Standardisation Workstream

Progress Report

Sept/2024

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Issue & Revision Record

Revision	Date	Author	Description	Checked by	Approved by
A	17/09/2024	Brendan Bromwich	Progress note	Marieke Nieuwaal, Standardisation task and finish group	Granville Davies

Executive Summary

This report sets out progress on the standardisation workstream of the Mainstreaming Nature Based Solutions project. We welcome feedback, advice and case studies relevant to the ongoing the development of this workstream. This work is a collaborative effort and has been co-created with a Task and Finish group that has met on four occasions in addition to the initial project workshops. This report is shared ahead of the second project workshop to be held in Birmingham on 25 September 2024.

The purpose of the workstream is create standardised approaches to the planning, design, implementation, management, and implementation of NbS projects that enable their scale up. The overall scope and main areas of progress are as follows:

Co-create the following in collaboration with the working group:

1. NbS intervention categories and taxonomy: We have tabled a revised and updated categorisation of NbS, with the four main groups:
    a. Sustainable Drainage Systems (SuDS),
    b. Natural Flow Management (NFM),
    c. Coastal, and
    d. Treatment Wetlands.

    In addition, we propose that a range of non-nature based agricultural interventions and community based interventions (e.g. rainwater harvesting using water butts) be considered alongside these options given that it is appropriate to include them as integral elements of projects that primarily comprise NbS solution portfolios. We propose a minimalist approach to modifying terminology here with NFM now relating to Natural Flow Management rather than Natural Flood Management, given that they produce multiple benefits well beyond flood management.
2. NbS Project categories and drivers: we found that there are numerous concurrent initiatives that promote the standardisation of NbS, that are working with different primary consideration around what drives NbS projects. This creates a diversity in approach that we propose is made clear and categorised to enable greater clarity in the standardisation of NbS. We have identified the following drivers of NbS projects.
    a. High integrity markets operating beyond catchment or landscape boundaries
    b. Regulatory compliance (which may include markets working within a catchment)
    c. Payment for ecosystem services to create improvement
    d. Collaborative work

    These categories are significant in establishing thresholds for standardisation of different aspects of NBS projects, such as planning assumptions and verification.
3. Risk sharing framework. We have set out set out the format and indicate how it will be developed. We have categorised risk management strategies drawing on risk theory and previous policy guidance and shown how this applies to a small number of examples.

4. Schedule of assumptions for NbS projects: we provide an initial schedule that will be further developed.

Coordinate with others developing:

1. A data standardisation protocol and a monitoring and evaluation framework. We are in liaison with the Rivers Trust who are leading this theme.

In addition:

2. Review progress on NBS design standards. This work will be taken forward now that the categorisation of NBS is complete.
3. Review potential to enhance integrated planning to increase the uptake of NBS. This work is scheduled to start soon. We reviewed a number of planning frameworks at the scoping stage.
4. Scope out means of creating a NBS skills strategy. This work is being taken forward by CIWEM and Cranfield.
5. Review NbS evidence gaps: We are providing advice on the scope of a piece of work to review NbS evidence gaps.

Having set out the frameworks above, the next steps will be to:

- Review more case studies to populate and verify the frameworks.
- Present recommendations for standardisation across the themes above.

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1. Introduction

1.1 Purpose

Implementation of NbS requires collaboration because they routinely deliver benefits to more than one party and are best implemented by numerous actors working together. Diversity in approaches to NbS is frequently identified as a blocker to the scale up of their adoption. The purpose of this workstream is to:

- Create standardised approaches to the planning, design, implementation, management, and implementation of NbS projects that enable their scale up.

We assume that:

- Funders of NbS schemes are more likely to invest, and regulators are more likely to approve schemes, if they see clearly articulated effective and efficient programmes, rather than diverse, inefficient bespoke projects, with higher transaction costs and uncertainty in outcomes.

Our approach involves identifying barriers to the uptake of NbS and identifying means of addressing those barriers.

1.2 Scope, method and progress

At the scoping phase of this workstream we set out a rationale for standardisation by reviewing different types of NbS project and the benefits that would be achieved with a standardised approach (see Appendix A.) We also reviewed reasons not to standardise approaches an appropriate level of diversity may allow for more effective contextualised approaches. The scope was developed in consultation with industry stakeholders. A summary of the rationale for standardisation is given in Annex 1. The full scoping document is available on request. The themes in the scope of this workstream are as follows:

Co-create the following in collaboration with the working group:

1. NbS intervention categories and taxonomy.
2. NbS Project categories and drivers.
3. Risk sharing framework.
4. A schedule of assumptions for NbS projects

Coordinate with others developing:

1. A data standardisation protocol and a monitoring and evaluation framework

In addition:

2. Review progress on NbS Design standards.
3. Review potential to enhance integrated planning to increase the uptake of NbS
4. Scope out means of creating a NbS skills strategy.
5. Review of NBS evidence gaps.

Having established the scope, we explored the themes with industry partners.

The main areas of progress, key messages and next steps are described in Table 1.1.

Table 1.1: Standardisation workstream themes: summary of progress, key messages and future work

Theme	Progress	Key messages	Future work
Create:			
1. NbS intervention categories and taxonomy	• Revised categorisation created	Four main categories of NbS have been identified: • Sustainable Drainage Solutions (SuDS) • Natural Flow Management (NFM) • Treatment wetlands • Coastal Take a wide perspective, so that other agricultural interventions and community-based interventions can be planned alongside NbS. Rename Natural Flood Management as Natural Flow Management to reflect benefits beyond flooding.	Add categorisation by impact. Add list of community based actions. Wider circulation/socialisation of the categorisation to promote uptake and acoption.
2. NbS Project categories and drivers	• Four main drivers identified with implications for standardisation agenda	Four categories of project driver: • "High integrity" markets beyond catchments • Regulatory compliance • PES for improvement • Collaborative effort	Use this categorisation as the basis of understanding where different thresholds of standardisation are relevant. (1) Review case studies to stress test this categorisation. (2) Review consistency of regulatory compliance criteria, (3) Adoption and apply this categorisation across the MNbS work

Theme	Progress	Key messages	Future work
Create:			
3. Risk sharing framework	• Approach to framework established • Risk management categories identified	The framework will show which organisation handles risk in which way at each stage of project development and implementation.	Review case studies Set out implications for a standardised approach to risk in NbS projects.
4. A schedule of assumptions for NbS projects	• Initial assumptions list has been tabled based on WRSE and one round of review	There is no one-size-fits all approach to listing assumptions. The list must not be longer than is required for a given type of NbS project.	Review case studies to identify appropriate schedules of assumptions for different types of NBS project.
Coordinate with others in developing:			
5. A standard approach to data monitoring and evaluation.	This work is being led by the Rivers Trust project CaSTCo.	CaSTCo identified the need to understand the different drivers of project so that an appropriate approach to data management, monitoring and evaluation could be adopted.	Continue coordination with CaSTCo and other projects with an interest in this area. Assess additional action that may be required.
In addition:			
6. Review progress on NbS Design standards	Initial list of existing design standards developed for review.		This will be taken forward now that the NbS intervention categorisation has been done.

Theme	Progress	Key messages	Future work
Create:			
7. Review potential to enhance integrated planning to increase the uptake of NbS	Different approaches to integrated planning were discussed in the scoping document.		This will be taken forward now drawing on the categorisation of NbS project drivers.
8. Scope out means of creating a NbS skills strategy	This work is being taken forward by CIWEM and Cranfield University.		This workstream will continue to liaise with that project so that synergies are achieved.
9. Review NbS evidence gaps	Initial list of existing NbS evidence reports, data bases and summary sheets developed.		Develop the scope of a piece of work to review NbS evidence gaps.

As we investigated each theme, it became clear that different national initiatives were promoting standardisation of NbS effort with different objectives in mind. Consequently, we investigated the different drivers of NBS implementation and set out the categories discussed in Section 0. These categories will be important because they help understand why people take different approaches to NBS standardisation – people want to standardise around a range of different objectives. By setting out these objectives (project drivers) then we will reflect a level of diversity in approach to NbS that responds to the different project requirements.

Having set out these different drivers for NbS projects we will review case studies to develop the themes in this workstream in light of the different project drivers.

2. NbS Intervention Categories and Taxonomy

Categorisation of the NbS intervention types is one theme in the standardisation workstream for the MNbS project. The categorised list is shown in the accompanying Excel spreadsheet with the filename 'MNBS NBS Intervention Categories AUGUST DRAFT'.

To create this categorisation of NbS types:

1. We reviewed the documents listed in Table 2.1 giving precedence to the CIRIA Natural Flood Management (NFM) and Sustainable Drainage Systems (SuDS) manuals. We then used the other documents listed to supplement the categorisation.
2. We compared our categorisation with those in Farmscoper and ELMS, and those developed by organisations including Water Resources South East, United Utilities, and as reflected in Groundswell's regenerative agriculture principles.
3. We then assessed each NbS intervention against the primary and secondary benefits/ outcomes, aligned with the Enabling a Natural Capital Approach (ENCA) ecosystem service benefits.

Table *0.1* Reference documents for NbS categorisation

Title	Link	Precedence	Date accessed
The Natural Flood Management Manual (C802)	https://www.ciria.org/ItemDetail?iProductCode=C802F&Category=FREEPUBS&WebsiteKey=3f18c87a-d62b-4eca-8ef4-9b09309c1c91	1	03-Jul-24
The SuDS Manual (C753)	https://www.ciria.org/ItemDetail?iProductCode=C753F&Category=FREEPUBS&WebsiteKey=3f18c87a-d62b-4eca-8ef4-9b09309c1c91	1	18-Jun-24
Working with Natural Processes - Evidence Directory	https://assets.publishing.service.gov.uk/media/6036c5468fa8f5480a5386e9/Working_with_natural_processes_evidence_directory.pdf	2	18-Jun-24
WWT Wetlands for Water Quality - A routemap	https://www.wwt.org.uk/uploads/documents/2023-07-31/wwt-water-quality-route-map.pdf	2	04-Jul-24
Coastal Nature-Based Solutions: A Quick Scoping Review - FD2738	https://www.gov.uk/flood-and-coastal-erosion-risk-management-research-reports/coastal-nature-based-solutions-a-quick-scoping-review	2	16-Jul-24
An Inventory of Mitigation Methods and Guide to their Effects on Diffuse Water Pollution, Greenhouse Gas	https://repository.rothamsted.ac.uk/download/942687eab7ec4b83751c7e241d62f0fa8472d72adcd25a149bb891b7c30d55d0/1595300/MitigationMethods-UserGuideDecember2011FINAL.pdf	2	04-Jul-24

Title	Link	Precedence	Date accessed
Emissions and Ammonia Emissions from Agriculture (Farmscoper methods),			
ENCA Services Databook 3.1 (updated May 2024)	ENCA_May 2024_Services_Databook_3.1 Final.xlsm (live.com)	1	23-Jul-24
Susdrain SuDS components	https://www.susdrain.org/delivering-suds/using-suds/suds-components/suds-components.html	1	21-Aug-24

Notes on method

- The CIRIA manuals provide a useful overview of SuDS and NFM but do not address coastal interventions for which we used the "Working with Natural Processes - Evidence Directory". We also split out 'SuDS infiltration systems' into individual interventions based on the Susdrain SuDS components categorisation.
- NFM improvements will generally be made as part of an overall portfolio that includes farm management measures that are not necessarily 'nature based'. To make this list useful to practitioners, the long list of farm interventions has been included, based on the measures listed in Farmscoper. Similarly, SuDS are usually delivered as part of a portfolio which includes non-nature based SuDS interventions and so these 'grey solutions' have also been included. Community based interventions such as water butts (a rainwater harvesting intervention) have also been captured by including education and volunteering as primary outcomes/benefits.
- Treatment wetlands for use in "end of pipe" solutions such as on the outlets of wastewater treatment works have been included as a separate group because they do not fit with the other categories. These have been informed by WWT wetlands for water quality routemap document, supplemented with advice from Mott MacDonald's subject matter experts.

At the highest level we have the following categories which we refer to as groups of NbS:

- Sustainable Drainage Systems (SuDS).
- Natural Flow Management (NFM).
- Coastal.
- Treatment Wetlands.

These groups are further broken down into three tiers:

- There are 26 Tier 1 categories.
- There are 142 Tier 2 interventions.
- Tier 3 applies to agricultural interventions only

We reviewed the categories of NbS interventions against the primary and secondary benefits/outcomes of each intervention. Benefits are aligned with the ecosystem service approach set out in Defra's Enabling a Natural Capital Approach (ENCA). This identifies that the key primary benefits/outcomes delivered by NbS are:

- Flood regulation.
- Water supply.
- Water quality.
- Biodiversity.
- Carbon reduction.

Cultural ecosystem services benefits such as physical health, mental health and education are much more design led and site specific. Benefits can be maximised through place-based planning and community engagement. The benefits of water resilience are captured via water supply, flood regulation and water quality ecosystem service (ES) benefits. Similarly, climate resilience is captured via a combination of regulating ES benefits including carbon reduction, flood regulation and temperature reduction.

We have been liaising with the Total Value Framework workstream to ensure that our approaches to benefits/outcome categorisation are aligned.

3. NbS project categories and drivers

NbS projects are categorised in different ways depending on the purpose of the project. Projects are categorised by:

- Scope and function: See section 0
- Project drivers. See Section 0

3.1 Project categorisation by scope and function

Table 0.1 below sets out the categories which are useful in identifying what type of project is being considered.

Table *0.1* Categorisation by scope and function

Categorisation	Main categories	Examples/illustrations	Significance / use
European Commission	1. Improved use/protection of natural ecosystems 2. Improve managed ecosystem 3. Create & manage enhanced ecosystem	1. Protected areas 2. Improved agricultural landscapes 3. Green buildings	*Please advise – feedback requested*
MNBS Finance workstream	1. Single intervention 2. Multiple intervention single outcome 3. Integrated plan within the environment: Multiple interventions with multiple benefits 4. Multi-system integrated plan (ie beyond environment/landscape). multiple interventions with multiple benefits.	5. Hedgerow 6. Interconnected Habitat restoration 7. Integrated Catchment Management 8. Includes action on farm business model, green energy, health etc.	Relevant to different funding / investment
NBS and actions aligned to NBS	1. NbS (categorised in this project as: SUDS, NFM, Coastal and treatment wetlands) 2. Aligned agricultural activities 3. Aligned community based activities	1. See categorisation in attached schedule 2. E.g. reduced fertiliser use, improved slurry storage etc 3. E.g. Water Butts	Significant in water and environment sector planning

3.2 Categorisation by project drivers

A live question in emerging policy and practice on NbS is whether different quality thresholds are required, and if so, to what aspects of the project would those thresholds be relevant. This question arises as a means of reconciling different current initiatives seeking to enhance NbS practice with different principal rationales, for example:

- BSI are working with Defra and others to enable NbS finance in "high integrity markets" through their Nature Investments Standards Programme.
- MNbS (this project) is scaling up with a focus on water sector regulatory compliance.
- CIRIA have a project relating to NbS and asset management which aligns with regulatory compliance.
- CaSTCo (Catchment Systems Thinking Cooperative) is enhancing data quality to enable the use of citizen science data to inform decision-making, including NbS funding.

This diversity of rationales has implications for the standardisation agenda, such as the quality and verification of outcome reporting.

There are four broad categories of rationale for NbS implementation around markets, compliance and collaborative action:

- **"High integrity" Markets**: The use of NbS in high integrity markets will come with a higher potential spend on verification and data management to achieve its "high integrity" status. "**Good verification**" means an acceptable quality to withstand scrutiny to support an investible product compatible with the "high integrity" label. This perception of quality is part of the tradeable commodity in the same way that trustworthy brands of vehicle are bought and sold at premium prices.
- **Compliance**: Much of the work in the water sector ultimately requires environmental outcomes to be compliant with regulatory thresholds. There is no benefit in spending money on verification to a higher standard than is required for regulatory compliance. "**Good verification**" means suffient as is required to demonstrate regulatory compliance.
- **Improvement:** Where payments are made for environmental improvement, without a specific regulatory driver or the demand for wider tradeable credits with the "high integrity" association. In this context "good verification" may be determined by the organisation paying for the improvement. The organisation paying for the work may adopt a set of quality criteria from a regulatory process.
- **Collaboration**: Citizen science falls within the context of collaborative social networks. Unlike market and regulatory driven verification there is a value associated with the social networks that is relevant to the verification process. "**Good verification**" is good enough for the network of actors, unless this verification is being used for one of the drivers above in which case those thresholds may apply. There is active discussion on what this commonly agreed threshold should be, and on which planning and payment processes this data is admissible to.

These categories can be used in varying and sometimes interwoven forms:

- Markets may be designed to operate within a catchment or with benefits traded over a wider scale. Within the catchment there may be more attention on a common good held across actors in the landscape. Benefits traded over a wider scale will not have the same association of a context specific common good
- NbS projects that promote compliance may have an intermediary body who are also interested in social value and other benefits. For example, a water company may be driven by compliance but implement a catchment scheme in a way that reflects the fact that they wish to maintain a collaborative approach with catchment stakeholders.

Essentially there are harder and softer approaches to compliance and verification. As one discussant within this workstream suggested:

- WFD improvement schemes are generally considered "soft" obligations as the legal consequences of failure are not clear. In these circumstances the Environment Agency has applied some flexibility in terms of using NbS or even low-cost conventional solutions where models suggest a scheme will get close to the improved condition because there is significant uncertainty in the boundary conditions and therefore close may well be good enough.
- WFD no deterioration schemes offer less flexibility because the obligation for no deterioration is very precise.
- For nutrient neutrality, the Habitat Regulations apply, and a more formal interpretation of the precautionary principle applies.
- Scale is another factor. For WFD, modelling can be applied at water body or operational catchment scale, allowing uncertainty about NbS performance to be balanced at a population level. So, if we assume we have 30 runoff attenuation features its entirely legitimate to claim overall load reductions will be close to the design mean unless some design or construction flaw introduces systematic error.

3.3 Discussion

We have identified the following list of drivers for projects, which reflects the fact that each arrangement can be placed on a scale from a high rigour, anonymous transaction, to lower rigour more collaborative arrangement in the context of greater social capital.

- High integrity markets – operating beyond the catchment boundaries.
- Regulatory compliance:
    - Hard compliance.
    - Markets operating within the boundaries of a catchment within a context of regulatory compliance.
    - Soft compliance.
- Bespoke schemes for payment for ecosystem services (PES).
- Collaborative working.

We will explore the implications of this scale for the standardisation of NbS as this workstream progresses. We do not see these categories as hard-and-fast and would welcome feedback on their implications. However we do see tension in aspiration for standardisation where different initiatives have different implicit assumptions around these project drivers.

We will add examples and present ways forward for streamlining and standardisation.

The following priorities emerge for this workstream:

1. Ensure consistency of regulatory requirements to enable efficiencies in project design and implementation.
2. Identify the implications of these different drivers of projects for
    - Monitoring and verification of projects (with CaSTCo).
    - Planning assumptions.

- Risk management.

At this stage there the wider system model (including, say, agriculture, transport, health etc – level 4 in the MNbS finance workstream categorisation) has not been developed in detail. There are likely to be a number of revenue streams for this type of project, in which case a standard approach would be beneficial.

4. Risk sharing framework

We will set out a risk framework that indicates who owns risks at different stages of a project and how they manage that risk. These arrangements will vary according to the size, scope and driver of NbS projects. The framework will show which elements vary by context and which are constant.

Our understanding of risk management is informed by a body of theory on risk known as Cultural Theory and on policy insights in Green Leaves III Defra's Guidelines for Environmental Risk Assessment and Management.

- Controlling risk e.g. prohibition; grey infrastructure.
- Capitalising (and trading) risk e.g. use of markets to outsource risk to those willing to take it for a price.
- Co-ordinating/collaborating to pool risk (distribution of risk by negotiation).
- Acceptance or tolerance of risk (accepting variable outcomes).

This four-way categorisation of risk is widely use in international analysis of water governance and is discussed in further detail in 8.2 Appendix B. Risk Sharing Framework

The benefits of understanding different comparative strategies of risk management is exemplified in a review of the risk framework for the Wyre Valley Natural Flood Management project (see ***0.1***). The River's Trust have a comparative strength in coordination but less capability in financial management than, say, investors and correspondingly hold reputational risk rather than financial risk for the project. Investors, whose function is to manage and trade risk have higher financial exposure to risk than other actors. The distribution of risk among actors changed over time at different stages of the project.

0.1: Risk framework: Wyre Valley Natural Flood Management Project

	Buyers	Investors	Landowners	Rivers Trust(s)
NFM Construction / delivery	£	£££	Nil	Reputational
NFM performance	££	££	Nil	Reputational
Contractual / counterparty risk	£	££		
External risks – policy environment	£	£		

Source: Showcase of the Wyre River Natural Flood Management Project, Green Finance Initiative.

The Wyre NFMP sets out an important overall basis for a risk framework in tracking the ownership and approach to risk of different actors through the project. To inform the development of a standardised approach to NbS, the following elements need to be added:

- Other steps in project development: NbS intervention development and planning, project development
- Other convening actors – such as Local Authorities and Water and Sewerage Companies

A framework to assess these risks is given in ***0.2***. This framework will be populated on the basis of case study reviews to identify good practice and assess the case for standardised approaches. We anticipate that this frame may vary according to the type of organisation is convening the project.

0.2: Outline risk framework

	Buyers	Investors	Providers (supply chain)			Convenors / managers	
			Landowners	eNGOs	LA / WASC / adopters	Stakeholder	Financial
NbS concept development							
Project design							
NbS Construction/ delivery							
NbS performance							
Contractual / counterparty risk							
External risks – policy environment							

5. Schedule of assumptions for NbS projects

The aim here is to create a list of items that need to be defined for options to be submitted to a project so that options are compared on a level playing field.

The task here does not include saying what the assumptions should be, but just to say what assumptions need to be made. Once this list has been finalised we may be able to sort these by threshold for different types/tiers of projects.

Planning context
Links to statutory planning or regulatory compliance, if any.
What is the screening and selection process for interventions?
What are the HRA/SEA/EIA requirements?
What option selection criteria are used?
What categorisation framework of NBS is used?
Are other non-NbS agricultural interventions and community based interventions included in the scheme?
What baseline assessment has been/will be done?
Benefit assumptions
What benefit assessment framework has been used?
What timelines have the benefits been assessed over (start/finish/growth/variation)
What tools are used to calculate benefits/outputs/outcomes?
Design assumptions
What is the design horizon?
What are the carbon assumptions
What climate scenarios are used in the assessment
Cost assumptions
What cost data has been used?
What maintenance and replacement costs over what time period have been assumed?
What monitoring costs and over what time period have been assumed?
What discount rate has been applied?
Procurement
How will the scheme be delivered (legal & procurement)
How are liabilities managed?
Management and payments
Payment by output or outcome?
What is the verification method?
Who is undertaking the verification?

Current key reference: wrse-options-appraisal-method-statement-november-2022.pdf

6. Data, monitoring and verification

At this point in the project the data, monitoring and verification theme has engaged with the Castco project led by the Rivers Trust. CaSTCo will provide a national framework for improved, integrated water environment data, integrated modelling capabilities, openly shared collaborative platforms and decision support tools driving environmental improvement.

This workstream links with CaSTCo by focussing on the use of data and insights that would be produced by CaSTCo. The first question raised by that interaction related to the variety of projects that would use data provided on CaSTCo platforms and whether different approaches to data, monitoring and verification are needed in different contexts. In response to that question this workstream investigated the different NBS project drivers discussed in Section 0. Having set out different project drivers we will review case studies and examine the implications for data, monitoring and verification.

7. Additional themes

7.1 Review of design standards

This will be addressed now that the categorisation of NBS has been done.

7.2 Review potential to enhance integrated planning to increase the uptake of NbS

This will now be taken forward.

7.3 Scope out means of creating a NbS skills strategy.

This work is being taken forward by CIWEM and Cranfield.

7.4 Review progress on NbS evidence

An often-cited barrier to NbS is perceived lack of evidence of their effectiveness, and the subsequent risk of NbS not delivering the intended outcomes. This 'proof that NbS work' is needed to build a business case to convince investors or regulators.

Barriers to creating an adequate evidence base include the fact that long term monitoring data is needed, measures need to be implemented at large scale to be effective and monitoring can be complex. If you work at catchment or landscape scale, you don't have full control over what happens in the catchment. Also, it may take a long time before you can measure the impact of measures, e.g. because of residual pollutant levels and travel times. Finally, we may look for the wrong type of evidence. For example, if you're aiming to reduce flood risk in a landscape, Natural Flood Management can be very effective for reducing the risk of regular events, but not for preventing the impact of extreme events. Integrated constructed wetlands may be effective for reducing P from higher to much lower levels, but less so to get levels down to very strict permit level requirements. So, this leave us with the question, how much evidence do we need?

Under the standardisation workstream we have started some initial research and collected academic papers, databases, catalogues with case studies and NbS summary sheets, that are aiming to provide an evidence base. As a next step we will try to answer the question why this is perceived not to be enough? We will analyse the gaps and come up with suggestions.

8. Appendices

8.1 Appendix A. The rationale for standardisation

This appendix reproduces the review of the rationale for standardisation made in the Inception report for this workstream.

Summary

- **Standardisation** supports an efficient process of setting up deals for landscape interventions – there should be a consistent set of parameters to describe NBS so that investors can make an efficient assessment as to their interest in engaging with a landscape deal.
    - The parameters used in a project may or may not be identical from one project to another, but there should be clarity on what items need to be consistent within a project. Therefore, a **schedule of assumptions** for NBS projects should be identified.
    - In addition, a **common taxonomy** should be created so that it is clear what terms refer to. This should include a common categorisation of NBS.
    - Data sharing protocols will create efficiencies.
- **Standardisation** will allow new actors to join the network of organisations already engaged in a NBS project in a landscape.
    - A schedule of assumptions and common taxonomy will assist newcomers to join and expand a project.
- The **standardisation** agenda should outline requirements and a strategy for creating a skilled workforce.
- **Standardisation** needs to operate in a way that reduces misunderstanding between organisations with different organisational cultures, language, business and regulatory contexts.
    - A common taxonomy and data standardisation protocol would facilitate communication between organisations. The risk sharing framework will enable projects to be set up that draw on respective strengths of different organisational cultures and reduce the risk of misaligned tacit assumptions around risk sharing.
- **Standardisation** should include a risk management framework. A consistent categorisation of risk management capability would enable efficient project design and assessment of project governance.
- The **standardisation** agenda should include a schedule of assumptions relating to planning assumptions that would enable integration of different planning frameworks. Scale up will be achieved by integrating planning as well as by enlarging NBS projects and creating blended finance at scale.
- The **standardisation** workstream should enable NBS planning and implementation to be integrated with wider transformative initiatives such as agricultural economies, renewable energy, health, wellbeing, food and sustainable transport, and others.
- **Standardisation** should include a clear data sharing protocol so that different organisations can transfer data in formats that are mutually convenient, protect

restricted data, includes suitable metadata and reflects the purpose, provenance and quality of the data.
- **Standardisation** of the approach to monitoring, evaluation and verification of the process and outcomes of the programme will generate efficiencies that avoid duplication of work across the programme. It will also benefit new funders engaging with the work if the monitoring, evaluation and verification meets agreed standard.
- The **Value Framework** developed in this project should allow for integration in numerous planning programmes including regional planning, flood management and environmental planning.

Work on NBS requires collaboration because they routinely bring benefits to more than one party and are best implemented by numerous actors working together.

- Collaboration requires clarity around common assumptions so actors can work together. Standardisation brings efficiency to this collaboration.
- Funders of NBS schemes are more likely to invest if they can see effective and efficient programmes.

The Green Finance Institute made the following observation:

> *With the exception of the voluntary Woodland Carbon and Peatland Codes, there are a lack of agreed technical standards for nature-based projects, or standardised methods for measuring and accrediting the environmental services they deliver. Although some standards for nature-based environmental services are being developed, there is no coordination of standard development, or an agreed set of principles that should apply.*[1]

For standardisation to enhance collaboration, we now review different models by which NBS projects are set up and the way that the benefits of NBS interventions are aggregated. At each stage, observations are made that identify the implication for the standardisation agenda. This list of observations then informs the draft scope of this workstream.

Different models of aggregation: what are the implications for standardisation?

A brief overview of some of the main approaches to NBS programmes provide the following implications for standardisation:

The Landscape Enterprise Networks (LENs) shows how aggregation is required on both sides of a transaction (Figure 1). A supply aggregator coordinates landscape actors to create a combined offering in terms of landscape benefits. A demand aggregator coordinates businesses and public bodies who would be interested in co-funding a set of outcomes from the landscape.

- **Standardisation** allows an efficient process of setting up deals for landscape interventions – there should be a consistent set of parameters to describe NBS so that investors can make an efficient assessment as to their interest in engaging with a landscape deal.

[1] Finance Gap for UK Nature Report (greenfinanceinstitute.com)

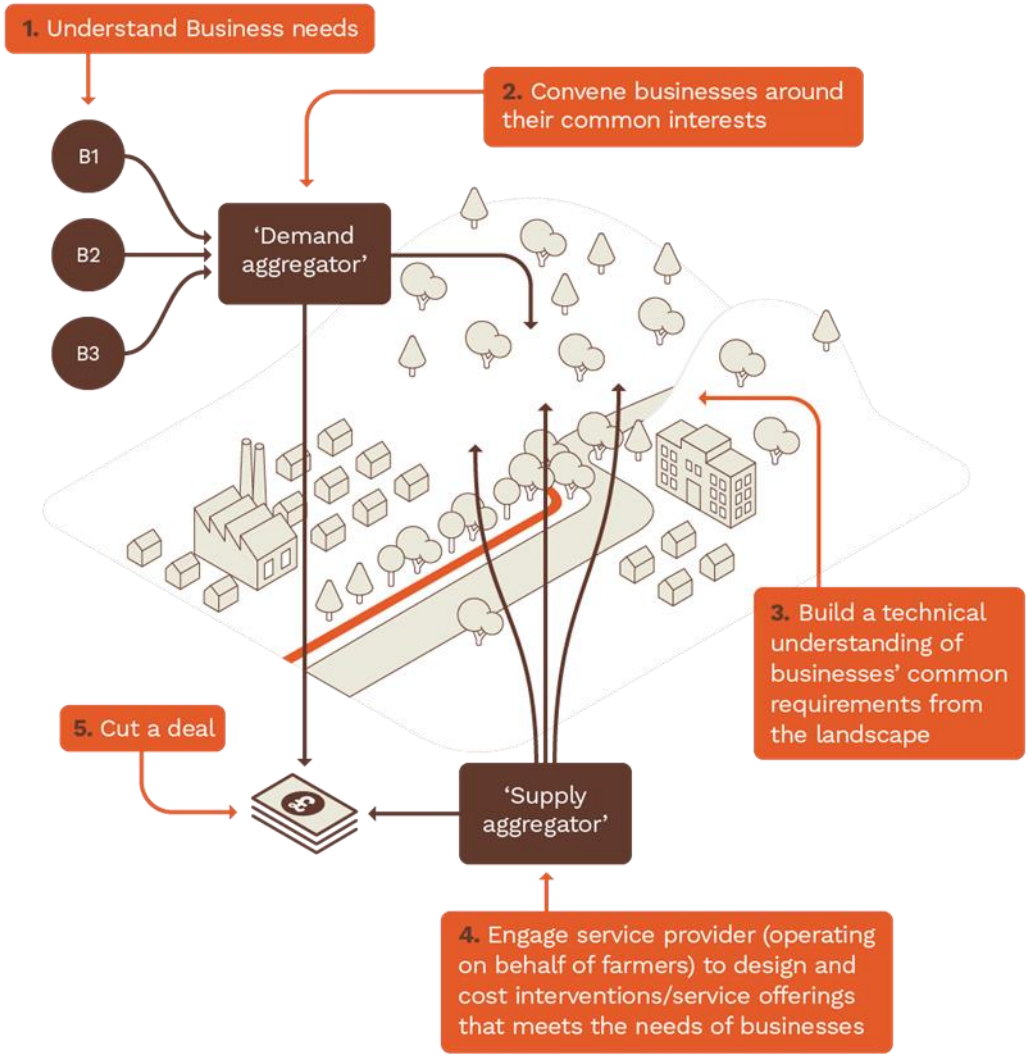

Figure 1 LENs model Supply and demand aggregation

Source: How LENs works - Landscape Enterprise Networks

The LENS framework indicates that there may be numerous parties interested in paying for the functions that a landscape provides. The framework describes an initial anchor value chain that creates momentum and interest, to which other value chains can be added. A number of actors work on the supply side to create an array of landscape functions to be contributed to the deal.

- **Standardisation** will allow new actors to join the network of organisations already engaged in a NBS project in a landscape. As Figure 2.1 indicates, patterns of aggregation will be overlapping and therefore need to be consistent to keep management costs down.
- **Standardisation** of the approach to monitoring, evaluation and verification of the process and outcomes of the programme will generate efficiencies that avoid

duplication of work across the programme. It will also benefit new funders engaging with the work if the monitoring, evaluation and verification meets agreed standards.

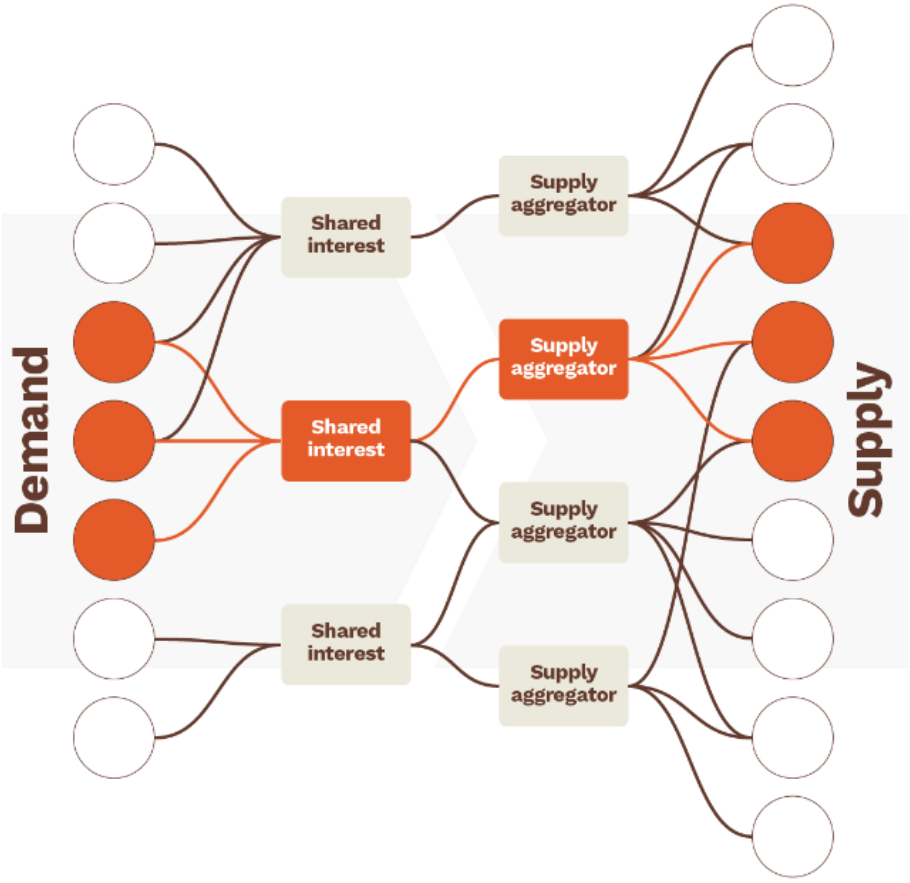

Figure 2: A network of supply and demand aggregation relating to the benefits from NBS and other landscape interventions.

Source: How LENs works - Landscape Enterprise Networks

Anglian Water's work in the Fens and Lincolnshire assessed potential for large scale investment in landscapes alongside the construction of new reservoirs, as part of their strategic resource option (SRO) schemes. The study assumed that some benefits are more local and may be aggregated at the scale of, say, a catchment or sub-catchment, while other benefits could be aggregated more regionally, encompassing several catchments. This means that some purchasers of ecosystem services will be small scale and local; others will be larger scale actors and may not have the same local interests.

The report also identified the fact that different types of organisations are familiar and competent with working in different financial thresholds as indicated in **Error! Reference s ource not found.**. The report suggests that, if left unchecked, different cultures or tacit assumptions that are held in different types of organisations used to working in different financial contexts which could lead to misunderstanding and inefficiency in the development of NBS funding and finance. For example, actors in the higher finance tiers may have a more market orientated culture, be subject to financial regulators, and have less awareness of the nuance and mosaic of the landscape in question. Actors closer to the landscape are

likely to have more of a common perception of priorities for people and nature in the specific landscape.

- In order to grow in scale, **standardisation** needs to operate in a way that reduces misunderstanding between organisations with different organisational cultures, language, business and regulatory contexts.

Conceptually, we need to see the interlocking collaboration of different actors working to co-fund a programme indicated in **Error! Reference source not found.** to be superimposed o n the different thresholds indicated in **Error! Reference source not found.**. Some collaboration is required in the lower thresholds and some collaboration needs to extend to higher thresholds.

Table A.1: Financial scales and the actors working within them

Financial scale: Order of magnitude	Typical/potential actors relevant to NBS	Explanation
£1,000,000,000	Banks, water companies	Actors with a green finance agenda whose engagement would be required for a scale up of NBS.
£100,000,000	Banks, water companies, infrastructure owners	
£10,000,000	Banks, water companies, infrastructure owners	
£1,000,000	Water companies, local government, ENGOs	Catchment and landscape groups.
£100,000	Land owners, local government, farmers, ENGOs	
£10,000	Land owners, farmers, ENGOs	

Modified from source at: annex-d-reservoir-and-landscape-system-summary-report.pdf (cambridge-water.co.uk)

The **Wyre Valley Natural Flood Management Project** identified different comparative advantages of risk management across different organisation types and designed the management arrangements for the project accordingly. This example is significant for our consideration of standardisation as it exemplifies an important way that organisations and actors differ and articulation and categorisation of unstated assumptions around risk management may make NBS projects more efficient.

- **Standardisation** should include a risk management framework. A consistent categorisation of risk management capability would enable efficient project design and assessment of project governance.

Table A.2: Risk management in the River Wyre Natural Flood Management Project

	Buyers	Investors	Landowners	Rivers Trust(s)
NFM construction/delivery risk	£	£££	Nil	Reputational
NFM performance risk	££	££	Nil	Reputational
Contractual/counterparty risk	£	££	-	-
External risks - policy environment	-	£	-	-

Source: Hird, D. (2022, May13). Showcase of the Wyre River Natural Flood Management Project. Green Finance Institute Webinar. https://www.youtube.com/watch?v=Iductkx8EU4

The **Oxford to Cambridge Arc Integrated Water Management Framework** set out a conceptual method of integrating water resource, water quality, flood management and environmental planning. This method is relevant to the standardisation agenda to inform how larger scale collaborative planning programmes could be managed in a way that enables the uptake of NBS. For example, the National Framework for Water Resources states that regional planning must consider flood management as well as water resource management.

The conceptual approach to summation of benefits across different planning domains is shown in **Error! Reference source not found.**. The method is framed on the basis that b enefits would have some form of consistent metrics or currency so that the summation is meaningful. Common planning assumptions and common metrics such as costing and carbon assumptions are required to make this type integrated planning viable. Efficient data sharing is also required. Water sector plans would include non-water related co-benefits such as social outcomes – referred to in the OxCam framework, and in regional water resource planning, as 'best value'. A shortcoming of this representation is that benefits are summed as additive positive goods. This might apply for some benefits such as Biodiversity Net Gain (BNG) or carbon sequestration. Whereas other goods (such as attenuation of flows to create a more natural flow regime) are not additive goods in the same way.

- The **Standardisation** agenda should include a schedule of assumptions relating to planning assumptions that would enable integration of different planning frameworks. Scale up will be achieved by integrating planning as well as by enlarging NBS projects and creating blended finance at scale.
- The **Value Framework** developed in a separate workstream of this project should allow for integration in numerous planning programmes including regional planning, flood management and environmental planning.
- **Standardisation** should include a clear data sharing protocol so that different organisations can transfer data in formats that are mutually convenient, protect restricted data, includes suitable metadata, and reflects the purpose, provenance and quality of the data.

Having adopted a common set of metrics and planning assumptions, it would be possible to select options that work together for increased benefits across the planning frameworks. This diagram sets out a way that the process could work.

The diagram shows how benefits from the four planning frameworks could be summed and then a combined portfolio negotiated and agreed.

This graphic shows a method for the summation of benefits across four planning frameworks leading to the creation of a combined portfolio of options.

Rows 1-4 show benefits and co-benefits of the options selected within each individual framework. The primary benefits in each system are coloured bold and co-benefits are coloured faintly:

- Water resource benefits are blue,
- wastewater brown,
- environment green and
- flooding pink.

Columns A to D show the benefits to each of the four planning frameworks. Columns E to J show co-benefits that represent show additional value ("Best Value" to use the terminology of WRMPs) such as social benefits, carbon sequestration etc.

Performance requirements for water resources and water management are shown as hard horizontal lines. Performance targets for environment and flooding are shown as dashed horizontal lines.

Row 5 shows the sum of all the portfolio benefits. Row 6 shows how a revised set of options could be negotiated to create a portfolio that reflects the efficiencies and potentially enhanced delivery of an integrated approach. Row 6 includes some additional best value benefits (red) from in combination effects.

As an example, using this method, a SUDs flood management with a secondary benefit to water resources would appear in both the flooding portfolio in Row 4 and summation of benefits in Row 5. A review would then be made to assess whether it should be included in the combined portfolio Row 6. This option could displace a more costly water resource option and create a more cost-effective water resource portfolio. If another similar project exists that does not meet the cost benefit threshold for flood schemes when considered in isolation, then identifying a cost share with another portfolio may mean that it becomes viable for inclusion in the flood portfolio too.

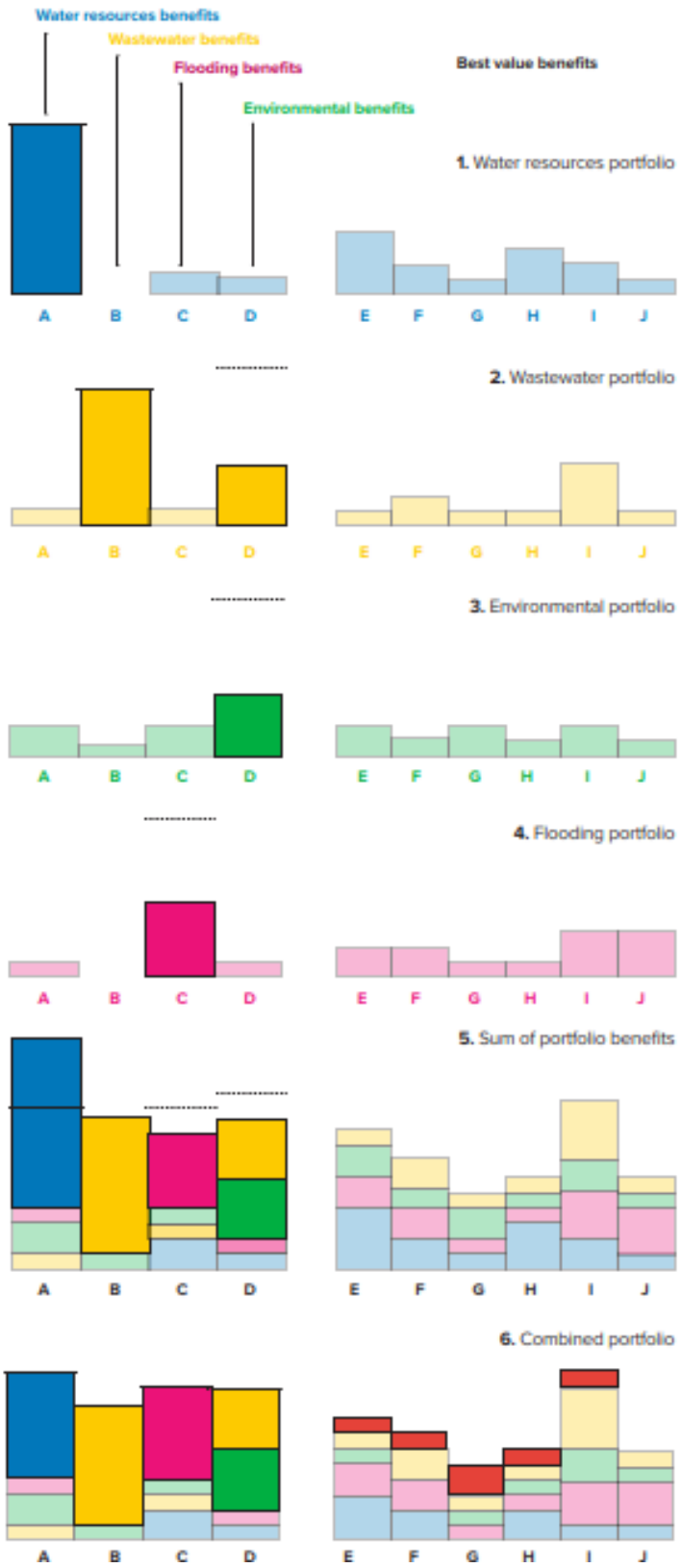

Figure 3 Summation of benefits: Oxford to Cambridge Integrated Water Management framework

Source: Oxford to Cambridge Arc Integrated Water Resource Management Framework

The **Transition Lab** model developed by North Star Transition takes a broader perspective to financing landscape transformation recognising that landscapes are part of wider social and economic systems. In the Wye Usk Transition Lab, actions relating to the landscape and river are set in a context that includes the economic model of farming, energy, health and transport.

- The **Standardisation** workstream should enable NBS planning and implementation to be integrated with wider transformative initiatives such as agricultural economies, renewable energy, health, wellbeing, food and sustainable transport, and others.

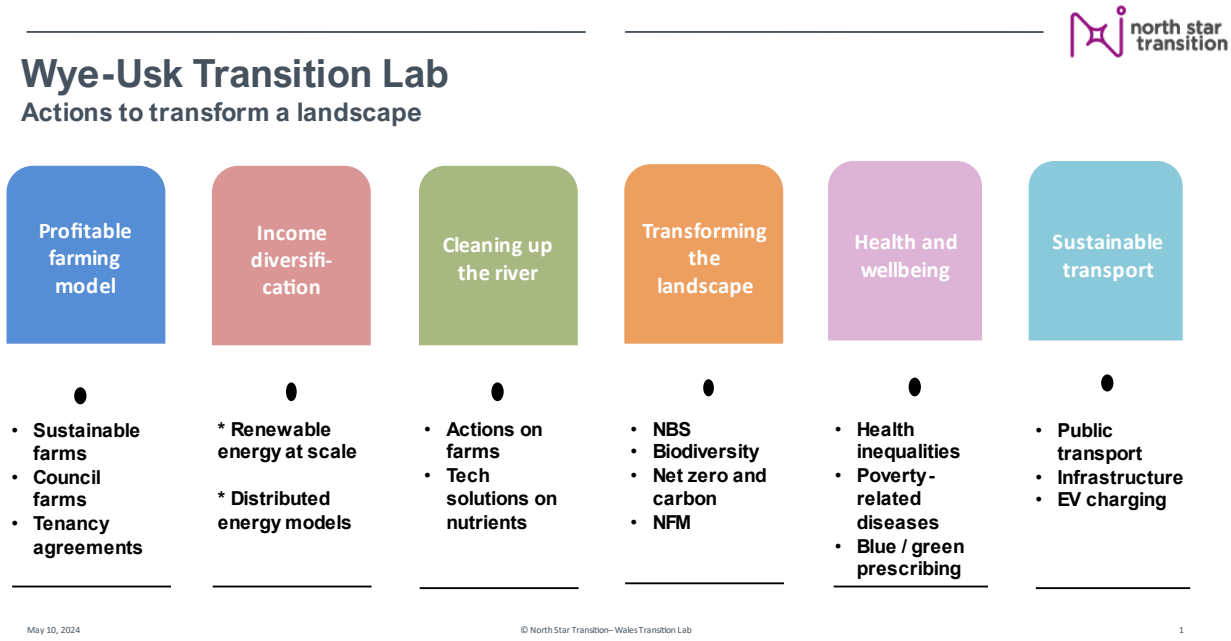

Figure 4 The Transition Lab model

Source: North Star Transition

In addition to the above, three further items have emerged for consideration. Firstly, that design and implementation of NBS is inhibited by a capable and experienced workforce.

- The **standardisation** agenda should outline requirements and a strategy for creating a skilled workforce.

Secondly, that the categorisation of NBS interventions is significant. For example, a catchment plan may seek to promote regenerative farming – but both the definition of what practices are included and how the specific activities would vary across different soil types and topographies must be made clear. The categorisation of interventions should be considered alongside the taxonomy.

Secondly, in some cases efforts have been made to create replicable models for NBS projects and aggregation. WWF for example have created the Wholescapes model with a view to developing replicability. Should the overall model be something that merits inclusion in the standardisation workstream? This should be considered within the integrated planning workstream.

In the workshop on 6/4/24 the standardisation agenda was framed as shown on **Error! R eference source not found.**

Figure 5 A potential standardisation agenda relating to different stages of a NBS programme

Source: Mott MacDonald

8.2 Appendix B. Risk Sharing Framework

Categories of risk management: Cultural Theory and Green Leaves III

An important theme in international analysis of water governance is around the capability of different organisations to manage risk. A seminal piece of work is The Middle East Water Question (Allan 2001) which acknowledges that different individuals, communities and organisations have different tolerance and attitudes towards risk. This categorisation known as Cultural Theory is derived from the work of Thompson et al (1990) which explored categories of cultural bias towards risk. At the core of this work is the differentiation of four categories of risk management:

- Controlling risk.
- Capitalising (and trading) risk.
- Coordinating/collaborating to pool risk.
- Acceptance or tolerance of risk.

Control of risk is seen in actions such as regulation or use of grey infrastructure. Capitalisation of risk occurs in the use of markets as risk is transferred to the organisations best able to manage it. Coordination for the pooling of risk takes place at different levels - at lower levels, catchment partnerships create collaborative action for a common good; at higher levels regional planning creates common outcomes across numerous actors. Acceptance/tolerance of residual risk is part of a risk strategy and is an example of how different organisations approach in different ways.

Defra's work on risk categories in Green Leaves III (Gormley et al. 2011) adds detail to the categories of control and capitalisation of risk but does not include coordination or the pooling of risk which has become increasingly significant in water planning with increasing engagement of eNGOs, the uptake of catchment approaches and regional coordination. A comparison of the categories used in Green Leaves III and Cultural Theory is shown on **B.1**.

The Green Leaves III categorisation of termination and mitigation of risk are both measures to control risk in Cultural Theory terms. Termination of risk is mitigation of risk to zero. Transfer and exploitation of risk are two sides of the same coin – one actor may transfer risk to another actor willing to exploit the risk for profit.

We plan to draw on both Cultural Theory and Green Leaves III in this work going forward.

B.1: Comparison of Risk Management Categories in Cultural Theory and Green Leaves III.

Risk management strategy (Cultural Theory)	Risk management strategy (Green Leaves III)
Control	Terminate
	Mitigate
Capitalise	Transfer

Risk management strategy (Cultural Theory)	Risk management strategy (Green Leaves III)
	Exploit
Accept	Accept
Coordinate / pool risk	Not addressed

Application of risk management strategies

To design governance and management arrangements of NbS projects well, it is important to understand the comparative advantage of different organisations with different risk management strategies. Government has comparative advantage in the control of risk as seen in the regulators who set rules for organisations such as water companies. This type of organisational culture is known as "bureaucratic" or "hierarchical". Private sector, including finance organisations, have comparative advantages in capitalisation of risk ("entrepreneurial" organisations). Environmental NGOs have a comparative advantage in convening collaborative action ("egalitarian" culture). Regional planning groups are set up for coordinating roles. Acceptance of risk varies from one organisation to another: the canal network is managed with an expected failure of 1:20 year drought, whereas the public water supply plans for the 1 in 500-year drought. The different organisational cultures around risk are shown on **Error! Reference source not found.**. This diagram is under d iscussion with the Task and Finish group and should be understood as a live document.

There are three examples demonstrate the significance of these categories to water planning:

Firstly, the governance of the Wyre Natural Flood Management Project aligns risk allocation with organisations best able to manage risk of that type.

- The Rivers Trust have a convening and coordinating role and are not allocated financial risk in the project.
- NFM performance risks are shared among buyers and investors given their capability in capitalisation of risk and the benefits that they will receive from the project.

Secondly, research by the Environment Agency shows useful comparisons between the catchment partnerships (egalitarian culture, generally chaired by eNGOs) and flood partnerships (which are more hierarchical in culture as they are chaired by the EA). The research showed that catchment partnerships perceived themselves as being able to convene grass roots action with greater reach because of their egalitarian and inclusive culture, but there was a trade-off in having less authority to drive action when compared with the more hierarchical structure that was brought by the EA's role in flood partnerships. The research identified that some problems were better tackled by each different approach.

Thirdly, we see these categories in the wider policy development around catchments. The Water Framework Directive (WFD) reflects a rules based approach to the control of catchments in the bureaucratic mindset. This policy failed to create the holistic response needed to the management of systems as complex as catchments (Giakoumis & Voulvoulis,

2019) and so a collaborative approach was created to achieve this in the form of the Catchment Based Approach CaBA. There is a widespread acceptance that these two approaches are still insufficient, and it is necessary to draw on the private sector for larger scale action in catchments for a greater scale of response than has been achieved with these two approaches. This approach would draw on the three different risk management strategies, thereby increasing the potential impact in this multi-dimensional challenge.

This introduction to risk management categories will be relevant to NbS in the following ways:

- The discussion of project drivers and verification in Section **Error! Reference s ource not found.** shows the categories of market driven, compliance, collaborative. It is useful to note how these categories are reflected in organisational cultures and therefore run through numerous aspects of practice in water and environmental management.
- The distinction between collaborative and competitive arrangements is important in a context in which both collaboration and the use of markets are important. This framework will be useful in adding nuance to that discussion. At different points of a project, it will be necessary to choose which strategy is being prioritised and to understand how this will have entailments for other issues. The regulatory framework requires clarity on the promotion of both collaboration and the use of markets.
- Coordination of organisations in different sectors will be enabled by understanding risk management cultures in these categories. There are different underlying assumptions in how to work that are expressions of these different risk management cultures.

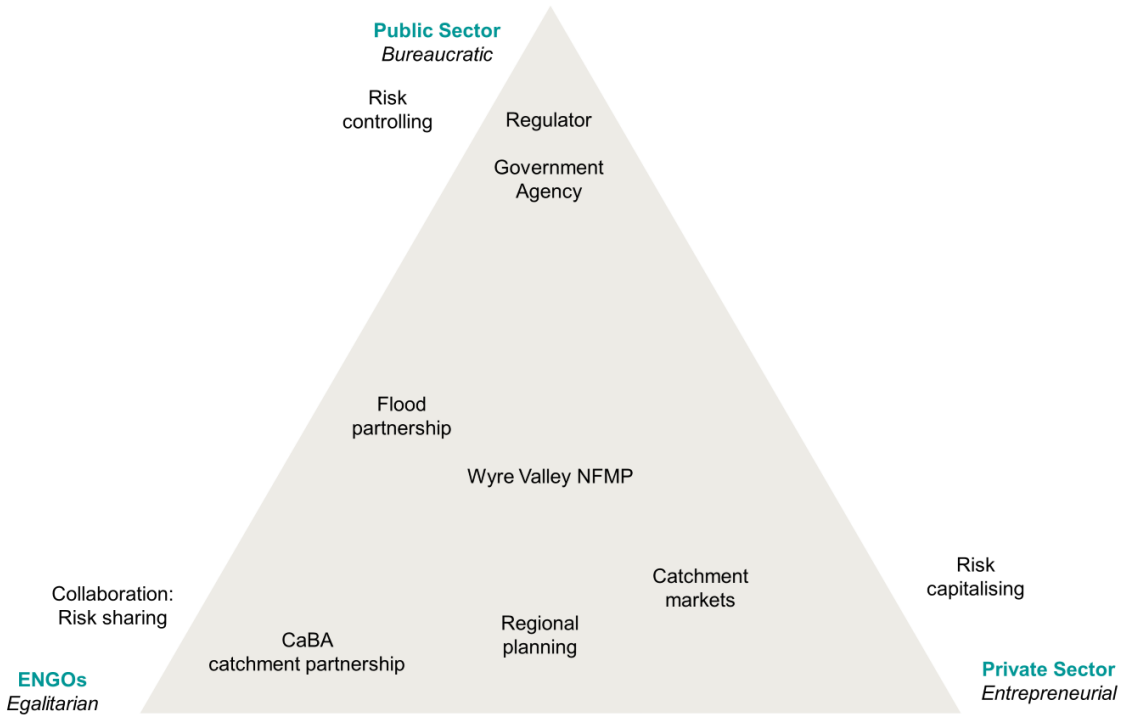

Figure 6 Categories of organisation and approaches to risk management.

Source: Bromwich, Crilly and Banerjee (2022).