference, I'd like to say thanks to the speakers for sharing your knowledge and experiences. It's been fascinating and let's hope the coming years are a period of opportunity for floodplain meadows. Few habitats have the potential to give more benefits to nature and people in combination and the case studies we've heard about have clearly demonstrated the art of the possible given the right incentives. So here's to really successful incentives over the coming years. No pressure Ellen. Thank you.

Emma: Thank you Gethin. Thank you speakers. Yes we are a bit over time so I'm going to suggest a couple of minutes comfort break and we'll start back at 7.00. So you can have 6 minutes and then we'll run a slightly shorter panel session. So we'll run from 7.00 to 7.30 and run over time by 15 minutes. I really hope that's okay with everybody and thanks very much. We'll see you in 5 minutes.

Floodplain Meadows Question Time

Emma: Okay, it's 7.00. I can't actually see how many people are back with us. Yes I can it's 55. So let's kick off the final session of Day 2 of our conference and this is back to our Floodplain Meadows Question Time where we have 4 panel members and I'm just going to introduce Stewart Clarke who is the Chair for this session. Stewart is the National Specialist for Freshwater and Catchments at the National Trust. He did a similar role at Natural England and has worked on Natural England's ecosystem service pilots. He's worked on the Natural Capital Committee Secretariat as a Scientific Adviser. He's a member of our Steering Group and is currently a Trustee of the British Ecological Society and the Ecological Continuity Trust. So thank you very much Stewart for taking this on. I'll leave you to it.

Stewart: Thanks Emma. I'm hoping that we've got all of our panel members for this Question Time session. This is a follow up to yesterday's great session. We've got 3 questions lined up but we'll see how we get on with time. But if there are other questions that people want to ask let's put them in the chat and we'll see how we get on. I'm going to ask each of the panel just to introduce themselves very briefly and just say who they are. I know some of them have spoken today but others haven't. If people have joined us for the first time today they may not be familiar, so it'd be helpful just to say who you are and what you do, and therefore what you might be able to offer in terms of questions that are asked. So I'll start with you David.

David: Hi, my name is David Gowing. I'm an academic at The Open University. I'm currently Director of the Floodplain Meadows Partnership. I'm a botanist by background and my research is into the ecohydrology of floodplains, particularly meadows.

Matt: I'm Matt Johnson. I work for the Wildlife Trusts in Northamptonshire. We're lucky enough to have quite a few floodplain meadows here and a few projects working with landowners on restoration work, particularly in the Nene Valley and I also sit on the Floodplain Meadows Partnership Steering Group for the Trust.

Stewart: I would call that the "Nene" Valley but I live the other side of the boundary you see Matt. But other than that brilliant.

Andy: I'm Andy Rumming. We have a family beef farm on the Wiltshire-Gloucestershire border. Our farm borders the Thames and we're one of the haymakers on North Meadow. We've also got our own species-rich floodplain meadows. We've got about 90 suckler cows, 300 cows altogether and we've got our on-farm butchery and we retail as much beef as we can promoting the meadows and we're Pasture for Life accredited.

Stewart: We've had 3 questions submitted in advance. The first one I'd like to ask Cath Mowat if she'd like to ask her question.

Cath: Thank you for my question. It's been a really interesting day and evening. So my question is about looking at catchments as a whole - We've heard lots about restoration. I have to say I've got concerns about the amount of phosphates and soil that rivers carry nowadays. What are your views on the potential damage that this high level of phosphates does on floodplains? We're going to have extra flooding and with that the extra potential for nutrient deposition which can damage plant communities. Am I wrong?

David: Thanks for the question. Phosphorus deposition on meadows is a potential problem. It's quite well established that the diversity of grasslands negatively correlates with the availability of phosphorus. So if you have very high availability then just a few strong competitive grasses tend to dominate the community and a lot of the smaller plants are pushed out. So you're quite right that it is a concern. But as in so many other aspects of meadow management, it's quite a fine balance because we do actually want some phosphorus from the rivers to deposit on the meadows because that's what sustains the hay yield from year to year. So we want some but not too much. But what I would say is that meadows are a more robust land use than many other habitats because there is a net export of phosphorus each year in the hay crop, and therefore that can balance the input that might come the following winter, whilst other habitats may be more susceptible to the phosphorus because they have no means of getting rid of it and it will accumulate over time. So we propose meadows as a solution to a polluted catchment as a tool to try and export that nutrient out of the floodplain and to clean up the river system generally. So meadows are an ally in that point of view. But you're right that their biodiversity can be compromised if there is simply too much phosphorus for them to handle.

Matt: On the individual meadow scale it's a case of monitoring what's going on and then tweaking your management to fit that to do the nutrient balancing that David mentioned. We've got a meadow that the Partnership have actually monitored for us

since the early 2000s annually. That had a large flood event in 2009 and we didn't get any management that year, so a lot of deposition of nutrients, etc. That's still recovering now even though we've introduced early hay cuts and tweaked the aftermath grazing. But it is recovering. Then at the wider scale, yes meadows are great at taking these nutrients out of the system but we do need more meadows and something like ELMS with specific options targeted at floodplains could really help that going forwards.

Stewart: A note that Phil Wilson has made a point in the chat actually that obviously what David described really works if you're getting the hay out of the system but if you're not selling your hay on and using it within the system then potentially you could be keeping it certainly within the catchment. Maybe you want to come back on that David in a bit. But Andy anything from your perspective from the sites that you manage, anything you've noticed?

Andy: Yes, as David said about the hay cuts, it's about having the equipment and the people available to take a hay cut at the right time to get that off and having a use for the hay and that's the crucial thing because even if there's people around with equipment, if they haven't got the right class of stock that can utilise that hay, well then you're stumped. So you need that whole linkage with the farmers and actually with the customers who are buying the product at the top of the tree especially if you want more meadows. I think it's pointless to have more meadows unless you've got the way of managing them otherwise you're just building a bit of a problem in. You need big efficient equipment as well if you want to do it cost effectively.

Stewart: We don't seem to have Clare with us unless she's going to shout out. So I'm going to suggest that we move on to the next question if that's okay which has been submitted by Alex Mills.

Alex: First of all thanks to everyone involved in the conference. It has been absolutely fascinating so far and my question has already been answered in part and probably will be answered more tomorrow, but I'll throw it out anyway. It's basically just - What does the word 'restoration' actually mean for floodplain meadows given that there are ecological communities that vary in time and space, and not to mention the ecosystem services and biocultural aspects of it. So it was just some thoughts on how we can or should choose targets in this decade of restoration.

David: Thanks for question. I think you partly answered it yourself there that a floodplain meadow is such a complex interaction of different things. There's not a simple target. Traditionally people have tended to regard the plant community as the target, but in many ways it's the process of what that community contributes in terms of agricultural production, in terms of stabilising the soil and capturing nutrients, creating a habitat for other taxa, particularly pollinators. So you can measure success using that sort of ecosystem service approach rather than a simple species list. Irina did mention the issues of just aiming for 1 or 2 species rather than considering the habitat as a whole. So in my view species richness is quite a useful

way of monitoring your success and possibly of setting a target if you target a minimum number of species per m², would give you a good measure of how successful you're being.

Stewart: Andy it'd be interesting to kind of hear your views on this, what are we restoring to?

Andy: So I'd add, so species diversity obviously, really important, but business resilience. So if I'm restoring it I want the net effect for the business to be more resilient, and that's economically resilient, it has to be part of it, because then that allows it to be sustainable. But yes also more resilient from drought and wetness. I know from our own place that permanent pasture next to the river is way more resilient in very, very long floods than my neighbour's short term leys or arable opposite. So I think economic and business resilience. I know that's difficult to measure but if you get that right then that's really good.

Stewart: I think it's a really interesting point isn't it that we need to think about the whole system in a sense, and actually the restoration needs to be sustainable. We need to make sure that it works for everybody otherwise it isn't going to be sustainable and we're not going to keep what we've got. We're not going to keep that species richness. Matt would you like to add anything on restoration targets?

Matt: I think you can end up with a whole list of different restoration targets depending on who you ask. I think when we've done projects the main things that we've really looked at is understanding what we've got in the first place, what the soil is, what's the hydrology, because you can't create something that doesn't want to be created. Then probably even more crucially creating something that you can manage going forwards because there's no point creating something that either you can't manage, or like Andy said, there's not the business there for exporting the hay or there's not someone to take the livestock on or something like that.

Stewart: Alex is there anything you wanted to come back on on that? Behind your question you're obviously thinking about how we choose targets and that there might be some difficulty around that. Has that answered your question?

Alex: Yes that's absolutely brilliant. I submitted that question when I signed up for the conference and it's an annoying one because it's something that you're all thinking about all the time I'm sure and it's, as you say, there's so many different factors to think of, and I think, yes all the panellists have put up some really good points, and especially this business resilience. It's not something that I would immediately think of but it's fascinating to hear that perspective as well.

Stewart: Great, good to hear that that question has been addressed satisfactorily. As someone points out in the chat, no questions are annoying. So if you've got a question that you're not sure about asking, please do. We've got time. We've got one more submitted question that was submitted beforehand from Judy Webb. I don't know if Judy's on the call. I'm not sure whether she was able to join the session.

Judy: Well I hate to throw a spanner in all these works because this restoration is absolutely fabulous and I'm well for it. But we are in a climate crisis and I heard on the news the other night the EA saying that we've got to think about river levels being I think it was probably 30% higher by 2050 or something like that. We know we get these erratic summer floods and high winter floods and droughts and so on. I am wondering and concerned about meadow restoration being resilient to the climate that we are now in and will be getting more extreme. So I wonder, I don't know who can answer this for me, nobody has the answers perhaps. David might have some thoughts on it. But how can we make our restored meadows resilient to the climate crisis that we are in now such that all that effort and the great stuff that you're doing is not ruined by being transformed into a more inundation community? More like floodplain fen you can't crop and just have to graze or whatever. There we are. So we have a challenge.

Stewart: Thanks Judy and what a great question. You're right, a challenge. It'll be interesting to hear some different views on this as well. So David, let's start with you again. Judy did point at you.

David: Hi Judy. I see where your question is coming from that floodplain meadows do have a preferred hydrology. We try to avoid the soil going anoxic for too long in order to maintain their diversity and maintain all that below-ground diversity we were hearing about this morning. So increased flood events are going to be a challenge for them. But as we've also heard they're very dynamic systems and I think they would cope with that. I think the important thing is to keep the whole river and floodplain system well connected and dynamic to allow even more frequent floods. As long as they're able to escape back to the channel once the peak has passed that's exactly what floodplain meadows are designed to cope with. So I don't think it's necessarily going to be a problem. The floodplains, of course, will accrete material over time and if flooding becomes more frequent and larger events they will accrete sediment even faster so the level of the floodplain will grow. Having a dynamic system without embankments or canalised rivers, the system should be able to balance itself. I think parts of the floodplain will always be suitable for flood meadow. It means that the whole system may have to become more dynamic and there may be areas that become too wet, but maybe new areas that become suitable. So I think it's definitely a challenge but it's not a reason not to select meadows. As we've just heard from a previous question that phosphorus is going to become an increasing issue and meadows offer a real solution to that. I think equally for flooding there is no system from which we can get some of the services like productivity and pollinator habitat that is as tolerant of flooding as the floodplain meadows. So I still think they're the best choice in many of these situations.

Judy: I'm a bit concerned, it's not depth of flood really, it's duration of flood. So the deeper it is, the longer it stays on. This spring we did have extended flooding on Port Meadow where the lake didn't go away until June or whatever. That killed everything underneath and I didn't even look at the floodplain hay meadows, I knew it wouldn't

be terribly good. So duration and then droughts in the summer David as well. That's the other extreme isn't it.

David: Yes indeed, they're forecasting that we'll get both more floods and more droughts. So more fluctuation. But again, floodplain meadows are probably the most resilient system in terms of the depth and structure of their soils. That's what's going to be important, the ability of your land to hold water between these extremes. So looking after the soil and again we've had a session on that this morning. Avoiding compaction is going to be absolutely key, but a deep well-structured soil is the best way of coping with these climatic extremes.

Stewart: Thanks David. Andy do you want to say anything from a farming perspective and managing. How are you thinking about what might be coming in future?

Andy: So the deepest floods we've ever had and the longest floods in the winter have all been in the last 5 years. Last spring our species-rich floodplain meadow looked like a moonscape with the amount of silt dropped on it. It then all cracked, and we got one blooming fritillary rather than 600 so it looked horrific. But this year it bounced back, we had a bumper year and it was great. So as I said before, they're amazingly resilient and compared with other types of vegetation and farming along our bit of river, they bounce back better than anything else. But you can't rely on them delivering the same output of hay or grazing every year because every year is a bit different. So yes, so you have to have more Plan B's and also we're losing more of our fencing now because the heavy winter floods are damaging it more and it's rotting off and the banks are changing a bit. So we're going to have to think about just trying to hold the line of the river channel that we've held for years I think is not a sustainable option. So yes you have to do things differently, accept some change and come up with some new plans.

Stewart: I think what we're hearing both from David and Andy is actually this ability to respond and actually maybe thinking on a slightly bigger scale as well and recognising that what we might traditionally see as particularly good areas for floodplain meadow might be different places in the floodplain in future. One suggestion in the chat, one question is whether we might be able to accommodate some of this by changing the microtopography. Matt, I'll give you a chance to comment on that and answer the wider question.

Matt: Yes I think that's a good suggestion. I think from our point of view managing nature reserves we're often trying to manage very small, very isolated meadows. That doesn't give us the opportunity to deal with such a dynamic system or have areas that aren't flooding as much as other areas. In this part of the world a lot of our rivers have been dredged, they canalise the navigation and actually higher river levels might bring a lot more restoration opportunities into play and persuade some of the arable farmers around here that floodplains aren't the place for arable and therefore there is an opportunity to create some much larger networks of floodplain

meadows that do have differences in microtopography or just different varying MG4 to MG8 habitats. That will increase the resilience of the dynamic systems that we've got here. So there could be some benefits as well as some downsides.

Andy: There was a good question in the chat about some of the economics and the demise of BPS and whether ELMS will meet it and just really to say that I can't see that it will and I think that if we put all of our permanent grassland, it's all permanent grassland in this farm, into the rates that I've seen so far, we'd get probably less than half of what we get for BPS. So I think there's a huge financial cliff coming at farmers and so we've got to look at other ways of financially supporting schemes, whether it's meadows and others. So I would love ELMS to be great. It'd be really helpful, but I am not relying on ELMS at all. So yes I just wanted to say that. I hope it's great.

Stewart: That's a useful reminder. I mean hopefully, Ellen, some of those messages did come through in the discussion in the previous session actually, that in order to keep these meadows we do need to make sure that there are the right incentives, and that certainly we're not going backwards and people are able to manage these things.

Kevan: So just to offer 2 threads of hope for Judy Webb. So Long Mead this year was the meadow that super impressed Tony Juniper. So although we had the highest winter floods since 2013 the meadow was showing at its best. The other point is just that Long Mead is a Saxon meadow so it's been going for 1000 years. The river has changed dramatically. So the braids of the Saxons has now turned into this dock controlled channel which is the Thames and the meadow is still spectacular. So I don't have quite the same concerns as Judy about the changes in these for the ancient meadows and presumably that will roll over into the restoration meadows too.

Stewart: That's a positive take on it as well. I'm conscious of time. But there's a really interesting question in the chat which I would like just a couple of words from each of the panel on. It's a pretty hot topic, rewilding, letting things go and depending on how you view that and where on the spectrum you see that might be happening, but the question is - Can diverse floodplain meadows be created or thrive within a rewilded system? So I'm just going to give everybody a chance to say Yes or No and perhaps give a reason for it quickly before we draw to a close because we said we'd finish at 7.30. So I'll start with Matt actually this time. Wildlife Trusts have been pushing rewilding, what's your view?

Matt: Yes, I think they can fit in. It depends on what your definition of rewilding is and everyone seems to have a very different one. I think in our part of the world in Northamptonshire we're not particularly going to have many wolves and lynxes and the like, but we do have the opportunity to manage our land a lot wilder and I think that again comes back to just having enough of it linked up that you can be having more of a low input management and creating different, more dynamic, habitats that do balance each other out over time.

David: I'd say Yes. It's an essential part of rewilding because it's the first step of having to try and transport some of the nutrient out of the floodplain before other habitats can develop well. But as Matt said, it depends on definitions that if you take the most extreme form of rewilding and want no human impact on the system, then meadows won't continue because meadow is an old English word meaning 'to mow'. So they don't need to be mown every year but if they're never mown at all then it's going to succeed to a different type of plant community. So I'd say definitely Yes in the early stages, and depending how you define rewilding, they may persist.

Stewart: Andy I'll give you the last word. I know some farmers have embraced rewilding and others are very anti. So it'll be interesting to hear your views.

Andy: So I guess I'm more interested in regenerative farming and so weaving in bits of rewilding into a landscape where you're still producing food and things. So we've seen some beavers on our section of the Thames and I'm very interested to know what effect those might have on our floodplain meadows. But it's an interesting one. I think there could be vast opportunities for rewilding but I would hate to see us lose places like North Meadow to just willow scrub which is what it would return to. So I think it's the right thing in the right place.

Stewart: I feel we could have had a whole Question Time on this topic and probably keep talking all evening but I'm conscious that we have reached 7.30 and we said we would finish now. We were already over schedule. So thank you everybody who submitted questions. I notice in the chat we've had a flurry which is often the way with these things that people get warmed up and enthused towards the end, and we don't have time to deal with them. So sorry if you've put things in the chat and we haven't had a chance to deal with them. Maybe there's an opportunity tomorrow in the final sessions to get that question in or a variation on that. I just want to thank our panel who were brilliant as they were last night. Lots of food for thought there and some really good questions. So thank you everybody. Emma I'm not sure if you want to come back in or if we're happy just to say good evening to everybody and see you in the morning. I think we start at 9.30, is there anything else you want to announce?

Emma: I don't want to announce anything else. I just love the chat. I wish we hadn't run over time so we could have more of it but I really don't think we can keep people for any longer. So thanks all for your comments and there's lots going on in the chat now suddenly. We start again tomorrow at 9.30 with a special on history, followed by a session on strategic policies, followed by a short session in the afternoon on our Art and Craft competition. So a really lovely day tomorrow. We might if we're lucky convince Amy to put the soundscape on in the morning as well, but we'll see. Thank you all very much.