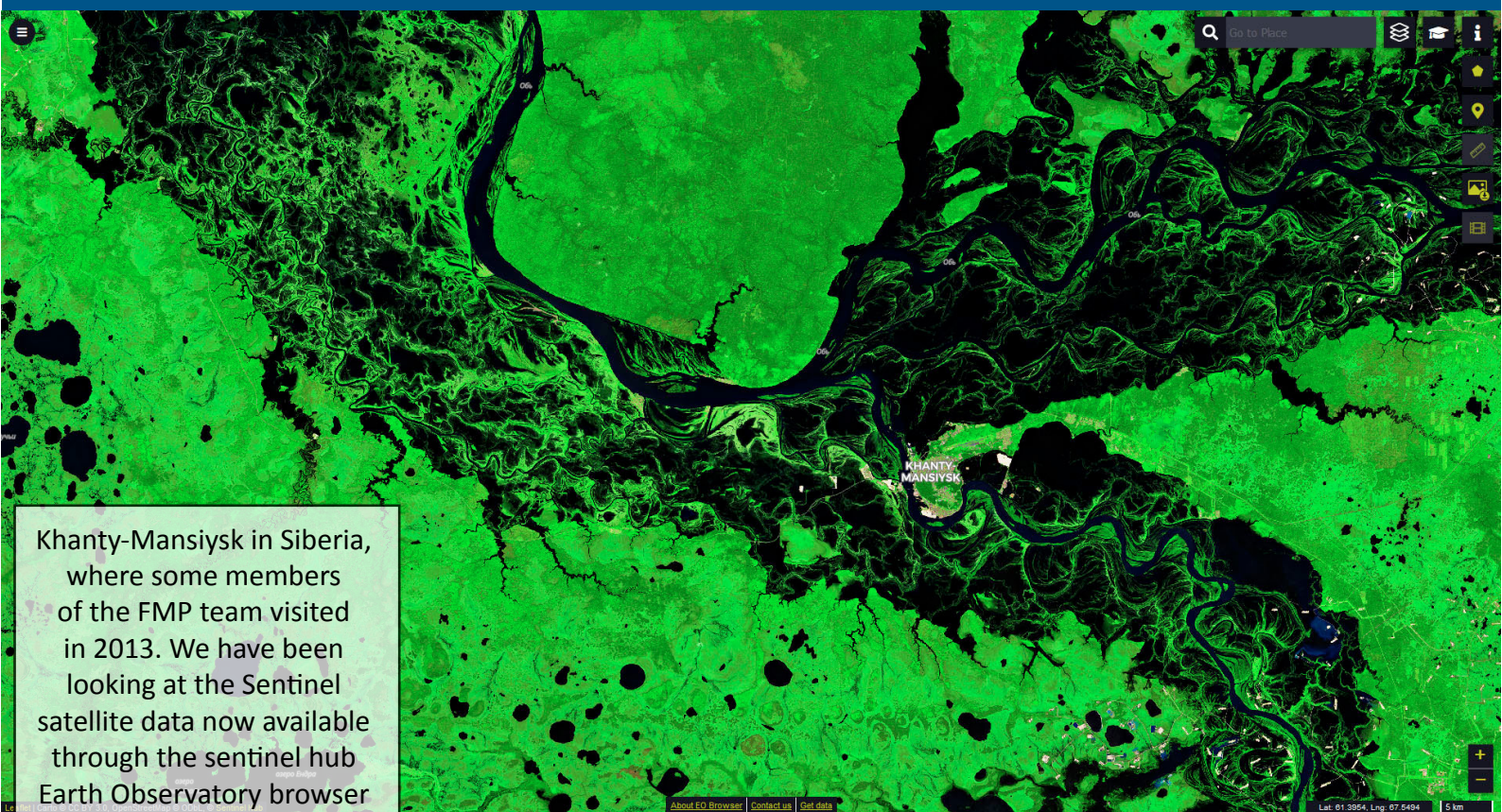


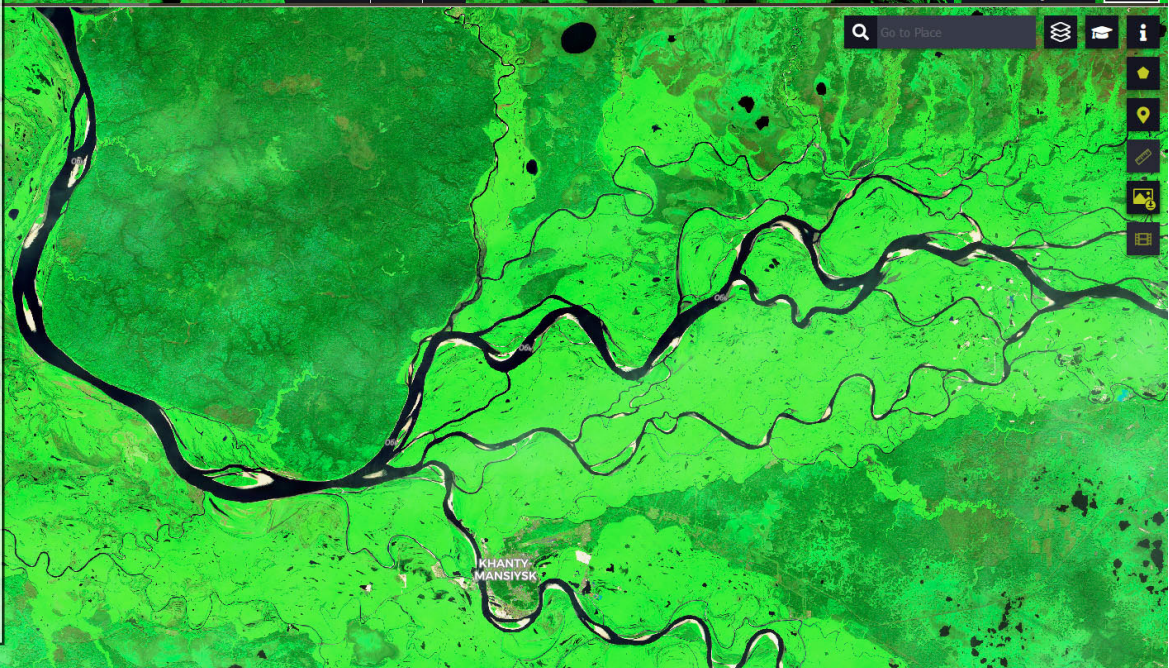


Welcome to our newsletter for the Autumn of 2020. The COVID year continues. We hope you are all coping OK and managing to work and live effectively. In this issue, a policy update, 'Fung in the dung', a new post-doc in the team, updating the PHI, and grasslands as Natural Flood Management measures.



Khanty-Mansiysk in Siberia, where some members of the FMP team visited in 2013. We have been looking at the Sentinel satellite data now available through the sentinel hub Earth Observatory browser and produced these

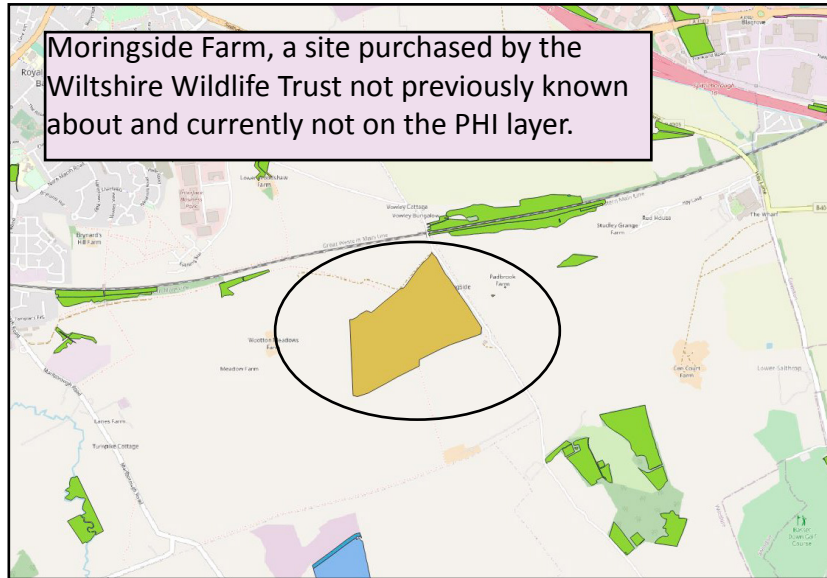
images showing flooding and dry periods along the Ob River. The dark colour shows water stretching across the nearly 50 km wide floodplain (in places) earlier this year. The lower image shows the river back in bank. This all requires more work to groundtruth the data, but we hope this will open up a way of better understanding our floodplain meadows at a large scale.





Updating the Priority Habitat Inventory (PHI) for floodplain meadows

The Priority Habitat Inventory (PHI) is a map dataset of the known locations of Priority Habitats in England. The PHI is based on the lists of Priority Habitats developed through the Biodiversity Action Planning process back in the 1990's. The PHI replaces the separate BAP inventories that were in place between 1999 and 2006. The original inventories were derived from a huge range of datasets collated from across the country, often from Local Records Centres, and including data from agri-environment schemes, before the Natural Environment and Rural Communities Act (2006) made it a legal requirement to compile the datasets into one Inventory.



The PHI can be freely downloaded here <https://data.gov.uk/dataset/4b6ddab7-6c0f-4407-946e-d6499f19fcde/priority-habitat-inventory-england> so it is relatively easy to check if you are familiar with GIS packages. Alternatively, it is also mapped on MAGIC <https://magic.defra.gov.uk/MagicMap.aspx> under the Habitats and Species layer.

Two lowland meadows in the Severn Vale recently surveyed, listed as Coastal and Floodplain Grazing Marsh on the PHI.



Increasingly, it is being used as a place to check the location of important habitats. It will also be used to help define local nature recovery strategies and deliver other policy instruments.

Examples of its use include:

- Being used to check where to plant trees (to avoid other habitats)
- To inform strategic plans for development purposes
- To inform Local Nature Recovery Networks and associated habitat creation and restoration plans.

The question therefore is, how up-to-date is the PHI in terms of floodplain meadows, which form part of the Lowland Meadow Habitat Inventory layer. We are aware of

some discrepancies in the accuracy of the layer for floodplain meadows and are starting to compile a list of these, using information from:

a) NEW SITES. We are currently working on some local projects which include identifying previously unrecorded species rich floodplain meadows and we would like to add these new sites to the PHI.

b) EXISTING SITES. Here at the FMP we have been updating the MG4 and 8 inventories over the years and now have an excel spreadsheet which is reflected in our meadows map based on grid references <http://www.floodplainmeadows.org.uk/about-meadows/meadow-map>. Luckily, through discussions with NE it is clear that the PHI covers many of the sites on our list, although they may not always be categorised as Lowland Meadows.

c) YOUR SITES? We have talked to a number of people around the country who also have species rich floodplain meadows that are not listed in the PHI, or are mis-labelled.

LOCAL INFORMATION. Local Records Centres are the best first places to go for up to date habitat inventory data for use in checking information and developing plans, and hopefully these are also used whenever the PHI is updated. However, funding to Local Record Centres has dried up from Government in recent years and it maybe that they now hold data locally that hasn't been added to the PHI and MAGIC.

We would like to amend what we can for floodplain meadows by sharing with NE and Local Records Centres data that we have compiled.

So, if you know of sites that are not on the PHI/MAGIC but that you have evidence are species rich floodplain meadows, please can you let us know? The way to check is:

1. Do you have a floodplain meadow site? Is it on our meadow map? If yes, that's great, we are checking that against the PHI already. If not, please let us know about it.
3. Is it listed as Lowland Meadow on the PHI? If not, please let us know with evidence of its habitat type.
2. If not on the PHI (and MAGIC) send us details about it and we will add it to our list (please include a map showing extent and any evidence you have about botanical diversity and plant community assessment).
4. Is it already known about by your LRC? If not, please also share the information with them.
5. Can you do this by end November 2020? That way we can aim to get this done and dusted asap.

Then we can all be confident that the best and most up to date information is being used to determine policy, local delivery, development and to undertake site checks to avoid damage to floodplain meadows

All of your data locally should be shared with Local Records Centres where they exist anyway, so that we are all able to see the same and most up to date information and LRC's operate as a local knowledge repository.



Floodplain meadows as Natural Flood Management (NFM) and Nature Based Solutions.

These are the current buzz words (some of them have actually been around for years, but have been gaining traction and becoming more mainstream recently). Having just attended the marvellous online 2020 River Restoration Centre Conference, (presentations online here now https://www.therrc.co.uk/sites/default/files/files/Conference/2020/handbook_2020_v14_online_compressed.pdf) NFM was clearly where it is at, and there was plenty of discussion about what it is, what works, and who is doing it. It is likely that many in the grasslands world would have dismissed NFM as largely about in-stream woody debris/leaky dams or upstream tree planting.

If that is you, think again, and think quickly. Wet grasslands in floodplains are one of the many NFM measures that are listed as options for Flood Risk Managers to use as part of a wider flood alleviation scheme. And NFM measures are going to be an option supported through the proposed Environmental Land Management Schemes (ELMS). So lets make sure that wider floodplain land use change elements are incorporated as a key part



Working with Natural Processes – Evidence Directory

SC150005

of flood schemes in the future, and that restoration of floodplain meadows is routinely considered as a fundamentally important NFM measure in lowland Britain.

Given that 42 % of rivers are no longer connected to their floodplains, there is a huge potential here to make a difference to how rivers and floodplains function. There is now a massive opportunity to deliver this through existing policy, using what we already know. So what policy drivers are there?

1. Environment Agency statement 'Working with natural processes: our role in natural flood management' 22/10/2018 lists restoration of species rich floodplain wetlands as one of a suite of NFM measures and cites our technical handbook.

2. Environment Agency documents published in 2018 'Working with Natural processes' <https://www.gov.uk/government/publications/working-with-natural-processes-to-reduce-flood-risk> include a Project summary document, an evidence directory and a mapping system which enables users to help identify which NFM measures might be suitable in their area.

3. The 25-year plan also references NFM as a delivery mechanism.

Floodplain/wetland restoration is listed in the EA 'Working with Natural Processes' documents as an NFM measure, as is soil and land management. More specifically, floodplain grasslands are listed as an example of a floodplain wetland.

Floodplain restoration is where flood banks are removed or bed levels are raised (where rivers have been deepened though historic land drainage or flood defence schemes) and the river is allowed to flood onto the floodplain, restoring the hydraulic connectivity between river and floodplain.

Floodplain wetland restoration is when the land within a floodplain is restored to a range of different habitats, such as oxbow lakes, alder and willow carr, fens, reedbeds and wet grasslands. The mosaic of habitats that would naturally have existed on unmodified floodplains.

Key points from the EA literature review are:

Restoring floodplains and floodplain wetlands can:

- reduce/delay flood peaks
- slow flood wave speed
- store large quantities of surface water
- enable flood water to flow back to the river later
- Re-charge groundwater (and thereby support low summer flow)
- Capture and store sediments (and take up nutrients)
- Be low maintenance
- Provide multiple other benefits

Finally, and the item that provoked much conversation at the RRC conference, CIRIA are developing new guidelines on NFM https://www.ciria.org/Research/Projects_underway2/Guidance_on_natural_flood_management_RP1094.aspx This is being undertaken by Mott MacDonald contractors and is focussing on four areas of NFM. These are:

- Storing water (bunds, ponds, ditches but also floodplains)

Working with Natural Processes – the evidence base
Project Summary SC150005

Background
Working with Natural Processes (WwNP) to reduce flood and coastal erosion risk (FCRM) involves implementing measures that help to protect, restore and emulate the natural functions of catchments, floodplains, rivers and the coast. WwNP takes many different forms and can be applied in urban and rural areas, and on rivers, estuaries and coasts.

Rivers and floodplain management	Woodland management
<ul style="list-style-type: none"> • River restoration • Floodplain restoration • Leaky barriers • Offline storage areas 	<ul style="list-style-type: none"> • Catchment woodlands • Floodplain woodlands • Riparian woodlands • Cross-slope woodlands
Run-off management	Coast and estuary management
<ul style="list-style-type: none"> • Soil and land management • Headwater drainage • Run-off pathway 	<ul style="list-style-type: none"> • Saltmarsh and mudflats • Sand dunes • Beach nourishment

Why was the study needed?
There has been much research on WwNP, but it has never been synthesised into one location. This has meant that it has been hard for flood risk managers to access up-to-date information on WwNP measures and to understand their potential benefits.

What did the study include?
This study is made up of 3 interlinked projects which together make up the WwNP evidence base (see figure).

The **Evidence Directory** summarises the effectiveness of WwNP measures from a FCRM perspective as well as the wider ecosystem service benefits they may deliver. It is underpinned by:

- a detailed literature review
- Guidance on project monitoring
- 65 standalone case study examples
- 14 one-page summaries of each of the WwNP measures, which provide a high level summary of the material included in the directory

We have **mapped the potential for WwNP**. These maps are intended to be used alongside the Evidence Directory to help practitioners think about the types of measure that may work in a catchment and the best places in which to locate them. It is a useful tool to help start conversations with key partners. The maps are provided in spatial data and PDF format, and are supported by a user guide and a detailed technical guide.

We have **written a guide** which sits alongside the Evidence Directory and the Maps, and explains how to use them to help make the case for implementing WwNP when developing business cases. It also includes guidance on implementing WwNP in areas at risk of groundwater flooding.

The **research gaps** that need to be addressed to move this form of FCRM into the mainstream are identified in the Evidence Directory. To help fill these gaps we have:

- worked with the Natural Environment Research Council to develop a £3.4 million research call to address some of these gaps with the aim of working in partnership with projects funded through this call to help advance science in this field
- shared the list of research gaps with catchment-scale Defra-funded natural flood management projects so they can address research gaps through long-term monitoring
- developed an evaluation plan to capture the outcomes of the monitoring conducted as part of Defra-funded catchment-scale projects so that learning can be shared across the WwNP community

Evidence Directory
Mapping the potential for WwNP
Research gaps

Flood and Coastal Erosion Risk Management R&D Programme


- **Flow path interception**
- **Leaky barriers (these can be used to restore/improve floodplain connectivity “Stage Zero”**
- **Floodplain and wetland restoration (through permanent re-connection)**


The guidance is not yet available; case studies are currently being sought (contact emma.wren@mottmac.com).

There is already more general guidance and examples here <https://thefloodhub.co.uk/knowledge-hub/>
But there is a strong focus on tree planting, including riparian woodland strips and riparian forest, because funding is available, it makes good television/PR, and is popular with politicians as it’s a very visible activity.

Whilst such schemes deliver benefits, they need to be considered very carefully, ensuring no tree planting occurs on areas with existing interest (botanical, landscape and historical) and only appropriate species of local provenance are used. Currently the UK lacks the capacity within the nursery stock industry to provide the number of trees needed to meet the Government’s tree planting ambition, which means much would have to be bought in, with all the biosecurity risks that entails (think ash die-back and Dutch elm disease). There are also fundamental issues over landowners preferring to retain their productive floodplain land for farming.

So, key messages:

 Restoration of floodplain meadows is and should be a priority NFM measure. Your floodplain meadow restoration projects should be badged as such and you should look for opportunities to use NFM funding sources to deliver floodplain meadow restoration for multiple benefits.

 Re-connection of rivers with their floodplains is an important NFM measure and all opportunities to look at floodbank removal should be investigated or highlighted as a potential NFM measure, especially if this can be combined with better floodplain management.

.....and Nature-based solutions?

According to the IUCN, nature-based solutions are:

“actions to protect, sustainably manage and restore natural or modified ecosystems that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits”.

<https://www.iucn.org/theme/nature-based-solutions/about/iucn-global-standard-nbs>

So floodplain meadows will also sit firmly within a suite of nature-based solutions. Please think about meadows when considering your sites and the terms you use to describe them. It should help you to access funding and it will gradually also help change mindsets, particularly if we continue to gather evidence of their effectiveness.

Can you help to gather information that will show how much water was attenuated, how much sediment captured and nutrient loads diverted.....how cost-effective are they over the long term? And what benefits do they provide?



Yarnton Mead SSSI providing NFM through flood storage above and below ground, as well as being a sediment and nutrient trap - and one of the most botanically diverse floodplain meadows in Europe.

History of floodplain landuse and its cultural value - can these be measured and quantified?

What was the extent of floodplain meadow before agricultural intensification? 97% of meadows are quoted as having been lost, but how accurate is this? Is the same degree of loss seen with floodplain meadows? And can we quantify the heritage value of land use, using the language of natural capital and ecosystem services?

These and other questions have troubled us for a while, so when Antony and Emma Firth contacted us after our last newsletter to share their work on historic watercourses, we were naturally very interested.

Emma and Antony are archaeologists who have been investigating the history of floodplains and rivers in a couple of catchments with Historic England and others. They have undertaken two pieces of work, which are linked.

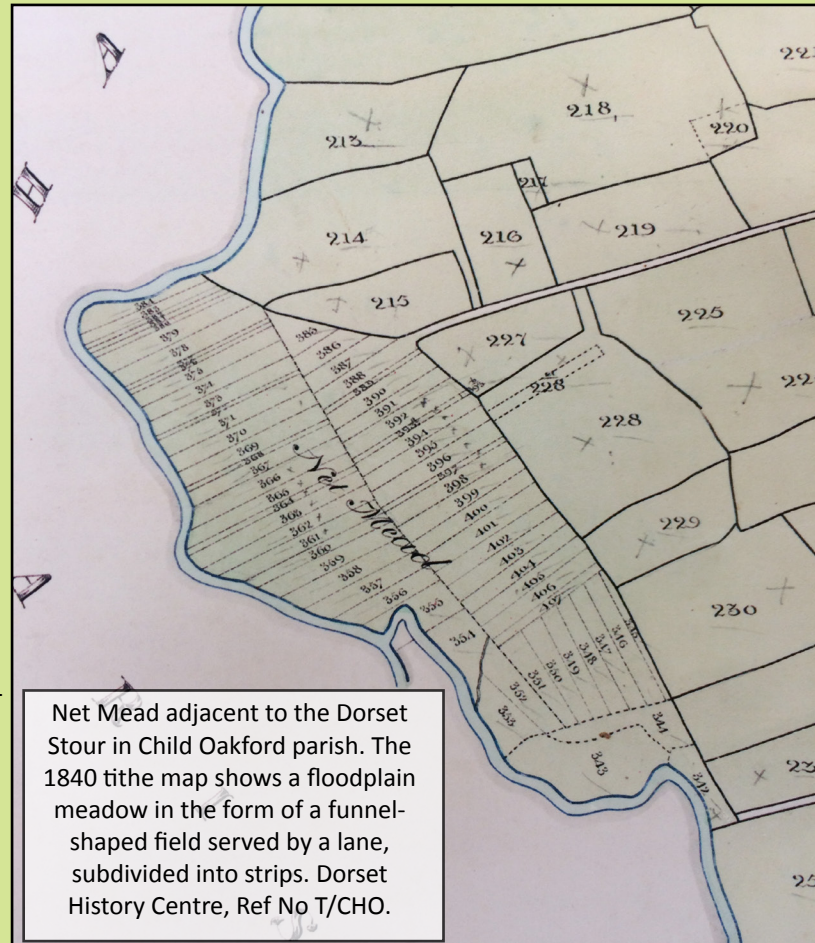
Firstly they developed a methodology for capturing evidence of human activity linked to the river as a GIS layer of 'Historic Watercourse Polygons' (HWP's) using the Dorset Stour as a test catchment. HWP's sit between Historic Landscape Characterisation (HLC) which is fairly broad brush, and the mapping of individual heritage assets and features typical of local authority Historic Environment Records (HERs) and statutory designation of Scheduled Monuments, Listed Buildings etc. Their report is available online here: http://www.fjodr.com/uploads/3/4/3/0/34300844/historic_watercourses_dorset_stour_report_280220_web.pdf

Their other piece of work looked at the relationship between heritage and Natural Capital / Ecosystem Services again using the Stour as one of two case studies. The report for Historic England is online here: http://www.fjodr.com/uploads/3/4/3/0/34300844/hnces_-_dorset_stour_and_tyne_to_tees_marine_area_-_fjodr_240120b_with_covers.pdf.

Natural Capital and Ecosystem Services approaches are problematic for archaeologists because 'nature' is so highly hybridised with 'culture' in so many cases. If anything, the difficulty is greater in riverine environments because they look natural to many people despite their often highly modified forms. Much of the language around river management implies that it is just a matter of turning the clock back a little, whereas in reality human use and modification of floodplains has occurred for millennia: their natural capital and cultural value are deeply entwined.

These ideas are very interesting to us and we are now working with them to see if their more general method can be refined to look specifically at floodplain meadows on a whole catchment scale. They are re-visiting their work on the Stour to see what other information they can tease out about floodplain meadows, and then they will trial the refined method on a new sub-catchment, somewhere in the Thames basin. We hope this will give us a way of assessing the extent of floodplain meadows historically, more widely.

If you are interested in researching the history of your floodplains, especially with a focus on floodplain meadows, please get in touch. It would be great if we could develop a country-wide project to investigate historic floodplain landuse.





Policy update

Whilst lockdown initially stalled the policy-making agenda relevant to us, it has now taken off again and over the summer the FMP responded to a number of key consultations including the Environmental Land Management (ELM) policy discussion document, the Draft England Tree Strategy, the EFRA Committee inquiry on flooding and the Environment Agency 'Challenges and Choices' consultation. Alongside this work we have also engaged and contributed to responses for Wildlife and Countryside Link - a consortium of conservation organisations, to use their strong joint voice for the protection of nature –after becoming a member earlier this year.

Headline points from our responses are:

We are encouraging

The importance of including “floodplain” as a specific land-category in ALL tiers of the ELM scheme, which acknowledge their unique importance in providing multiple benefits: allowing farmers and land managers to consider seasonally flooded land to be part of a farm business’ economic model, rather than an increasingly risky investment.

25% of floodplain needed to be low input meadow (which equates to almost 200,000 ha) within 25 years

70,000 ha of this to be as species-rich habitat in Favourable Conservation Status - to deliver high-nature-value floodplain habitats and to restore river systems.

Nature based solutions are used wherever possible, to solve multiple problems in more cost-effective ways. An increased proportion of flood defence funding should be invested in Natural Flood Management measures which include species rich grasslands

Greater investment into restoring and reconnecting rivers with floodplains, along with creating/restoring species-rich seasonally inundated floodplain grasslands for multiple benefits.

The importance of payments for maintaining already good habitats, supporting pilots of payment by results, highlighting the need for ensuring adequate access to advice (especially on-going support), the continuation of the Facilitation Fund, the use of Conservation Covenants and reverse auctions.

Calling for a Carbon Code for Grassland, similar to that for Peat and Woodland.

Floodplain meadows should be a fundamental part of any Nature Recovery Network (proposed through the Environment Act)

We are resisting

The widespread application of buffer strips in Tier 1 of ELMS, as there is now plenty of evidence to show they don't work, and don't ultimately change damaging landuses in floodplains.

The focus on tree planting to the detriment of other habitats, in particular the overwhelming emphasis on tree planting along watercourses as set out in the Draft Tree Strategy for England



This buffer strip is allowing sediment to run into the river and providing 'greenwash' for inappropriate land use on the floodplain.



Its amazing what you can find in cow dung if you just stop and poke around.

The orange coloured fungi here is *Cheilymenia granulata*. However the really interesting thing about this photo of a cow dung are the black dots you can see more clearly in the zoomed in photo to the right.

These are the sporangia of *Pilobolus crystallinus*. Each of the 'black hats' contains tens of thousands of spores. If you look closely there are many of the 2-5 mm tall fungi all over the image. The translucent structures fire the black sporangia several metres into the air. We are not sure if floodplain meadows are particularly good habitats for these fungi but we have seen plenty on three sites visited recently.

The lungworm nematode piggybacks on the explosive mechanism of the fungus to get into animals, and if you believe the poem here,

http://botit.botany.wisc.edu/toms_fungi/mar2006.html, the nematode helps the fungi to digest the dung.



**'A nematode climbs to the top of my spores.
It's shot off the same time-it's just like Star Wars!'**

From 'Pilobolus, the Fung in the Dung' by Tom Volk

Latest research - cutting times, hay quality and farmers

The

FMP have just started a long-term management trial working with The Parks Trust in Milton Keynes. Our study is going to chart the changes in plant community under different cutting regimes and will last for 10 years. This should be long enough to see the impacts on the plant community of cutting in June, mid-July and then end of September through a controlled trial. We have many examples of sites from around the country where we can see changes at individual sites through different cutting times, but we have not run a scientifically controlled trial on a British floodplain meadow before to enable this to be proven finally in the scientific literature. So here's to the next 10 years.

This study sits alongside the PhD currently being undertaken by Vicky Bowskill, who is looking at recording hay quality throughout the season to help provide evidence as to when may be the best time to cut hay to balance production of a nutritious hay crop with biodiversity conservation. Vicky is also collecting the views of meadow managers about how they use and value their hay. More information about Vicky can be found at her blog, which is really brilliant, here <https://vickybowskill.com/>

I think we can all agree that not only has she found a passion for science communication, she has a huge talent for it that we are keen to promote.



Sunrise sheep on Meadow Farm

Vicky Bowskill

New Post-Doc position in the FMP team

We are currently advertising for a post-doc post to look at two possible floodplain meadow areas of research. **Deadline is 4th November 2020.**

1. Look at data we have collected from soils at different depths from different species rich floodplain meadows in order to understand how much these soils store carbon. We want the findings to be put into the policy context of climate mitigation and the value of grasslands as carbon sinks.
2. Pull together a number of management trials we have run so that they can be published in scientific journals and shared more widely. To find out more and apply see here <http://www.floodplainmeadows.org.uk/content/new-post-doc-position-within-team-deadline-extended-4th-nov-2020-applications>

Things we missed this year because of COVID

1 Annual fritillary count in April

No data this year for the first time in 21 years of counting!



2 Arts projects

These have been delayed to next year. We were planning to run an arts competition, and to support an arts community engagement project around Avon Meadows in Pershore, working with MeadowArts <https://www.meadowarts.org/> and Wychavon District Council with Friends of Avon Meadows <http://foam.btck.co.uk/>. We will promote these projects again in the near future when it is clearer that we can progress them next year (fingers crossed we will be able to move forward with these).

3 John Ellerman Foundation Restoration Project Part 2

This project was due to start in March this year, but because of COVID has been suspended, due to re-start next year. We are planning to build on our work from 2015-2018, re-visiting restoration sites, visiting new sites and compiling further evidence about the outcomes of restoration projects. We are about to publish a paper showing our final analysis from the 3-year project already completed, and have published initial findings about this previously here: <http://www.floodplainmeadows.org.uk/sites/www.floodplainmeadows.org.uk/files/files/17%20ROTHERO%20Final%20version%202015%20feb%202018.pdf>

And as a newsletter article here:

<http://www.floodplainmeadows.org.uk/sites/www.floodplainmeadows.org.uk/files/Newsletter%20Autumn%202018%20V17%20LQ.pdf>

4 Survey programme

We did manage to do high priority survey sites in June including North Meadow, Ducklington, Oxley Mead and Mill Crook. We undertook an NVC survey at Hinksey Mead as part of the EA Flood Alleviation Scheme there, and survey work and dipwell installation work at Clifton and Rawcliffe Ings SSSI as part of the Environment Agency Flood Alleviation Scheme in York.

5 Site visits

Normally our summer programme would comprise a mix of routine, long term survey, visits and survey of restoration sites, visits to one off sites to give advice or find out more, visits to existing MG4 sites that we are not aware of already etc. However, most of these were cancelled. We did manage to get out into the Severn Vale and trial a survey method that can be used by farmers and volunteers to help collect data to update the PHI and to feed into ELMS applications, and to pay some passing visits to some MG4 sites we haven't been to before. These site visits however did not involve meeting people sadly.

6 CaBa Terrestrial Biodiversity Group conference 2020

This was due to be run in March 2020. It would have been a series of workshops and presentations to explore, showcase and understand how Rivers Trusts and Catchments Partnerships are delivering biodiversity objectives. We were part of the organising committee for this. It is hoped that this can be re-scheduled and in the meantime, a series of webinars are being planned. Watch this space.

