

<p>Is there anything in particular you hope this webinar session will cover?</p> <p>Do you have a question on this webinar topic you would like answered during the session?</p>	<p>Lydia's response</p>
<p>Research gaps</p>	<p>The R&D gaps are set out in detail in the end of each section of the evidence directory. The biggest gap is around scale, scale of flood risk impact and scale within a catchment at which it is effective</p>
<p>How to integrate the NFM into restoration design</p>	<p>I think this is key if NFM is designed to work with and restore natural processes then this helps deliver a range of ecosystem services and as a result by emulating natural systems there's likelihood to be a need for longterm maintenance.</p> <p>Hopefully the Cirai NFM design Manual will start to do this. But I would also suggest you visit the UK River Restoration Centre's webpage and look at their manual of techniques.</p>
<p>I work as an environmental consultant on a number of flood risk projects around the UK and am keen to better understand and be able to promote the link with natural flood risk and man built flood defences, quantifying the positive impacts of natural flood risk management in a way that enable them to be funded by flood defence schemes is a key topic of interest.</p>	<p>The Lustrum Beck case study in the evidence directory is worth looking at this was the first example of a hybrid project (traditional engineering and NFM) being funded through FDGiA. The other more recent examples is Leeds FAS Phase 2. I'd like more examples like these for Version 2 of the Evidence Directory so keep in touch if you have case studies to share</p>
<p>the EA 25 year programme</p>	<p>I referred briefly to the sections in it which reference the need for NFM</p>
<p>Naturalising flood plains</p>	<p>This is covered in Chapter 2 of the evidence directory. The Ciria NFM manual will also look at measures which can be implemented to restore river-floodplain connectivity</p>
<p>Evidence collection, backing up the funding</p>	<p>Yes I covered this, how evidence is being collated to update the directory in the future</p>
<p>Collaboration with universities, needs of EA</p>	<p>What are the current research needs of the EA regarding WwNP?</p>
<p>Evidence is important when talking to farmers. I am particularly interested in the impact of regenerative agriculture/ mob grazing/ cover crops. Also in hedge and tree planting. It would be good to have evidence which shows farmers how their income is not negatively affected by these actions, particularly regarding hedgerows.</p>	<p>I wonder if this might be something for Natural England to cover in a future presentation Gerard. I'm not the best person to answer this one.</p>

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<p>Evidence of flood risk reductions from NFM measures</p>	<p>I covered this in the first section of the talk where we discussed what I found</p>
<p>Cumulative impacts within a catchment and if there's any standardised tools for multiple intervention design</p>	<p>This is a hard one. I'd take a look at Paul Quinn's 'NFM +' work at Newcastle Uni and Alex Nicholson's (from Arup) papers on Belford</p>
<p>How those interested in getting involved either as a career or through voluntary work can learn and qualify to lead these projects. Is there a NFM qualification?</p>	<p>Sorry I had brain freeze earlier here are some things I should have said:</p> <p>We have our flood and coast degree at the EA that covers NFM too. The Flood and Coastal Engineering degrees offered by Brunel University in conjunction with HR Wallingford and the Environment Agency, from Foundation Degree through to Masters qualifications.</p> <p>Lately I have been doing some excellent free on line learning with EDX.</p> <p>The UK river restoration centre runs courses too</p>
<p>Impact or conversations with farmers and landowners</p> <p>Challenges relating to engaging local communities and other stakeholders.</p> <p>Practical methods to implement natural flood management at both local and catchment scale</p>	<p>My background is more from a science perspective would suggest maybe future guests cover NFM from a more practitioner perspective, maybe try Dave Johnson at Rivers Trust Gerard</p>
<p>A greater understanding of NFM in practice</p>	<p>My talk was more focussed on the evidence base as my background is less in the practical application of NFM. Gerard maybe Chris Uttley could give a practitioner and policy overview based on his current role and also his past role as the project manager for Stroug slowing the flow</p>
<p>What are the metrics for measuring soil structure and preventing run-off?</p> <p>What are the certification criteria for soil health and who has the database?</p>	<p>I am not a soils expert, so am not sure I am able to respond. Gerard, maybe Jo Clarke or one of your colleagues at Reading could do a session on this</p>

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<p>Overview of NFM and its standing alongside traditional flood defences, awareness of whole catchment approach and buy-in from water companies</p>	<p>I covered this talking about how its not an either or situation, NFM and traditional forms of engineering complement each other, NFM is never going to be a silver bullet</p>
<p>Detail re monitoring being undertaken and how this is being assessed/analysed re outcomes and results. Are projects aligning flow data and rainfall data and if so , how?</p>	<p>The outcomes of recently monitored projects will be collated as case studies for future update to NFM evidence directory post March 2021</p>
<p>It will be interesting to see if there is any discussion about lowland NFM</p> <p>I am currently working with a group including EA, NE, Wildlife Trusts, Rivers sTrusts IDBs on looking at NFM in lowland catchments. Has the panel any advice they could give?</p>	<p>Sorry I didn't go into this in detail, the potential for NFM to reduce flood risk in lowland catchments is a big evidence gaps. I know of case studies in lowland catchments which are being monitored I'm hoping these generate evidence for inclusion in the next update to evidence directory.</p> <p>Also worth noting there is a Lowland NFM group who meet to discuss some of these challenge on a biannual basis. Its led by Ian Benn from a Yorkshire IDB, let me know if you want me to link you up</p>
<p>Manning's Roughness Coefficient, advantages and limitations.</p>	<p>Sorry this is a little too academic for me I didn't cover it and don't know the answer</p>
<p>latest evidence</p> <p>I'm hoping there will be a good 'before and after' hydrograph, showing the impact of NFM interventions form one of the NFM projects !</p>	<p>I'm hoping we get this too!</p> <p>In the revised case study template for the evidence directory update I have specifically added this in</p>
<p>Evidence on effectiveness of NFM in high rainfall event</p> <p>Do we have the evidence that NFM makes a real difference in a high rainfall event?</p>	<p>Currently evidence is for more nuisance type events in smaller catchments, but we hope that recent monitoring during high flow events will enhance our knowledge in this areas and validate models which suggest NFM could be effective for larger events at larger scales</p>
<p>The use of data and evidence to select catchments</p>	<p>Covered this in mapping and modelling section. I suspect Barry Hankin will cover this in a lot of detail in his talk as he developed my maps and modelling guidance</p>
<p>Sand Dunes</p>	<p>I didn't cover this in detail on the call, but they are covered in Chapter 5 of the Evidence Directory. The international Natural and Nature Based Features guide will also cover beaches in a lot of detail as</p>

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	<p>this chapter will be written by Dutch colleagues</p>
<p>Farmers/land managers will be a huge part of successful delivery and speedy introduction of Environmental Land Management Scheme incorporating NFM measures will be essential. Conservation agriculture of no-till, increasing soil carbon stores, cover crops and crop rotation are NFM measures, permitting greater water infiltration and holding capacity will assist with delivery. This will also help restore our depleted soils, in many places little more than a medium for holding plants upright. This can be an important message particularly in lowland catchments of impeded drainage, associated with floodplain reconnection. Water is not the enemy must be regularly reinforced, it is a precious resource particularly in a changing climate, we need to treat it as such.</p>	<p>I completely agree. Maybe DEFRA or Natural England could do a talk on ELMS?</p> <p>The EA (Chris Uttley) is on an ELMS steering group where we offer our technical views. We are advising DEFRA on the different 'actions' which could be implemented to reduce flood risk (e.g. via infiltration, store/attenuation or roughness)</p>
<p>Are you starting to see evidence for catchment scale soil carbon increase for flood risk reduction?</p>	<p>Not yet, but I am about to start a project on carbon offsetting so if this is available hopefully this work will collate it</p>
<p>In any of these evidence reports are there cost benefits of NFM interventions in real pounds and pence?</p> <p>Cost benefit varies hugely with the specific features of each project. For well designed projects with a clear understanding of the needs and aims it can be very high.</p>	<p>We are trying to collect a better suite of metrics in our revision to the NFM case study template</p>
<p>Is the assumption that NFM is most effective in small catchments linked to the evidence being based on small projects in small catchments? If NFM was the normal approach across all catchments and river basins would this be a game changer?</p>	<p>It probably is. The case studies with the best observed evidence are older case studies which may have started at smaller scales.</p> <p>I guess it could be a game changer, but you'd need really good monitoring to demonstrate the impact. Often at a larger catchment scale it's harder to demonstrate an impact, not because there is no impact but because the larger the scale the more 'noise' there is in the catchment and it's hard to determine cause and effect</p>

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<p>Can I recommend the work at Kings College as part of the NAIAD project http://naiad2020.eu - which has focused a lot on low cost outstations using internet of things approach to generate the much needed to go into the modelling Lydia mentioned. Contact is arnout.van_soesbergen@kcl.ac.uk and there is another weblink to the sites they have been working on www.policysupport.org/smart</p>	<p>Thanks for sharing</p>
<p>Did you put in place any monitoring before putting the measures in place?</p>	<p>The DEFRA funded NFM case studies have a wide range of levels of monitoring in some cases we were able to put the equipment in first, but due to pressures to get on with construction the baseline wouldn't be that long. In other cases we used pared catchment approach</p>
<p>How is the EA influencing DEFRA ELMS? Would there be a specification for landowners or performance based. For example, for leaky woody debris dams ? I have seen many examples of varying quality.</p>	<p>The EA (Chris Uttley) is on an ELMS steering group where we offer are technical views. We are advising DEFRA on the different 'actions' which could be implemented to reduce flood risk (e.g. via infiltration, store/attenuation or roughness)</p> <p>To date they are developing a suit of actions (e.g. measures) which deliver outcomes (e.g. reduced flood risk, improved water quality etc...) and then the effectiveness is assessed via outputs (e.g. improved roughness, greater amount of flood storage etc)</p>
<p>Is it possible to get a contact email for Kate Kipling? From the presentation I noted she was responsible for creating the benefit pie charts, is this correct?</p>	<p>If you e-mail me I can put you in contact with her or share our spreadsheet we used to create the wheels</p>
<p>Are the Environment Agency case studies being shared with the Natural Capital Committee? I know Prof Mel Austin of Plymouth Marine Laboratory (and a NCC member) is interested in coastal ecosystems and role of NFM eg sea grasses - I tried to link her with Jon Hollis but not sure they did!</p>	<p>Yes I've done this via their secretariat</p>
<p>Have you looked at longer term impacts (positive and negative), including maintenance and liability issues?</p>	<p>The issues of maintenance, ownership and liability are still being addressed. My colleague Chris Uttley is starting work to</p>

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	<p>develop an 'asset register' so that we can record the location of measures.</p>
<p>since modelling can be very expensive and NFM measures are often used or more effective on a small scale, is modelling often used? Or is it not cost effective? Are alternative cheaper methods to assess flood risk and quantify potential NFM measures ever used? If so what?</p>	<p>I covered effectiveness after I discussed mapping tools. Modelling is frequently undertaken, because I think we often feel we need a model to give us comfort that something works. There are a range of alternatives described in our supporting document called 'using the evidence base'</p>
<p>Following on from the ELMS question, there IS fear that measuring the efficiency/ effectiveness of NFM strategies/ techniques could be used measure of payment in the future...</p>	<p>To date we are advising that measures are assessed on the outputs they deliver e.g. improved storage, increased infiltration, greater roughness etc...</p>
<p>Is it not dangerous to implement localised NFM interventions in opportunistic locations i.e landowner permission, without knowing its larger scale catchment impact (which can only be assessed through hydrological modelling)? surely we need coordination and planning at catchment scale</p>	<p>NFM measures are implemented for many different reasons, not always to reduce flooding, sometimes its for water quality, biodiversity etc... This means that measures do get installed opportunistically as and when pots of money are made available or if a landowner is suddenly amenable to work on their land.</p> <p>I don't think modelling is always needed. I think how we assess the effects of NFM needs to be proportionate. If you are implementing measures catchment wide at a large scale then a model may be the way forward. But if say you are a small NGO implementing one measure in one location then there may be other sources of evidence which are more appropriate.</p> <p>We must not also forget that models are not perfect representations of reality, so it is hard to model all the processes in a catchment.</p> <p>It would be great if we had overall coordination and planning at a catchment scale. The closest we perhaps come to this is our CABA partnerships and our EA catchment coordinators, so these organisations and whoever your lead local</p>

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	<p>flood authority are would be the best place to start to decide pragmatically what level of modelling is needed</p>
<p>Where the implementation of an NFM project causes a land value loss or fall in productivity how is this equitably dealt with? I am aware that the Natural Trust are attempting to force their farming tenants to adopt measures like these but are not expecting any reduction in rents paid.</p>	<p>I cant answer this, maybe as Gerard suggests it would be a good one to ask Stewart Clark from the NT when he does his talk</p>
<p>Evidence over time...and the future ? For example - efficacy of NFM measures as silt builds up behind interventions.</p>	<p>I think there is some evidence for Peatland restoration and maybe salt marsh restoration, but probably not so much for other intervention types. Nfm and its effect on sediment is being studied by one of Janet Hooke's students at Liverpool Uni in partnership with Mersey Forest (Mike Norbury) and EA</p>
<p>I'm interested to know about work that is happening with land owners/farmers on how NFM/water storage can benefit a farm/land owner business e.g. through live stock watering, irrigation, pico-hydro. Is anyone aware of this?</p>	<p>Jo Clarke's work on Landwise is working with farmers to look at the benefits of land management measures for flood risk</p>
<p>Linking ELMS to payment for environmental goods is most appropriate method of farm subsidy rther than solely payment for being a land owner. There will need to be flexibility within ELMS to make changes to scheme where particular NFM implementation is shown not to be working.</p>	<p>Hopefully Chris will cover in his talk in the autumn</p>
<p>re the modelling question - David Ramsbottom at HR Wallingford has been working on this. and the Kings College tools could be really helpful esp for NGOs like Wildlife and Rivers Trusts to generate data</p>	<p>I agree, there are loads of excellent tools out there, it can just be a challenge to find the right one for your catchment</p>
<p>Lydia mentioned Chris Uttley was giving a webinar, can anyone advise when/where this is? I cannot see it on the NERC website where this was advertised.</p>	<p>Gerard sorry did I invent this! I am sure Chris would be really happy to talk. I think it would be good to get his views from his past role running the Stroud project and his current role in EA</p>
<p>There may just be increasing pressure to get it right - or more the point, the most effective is can be and depending on how the effecacy is measured, this might end up with quite a</p>	<p>No response. I think this is a comment to the group rather than a question to me</p>

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<p>different result to what is hoped for... Just being aware of the effect of other subsidies and the farming of wildlife that is already happening in some situations</p>	
<p>I terms of silt build up behind leaky dams etc, surely sensible for the farmer whose soil was eroded down the watercourse to reclaim it?</p>	<p>Yes I believe in the Belford catchment the farmers remove the silt from their runoff attenuation measures and re-use on fields</p>