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The Enablers and Barriers to the Delivery of Natural Flood Management Projects

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Abbreviations

CLA	Country Land and Business Association
CS	Countryside Stewardship
Defra	Department for Environment, Food and Rural Affairs
EA	Environment Agency
ELMS	Environmental Land Management Scheme
FAG	Flood Action Group
FC	Forestry Commission
FWAG	Farming and Wildlife Advisory Group
GiA	Grant in Aid
FCERM	Flood and Coastal Erosion Risk Management
FRM	Flood Risk Management
LPA	Local Planning Authorities
NE	Natural England
NFF	National Flood Forum
NFM	Natural Flood Management
NFU	National Farmers Union
NGO	Non-Governmental Organisation
NPA	National Park Authority
NRW	Natural Resources Wales
PF	Partnership Funding
SAC	Special Area of Conservation
SEPA	Scottish Environment Protection Agency
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest

Executive summary

Natural Flood Management (NFM) aims to manage flood risk by protecting, restoring and emulating the natural regulating function of catchments, rivers, floodplains and coasts. NFM projects can be complex and whilst considerable research has been undertaken on this topic, particularly in the area of flood risk and multiple benefits of NFM, explicit information on the barriers and enablers to NFM is lacking. The conditions needed to implement NFM is thus relatively unclear, making it difficult for NFM measures to be selected and implemented successfully. Knowledge of the barriers to delivery, as well as the enablers to overcome them, is therefore crucial if successful NFM implementation is to be improved both in terms of policy and practice.

This project combines comprehensive and innovative research methodologies to gather valuable information from relevant stakeholders to better understand cultural, institutional and social barriers and enablers to NFM. Work includes:

- A comprehensive desk-based literature review;
- Stakeholder Engagement, including:
 - Short, semi-structured interviews;
 - Focus groups with farmers
 - A landowner deep-dive analysis;
- Legal Analysis;
- Detailed case studies.

A wide range of stakeholders participated in the project including Non-Government Organisations (NGOs), landowners, farm-scale land managers, Government and regulatory organisations, local communities, funders, land agents and membership organisations, e.g. the National Farmers Union (NFU).

This report presents the findings of the research under four research questions. The findings are all based on stakeholder dialogue.

1. Who are the main **stakeholders** delivering NFM projects and what is their **engagement** in the projects?
2. What social, regulatory and/or institutional **barriers** are experienced in the delivery of NFM projects?
3. What social, regulatory and/or institutional **enablers** are experienced in the delivery of NFM projects?
4. What are the main enablers and barriers associated with different **funding mechanisms** used to deliver NFM projects?

Findings from Research Question One lists the relevant stakeholders involved in NFM and explores their role. This research identifies a wide range of stakeholders

involved with NFM projects. The interaction these groups have with projects can be crucial to success and it is important that different groups are engaged with appropriately, and at the right stage of the project, which is generally as early as possible. Appropriate engagement was found to be about adopting an empathetic approach towards landowners and farmers with consideration of both their business needs and NFM implementation requirements.

Findings for Research Questions Two and Three are set out in tabular style with key information drawn out and discussed in detail. Barriers and enablers have been identified and explored based on who they affect, their causes, the impact they have and possible changes to improve NFM delivery.

Report conclusions have been drawn directly from these findings and found the following to be key barriers:

- NFM is recognised as a complex process lacking specific guidance, policy regulation and, often, financial and perceived environmental incentive;
- Challenges of successfully engaging a wide range of stakeholders with different levels of involvement;
- Lack of clarity on maintenance requirements for NFM measures and who is ultimately responsible or liable for them;
- Access to funding in conjunction with an onerous application system.

The research found the following factors to be enablers which goes some way to addressing the barriers:

- Early and regular positive engagement with farmers and landowners;
- Using an advisor who is local, understands the landscape and has an awareness of farming business requirements;
- Appropriate accessible, project-flexible funding mechanisms with relevant guidance;
- UK policy and legislative improvement in relation to NFM.

Research Question Four specifically identified the barriers and enablers associated with different funding mechanisms associated with NFM. Six funding mechanisms were assessed in detailed case studies: Countryside Stewardship; Defra £15m funding; Payments per Outcome; Calderdale grant funding; Somerset NFM auction; and EnTrade. Some of the general barriers identified with funding include complex applications processes and extensive paperwork, inappropriate modelling and evidence requirements associated with applications, a lack of funding for maintenance, and delays to payments after covering the upfront costs. The research shows that some of these barriers are now being addressed by some of the new, innovative funding mechanisms. This includes more flexibility in payments per outcome as opposed to Countryside Stewardship, and more simplistic application processes with the online reverse auctions in Somerset and through EnTrade.

This report also provides recommendations from the project team for how the research on enablers and barriers could contribute to the development of an information 'hub'. This information 'hub' could be used by stakeholders and support the creation of a national framework, which could be used as a policy and planning decision-support tool.

Introduction

Natural Flood Management (NFM) involves techniques that aim to work with natural hydrological and morphological processes, features and characteristics to manage the sources and pathways of flood waters. These techniques include the restoration, enhancement and alteration of natural features and characteristics, but exclude traditional flood defence engineering that works against or disrupts these natural processes¹.

The science and practice behind NFM are still evolving. Although there are many examples of successful NFM projects to date, it is not yet routinely adopted within the catchment management process with confidence or ease. There are many speculative reasons for this, including: lack of evidence; uncertain cost and flood risk management benefits associated with NFM; limited funding; ownership issues; ongoing maintenance; and the need to access and utilise valuable private land. Working across the wider landscape (rather than just the riparian corridor) also exposes various social, economic, environmental and political issues which are not necessarily applicable to traditional 'hard' engineered flood defence schemes. For instance, upstream farmers and landowners are automatically key NFM stakeholders because their land offers a large 'NFM potential', but they can currently choose the extent of their involvement. Flooding is also a sensitive topic to landowners and communities given that some have experienced devastating impacts first-hand in recent years.

The NFM process from inception through to design, installation, monitoring and maintenance is complex and still relatively unclear. This is exacerbated by the uniqueness of every site, including the spectrum of stakeholders involved. Individual and organisational stakeholders have their own perceptions and opinions of NFM and are influenced by their own requirements. These barriers, as well as the enablers to overcome them, must be captured if successful NFM implementation is to be improved both in terms of policy and practice.

¹ Scottish Environmental Protection Agency (SEPA). (2016). *Natural Flood Management Handbook*. [Online]. Stirling: SEPA. Available from: <https://www.sepa.org.uk/media/163560/sepa-natural-flood-management-handbook1.pdf>

For the purpose of this study, we have defined barriers and enablers as the following²:

- **Barriers:** Circumstances or obstacles that prevent communication or progress
- **Enablers:** Circumstances that cause particular outcome to happen or develop

At the outset of this project a set of four research questions were developed for consideration. These provide the structure of the report and are:

1. Who are the main **stakeholders** delivering NFM projects and what is their **engagement** in the projects?
2. What social, regulatory and/or institutional **barriers** are experienced in the delivery of NFM projects?
3. What social, regulatory and/or institutional **enablers** are experienced in the delivery of NFM projects?
4. What are the main enablers and barriers associated with different **funding mechanisms** used to deliver NFM projects?

Methodology

To address these research questions, a comprehensive research methodology was developed. This approach used a variety of techniques to develop a greater understanding of the cultural, institutional and social barriers to NFM across both England and Wales. The techniques used include:

- A comprehensive desk-based literature review;
- Stakeholder engagement, including:
 - Short, semi-structured interviews;
 - Focus groups with farmers;
 - A landowner deep-dive analysis;
- Legal Analysis;
- Detailed case studies.

² Feliciano, D., Hunter, C., Slee, B. and Smith, P. (2014). Climate change mitigation options in the rural land use sector: Stakeholders' perspectives on barriers, enablers and the role of policy in North East Scotland. *Environmental Science & Policy*. 44, pp.26–38.

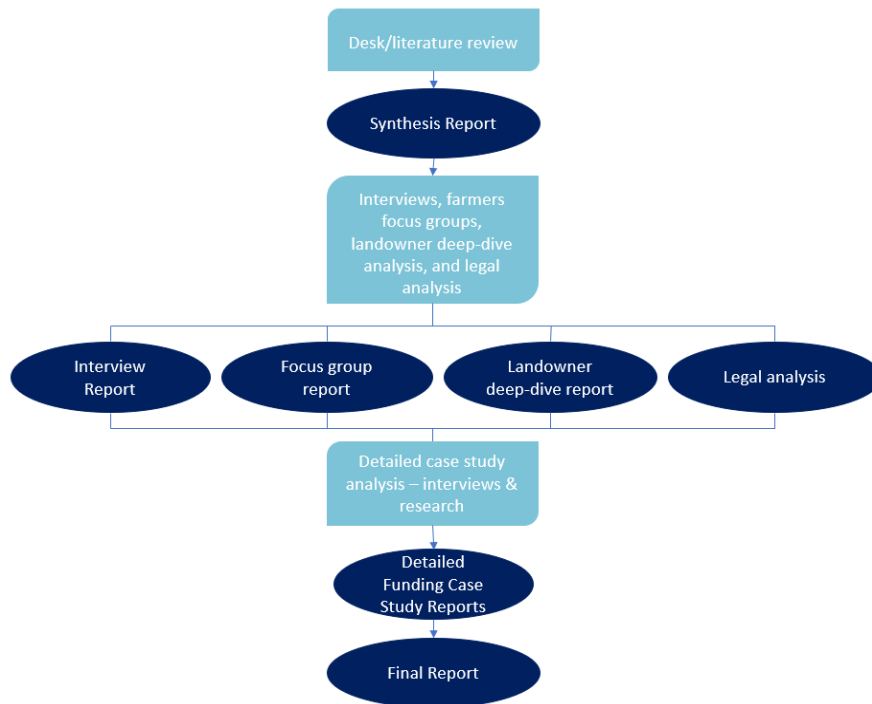


Figure 1. Methodology diagram

It should be noted that this methodology is based upon the identification of interviewees and stakeholders who are involved in implementing NFM projects, rather than across the wider Flood and Coastal Erosion Risk Management (FCERM) and land management community. Consequently, the research found many overlapping and complementary opinions and a limited number of seriously conflicting interests and views between stakeholders.

Literature review

During the initial stage of this research (September – December 2018), a comprehensive, desk-based review of literature related to NFM was carried out, particularly around barriers and enablers to implementation. This provides a baseline position on current knowledge and informed the overall design of the research.

Articles and publications have been identified by searching google and google scholar for key terms including ‘natural flood management’ and ‘working with natural processes’. Over 50 references were included in this review, including peer-reviewed academic articles, practical guidance documents (principally from local government and regulatory organisations) and outputs from multiple case studies across the UK. Key findings from each publication were identified through key word searches and a review of the abstract and conclusions and key information was recorded in an excel workbook. This formed the basis of the literature review and identified any documents to go back to for any detail throughout the project.

Following a review of the key findings from each article or publication, six categories/themes were identified (see below), within which there are both enablers and barriers. This highlighted some areas that could be explored further, particularly the role of farmers and landowners who are relied upon for their land and cooperation in the vast majority of schemes. As a result, more detail on the opinions and experiences of the farming community were researched by reviewing farming publications and forums such as 'Farmers Weekly' and the 'Farmers Guardian'.

The six themes identified during the literature review and listed below provide the overall structure of the stakeholder interviews:

- Farmers, agriculture and Agri-environment schemes
- Local communities
- Partnership working
- Funding
- Policy and regulation
- The availability of evidence and best practice guidance

As previously mentioned, the completed desk-based review identified the gaps present in the current literature, any further analysis warranted and, as a result, directly informed the next stages of the project.

Interviews

To inform this research, a set of semi-structured interviews were conducted. Using this method of data collection as opposed to a survey ensured we could collect a much richer data set as interviewees were not restricted to selecting from a set of pre-populated answers and were provided with an opportunity to speak freely about their thoughts.

Interviews were completed with a wide range of stakeholders involved in NFM with participants mapped within typical groups involved in the processes of NFM development and implementation. Key groups of stakeholders within catchment partnerships were recognised in a report published by the Foundation for Water Research³ (Figure 2) and this formed the basis of our identification of relevant contacts, expanded on using the desk-based research and through the interview process (see below).

³ Starkey, E. and Parkin, G. (2015). *A Review of Current Knowledge: Community Involvement in UK Catchment Management* [Online]. Marlow, Buckinghamshire: Foundation for Water Research. Available from: <http://www.fwr.org/Catchment/fr0021.pdf>

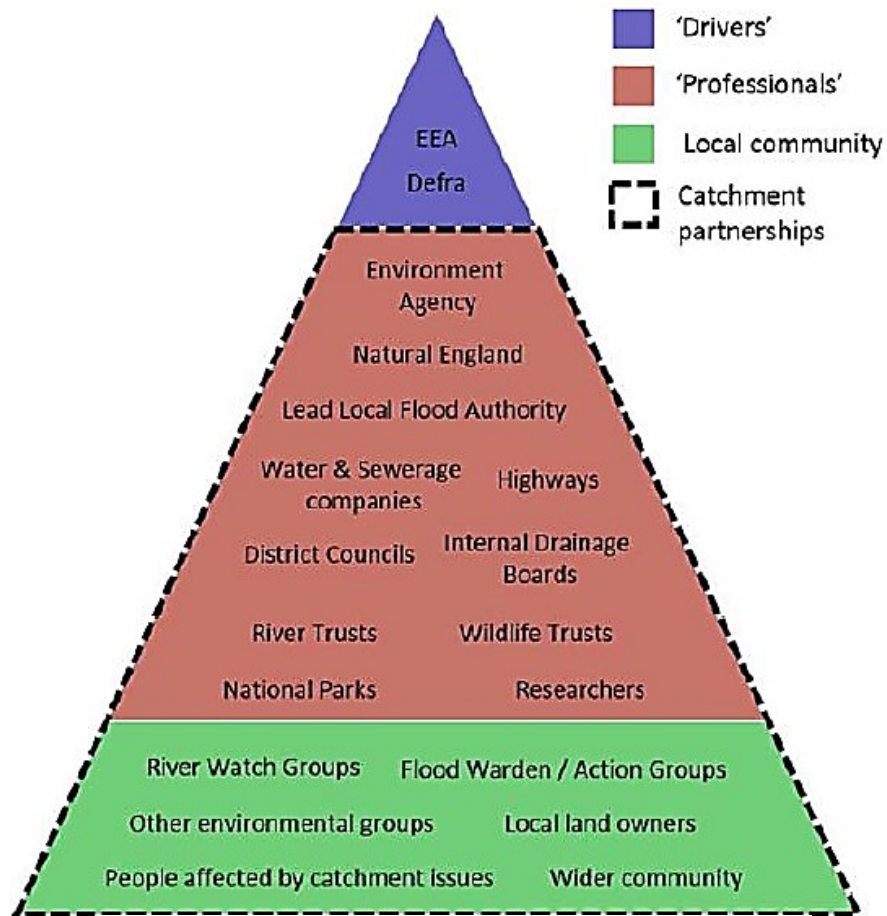


Figure 2. Catchment partnership stakeholders

This information provided seven broad groups in which stakeholders were identified:

- Landowners and estates
- Farm-scale land managers
- NGOs
- Government policy/regulatory
- Flood action groups/local communities
- Funders
- Land agents and membership organisations representing business, rural and agriculture land

An important consideration made throughout this project was to engage not only with the typical 'usual suspects' in the NFM community, such as those who have been involved with development of the Environment Agency 'Working with Natural

Processes' Evidence Base⁴ and are regular contributors to NFM research, but also reach wider stakeholders. It was important to ensure that people from a variety of geographical locations, different sized schemes (both physically and financially), and a variety of organisations and individuals were engaged with. This was deemed to be important in answering the research questions due to the highly contextual nature of NFM.

Internal Drainage Boards (IDB) were not considered in this study since research is still on-going on how NFM can be applied to pumped catchments.

The interviews conducted were semi-structured allowing them to be tailored depending on each participant's experience and expertise. A broad interview guide was developed which outlined the key questions and topics to cover with each participant. The main topics included in the interview guide:

- What are the local flood risks?
- How did they/their organisation get involved in NFM?
- Information regarding the different NFM measures that they have considered
- Barriers and enablers to implementing NFM
- Stakeholder partnership, barriers to engaging with major partners
- Funding sources

After the initial stakeholder mapping, further contacts were identified through recommendations from interviewees. In total, 58 interviews were conducted. The majority were completed over the phone and 2 were organised face to face. These interviews were determined iteratively as the themes emerged and further research was required. The interviews conducted included:

- 18 NGOs
- 16 Government agencies and Local Authorities
- 7 Landowners/estates
- 6 Flood Action Groups
- 5 land agents and membership organisations representing business, rural and agriculture land
- 4 Funders
- 2 Farm-scale land managers

No interviews were recorded during this project. Notes were taken by the interviewer throughout and were sent through to the participant to approve. Information on the

⁴ Environment Agency (2017) Working with Natural Processes Evidence Base. Available from: <https://www.gov.uk/government/publications/working-with-natural-processes-to-reduce-flood-risk>

research was provided prior to the interviews via email. Verbal consent was obtained at the start of each interview and the participants were informed that their response would remain confidential and comply with General Data Protection Regulation (GDPR). Participants were able to modify or withdraw their response any time during the research.

A deductive qualitative analysis of the interview notes reinforced the six key themes established in the literature review (see page 9). These themes were used to structure the key findings from the interviews. Direct quotes were extracted from some interviews to highlight key points.

Focus groups

Alongside the semi-structured interviews, three focus groups with farmers in England were undertaken. Farmers play an important role in NFM delivery and the focus groups explored any barriers and enablers specific to them. This builds on the work undertaken in Scotland by Holstead *et al.* (2014)⁵.

A discussion guide based on the interview pro-forma was used. This guide outlined the key questions and topics we wanted to stimulate discussion around. This started with specific questions, which, with the help of a market research organisation, Enventure, were developed into broader themes and allowed new topics to arise.

Of the three focus groups held, two were undertaken in Leicestershire and one in Yorkshire. Enventure facilitated each group. Each session was also observed by members of the project team who were on hand to answer any questions if necessary.

Participants were recruited with the help of contacts in the farming industry (National Farmers Union (NFU) and The Farmer Network) and through a recruitment agency. Each group had between four and seven participants for a variety of farming types (e.g. arable, grazing), tenants and non-tenants, farm sizes, and geographical locations (e.g. upland, lowland). The sessions lasted approximately 90 minutes, and each were audio recorded by Enventure. These recordings were used to write up a report of key findings and key quotes.

Landowner deep-dive

A deep-dive analysis investigated the barriers and enablers of NFM specific to landowners in greater detail by conducting further interviews and desk-based research; exploring their opinions and attitudes. As landowners are a crucial

⁵ Holstead, K.L., Kenyon, W., Rouillard, J.J., Hopkins, J. and Galán-Díaz, C. (2014). Natural flood management from the farmer's perspective: criteria that affect uptake: Natural flood management from the farmer's perspective. *Journal of Flood Risk Management*. 10(2), pp.205–218.

stakeholder in NFM with a significant influence on a scheme's viability or success, it was important to ensure that the barriers and enablers specific to them were identified and acknowledged.

The findings associated with the Landowner Deep Dive were informed by both the literature review and seven of the 58 interviews which were conducted with landowners. Participants were from a range of organisations including utility companies and large estates. There were varying levels of involvement with NFM between those interviewed and so it was possible to get an insight into why people had and had not engaged with NFM.

Legal analysis

Information from stakeholders which had a legal component, such as potential liability issues or land ownership uncertainty in relation to, for example, maintenance of NFM/resultant cost, was analysed by the project legal expert. This established a clearer understanding, both for participants and project researchers, of relevant legal issues and their impact on NFM enablers and barriers.

This legal analysis was not part of the original scope of the research but was added due to the importance of the emerging theme identified in the interviews.

Case studies

A set of six case studies have been developed on the different funding mechanisms available for NFM. The funding element was decided as the focus of these case studies after funding was identified as a significant barrier by interview participants. This provided a valuable opportunity to explore the barriers and enablers specific to each different funding mechanism.

After some initial desk-based research on funding, six funding mechanisms were identified that can fund NFM directly, or through NFM-type measures. There were:

1. Countryside Stewardship (CS) (England)
2. Defra £15m (England)
3. Payments per outcome (England and Wales)
4. Calderdale NFM grant
5. Somerset NFM auction
6. EnTrade (England and Wales)

These funding mechanisms show variation in style of funding. For example, the Defra funding and some of the payment per outcome is top-down government funding, while the Calderdale grant fund and Somerset auction are local initiatives in England.

To develop these case studies various sources of information were used including: the literature review; specific interviews which focused on the funding mechanisms; and commentary from focus groups. In total, five of the 58 interviews were specific to the case studies with other information taken from the wider interviews. The Countryside Stewardship scheme, in particular, was discussed at length in the focus groups. The six case studies identify both the barriers and enablers under each funding mechanism and look at how the funding mechanisms address the wider barriers identified in this research.

Key research findings

The key findings of this research project are structured around the four research questions defined in the introduction. As such, each section in this report answers each research question One through Four. The findings are all based on stakeholder dialogue. In the final section of the report conclusions have been drawn from these findings with recommendations made by the project team.

Detailed reports for each of the method types completed are included in appendices to this report. A literature review, interview report, focus group report, landowner deep-dive report, legal analysis report, and six detailed case studies are included.

An overview of the barriers and enablers identified throughout this project is presented in the format of a project lifecycle. This illustrates how the barriers and enablers drawn out of the research affect different stages of a project.

NFM project lifecycle diagram

When identifying the barriers and enablers to NFM, it was possible to map these on a typical project lifecycle. By doing this, it is easy to see what issues need to be addressed at each stage of the project. The project lifecycle is shown in Figure 3 and is split into the barriers and enablers at each stage of the project. Some barriers and enablers identified, such as the challenges of sharing information and the benefits that come from providing appropriate advice, are evident across the whole project lifecycle.

Mapping the findings across the project lifecycle illustrates how some of the barriers and enablers identified are more frequent in some stages. Consequently, this shows how considering some of the enablers in the earlier stages could help overcome some of the barriers in the later stages.

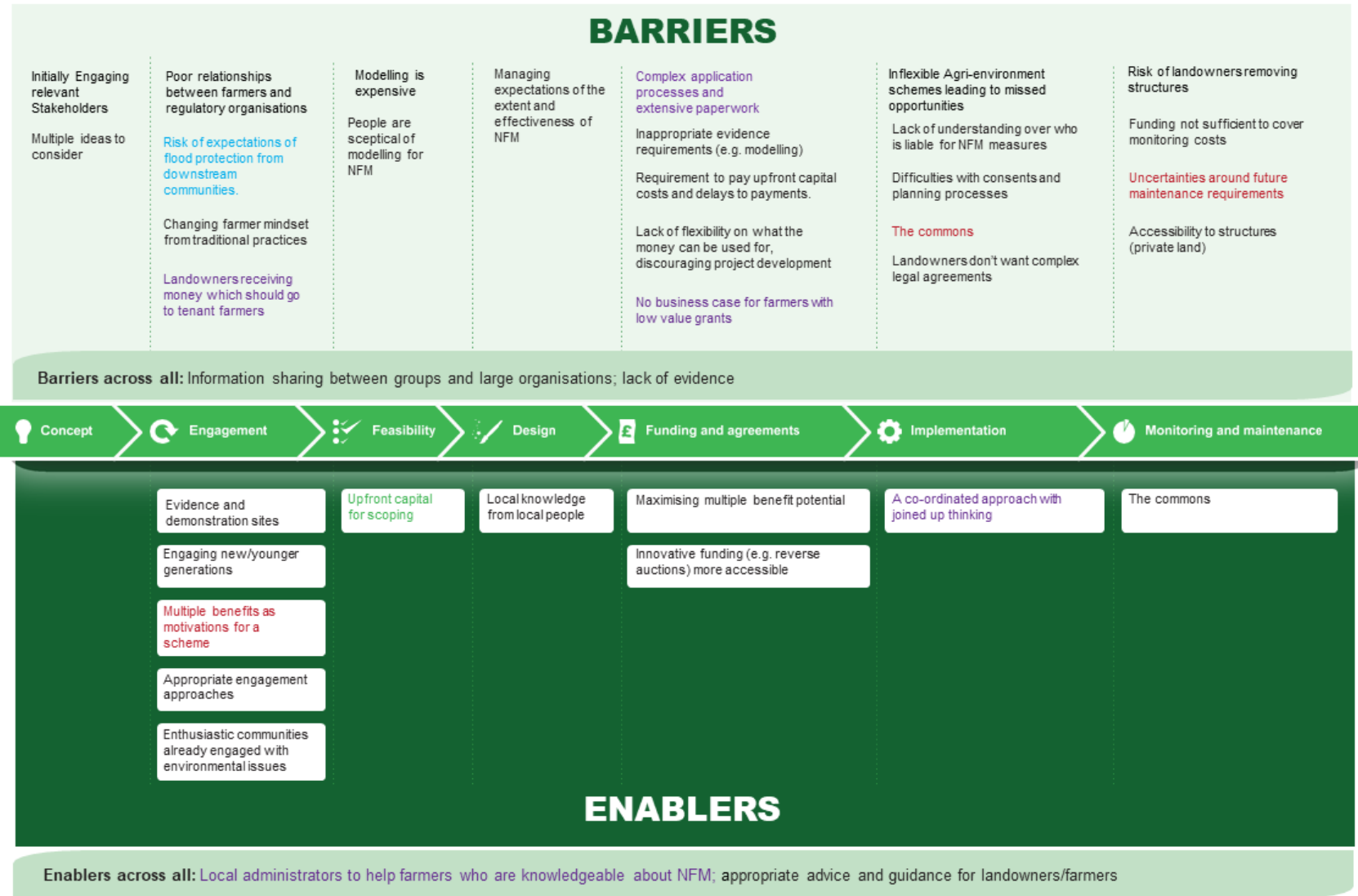


Figure 3. The barriers and enablers to the delivery of NFM projects across the project lifecycle

Question One: Who are the main stakeholders delivering NFM projects and what is their engagement in the projects?

The implementation of NFM schemes often involves a wide range of stakeholders. The active participation of these different groups and individuals can often be key to the success of projects. These stakeholder groups play a different role in each stage of the project lifecycle with some understandably more involved than others. The type and level of engagement from each of these groups can be dependent on who is driving the project. For example, where some projects are community-driven, others are developed by the Non-Government Organisations (NGOs) (e.g. rivers trusts) or larger organisations (e.g. Environment Agency, EA) and require the community to be actively engaged with from the outset.

It is crucial to the success of NFM projects that relevant groups of stakeholders (Table 1) are engaged as early in the project as possible, and throughout its duration. Local communities, including farmers are particularly important to engage early as they can provide valuable local knowledge that can help ensure the project is in everyone's best interest (Starkey *et al.*, 2017⁶; Creed *et al.*, 2018⁷). However, it is understood that within communities there can be conflicting opinions and goals that may cause challenges in any project, including implementing NFM. This is further explored in the barriers and enablers below. It is also important that these stakeholders are engaged with appropriately. For example, when engaging with farmers who are often key landowners in NFM projects, this research identified the need to adopt an empathetic approach; considering their needs as a business as well as the delivery of environmental and societal benefits.

The table below outlines the stakeholders who would typically be involved in an NFM project. These stakeholders each had a slightly different role to play as shown in more detail in Table 1. Those identified and presented are based upon our current understanding as a result of this research project. It is possible that there will be others who have not been identified.

⁶ Starkey, E., Parkin, G., Birkinshaw, S., Large, A., Quinn, P. and Gibson, C. (2017). Demonstrating the value of community-based ('citizen science') observations for catchment modelling and characterisation. *Journal of Hydrology*. 548, pp.801–817.

⁷ Creed, R., Baily, B., Potts, J., Bray, M. and Austin, R. (2018). Moving towards sustainable coasts: A critical evaluation of a stakeholder engagement group in successfully delivering the mechanism of adaptive management. *Marine Policy*. 90, pp.184–193.

Table 1. The typical stakeholders involved in an NFM project and their role.

Stakeholder	Engagement/role in the project
Local communities	<p>Local communities can sometimes be the driving force behind a project, often becoming engaged after being severely impacted by a large flood event and motivated to prevent similar flooding happening again.</p> <p>Other local communities may need to be engaged with and educated on the benefits NFM measures can provide.</p> <p>It is important to engage with local communities to make clear the scale of the impact NFM could have in terms of large flood events in their specific catchments.</p>
Landowners and tenants	<p>The landowner is a crucial stakeholder as they provide the land for NFM measures to be implemented on.</p> <p>As with communities, some landowners can be the drivers or instigators of a project, whilst others have to be engaged with and their buy-in secured.</p>
Flood Action Groups (FAGs)	<p>FAGs are often made up of those in the local community and often drive the projects.</p> <p>Some groups are created and supported by local authorities and the National Flood Forum (NFF).</p>
Local Authorities and Local Planning Authorities (LPAs)	<p>LPAs are integral to development of Flood Risk Management Plans (FRMPs) and also need to be consulted on any necessary planning permissions or consents.</p> <p>There can sometimes be difficulties engaging with the local authorities as their planning systems may not be appropriately set up to properly consider NFM.</p>
eNGO's e.g. Rivers Trusts, Wildlife Trusts, charities (incl. National Trust, Woodland Trust)	<p>Environmental NGOs generally develop, manage and implement projects, consulting with the other stakeholders in this table.</p>
Environment Agency (EA)	<p>The EA plan, develop, manage, implement, fund and consult/work with the other stakeholders.</p> <p>Groups need to engage with the EA about permits and consents (i.e. ordinary watercourse consent).</p>
Natural England (NE)	<p>NE provide advice and guidance on NFM measures particularly to farmers involved with Countryside Stewardship and where there are environmental designations on the proposed area or nearby.</p>
Forestry Commission (FC)	<p>FC plan, develop, manage, implement, and fund projects.</p>

Stakeholder	Engagement/role in the project
Natural Resources Wales (NRW)	NRW plan, develop, manage, implement, and fund projects. Groups need to engage with the NRW about permits and consents.
National Park Authorities (NPA)	NPAs can fulfil a variety of roles including facilitation, implementation, funding and stakeholder engagement with NFM schemes. They fulfil the role of Planning Authorities in National Parks.
National Farmers Union (NFU) / Country Land and Business Association (CLA)	NFU and CLA are representative organisations for farmers / landowners (as a stakeholder group) and can provide advice and guidance. They could be engaged with by the farmers involved in any project.
Utility companies	In some areas of the UK, Utility companies own large amounts of land. Where they own this land, they can often plan, develop, implement, and fund projects for multiple benefits to themselves and flood risk mitigation benefits.
National Flood Forum (NFF)	The NFF assists and supports local flood action groups.
Land Agents	Land Agents can provide advice and guidance to landowners that they manage.

Question Two: Social, regulatory and/or institutional barriers experienced in the delivery of NFM projects

During this section of the report the social, regulatory and/or institutional barriers identified in this research are defined and the following sub-questions answered:

- Who do these barriers affect?
- What are the main causes of these barriers?
- What impact do these barriers have on the delivery of NFM measures?

These barriers vary both in scale of impact on implementation and who, specifically, they affect. Table 2 below describes these barriers which are grouped into six themes (highlighted in orange) consistent with our initial thematic analysis of the literature and the information collated from the interviews and focus groups. Some of these barriers were highlighted (in blue) as being of importance to the development of future policy.

Table 2. Barriers to NFM Implementation as identified by the research participants. Text in square brackets denotes the sources of the information.

Barriers	Who do these barriers affect?	What are the main causes of these barriers?	What impact do these barriers have on the delivery of NFM measures?	Possible Changes
<i>Farmers, agriculture, and Agri-environment schemes</i>				
Complex administration processes for the Countryside Stewardship (CS) scheme (England)	Farmers/landowners, or those who are receiving payments from the CS scheme. Ultimately, the project team will be affected if this barrier is not overcome and there is no uptake by the farmer, landowner or tenant [focus groups 1, 2 and 3; NGO interviews].	Excessive evidence requirements. Poor reputation with farmers of on-time payment from funder. Many inspections and paperwork. Complex agreements with little flexibility [interview NGO, focus group 3].	If farmers become reluctant to enter CS agreements, this could limit the amount of uptake [NGO interview].	Funding applications and processes for farmers need to be more dynamic to reflect the dynamic nature of farming (i.e. more flexible in what can be done with the funding) [NGO interviews]. Ensuring an understanding of the appropriate way to engage with individual farms at the outset includes understanding their business, history, and raising awareness on the benefits on NFM [NGO, land agents and
Business or economic case (funding or grants may not justify the loss of profit or production)	Farmers, or those who are responsible for farm business management.	Value of funding or grants.	Lack of funding or grants reduces viability of business/economic case for the landowner or tenant which may reduce uptake of implementation of NFM measures [NGO interview and	

Barriers	Who do these barriers affect?	What are the main causes of these barriers?	What impact do these barriers have on the delivery of NFM measures?	Possible Changes
			farm-scale land manager interview].	Gov/Policy/ Regulation interviews].
Property rights-tenant/landowner relationship	The tenant can be disproportionately impacted by the financial burden of the CS schemes where the landowner takes the benefits but still require the tenant to pay the same rent, despite land being taken out of profitable production [land agent/rep and farm scale land manager interviews focus group 3].	Poor relationships between tenant and landowner. Administration process that allow the landowner to take advantage of the funding.	The NFM measures are likely to still be implemented, however there could be a risk that the tenant farmer would remove or not maintain the measures.	Providing farmers and land managers with face to face guidance that is specifically tailored to the context of their farm business. Ideally this would be from someone who has a good awareness of the local area, farming business and practices, and also the funding processes [focus group 1; NGO and land rep organisation interviews].
Uncertainty about responsibilities for the future maintenance / management of NFM measures and associated costs	The owner of the NFM measures/structures.	Uncertainty surrounding the extent of maintenance required and limited case study evidence. Maintenance required is very site specific and requires funding [Land agents/rep organisations, NGO interviews].	Reduction of uptake of implementing NFM measures and the long-term costs of maintenance [NGO interview].	A new Agri-environment scheme needs to have a simple application and not be over-complicated [NGO interviews].

Barriers	Who do these barriers affect?	What are the main causes of these barriers?	What impact do these barriers have on the delivery of NFM measures?	Possible Changes
Lack of clarity on legal and liability agreements of NFM features	Views on these issues were often dependent on type, size and scale of NFM measures that were to be implemented. In particular, farmers and those representing farmers identified this barrier regardless of the factors of NFM measures. However, other stakeholders involved with smaller-scale projects, such as the Rivers Trust, indicated that maintenance and liability issues could be overplayed relative to the size or significance of the measure being delivered [NGO and Gov/Policy/Regulation interviews].	Lack of standardisation or understanding of legal and liability agreements and uncertainty around the ownership of features [Land agent/rep organisations interview].	Measures that are implemented could be at risk of being removed if it is not clear who owns them. There is likely to be a lack of maintenance/upkeep of the measures if no one is responsible, which could result in poorly operating or failing measures.	A better financial delivery system that considers the needs of longevity (e.g. maintenance) and provides economic gains for the benefits, rather than just compensation [Land agent/rep organisation interview].

Barriers	Who do these barriers affect?	What are the main causes of these barriers?	What impact do these barriers have on the delivery of NFM measures?	Possible Changes
Changes to traditional farming practices.	Project delivery team. This could include (but is not limited to) NGOs, funders, government organisations, local communities etc.	Farmers consider that government priorities for food and farming have changed over time, which have led to varying policy, regulation, and funding schemes, occasionally with conflicting objectives and methods. These periodic changes can lead some farmers to become reluctant to change each time new advice is issued [NGO and Flood Action Group interviews and focus groups 1 and 2].	Lack of uptake and buy-in as well as creating problems once a farmer is willing to undertake NFM, such as limited advice or assistance in identifying funding, identifying relevant consents and approvals, and navigating complicated evidence requirements.	
Relationship between farmers and larger regulatory organisations (e.g. Environment Agency, Natural England, etc.)	Farmers and other organisations.	Past difficulties between farmers and organisations affects present day relationships [NGO and land agent/rep organisation interviews]. Difficulties arise if organisations provide prescriptive instructions to farmers, rather than encouraging collaborative working [land agent/rep organisation interview].	Reduced trust and confidence in each other slowing down processes throughout the entire project lifecycle [focus group 1].	

Barriers	Who do these barriers affect?	What are the main causes of these barriers?	What impact do these barriers have on the delivery of NFM measures?	Possible Changes
The Commons Land ⁸	Project delivery team. This could include (but is not limited to) NGOs, funders, government organisations, local communities etc.	Legislation associated with common land, historic culture, and emotional attachment to the Common land [Land agent/rep organisation interview].	Engagement, planning, and consents for the project [land agent/rep organisation interview].	
Local communities				
Understanding of the extent of effectiveness and limitations of NFM	Communities and all project stakeholders.	Misunderstanding of the effectiveness of NFM and the role site-specific issues play in the wider catchment [NGO, Flood Action Group, and Gov/Policy/ Regulation interviews].	Impact on the expectations of the effectiveness of the NFM measure [NGO, Flood Action Group, and Gov/Policy/ Regulation interview].	Communities should be collaborated with and supported with early engagement to ensure a comprehensive understanding of the flood risk benefits NFM can provide and the potential options for this.

⁸ The commons refers to areas of land where certain people hold beneficial rights to use land they do not own (refers to England and Wales).

Barriers	Who do these barriers affect?	What are the main causes of these barriers?	What impact do these barriers have on the delivery of NFM measures?	Possible Changes
Partnership working				
Lack of effective communication and sharing of information between stakeholders.	All project stakeholders involved, including the community(ies) at risk.	Lack of agreed partnership structure, roles, and responsibilities [NGO and Gov/Policy/Regulation interviews].	Problems in partnerships can lead to a breakdown in relationships, which can lead to a barrier to delivery [NGO, Gov/Policy/Regulation, and Flood Action Group interviews].	It would be beneficial to have an organisation with the resources to bring all elements of NFM together, for example funding, modelling, design, delivery and monitoring [NGO and Flood Action Group interviews].
Funding				
Inappropriate evidence requirements for funding applications (e.g. modelling and mapping of NFM)	Project delivery team and their ability to fund and complete the requirements for funding applications.	Some funding, such as the FCERM Grant in Aid (GiA) funding (available for England and Wales) requires cost-benefit analysis, which requires data such as the number of homes protected, which cannot be easily/accurately predicted, unless detailed flood modelling is completed. Countryside Stewardship (CS) schemes (e.g. the SW12 Making space for	Modelling requirements can limit the ability of small organisations to apply for funding due to lack of resources, skills, and time [NGO interviews].	Funding mechanisms need to change their requirements to be more proportionate to the application and projects. Greater dissemination of latest EA work on appropriate modelling

Barriers	Who do these barriers affect?	What are the main causes of these barriers?	What impact do these barriers have on the delivery of NFM measures?	Possible Changes
		<p>water grant⁹) recommend ‘professional’ advice (i.e. consultants) to be sought to choose the right location and state the “applicant will need advice and relevant consents from the Environment Agency, Natural England, and the local authority before carrying out any work”. This advice often leads to additional costs and time for the applicant [NGO and Flood Action Group interviews].</p>		<p>for planning NFM interventions.</p>
<p>Upfront costs of constructing NFM features.</p>	<p>Upfront costs for feasibility studies, or other professional services, can cause cashflow problems and impacts for an organisation’s wider activities [NGO and gov/policy/ regulation interviews].</p>	<p>Funding requirements. The poor reputation of Countryside Stewardship to actually send out payments to the agreement holders [NGO interviews and focus group 3].</p>	<p>Potentially the viability and implementation of the feature [NGO interviews].</p>	

⁹ <https://www.gov.uk/countryside-stewardship-grants/making-space-for-water-sw12>

Barriers	Who do these barriers affect?	What are the main causes of these barriers?	What impact do these barriers have on the delivery of NFM measures?	Possible Changes
Policy and regulation				
Lack of policy and regulations specifically relating to NFM	Highly variable dependent on the Local Planning Authority. Different interpretations can lead to requirements for planning approvals, drainage and ordinary watercourse consents, and other processes which lengthen timelines and potentially have high costs [NGO and Flood Action Group interviews].	Lack of policy and regulation specific to NFM and limited application and experience of consenting with regards to NFM projects [Gov/Policy/Regulation interviews].	Varying rules and policies from different Local Authorities lengthen project timelines and potentially have high costs. Can lead to more 'engineered solutions' being favoured over NFM solutions due to the perceived 'greater guarantee' of flood defence benefits [Gov/Policy/Regulation and NGO interviews].	There needs to be more guidance for local planning authorities on how to consider NFM projects. Some guidance on what policy and regulation might apply to different NFM projects (e.g. planning permission, ordinary watercourse consent) would be beneficial [Gov/Policy/Regulation interviews].
Designations (e.g. World Heritage Site, SSSI, SAC, SPA, National Nature Reserve, RAMSAR site) adding time, costs, and resources, through additional	Highly variable dependent on the Local Planning Authority and designation body. Different interpretations can lead to requirements for varying consents, and other processes [Flood	Lack of policy and regulation specific to NFM and limited application and experience of consenting/approvals in regard to NFM projects [gov/policy/regulation interviews].	Further complications for engagement, planning, and consents/approvals for the project. Varying interpretation of consents/approvals could potentially lengthen timelines and lead to high costs	

Barriers	Who do these barriers affect?	What are the main causes of these barriers?	What impact do these barriers have on the delivery of NFM measures?	Possible Changes
consents and potential delivery of the NFM projects.	Action Groups and Gov/Policy/Regulation interviews].		[Gov/Policy/Regulation interviews].	
Availability of evidence and best practice				
Uncertainties in specific NFM measures; effectiveness, construction, and maintenance.	Everyone involved in the project, including the project team, key stakeholders, and communities.	Limited quantitative scientific evidence around the extent of flood risk benefits (and other environmental benefits) for certain NFM measures, particularly over the scale of which these benefits can be achieved [NGO and land agent/rep organisation interviews].	This barrier was highlighted as a problem where uncertainties and/or conflicting information from different organisations lowered buy-in of landowners and other stakeholders [NGO interviews].	There is a need for more definitive advice and guidance on the implementation of NFM, the whole-life costs of the project, and maintenance requirements. Further guidance is needed on how to consider aspects such as the value of the land, and the farming business, when looking for NFM opportunities.
Mixed messages from different organisations	Everyone involved in the project, including the project team, key stakeholders, and communities.	Limited evidence and communication between different organisations providing varying levels of evidence and examples [NGO interview].	Increase uncertainty of stakeholders and lower buy-in of landowners and other stakeholders. Difficulties when developing a business case for an NFM project [NGO interview].	

Barriers	Who do these barriers affect?	What are the main causes of these barriers?	What impact do these barriers have on the delivery of NFM measures?	Possible Changes
Understanding the value and limitations to modelling and mapping NFM	Project delivery team. This could include (but is not limited to) NGOs, funders, government organisations, local communities etc.	Limited evidence and understanding on the extent to which modelling, and mapping can be of use for project planning, funding, and delivery [NGO and Gov/Policy/Regulation interviews].	If the project is using modelling and mapping results to inform the design of the NFM measure, it can cause an overly prescriptive design and may increase expectations of the effectiveness of the measure [NGO interviews].	

More information on all of the barriers identified in Table 2 above can be found in the following:

- Appendix A: Literature review
- Appendix B: Interview report
- Appendix C: Focus group report
- Appendix D: Landowner deep-dive report
- Appendix E: Legal Analysis report
- Appendix F: Case studies

Those barriers of particular importance to policy makers are discussed in more detail below.

Maintenance and liability

A key barrier identified by multiple participants was uncertainty around the longer-term maintenance and management of NFM features. Some interviewees working with and representing farmers highlighted the unknowns about maintenance costs as an area of concern for many landowners, particularly where they were working with large structures or features (e.g. bunds and leaky barriers). These unknowns may deter a landowner from implementing any NFM features on their land. However, other interviewees, such as the NGOs, indicated that this issue could be somewhat 'overplayed'. The primary difference between interviewees suggesting maintenance was a barrier and those who thought it was overplayed was the scale of the projects they were involved with. Generally, it is accepted that physically bigger features or catchment-scale features require more maintenance and therefore present a larger financial risk.

To address these barriers more guidance on the maintenance requirements, particularly costs, is needed. Alongside this guidance, stakeholders suggested that there is need for financial support that includes costs of maintenance. Some of the new funding mechanisms are offering some maintenance cost support (Appendix F: Case studies). Participants suggested that the application of this approach to other funding sources could help to widen uptake and implementation of NFM.

Legal liability

The legal liability of measures and, in particular, the uncertainty surrounding this was a key barrier identified by many of the stakeholders. As further detailed in Appendix E: Legal Analysis report, there is occasionally uncertainty surrounding ownership of different types of assets (under Land Law) resulting in concerns of liability if a feature was to fail or require maintenance. Legal analysis identified that there is potential risk where no formal agreements are made and the stakeholders within an NFM project therefore have no protection where a landowner might remove a feature or fail to

maintain it. Although further clarity in legal liability is sought by all stakeholders, some farmers and landowners stated that they did not want to enter demanding and complex legal agreements, potentially resulting in reduced up-take of the implementation of NFM features and/or unresolved legal matters.

Understanding of the extent of effectiveness of NFM

Multiple stakeholders, most frequently NGOs, stated that communities can often become interested in NFM as a flood risk management solution shortly after their own first-hand experience of the impacts of a large flood event. While engagement of the local community is necessary and often an enabler to an NFM project, it was indicated that it is vitally important to manage expectations and emphasise to these communities that NFM is not necessarily, by itself, going to provide adequate protection against large storm events. It was also suggested that communities often need reminding that NFM is never a 'one size fits all' approach and each project needs to be tailored to each specific location. Interviewees and focus groups pointed out that there was a particular difficulty where communities see NFM working in one catchment and want to implement the same features in their catchment which may have very different geographical and political characteristics.

Examples of the implementation of NFM projects can help to manage the expectations of different stakeholders and, ultimately, contribute evidence towards how NFM works. Through documents such as the 'Working with Natural Processes Evidence Base' (Environment agency, 2017⁴), SEPA NFM Handbook¹⁰ and demonstration projects such as 'Slow the Flow' at Pickering¹¹, the overall evidence base on NFM is building. The Pickering project provides a good example of a successful partnership between academics, consultants, NGO's, government authorities and local communities; this project has been somewhat successful in reducing flood risk in the area.

Lack of policy and regulation specific to NFM

The policy and regulation directly related to NFM is currently limited. No specific policies were identified that relate to NFM across both England and Wales, and this can cause problems within the NFM community. For example, a few interviewees suggested that identifying the necessary consents and planning permissions is a hurdle for implementing an NFM project before any work 'on the ground' can be started. This barrier stems from different planning authorities having different policies and regulations. It was indicated by several stakeholders that a project in one area may have to pay one single fee for all of its consents whilst a project in a nearby

¹⁰ Scottish Environmental Protection Agency (SEPA). (2016). *Natural Flood Management Handbook*. [Online]. Stirling: SEPA. Available from: <https://www.sepa.org.uk/media/163560/sepa-natural-flood-management-handbook1.pdf>

¹¹ Defra. (2015). *Slowing the flow at Pickering: Final Report*. [Online]. Available from: <https://www.forestresearch.gov.uk/research/slowing-the-flow-at-pickering/>

local authority may have to pay per feature. These differences can create significant cost differences depending on the location of the NFM features.

Some interviewees said that local planning processes are often not appropriately set up to consider projects such as NFM. Generally, they are tailored to engineered, built solutions with the planning officers having little experience assessing more nature-based solutions. This miss-match between the planning process and the type of project was perceived, in some cases, to lead to engineered solutions being favoured over more natural ones. Problems appear when filling in the initial planning/consent application forms where the forms are poorly designed for NFM-type projects. Specific information is often needed that cannot necessarily be calculated for NFM such as the level of protection to be achieved. Interviewees suggested that improvements could be made by making forms less prescriptive with more consideration of the environmental and societal goals, rather than solely the level of flood protection provided.

Designations add time, processes, resources and consents

Similar to the difficulties identified with the planning and consent processes, some environmental and landscape designations can add further time, costs and resources to a project. Specific problems were identified with World Heritage Site designation. For example, in 2017 the Lake District National Park was awarded World Heritage status. Interviewees from the Lake District identified potential complications with the designation including the need to possibly complete heritage impact assessment as part of any project. Since part of the Lake District's heritage comes from Traditional Hill farming, agriculture and the commons, which are major factors in the implementation of NFM measures, this is likely to not only add additional time, costs and resources to a project, but could limit the potential uptake of NFM.

However, interviewees involved in NFM projects in Sites of Special Scientific Interest (SSSI) or a Special Areas of Conservation (SAC) mentioned that they can often make sure that the plans align with the objectives of that area. This alignment can make it easier to get plans implemented and complement the aims of the designation.

Understanding the value and limitations of NFM modelling

One of the common barriers raised by interviewees was the requirements of NFM modelling. In particular, NGO interviewees noted issues with the costs and skills required to model NFM. Many NGOs involved in NFM did not have the skillset, resources (such as access to software) or funds to be able to complete modelling as part of an NFM project. The lack of modelling capability can sometimes mean NFM projects have limited access to funding due to the complex modelling requirements in the applications processes.

Many of the NGO's and community groups spoken to indicated that the modelling requirements to bid for funding were generally not proportionate to the scale of the project with some interviewees saying that there is no need for complex modelling and mapping for small projects. Some NGOs were choosing not to apply for some types of funding due to their lack of resources to meet the complex modelling and mapping requirements.

Question Three: Social, regulatory and/or institutional enablers experienced in the delivery of NFM projects

During this section of the report the social, regulatory and/or institutional enablers identified in this research are defined and the following sub-questions answered:

- Who do these enablers affect?
- What are the main causes of these enablers?
- What impact do these enablers have on the delivery of NFM measures?

Research participants identified enablers they experienced during the delivery of NFM projects. Table 3 below describes these enablers. As with the barriers, the enablers are grouped into six themes (highlighted in orange) consistent with our initial thematic analysis of the literature and the information collated from the interviews and focus groups. Those enablers highlighted in blue are thought to be particularly important to future policy.

Table 3. Enablers to NFM delivery as identified by the research participants. Text in square brackets denotes the source of information.

Enablers	Who do these enablers affect?	What are the main causes of these enablers?	What impact do these enablers have on the delivery of NFM?	Possible changes
<i>Farmers, agriculture and Agri-environment schemes</i>				
<p>Appropriate advice and guidance on the potential for NFM on a farmer's land. Ideally this will be personal and specific to their farm [NGOs, Land agents/rep organisations, and farm scale land managers interviews].</p>	<p>Farmers and landowners.</p>	<p>The stakeholders contributing to this study have identified the following groups as able to provide advice and guidance:</p> <ul style="list-style-type: none"> • Farming and Wildlife Advisory Groups (FWAG) • Rivers Trusts • The Farmer Network • Facilitation fund groups <p>Funders highlighted that some of the funding mechanisms explored in the case studies (particularly the payments per outcome and reverse auction 'EnTrade') were trying to increase one-to-one farmer advice.</p>	<p>If farmers better understand how they might be able to implement NFM on their land, it could lead to increased uptake, particularly of the smaller, easier to implement measures [focus group 1 and 3].</p>	<p>Providing more advisors that have good local knowledge, an understanding of the funding mechanisms and science behind NFM, as well as an appreciation for the farming business. [NGOs and Farm scale land manager interviews]</p> <p>Development of more demonstration sites that farmers can use for educational purposes [land agents and rep organisations interviews].</p>

Enablers	Who do these enablers affect?	What are the main causes of these enablers?	What impact do these enablers have on the delivery of NFM?	Possible changes
Evidence of where NFM features have been successfully implemented (i.e. demonstration sites, case studies from farmers) [land agents and rep organisations interviews].	Farmers and landowners, as well as those who might manage the demonstration sites or organise knowledge sharing events.	The strong, knowledge sharing communities of farmers who want to share educational opportunities with others, community practitioner groups, school groups and generally a strong sense of community were cited as being causes of this enabler by several of the gov/policy/regulation, farm scale land managers, and land agent and rep organisation stakeholders.	Encourage further uptake [gov/policy/regulation stakeholders and farm scale land managers interviews].	
Positive relationships between farmers/landowners/land agents (on whose land the NFM measures may be implemented) and the project team (e.g. landowner and the EA,	The entire project team	Time to develop relationships and/or the NFM network. Strong relationships in the farming community.	The sharing of positive experiences between farmers is likely to encourage other farmers to consider NFM.	

Enablers	Who do these enablers affect?	What are the main causes of these enablers?	What impact do these enablers have on the delivery of NFM?	Possible changes
Natural England, and others) are important [Gov/Policy/Reg interviews]				
Engaging with farmers in an appropriate way, with consideration taken to the individual situation and to aspects such as the business [flood action groups, gov/policy/regulation, and land agent/rep organisation interviews].	The larger organisations (e.g. the Environment Agency) as well as NGO's who all need to develop more effective methods of engagement with farmers.	Having an appreciation and understanding of the farming business, and how the implementation of NFM measures might impact on this.	Appropriate, empathetic engagement from the outset will likely increase buy-in from the start and result in a smoother project [NGO interviews].	
Financial incentives	Farmers and landowners who received the payment.	Multiple different funding mechanisms are available for NFM. See funding case studies for examples of these.	Monetary incentives allow farmers/landowners to implement the NFM features with minimal negative financial impact to the business.	
Local communities				

Enablers	Who do these enablers affect?	What are the main causes of these enablers?	What impact do these enablers have on the delivery of NFM?	Possible changes
Active community participation	Local communities NGOs that work with local communities	Close community relationships and an active community [NGO interviews].	The involvement of communities who are engaged and educated on the potential of NFM can help by providing valuable local knowledge to help identify the most appropriate location for NFM features, as well as how the community might obtain multiple benefits from different features [NGO interviews].	Communities should be engaged with early on in the project to ensure they are aware and understand the potential from NFM [NGO interviews]. Early engagement should look to identify any relevant skills and experiences in the community that can help the project. [Flood Action Groups and Gov/Policy/Regulation interviews].
Appropriate skills and enthusiasm for environmental issues within the community [Flood Actions Groups and Gov/Policy/Regulation interviews].	Organisations likely to engage and work with the communities.	Communities who have experience in environmental work and are engaged with social and environmental issues [Gov/Policy/Regulation interview].	Members of a community with experience in environmental work and/or local knowledge and expertise can bring valuable skillsets to a project. These skills may help to plan a more effective NFM project, and therefore increase the success of the project [Flood Action Groups,	

Enablers	Who do these enablers affect?	What are the main causes of these enablers?	What impact do these enablers have on the delivery of NFM?	Possible changes
			NGOs, and Gov/Policy/Regulation interviews].	
Partnership working				
Good relationships between stakeholders and a collaborative working approach [NGO interviews].	Everyone. This could include, but is not limited to, NGOs, community members, consultants, regulatory organisations etc.	Good relationships can make partnership working easier. These partnerships then work to overcome barriers through conflict resolution and develop the project in a manner that meets the needs of everyone [NGOs and Gov/Policy/Regulation interviews].	A successful partnership approach built on good relationships is likely to be effective at ensuring the project is implemented successfully. Bringing together the right people at the right time (depends on the project) and ensuring regular face-to-face meet ups were identified as pertinent to building good relationships and consequently implementing NFM. One effective approach to partnership working included bringing together two groups with different priorities (biodiversity and flooding) to develop an	Ensuring a better, more joined-up approach between the different agencies, landowners, and farmers [Gov/Policy/Regulation interviews].

Enablers	Who do these enablers affect?	What are the main causes of these enablers?	What impact do these enablers have on the delivery of NFM?	Possible changes
			NFM project. The multiple benefits NFM measures can provide allow both groups to achieve their aims and potentially increase opportunities for funding [NGOs, Flood Action Groups, and Gov/Policy/Regulation interviews].	
Funding				
New, innovative funding mechanisms (e.g. the reverse auction)	Landowners who may not be able to access, or struggle to access, traditional government funding, but want to make small differences can benefit from this [Funders interviews].	Innovative funding often enables a wide range of farmers to access the funds and overcomes barriers such as inflexibility and inappropriate requirements for applications.	More widely available funding from multiple sources provides better opportunities for projects to be implemented.	Develop funding mechanisms that are simpler to apply for, are less paper-work heavy, and more flexible [focus group 1 and NGOs and funders interviews].
Funding for future maintenance	Recipient of funding, or those liable for the	Some of the new funding mechanisms offer ongoing payments for	Funding to cover the costs of future maintenance increases	

Enablers	Who do these enablers affect?	What are the main causes of these enablers?	What impact do these enablers have on the delivery of NFM?	Possible changes
	measures and their upkeep.	maintenance (e.g. the Calderdale grant fund). See response to Research Question 4 and funding case studies for more detail.	the incentives for people to implement projects as it reduces future financial risk [funders and NGO interviews].	
Policy and Regulation				
Legislative changes that require consideration of the environment (e.g. Future Generations Act in Wales).	Everyone, including but not limited to, NGOs, regulatory organisations, consultants etc.	New legislation may provide new environmental targets and may require consideration of natural solutions such as NFM [Gov/Policy/Regulation interviews].	Changes to legislation, such as the draft Environment Bill, Environment (Wales) Act, and Future Generations Act in Wales direct planners and developers to consider how they manage the environment in decisions. This could enable the implementation of NFM, where appropriate, complementing hard engineering solutions [Gov/Policy/Regulation interviews].	Streamlining of the consent and planning processes to ensure people know who to and what is needed for applications [NGO, Flood Action Groups and gov/policy/regulation interviews]. Educating planning officers and those dealing with consents on how to handle and consider NFM projects [NGO and Gov/Policy/Regulation interviews].
The availability of evidence and best practice				

Enablers	Who do these enablers affect?	What are the main causes of these enablers?	What impact do these enablers have on the delivery of NFM?	Possible changes
Guidance document (e.g. Natural Flood Management Measures – A practical guide for farmers by the Yorkshire Dales National Park)	<p>NGOs as it will help them when engaging with farmers/landowners.</p> <p>Farmers</p>	More knowledge and understanding of NFM measures and evidence of its effectiveness causes this enabler [NGO interviews].	Guidance documents encourage uptake of NFM as it increases opportunities for farmers and landowners to gain a better understanding of what they can do [NGOs and land agents/rep organisation interviews].	The development of further guidance and best-practice documents that relate to specific areas. In particular, developing guidance according to specific landscapes would enable a more localised approach to NFM. [NGO interviews].

More information on all of the enablers outlined in Table 3 above can be found in the following:

- Appendix A: Literature review
- Appendix B: Interview report
- Appendix C: Focus group report
- Appendix D: Landowner deep-dive report
- Appendix E: Legal Analysis report
- Appendix F: Case studies

Those enablers of particular importance to policy makers are discussed in more detail below.

Appropriate on-farm advice for farmers

Specific advice on the potential for NFM on farmers' land and how to implement it is crucial to the development of NFM measures on the ground. A number of NGO interviewees indicated that advice and guidance has been essential when they have worked with farmers. Furthermore, farmers participating in the focus groups indicated they would be somewhat reluctant to consider NFM unless they knew that a good network of support and advice would be available to them to advise throughout. One of the problems identified throughout this project and in particular, at the focus groups, has been the lack of advice available from organisations such as Natural England who used to be much more present on the ground. Farmers would like this type of 'on-the-ground' advice from experts to help them implement NFM.

Engaging with farmers in an appropriate way

It is generally accepted that engagement with stakeholders is crucial for NFM schemes. However, interviewees identified the need to consider how engagement occurs, particularly when engaging farmers. The perception was that for engagement to be effective, an empathetic approach, considering the farming business and how NFM features might impact on this, is more likely to help build a more trusting and positive relationship. A good approach to any NFM project with farmers and landowners would involve emphasising how NFM features can be implemented without having a significant impact on their business. The NGOs emphasised that the network between farmers can be utilised to share information and positive experiences. It is therefore crucial that relationships between farmers and other stakeholders such as NGOs or the regulating authorities such as the Environment Agency are positive and built on trust.

Good relationships between stakeholders and a collaborative working approach

Alongside the need to build positive relationships with farmers, good relationships need to be established between all stakeholders involved in NFM projects. Involving the right people at the right time, as well as actively sharing information between them, is inherently important to getting measures working on the ground. Some stakeholders (often those with a government/policy/regulation background or NGOs) identified the need to ensure there is a more joined-up approach between different organisations. Several stakeholders (generally those involved in policy and regulation or landowners) highlighted the importance of holding regular working meetings of all the different organisations to encourage this.

New, innovative funding mechanisms (e.g. the reverse auction)

Funding was identified as a significant barrier to the delivery of NFM throughout this project. However, innovative new funding mechanisms such as the reverse auction and payments per outcome have gone some way in enabling the successful implementation of NFM. These move away from the traditional, top-down government completion-style funding of the Defra £15m scheme and the strict, prescription-heavy Countryside Stewardship in England or equivalent Welsh Glastir schemes. Instead, these types of funding mechanisms are made to be flexible about what can be done, give the farmer the choice over what they want to do and how much they want to do, and have relatively simple application processes with limited paperwork throughout. After speaking with a number of stakeholders associated with these types of funding mechanisms (Appendix F: Case studies), it became clear that these innovative new funding mechanisms are being developed on the basis that they are more accessible to those wanting to implement single features or small projects, and more flexible to address the barriers with funding such as Countryside Stewardship.

Legislative changes which require environmental consideration (e.g. Future Generations Act in Wales)

One of the barriers identified in this project was the lack of policy and regulation around NFM and the resultant need for change to ensure the consideration of more nature-based approaches. Welsh legislation is an example of where things are developing and was explored through dialogue with some of the government/policy/regulation stakeholders. The Environment (Wales) Act 2016 and the Well-being of Future Generations (Wales) Act 2015 were both cited by some stakeholders as examples of where UK policy and legislation require consideration of sustainable solutions such as NFM. This type of policy would require all projects to look at the option of NFM and provide opportunities for it to be delivered.

Question Four: What are the main enablers and barriers associated with different funding mechanisms used to deliver NFM projects?

The availability of funding is a key enabler to the uptake of NFM. However, this research implies that whilst there is significant enthusiasm for NFM, there are clear barriers to the accessibility of funding. Current available funding mechanisms have their own specific issues, which can pose a barrier or a delay to a scheme.

Flood and Coastal Erosion Risk Management (FCERM) Grant in Aid (GiA) funding is widely considered the 'go-to' funding mechanism in England and Wales for an FCERM scheme. However, there is a difficulty of compatibility with NFM (as identified in Table 1). The primary reason identified by the respondents is the requirement in England of the Partnership Funding (PF) Calculator (used to determine how much funding a project is eligible for) to provide an estimate of the number of houses that will be protected by the scheme. Such an estimate requires modelling inputs and their associated costs, and for NFM this is further complicated by the difficulty and uncertainty with which acceptable estimations can be made for NFM measures or projects. As a result, use of the PF calculator or similar for NFM projects in England and Wales may not always generate the benefits required to obtain the GiA.

This research has identified an increasing number of new or alternative funding streams for the implementation of NFM measures or schemes. This research has sought to understand the primary enablers and barriers associated with these different funding methods when used to deliver NFM schemes. Six funding streams were chosen on account of their innovative approach and/or their recurrence throughout the research process (e.g. during the interviewing process and farmer focus groups) (Table 4). Of the six, three are not directly relevant to Wales, but responses from participants will be applicable in some cases and will inform current consultation surrounding funding mechanisms in Wales and highlight areas that need consideration.

Table 4. The barriers and enablers to six different funding mechanisms for NFM (See Appendix F: Case studies for more detail).

Funding mechanism	Barriers	Enablers
1) Countryside Stewardship Scheme (England)	<ul style="list-style-type: none"> • Not specifically targeted at NFM. • Complex application forms with extensive paperwork. • Highly prescriptive in terms of what funding can be used for, with little flexibility for change post-agreement. • Considerable delays to farmers or land managers receiving payment (sometimes 2-3 years after implementation). Costs must be paid upfront with reimbursement after agreement conditions have been met. • No on-going payment for maintenance/management of NFM measures or assets. • Complex auditing and strict inspection process demanding extensive paperwork. • Lack of 'on the ground' guidance available despite requirement for professional advice for many of the grants. 	<ul style="list-style-type: none"> • Provides a monetary incentive for landowners/farmers to make changes for environmental benefits • The SW12⁹ (a grant specifically for making space for water on agricultural land) agreement is 20-years, which would allow for some long-term benefits. It is also considered to be a decent payment per hectare compared to other CS grants.
2) Defra £15m NFM Initiative (England and Wales)	<ul style="list-style-type: none"> • Requirements for monitoring limits the funding for implementation. • The evidence necessary in the application was difficult to obtain (e.g. specific number of homes protected). • No direct funding for future maintenance/management - the grant money could quickly run out. 	<ul style="list-style-type: none"> • NFM focussed funding. • Government backing for NFM - raises awareness. • Adds to the evidence base through the monitoring requirements.

Funding mechanism	Barriers	Enablers
	<ul style="list-style-type: none"> The one-off payment could limit future project development. 	
3) Payments for Outcomes <i>e.g. new Environmental Land Management schemes¹² (ELMs) and the National Trust's trials¹³ (England and Wales)</i>	<ul style="list-style-type: none"> Difficulties determining the exact value of the benefits. Common to all NFM. Some benefits are easier to score than others. Need for significant advisor input at the start. 	<ul style="list-style-type: none"> Flexibility for landowners/farmers: no prescriptions on what they must do. Upskilling farmers to facilitate them to be able to make better land management choices/consider the environment. Value for money: landowners/farmers are only being paid for the environmental and societal benefits they actually produce.
4) Calderdale Grant Funding	<ul style="list-style-type: none"> There can be difficulties associated with applying for consents. Could have a simpler application form in time. 	<ul style="list-style-type: none"> NFM focussed funding. Accessible funding: local, small-scale funders can access. Flexible: a wide range of features are included in the grant scheme. Maintenance funding. Addresses a 'gap in the market' for a funding source for small scale projects.
5) Somerset Reverse NFM Auction	<ul style="list-style-type: none"> Limited uptake of more complex features such as river re-meandering. Landowner/farmer incurs the initial costs - they must wait to receive the money. 	<ul style="list-style-type: none"> NFM focussed funding. Auctions are a well understood process. Simple application process and limited paperwork.

¹² <https://www.gov.uk/government/news/environmental-farming-scheme-given-green-light>

¹³ <https://www.nationaltrust.org.uk/features/trialling-how-potential-new-farming-policy-can-help-nature>

Funding mechanism	Barriers	Enablers
	<ul style="list-style-type: none"> • Still some prescriptions /requirements on what must be done. • No specific maintenance funding for capital measures, but maintaining them is expected. 	<ul style="list-style-type: none"> • Local funding: local advice and guidance. • Accessible funding. • Engaging a new generation of farmers through an innovative approach. • Opportunity for more land to be used for NFM. • Advice and guidance sheets: allows the farmers to self-implement features.
6) EnTrade (England and Wales)	<ul style="list-style-type: none"> • Not specific to NFM. • Some difficulties modelling the environmental benefits with limited evidence. • It is not actually a funding source in itself, but a platform for those with funding to use to distribute it. 	<ul style="list-style-type: none"> • Useful at finding areas to maximise environmental benefits for a fair price: possible to identify a market price. • Limited paperwork/light-touch validation process. • Simple application in a system that farmers understand (auction). • Value for money: payment is per outcome.

Conclusions and suggested actions

The following conclusions have been drawn directly from the research findings with proposals for suggested action made by the project team.

This research identifies the typical stakeholders involved in the delivery of NFM and explores their role. The research shows that the implementation of NFM schemes often involves a wide range of stakeholders with a wide range of involvement (Table 1).

A series of key barriers to the delivery of NFM were identified. Those barriers which are particularly important for policy development and effectiveness include:

- NFM maintenance costs;
- Legal liability of maintenance responsibilities and ownership of features;
- Managing expectations of the extent of effectiveness of NFM;
- Limited current NFM policy and regulation and differing governance between local authorities preventing straightforward NFM delivery;
- Limited access to modelling due to high costs or limited skills.

Identification of NFM barriers led to discussion by participants of the requirements needed to address those barriers. Early, appropriate engagement with stakeholders was seen as particularly important. An improved evidence base with examples of successful partnerships and scheme implementation was also deemed important. This could include improved guidance surrounding NFM maintenance costs and liability issues. Participants indicated that form filling and the planning and consents processes need tailoring to NFM for location-specific schemes and to work across geographical and governance boundaries. The need for sufficient cost and resources appropriately scaled for projects both during the short-term development stages and for associated long-term maintenance costs was also highlighted.

The enablers identified through this project illustrate how NFM projects are delivered on the ground. Many of these enablers begin to address the multiple barriers identified under Research Question Two and further improvement will make successful delivery of NFM more achievable.

Ultimately, stakeholders have indicated that the following are required to enable successful NFM implementation: appropriate advice, guidance and funding plus good stakeholder relationships and timely participation. They suggest improvements need to be made to:

- Providing appropriate 'on the ground' expert advice;

- Providing one-to-one on-farm advice with consideration of the farming business, and utilising the farming network which will be instrumental in sharing information and positive experiences;
- Enabling positive relationships between stakeholders through a collaborative working approach and engagement of the right people at the right time;
- Innovative new funding mechanisms that are more accessible to single feature or small-scale NFM and more flexible to address any funding barriers;
- UK policy and legislation improvement regarding NFM.

There was general agreement across participants that the key barriers associated specifically with NFM funding mechanisms are access to funding, in particular the complicated application process and limitations regarding use of the Partnership Funding calculator when applying for 'Grant in Aid' funding.

A number of new or alternative funding streams for the implementation of NFM measures or schemes have recently been instigated, such as the online reverse auctions in Somerset and via EnTrade and the Calderdale specific grant fund, each with their own associated enablers and barriers. The project findings recognise that ideal funding mechanisms would include:

- Light paperwork
- A simple application process
- Flexibility throughout the funding period/scheme
- Upfront payment
- Payments for maintenance
- Payments per outcome
- Availability of local advice and support

Suggested Actions

The project findings demonstrate the need for further work which could improve the delivery of NFM. Alongside the suggestions made by stakeholders, as outlined in Table 2 and Table 3 above, a number of proposals for improvement have been inferred from the findings. Suggestions for future work include:

- The development of an information 'hub' for use by stakeholders in NFM delivery across England and Wales. This could include examples of where NFM can be applied in different contexts (e.g. with differing physical, social, economic and political aspects) and the conditions needed for successful implementation;

As such, the Environment Agency 'Working with Natural Processes Evidence Base published in 2017 would be a key resource (published on the GOV.UK website [Error! Bookmark not defined.](#)). This evidence base provides information on NFM benefits, how NFM can be integrated within flood alleviation schemes

and where in a catchment they might be most effective. The directory includes a set of case study examples and a series of GIS catchment maps as a tool for communication with stakeholders about NFM potential;

Best practise and relevant experience in other countries could also be included;

And,

The information hub could include a toolbox to showcase where funding in the UK may come from and guidance on how to apply.

- Creation of a national framework to help stakeholders clearly identify the steps and decisions needed to successfully deliver NFM projects. The framework should consider schemes at all relevant scales down to small community-led projects and allow for improved understanding of differing sector goals;

Clear goals and indicators of success will help to monitor specific schemes and overarching policy effectiveness. This will also allow room for innovation and adaptation both during the development of schemes and considering wider future scenarios.

- A thorough UK policy review to support the development of the national framework mentioned in the previous bullet point so that NFM measures are routinely considered as an option in England and Wales with more straightforward delivery.