



Deliverable D4.5
**Focus Sectoral Strategies for
mainstreaming freshwater restoration**

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Imprint

The MERLIN project (<https://project-merlin.eu>) has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101036337.

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To be cited as:

Bérczi-Siket, A., Blackstock, K. and Nyírő, F. (2025). Focus Sectoral Strategies for mainstreaming freshwater restoration. EU H2020 research and innovation project MERLIN deliverable D4.5. <https://project-merlin.eu/deliverables.html>

Due date of deliverable: 31 January 2025

Actual submission date: 31 January 2025

Disclaimer: Throughout the participatory process and strategy revision, we received many valuable insights which were invaluable to foster discussion, though they sometimes revealed conflicting views which did not always lead to a consensus or a resolution. Therefore, the Strategy uses these insights but does not necessarily reflect the opinion of the full Community of Practice.

Key messages

1. The six MERLIN Sectoral Strategies provide a vision for integrating Nature-based Solutions (NbS) into key economic sectors (Agriculture; Hydropower; Insurance; Navigation; Peat Extraction; Water Supply and Sanitation).
2. Economic sectors both depend on and impact freshwater ecosystems—NbS align private benefits with public goods like flood risk mitigation.
3. The business case for NbS includes cost reduction, risk management, regulatory compliance, sustainability commitments, and brand value.
4. The Strategies promote not only freshwater measures but also a shift toward recognizing natural capital as a business priority.
5. These Strategies aim to foster Communities of Practice (CoPs), engaging businesses, policymakers, financial institutions, and sectoral associations, as well as other civic and financial institutions.
6. Actions cover 'why,' 'what,' 'when,' and 'who'—starting with evidence gathering, followed by knowledge sharing, capacity building, policy shaping, and securing funding.
7. Collaboration is key, requiring cross-sector partnerships at catchment, national, and EU levels, alongside policy support from non-environmental sectors.
8. An enabling policy environment is essential, with non-environmental sectors (e.g., Agriculture, Energy) needing to support NbS.
9. With rising economic competitiveness concerns, sectors show interest in NbS, but further work is needed to turn strategies into action.

MERLIN Executive Summary

In the H2020 MERLIN (Mainstreaming Ecological Restoration of freshwater-related ecosystems in a Landscape context: INnovation, upscaling and transformation) project we focus on how to mainstream freshwater restoration through Nature-based Solutions (NbS) in order to develop **solutions both for nature and society**. Society includes those economic or industrial sectors that use natural resources for economic development.

NbS requires the engagement of all relevant stakeholders including the economic sectors that affect and are affected by interventions in our freshwater ecosystems. We focus on **Agriculture, Hydropower, Insurance, Navigation, Peat Extraction and Water Supply and Sanitation Sectors**. This deliverable summarises the six Sectoral Strategies that have been developed through engaging with these sectors.

Identifying win-win scenarios aligning economic interests with ecosystem restoration was our ambition. These strategies focus on the **overall enabling conditions** that can help align private benefits with delivery of public goods like climate regulation and habitat restoration generated from freshwater restoration measures. This may require some changes from 'business-as-usual'. Complementary economic and finance analyses will be reported elsewhere in the MERLIN project (D3.4 on Cost-benefit Analyses due May 2025 or D3.5 on best practice for financing due January 2025).

Since 2021, the project has engaged with the six economic sectors through roundtables, interviews, written comments and feedback on the project products, using these activities to **form sectoral Communities of Practice** (CoPs) to encourage knowledge sharing and collaboration. In MERLIN, CoP means an informal group of people who share practical learning based on a common interest (in this case, freshwater NbS) and not as part of a formal network. Sectoral understanding of NbS was varied within these groups, so efforts were made to discuss **restoration measures** in some CoPs (e.g. Navigation, Peat Extraction) to make the topic more tangible. These measures include soil management, natural water retention measures, riparian and instream restoration, wetland/peatland restoration, floodplain restoration and removal of barriers. Developing Strategies required a common practical focus to build community. However, it proved difficult to find an agreed focus given the range of perspectives on whether these freshwater measures were beneficial for their sector.

The six Sectoral Strategies have actions which address 'why', 'what', 'when' and 'who' questions to identify how to mainstream catchment-scale freshwater NbS. The Strategies tend to begin with **evidence gathering** to understand the benefits and costs of NbS, followed by **knowledge sharing** to spread awareness and increase understanding. This leads to **capacity building** among stakeholders and shaping **policy** to create supportive frameworks for NbS implementation. Throughout this process, **collaboration** and attracting **funding** are crucial to ensure that NbS can be effectively mainstreamed and adopted on a large scale.

The actions are timed to achieve the **visions** by 2030 (for some) and up to 2050 (for others), which aligns with other policies such as the Nature Restoration Law (NRL). These long-term perspectives are necessary to achieve large-scale transformational change, as there are many headwinds to changing the sectoral practices. However, many actions are steps on the way, and an adaptive approach will be needed. The Strategies recognise the sectors work in the current context where businesses need to balance economic, environmental and social objectives, and there are current concerns about **risks to businesses** from changes signalled from both policymakers and society.

The CoPs were designed to create ownership of these Strategies, driving the mainstreaming of NbS across sectors (Schultz et al., 2024). However, as foreseen at the start of the process (Bérczi-Siket et al., 2023) **not all sector actors were convinced** that adopting NbS would lead to sectoral benefits. The Strategy development tried to **align with the eight IUCN principles for NbS** but we found there is still a long way to go to implement the full set, particularly in terms of demonstrating economic viability or working at scale.

These Strategies reflect an important milestone in developing the appetite for economic sectors to make a substantial contribution to mainstreaming catchment-scale freshwater NbS. Further work, and strong policy signals, will be needed to change the aspirations in the Strategies into actual implementation processes.

Acronyms

- CAP - Common Agricultural Policy
- CoP - Community of Practice
- IUCN - International Union for Conservation of Nature
- MERLIN - Mainstreaming Ecological Restoration of freshwater-related ecosystems in a Landscape context: INnovation, upscaling, and transformation
- NbS - Nature-based Solutions
- NRL - Nature Restoration Law
- UN - United Nations
- WP - Work Package
- WSS - Water Supply and Sanitation

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1 Introduction

This deliverable provides a high-level summary of the six MERLIN Sectoral Strategies (*D4.5 Focus Sectoral Strategies* for mainstreaming freshwater restoration).

MERLIN's focus is on mainstreaming freshwater restoration through Nature-based Solutions (NbS), aiming to address the needs of nature, society, and the economy. The goal of the strategies is to serve the European Union's Green Deal ambitions. To reach these ambitions, the strategies advocate for the exploration and implementation of NbS. The strategies are relevant for all stakeholders in the six MERLIN sectors, as well as the environmental sector; both within the public and private sphere and both on high policy levels. Within their sectors, their aim is to have common actions about how NbS can benefit for all the sectors, the society and biodiversity.

Nature-based Solutions (NbS) are, as defined by the UN, “actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems which address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services, resilience and biodiversity benefits.” (UN, 2022)

D4.5 focuses on explaining the underlying rationale, methodology, and strategic framework to support sectoral actors in advancing NbS within their practices. This is not an economic analysis but looking at the overall conditions for mainstreaming and transformation (see the explanation of the terms below). The Sectoral Strategies are available online (see links below).

These Strategies are the following:

- **Agriculture** Sectoral Strategy: Gaining resilience through Nature-based Solutions.
- Taking an NbS approach to barrier removal: A Strategy for the **Hydropower** Sector.
- Mainstreaming Nature-based Solutions in **Insurance** activities - a Sectoral Strategy.
- **Navigation** Sectoral Strategy: Greening the European inland waterway network by mainstreaming Nature-based Solutions.
- **Peat_Extraction** Sector Strategy: Upscaling peatland restoration through Nature-based Solutions in the landscape.
- **Water Supply and Sanitation** Sector Strategy: Mainstreaming Nature-based Solutions for Resilience in the Water Sector.

Mainstreaming means normalising ideas considered common in one domain into other domains, to build shared understandings and concerted actions (Scott, Holtby, East & Lannin, 2022; in Blackstock et al., 2023).

Mainstreaming NbS is critical given the current state of European surface waters, with only 40% achieving good ecological status. Moreover, freshwater species are in a freefall, with an 85% decline in species populations on average since 1970 (WWF, 2024). This is due to multiple intersecting pressures such as water overuse and pollution, and it is further exacerbated by climate change (European Environment Agency, 2024). In particular there are concerns about future crises associated with water shortages in parts of Europe (Elsner, 2023). Therefore, restoration as NbS is crucial for society as well as the environment.

Within MERLIN, **restoration** as **NbS** means working at scale, combining ecological and societal benefits to restore rivers, wetlands, and streams (Bérczi-Siket et al., 2023).

The European Green Deal provided the initial stimulus for these Strategies and ongoing positive signals from non-environmental policy domains (such as Agriculture or Energy) are needed to reassure the economic sectors that NbS will be actively supported. However, since the adoption of the Green Deal, the political status quo has changed, and the new Commission is reframing the Green Deal. Partly due the Ukrainian war, the energy crisis and slow economic growth, the focus is now shifting towards industrial decarbonization and competitiveness (von der Leyen, 2024; European Council, 2024). While the focus evolves, it will be crucial to still drive bold progress on biodiversity and climate targets.

Economic sectors (as collection of business interests) are key stakeholders in supporting NbS and driving sustainable practices that align with ecosystem restoration goals (Malekpour et al., 2021, in Schulz et al., 2024). The six focal Sectors within MERLIN - **Agriculture, Hydropower, Insurance, Navigation, Peat Extraction, and Water Supply and Sanitation** - have a significant influence and dependence on freshwater ecosystems (Escribano et al., 2017). These sectors could and should play a central role in achieving transformative change and delivering mutual benefits for both the economy and the environment (Schulz et al., 2024).

Transformation represents “a fundamental, system-wide reorganization across technological, economic and social factors, including paradigms, goals and values, needed for the conservation and sustainable use of biodiversity, good quality of life and sustainable development”, according to IPBES (2019, p. 889).

Beyond ‘societal’ benefits, the Strategy development process sought to find the ‘business case’ for the sectors, whether this was to stay ahead of regulatory pressures, to reduce operating risks, or to gain better market share through a reputation for sustainability. The Strategies focus on the specific links between sectoral practices and freshwater restoration measures, adding the NbS philosophy to the many existing initiatives addressing Business for Nature (e.g. WBCSD, 2023).

MERLIN aims to showcase the potential of NbS as both environmentally sustainable and financially viable investments. The project highlights the potential for equitable distribution of socio-economic benefits from NbS, ensuring that healthier ecosystems reduce environmental risks, support local communities, and enhance resilience of critical economic activities to the challenges of climate change when implemented following the IUCN Global Standards. By adopting NbS more widely, these Sectors can actively contribute to a fair and inclusive transformation in how business relates to and interacts with the natural environment, to ensure that this shift also leads to the equitable distribution of benefits to all stakeholders (Schulz et al., 2024).

Achieving these outcomes requires cohesive Strategies and shared understanding across sectors. To facilitate this, MERLIN is developing sectoral **Communities of Practice (CoP)**, bringing together policy, scientific and sectoral actors, while fostering cross-sectoral dialogue and collaboration. CoP are “groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly” (Wenger-Trayner & Wenger-Trayner, 2015, p. 2).

In MERLIN, CoPs mean an informal group of people who share practical learning based on a common interest (in this case, on freshwater NbS) and not as part of a formal network with governance rules.

Since 2021, the project has engaged with the six economic sectors through roundtables, interviews, written comments and feedback on the project products, using these activities to form sectoral CoPs to encourage knowledge sharing and collaboration. This deliverable is both shaped by and serves the CoP. Drawing on MERLIN’s three years of insights, its purpose is to highlight how sectors can take an active role in safeguarding Europe’s freshwater resources, and to help them benefit from the transformation.

2 Methodology

There are two parts to this section, summarising the process taken for developing the Sectoral Strategies and summarising the methodology for this summary deliverable.

2.1 Sectoral Strategies

The methodology for this deliverable was designed to provide a clear framework for mainstreaming freshwater restoration as NbS across the six focal sectors. The exact methodologies for each Sector are detailed in their individual Strategies. The Strategies build on insights from previous project deliverables which include a sectoral and cross sectoral briefing (D4.1), a just transformation analysis (D4.2), a policy analysis (D4.3), and a value chain analysis (D4.4) (see in the box below).

- D4.1:** Mainstreaming aquatic restoration using Nature-based Solutions (Bérczi-Siket et al., 2023)
- D4.2:** Just Transformations: Sectoral Stakeholder Engagement, Processes and Perceptions of Mainstreaming Nature-based Solutions (Schulz et al., 2024)
- D4.3:** Briefing on policy opportunities for mainstreaming freshwater nature-based solutions (Blackstock et al., 2023)
- D4.4:** Value Chain Analysis in Key Economic Sectors (Chen et al., 2024)

The Sectoral Strategies aim to bridge the gap between the MERLIN Case Studies and broader EU-level policies, offering a pathway to mainstream NbS implementation across sectors. Internal financial working papers from WP3 and insights from MERLIN **Regional Scalability Plans** (see examples of measures relevant to different sectors in Section 3.3, e.g. the Deba barrier removal case study, or greening waterways in the Danube Floodplain restoration case study) were also used. This approach fosters a connection between "top-down" institutional support from organisations and "bottom-up" implementation in local restoration projects (see Annex II).

The methodology, guidance and templates (see Annex II and III) for the Strategies were developed by WWF Hungary (WWF HU) and the James Hutton Institute (JHI) and refined three times based on feedback for the MERLIN sectoral teams (see Annex I). The CoP also provided feedback through online consultations, three roundtables during the three years (see Figure 1) and the project all-partner meeting workshops. These efforts were made to help the Strategies reflect the diverse needs and perspectives of the sectors while remaining consistent with MERLIN's goals (see WP4 deliverables in Figure 1). Each Sectoral Strategy was led by designated experts who guided its development. These leads collaborated with consortium partners (see Annex I) to integrate CoP feedback from the consultations on roundtable reports and draft versions of deliverables. However, note the disclaimer in the Strategies that the final content was not unanimously agreed by all participants in the CoPs.

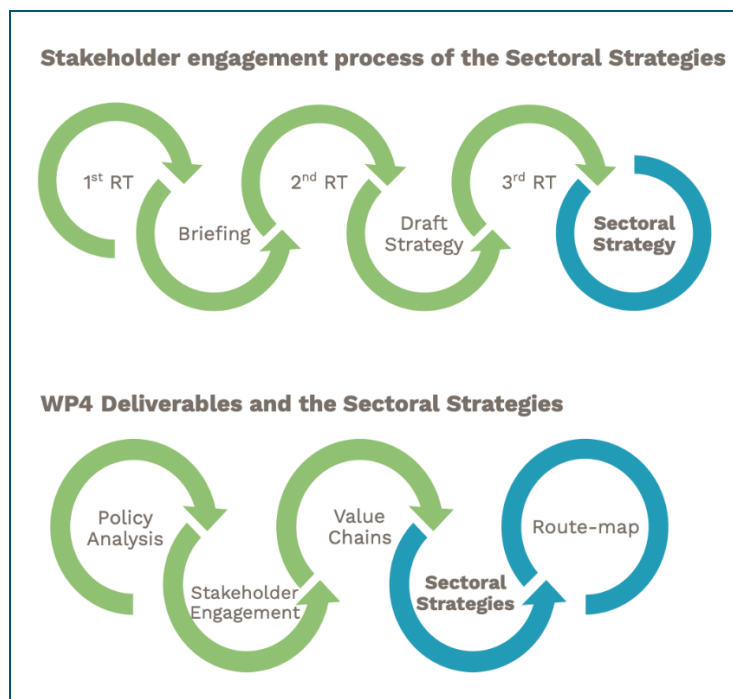


Figure 1: Sectoral engagement process of the Sectoral Strategies, and their place in the development of WP4 deliverables.

2.2 Methodology for this deliverable

For this deliverable, we sought to identify the commonalities and differences across the Strategies, following the structure set out in the template (Annex III). The Strategies were read carefully. Each author was assigned sections, based on their main content chapters (Section 3), which in turn were based on the common template. The Strategy contents relevant to that topic were summarized and assessed. There were several internal iterations, where other authors of this deliverable read and commented on the sections they did not write. This process was conducted in parallel with the process of reviewing and commenting on the six Strategies, so the authors of this deliverable became very familiar with the content of the Strategies. However, this also meant we were assessing and summarising fluid documents, as the Strategies continued to be updated and improved right up to the deliverable due date.

During this process, we consulted with sectoral leads several times to ensure that the content we developed accurately reflects the content within their respective Strategies. This process of checking this synthetic deliverable also helped the sectoral leads to see how their Strategy compared to the other five, fostering more social learning within the project. Further content review, and a more detached perspective, was provided by non-sectoral MERLIN colleagues, to help focus on key messages (see contributors on the title page).

The implications of the findings in Section 3 for the overall objective of the task, and the transformation philosophy guiding the work, form the discussion; and these insights were developed during the summary and assessment phase. Therefore, the analytical approach was abductive. The initial stages were strongly deductive (summarising, comparing and contrasting the information in each Strategy under common headings), but the later stages were inductive, developing new themes for the discussion based on ideas arising from the text. It was challenging to find the right balance between supporting the sectoral teams to finalise their Strategies and reflecting on the content of Strategies at the same time. Through the synthesis, new insights and feedback on individual Strategies arose. Whilst the deliverable reports on the content of the Strategy, there are also many lessons learned that will be taken forward in the rest of the project (see Section 5: Next Steps).

3 The content of the Sectoral Strategies

This section provides an overview of the main content of the six Sectoral Strategies. It covers the purpose (3.1.), the target audience (3.2.), and the integration of NbS into freshwater ecosystem restoration (3.3.) of each sector. It also covers the environmental, socio-economic, and policy contexts that shape each sector's ability to mainstream NbS (3.4.) and outlines the visions (3.5.) and main actions for 2030, 2040, or 2050 (3.6.). Finally, the section explores the key actors involved (3.7.), emphasizing the importance of cross-sectoral collaboration for effective NbS implementation. Overall, Section 3 provides an overview of the Sectoral Strategies, including where there are unique aspects or similarities across the different sectors.

3.1 Purpose of the Strategies

The Sectoral Strategies aim to provide clear, actionable pathways for mainstreaming NbS within their respective fields. Each Strategy is tailored to the characteristics and challenges of its sector while addressing shared goals, such as scaling up restoration efforts and integrating NbS into strategic planning and operations. Collaboration among policymakers, private sector actors, and local communities is also recognized as vital across all Strategies.

The Agriculture, Peat Extraction, and Water Supply and Sanitation (WSS) Strategies particularly focus on identifying and addressing mechanisms and uncertainties that hinder the implementation of multiple large-scale NbS measures. Overcoming these challenges is a unifying theme across all Strategies, which seek to move beyond business-as-usual practices toward transformative change.

In their purpose, some sectors specifically mention key measures as well. While the Hydropower Strategy prioritizes barrier removal as the key measure, Navigation promotes environmentally friendly practices to enhance biodiversity in inland waterways. Peat Extraction emphasizes achieving full restoration (i.e. integrating revegetation with rewetting and ensuring landscape connectivity) rather than just rewetting post-extraction sites or converting them into intensive land use, such as agriculture or forestry. Meanwhile, the Insurance Strategy is aimed at supporting frontrunners within the Sector to become early adopters of NbS approaches.

Moreover, when defining their purposes, the Agriculture, Hydropower and Peat Extraction Strategies also highlight the critical role of the private sector, aiming to reshape its role and attitudes to increase investments

in NbS through incentives. Additionally, they emphasize the public sector’s role in involving local stakeholders, creating enabling regulations and partnerships, and driving transformative action.

3.2 Target audience

The Sectoral Strategies are designed for a range of audiences, reflecting each Sector's role in mainstreaming NbS. While many Strategies include stakeholders beyond their immediate sector - such as policymakers - some focus more specifically on actors directly involved in the sector. Each Sector defined its audience based on the actions outlined in its Strategy. A broader scope can facilitate engagement at multiple levels and enhance the Strategy’s reach, while a narrower focus supports targeted implementation within the Sector.

The Agriculture Strategy has the widest target audience of the six sectors. In addition to agricultural stakeholders like farmers, their representatives, and advisors, it includes policymakers at EU and Member State levels, municipalities, private companies sourcing agricultural products, the general public, civil society, and public and private financing institutions. Similarly, the Peat Extraction Strategy addresses a broad audience, including the sector's Community of Practice, industry actors, EU and Member State policymakers, and peatland stakeholders.

The Hydropower Strategy’s key audience are large companies already doing or interested in developing NbS programmes with barrier removal as a core measure. Moreover, they are targeting sectoral representative entities, i.e. associations and networks. The Insurance Strategy primarily focuses on public and private Insurance companies, while also considering associations, policymakers, and researchers. As for the WSS Strategy, the primary focus is water and sanitation operators, regardless of their legal or ownership structures. However, the Sector targets other stakeholders as well, such as EU institutions, national governments, local authorities or NGOs (more stakeholders are mentioned in the Strategy). Regarding Navigation, the Strategy addresses a wide range of stakeholders within the Navigation Sector, but recognizes that national waterway management and navigation authorities should take the lead in greening European inland waterways.

3.3 Restoration measures/NbS approach

This section focuses on how the Strategies relate to the wider MERLIN project’s focus on restoration of freshwater ecosystems. The Strategies were asked to consider how restoration measures can be implemented as a NbS; and how to mainstream these measures so they become part of sectoral practices. Each Strategy has selected a particular aspect of how their sector affects, or is affected by, freshwater ecosystems and this was the ‘entry’ or ‘cooperation’ point to help the actions (see Section 3.6) to be specific and to build on the MERLIN case studies as demonstrations. However, the link between measures and actions are more generic in some Strategies than others - the outcomes of these different approaches are discussed in Section 4.

The measures that were mentioned in the six Strategies are summarised below and illustrated where possible with examples from the MERLIN Case Studies.

Floodplain restoration - the creation of permanent and temporary flood retention areas which can help reduce flood damage to businesses and populations - is mentioned in the Agriculture, Insurance, and WSS Strategies. These measures often require changes to how land is used or managed.



Figure 2: Danube floodplain, Austria, 2024 (photo by viadonau)



Figure 3: Floodplain of Buiten Ooij near Nijmegen, the Netherlands, end of April 2020 (photo by Remco Versluijs)

Natural water retention measures or buffer strips/riparian plantings in catchment areas beyond the floodplains consist of different ways to slow the flow of water flowing over land, helping offset flood peaks, encouraging infiltration and trapping sediments. They are mentioned in the Agriculture, Hydropower, WSS Strategies. The WSS Strategy also names reforestation and afforestation to enhance water retention, reduce erosion, and improve overall water quality as a potential measure for the Sector to support. This is presented separately to riparian tree planting, as these measures can take place away from the riparian zone. However, they are a form of natural water retention measure, but on a larger scale than an earth retention measure in the corner of a field.

Soil management practices, such as minimising disruption or compaction of the soil, incorporating organic matter and maintaining soil cover, can help the soil absorb and retain water, replenishing both surface and groundwater flows. They are mentioned in the Agriculture Strategy. These measures can be done within field/site (land sharing) rather than requiring land to be set aside or negotiations with neighbouring land managers.



Figure 4: Basque streams before and after barrier removal (photo by UPV/EHU)

Increasing connectivity by **removing or modifying lateral or transversal barriers** to allow migratory species and sediments to move up and downstream and reconnecting the river to the floodplain is mentioned in the Hydropower and Navigation Strategies. Removal of lateral barriers consist of practices like: removing bank protection, re-siting or removing dykes, adapting groynes and longitudinal training walls to reduce the environmental impact of Navigation without hampering the navigability; or removing or bypassing transversal barriers, which includes dams, sluices, and weirs, used for multiple purposes. Removing or modifying these barriers can be *ad hoc* or strategically planned; and require the cooperation of diverse stakeholders. Both Strategies focus on removal of barriers when possible (e.g. where no longer needed or costs exceed the benefits, recognising that some barriers are required) rather than mitigation measures like fish ladders.



Figures 5 and 6: Two leaky dams with channel and pond (left), and single leaky dam measure (right) at the Forth Catchment (photos by Forth Rivers Trust)

Riparian or instream modifications such as gravel reintroduction, adding woody debris or reintroduction of aquatic plant species to stabilise the stream beds, to improve hydro-morphological function is mentioned in the (Insurance, WSS) Strategies. They can be small scale interventions but as with barrier removal/modification, they require the cooperation of both riparian and channel stakeholders.



Figures 7 and 8: Pre- and post-restored peatlands at Flanders Moss, Forth catchment (photos by NatureScot)

Wetland or peatland restoration, including revegetation and rewetting that reduces Green House Gas emissions from degraded soils, can replenish sub-surface and groundwater sources and increase the biodiversity of these habitats is mentioned in the (Agriculture, Insurance, Peat Extraction) Strategies. These measures consist of things like: blocking ditches or creating channels and dams to reflood the drained areas, and replanting with appropriate vegetation to restore ecological function. They can be small scale interventions but as they can affect the local hydrology, may require cooperation with downstream land managers. The WSS Strategy addresses constructed wetlands – designing and building artificial wetlands to treat agricultural runoff or wastewater before it enters natural waterways, thereby improving water quality.

To provide outcomes at the catchment level, often measures need to be implemented at scale. As noted above, many of these measures require cooperation beyond the individual business holding (field, barrier, insured asset, fairway, extraction site or abstraction area) and deliver both private and public goods/services that benefit others beyond those implementing the measure. The implications of cooperation and distribution of costs and benefits are further addressed in the Discussion.

These measures are considered NbS because they address social and economic concerns whilst protecting or improving habitats and species. Using the Agricultural Strategy as an example, the focus was to reduce negative externalities, restore or better manage riparian habitats and aquatic environments and generate new revenue streams for land managers and others in the river basins. This Strategy recognises the need for multi-scale (field-farm-catchment) and multi-actor (private, government and third sector) cooperation and the need for wider society to be better informed, which should also sustain agricultural livelihoods.

3.4 Overview of current situation

The ability to mainstream support for restoration and to take an NbS approach is conditioned by the context in which the sectors are working. Each Strategy considers the climate, biodiversity and socio-economic challenges, which can provide both the enabling conditions for change but also barriers to action. They also consider the policy frameworks affecting their sectors; and how societal expectations might be driving change.

The Agriculture, Hydropower, Navigation, and WSS Strategies note that only 40% of Europe’s surface waters are in good or better ecological status, with sectoral activities being recognised as a major source of **pressures on water quality and quantity**. Furthermore, the Agriculture, Hydropower, Navigation, Peat Extraction Strategies note that **biodiversity loss** is increasing, again with sectoral activities contributing via pollution and habitat loss. Other Strategies focus on how restoration can protect or restore biodiversity (Insurance, WSS Strategy). The Agriculture and Peat Extraction Strategies recognise **soil degradation**¹ as part of the need for change, as this is one of the most widespread problems in Europe and central to the mitigation of drought and floods.

The sectors are negatively affected by these environmental pressures – for example, above and below ground biodiversity is necessary for healthy crop yields and pastures as described in the Agriculture Strategy. However, biodiversity gain is not directly important for businesses to prosper in the other sectors (Hydropower,

¹ It could be argued that the Peat Extraction Strategy also relates to soil health, as peat can be classified as a soil type as well as an ecosystem.

Insurance, Navigation, Peat Extraction, WSS). Water scarcity and flooding impacts are highlighted in all the Strategies; and fluctuations in water levels affecting operations are mentioned in the Hydropower, Navigation and Peat Extraction Strategies. Increased operating costs due to pollution from other sectors (including Agriculture) is mentioned by the WSS Strategy.

Climate change can accelerate such pressures on the environment. All six Strategies note increasing hazards (e.g. heatwaves, prolonged droughts and floods) that threaten food production and the farmers' livelihoods; the ability to operate Hydropower barriers; the viability of protecting insured assets, navigability of waterways, the ability to restore past extraction sites and ensuring reliable water supplies respectively. The context illustrates that failure to tackle these pressures will have a direct impact on livelihoods for those working in our six sectors.

Climate mitigation was identified as driving the need for NbS in the Peat Extraction and WSS Strategies. The Agricultural Strategy highlights climate mitigation by the sector in the vision and actions. However, for the Hydropower Strategy climate mitigation drives the demand for renewable energy sources, providing a strong position for the Sector to argue for continued Hydropower operations, including those linked to in-stream barriers. Finally, the Navigation Strategy notes that climate mitigation by the inland waterways fleet is important, but it is not the focus of their Strategy.

The Strategies recognise that there are a variety of ongoing **policy processes** that can help or hinder mainstreaming of NbS and transformation from our current way of working with nature. The EU Green Deal's vision aims for zero net emission of greenhouse gases by 2050, and promotes economic growth decoupled from resource use with no person or no place left behind (European Commission, 2019). The need to find win-win-wins between climate action, biodiversity action and livelihoods is noted in all the Strategies. The Common Agricultural Policy (CAP) is associated with funding opportunities as well as cross-compliance regulations as highlighted in the Agriculture Strategy. Moreover, a potential conflict with the CAP objective (for food production) is highlighted in the Peat Extraction Strategy.

Other common policies supporting the need to mainstream an NbS approach by the sectors include the Biodiversity Strategy 2020 (Agriculture, Hydropower and WSS Strategies); the NRL 2024 (Agriculture, Hydropower, Insurance, Navigation, Peat Extraction and WSS Strategies) and the Adaptation Strategy 2021 (Hydropower Strategy, WSS Strategy²). There are also industry specific policy drivers, e.g. the Renewable Energy Directive (2023) for Hydropower, the Solvency II Directive (2009) for Insurance, the Trans-European Transport Policy (2024) for Navigation, the Drinking Water Directive (2020) and Urban Wastewater Treatment Directive (UWWTD) (2025) for WSS.

However, the Peat Extraction Strategy differs from the rest of the Strategies as a key part of this sector's current context is the fact that there is a lack of a clear EU policy framework to encourage consistent and ambitious restoration practices once extraction ceases. Thus, the variability of Member State's policies towards after-use (which concerns how a site is managed, whether for agriculture, forestry, restoration or abandonment) is an important context for the Peat Extraction Strategy. There is a need for a clear framework at the EU level for **mainstreaming NbS** in the water Sector (although there have been recent developments such as the NRL and UWWTD, along with better enforcement of existing legislation); and for the Hydropower Sector. Consequently, the variation in the use of NbS across Europe is also influenced by the presence of specific policies at national levels.

Some Strategies (Hydropower, Insurance, Peat Extraction, WSS) highlight increasing pressures placed upon the Sector by **regulatory requirements**. The need to upgrade aging infrastructure is both a challenge and enabling factor for the Hydropower sector; as replacement may trigger a change to include restoration measures in the next planning cycle. Concerns about rising costs (fuel, feed and fertilisers for Agriculture, increasing flood damage for Insurance) is also an important contextual factor in the Agriculture and Insurance Strategies; alongside the fact that consumers demand low prices but additional delivery of public goods (see Agriculture, Peat Extraction, WSS Strategies).

There has also been a shift in **societal expectations** for the sectors, which is highlighted in some of the Sectoral Strategies. For example, the Hydropower Strategy notes how there are diverse views regarding in-river barriers used for power production; and increasing pressure to better mitigate any negative environmental or social impacts. The Navigation Strategy notes the push for a modal shift from roads and railways to water-borne transport. Peat Extraction Strategy notes the wider context of industries taking more responsibility for impacts of their activities on peatlands, and to contribute to peatland restoration as part of legal and corporate social responsibilities. The Agricultural Strategy is seeking a great shift in consumer expectations to demand and reward more sustainable farming practices.

There are increasing **business risks** (e.g. reputation) for being perceived not to align with sustainability and environmental goals. The benefits for sectors are therefore highlighted, including, operational, financial and

² The other Strategies mention adaptation to climate change many times, but do not explicitly name the EU Adaptation Strategy.

reputational and compliance benefits that could arise from adopting a NbS approach to business. This is highlighted by the Hydropower, Insurance, Peat Extraction and WSS Strategies. However, some Strategies (e.g. Peat Extraction, WSS) also note that there is little evidence of how such benefits from NbS may arise for *individual* commercial businesses - rather the benefits are public goods for societal wellbeing. Furthermore, the Strategies suggest that currently it is often unclear how sectoral businesses can benefit from restoration measures. For example, this entails accessing carbon credits from restoration of Peat Extraction sites or enabling water operators to legally recover the costs of upstream, multi-functional restoration measures. Wider sustainability or finance policies are rarely included, with the EU Taxonomy for Sustainable Activities (2020) mentioned by the Hydropower, Insurance and Peat Extraction Strategies; and Corporate Sustainability Reporting Directive (CSRD) (2022) mentioned in the Hydropower and Insurance Strategies in the context (CSRD is mentioned in the Agriculture actions).

The approach to water management requires more than regulation of specific pressures and activities but a focus on **integrated river basin management** - a context explicitly highlighted in the Hydropower and WSS Strategies. However, this integrated, catchment-scale approach can create governance challenges for sectors, including how to finance measures beyond their particular sites (noted specifically in the Hydropower, Insurance, Peat Extraction and WSS Strategies - see Section 4, Discussion).

The actions discussed in Section 3.6 often imply a particular 'starting point' for the sectors. For example, the common focus on the need for awareness raising suggests that the current context for a sector is a lack of familiarity with NbS approaches and the tendency to defer to more familiar 'grey' solutions. Another common issue for the sectors is the lack of evidence on the costs and effectiveness of measures described in Section 3.3 above, particularly over the term of sectoral capital investments, which can be up to 50 years (e.g. Hydropower, WSS Strategies). All six Strategies also highlight a lack of evidence, skills and knowledge, available to the sectors at present for use in their decision-making processes.

To summarise, the Sectoral Strategies share some commonalities of context (see Table 1), often associated with risks and/or opportunities to the sector. How these contextual factors affect the choice of actions and actors varies, which reflects the different focus of the Strategies (Section 3.1) and the different visions being sought (see Section 3.5).

Table 1: Current Conditions as highlighted in the Sectoral Strategies

Current Context	Agriculture	Hydropower	Insurance	Navigation	Peat Extraction	Water Supply & Sanitation
Water Framework Directive Pressures	✓	✓	✓	✓	(general pressure on wetlands)	✓
Biodiversity Loss	✓	✓	(seek to enhance biodiversity)	✓	✓	-
Soil health	✓	-	-	-	✓	-
Climate mitigation	✓	(✓)	-	(✓)	✓	✓
Adaptation to Climate Change	✓	✓	✓	✓	✓	✓
Other Policy Drivers	✓ Green Deal, CAP, Biodiversity Strategy, NRL, UN Sustainable Development Goals, European Climate Law, River/Flood Basin Management Plans	✓ Green Deal, Biodiversity Strategy, NRL, Adaptation Strategy, Renewable Energy Directive, WFD, Habitats Directive, Corporate Sustainability Reporting Directive	✓ Green Deal, NRL, EU Taxonomy for Sustainable Activities, Corporate Sustainability Reporting Directive, Solvency II Directive	✓ Green Deal, Biodiversity Strategy, NRL, Trans-European Transport Policy	✓ Green Deal, Biodiversity Strategy, NRL	✓ Green Deal, Biodiversity Strategy, NRL, Drinking Water Directive, UWWTD, European Climate Law, Adaptation Strategy
Societal Expectations	✓	✓	?	✓	✓	?
Business risks, costs	✓	✓	✓	-	✓	✓

3.5 Overview of Visions

In order to see how the above-mentioned challenges (Section 3.4) can be handled, each Strategy sets goals that they aim to achieve by 2050 and beyond. This helps envision a scenario where risks can be tackled, and challenges can be turned into opportunities. Visions are essential to provide a clear direction for transformative change and to ensure alignment with MERLIN’s overarching objectives and the European Green Deal. The visions also establish how the Strategies’ outcomes can contribute to freshwater restoration, biodiversity, and climate resilience, while supporting the mainstreaming of NbS.

A shared vision across all Strategies is the **integration and promotion of NbS** within regular sectoral activities. They acknowledge NbS’ role in addressing social and economic concerns, and they mostly see them as an opportunity to deal with some sectoral challenges as well (see Section 3.3). In line with this, the Agriculture, Hydropower and WSS Strategies emphasize both the need for a clear definition and comprehensive understanding of NbS. Furthermore, the WSS and Hydropower strategies highlight that NbS should be **embedded in policy**, legislation, and governance at all levels - an opportunity that existing policy drivers can enhance (Table 1).

Collaboration is another key theme in many of the visions. On the one hand, the Agriculture, Hydropower, and Peat Extraction Strategies specifically stress cooperation *within* their Sector and across regions and scales. For example, the Peat Extraction Strategy envisions incorporating the sector's restoration expertise into landscape-level planning. On the other hand, the Agriculture and Peat Extraction Strategies emphasize *cross-sectoral* and *multi-actor* cooperation. In Agriculture, this is reflected in the vision of farmers working collectively to manage water catchments and landscapes through collaborative networks. Additionally, funding for NbS is explicitly addressed in the vision of the Hydropower Strategy, which envisions that by 2030, the Sector will actively provide financial resources to support barrier removal projects that adopt an NbS approach.

Knowledge sharing or learning is also a recurring theme. For instance, the visions of the WSS and Hydropower Strategies include widespread knowledge and easy access to tools, methodologies, and case studies related to NbS. This focus aims to bridge existing knowledge gaps, particularly where water operators lack information about the costs and benefits of NbS. The Agriculture Strategy incorporates additional elements about the Sector's future. By 2050, it envisions resilient, productive, and sustainable farming systems, with shorter value chains and fairer producer prices. It also highlights the importance of recognizing and rewarding farmers for not only providing food but also enhancing public goods and ecosystem services.

3.6 Main Actions and Actors

The Sectoral Strategies define concrete action points to address the current situation (Section 3.4) and to realise their vision (Section 3.5.). Most Strategies follow a common progression: they begin with *evidence gathering* to understand the benefits and costs of NbS, followed by *knowledge sharing* to spread awareness. This leads to *capacity building* among stakeholders and *shaping policy* to create supportive frameworks for NbS implementation. Throughout this process, *collaboration* and *attracting funding* are crucial to ensure that NbS can be effectively mainstreamed and adopted on a large scale.

However, this process is carried out on different timescales, as Table 2 shows below. Agriculture generally has continuous actions, spanning from 2025 and beyond. Hydropower and Insurance aim to realise their actions relatively quickly (by 2030), while Navigation and Peat Extraction aim for short, middle and long-term goals until 2050 or beyond. WSS aims to realise all its actions by 2036, yet it divides their realisation into separate time phases. These different timelines reflect the various challenges and expectations from and within each sector.

Evidence gathering - Most Sectoral Strategies begin by defining what NbS mean within their context, enhancing clarity and the importance of common understanding. This often involves gathering data and evidence on the benefits and costs of NbS implementation. Some Sectors even aim to quantify the consequences of *not* implementing NbS. In the Strategies, this data-driven approach serves to attract funding and generate public support. This activity is not included in any of the strategic visions, yet Sectors starting with it highlights how important it is for the further steps.

Knowledge sharing - Evidence gathering is usually closely tied to sharing knowledge and raising awareness about NbS. Agriculture and Navigation both have continuous actions for it over the years, with Agriculture even aiming to raise public awareness. Hydropower, Insurance and Peat Extraction all tie knowledge sharing closely to evidence gathering. For two of its actions, WSS also mentions it at the early phases, yet it is included later in the process as well.

Capacity building - Integrating NbS through capacity building into actual Sectoral practices is crucial in almost every Strategy, as highlighted in the Strategic visions as well (Section 3.5). Based on the gathered evidence and good examples, they strive to contribute to capacity building, allowing Sectors to implement NbS in practice. Specifically, the Insurance Strategy aims to innovate by developing new non-life Insurance products after reassessing its portfolios. Hydropower aims to provide tools to design NbS programmes for barrier removal, and the WSS Strategy mentions strengthening workforce capacity by training programmes. Plans are also important in capacity building: Navigation highlights the development of a concrete plan for greening waterways.

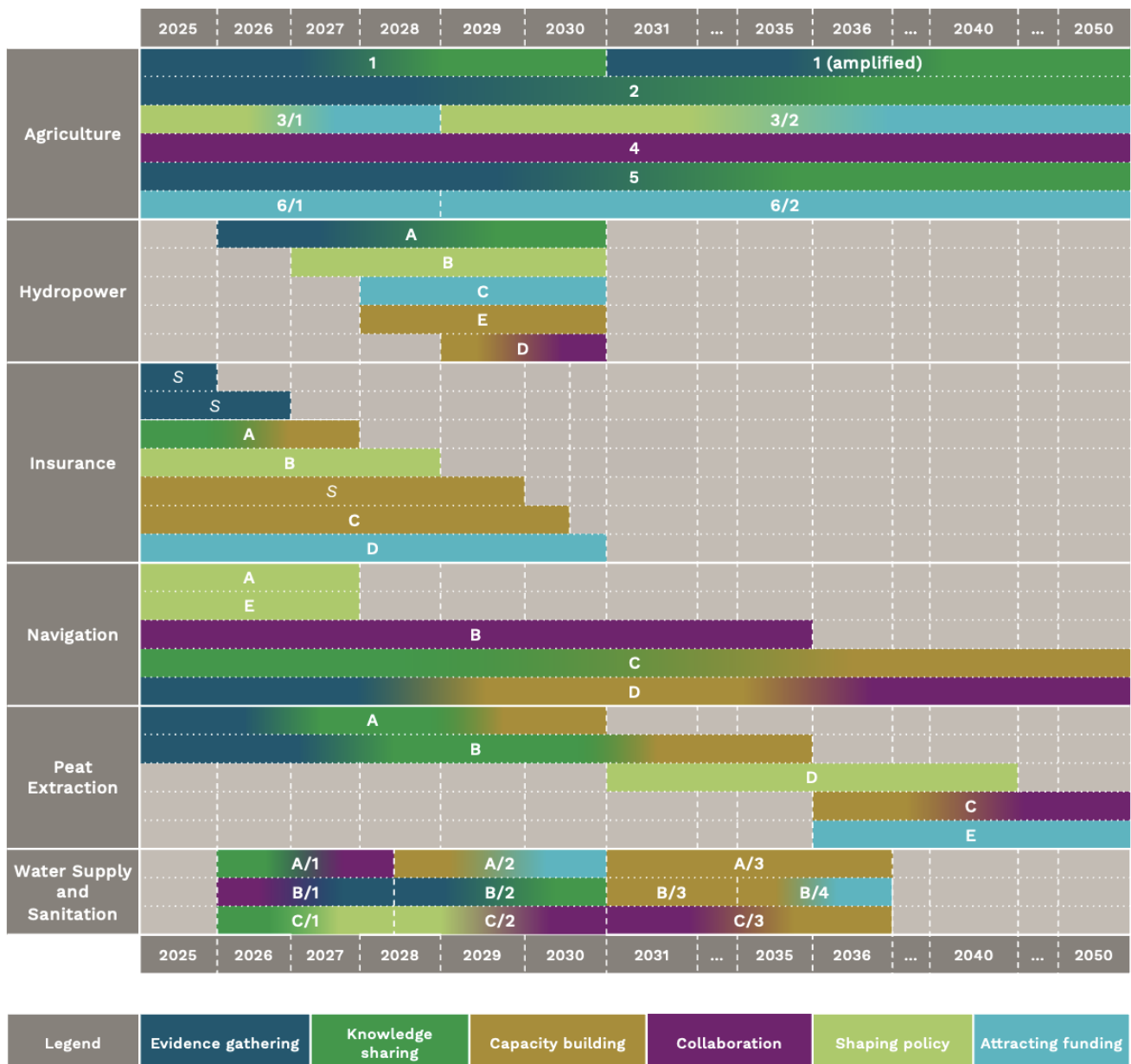
Collaboration - Most Strategies have explicit actions for sectoral or cross-sectoral collaboration, in accordance with their vision. Many also highlight creating partnerships with other economic sectors, at the level of the public and private sectors, too. The cooperation with both local groups and high-level representatives are also frequently mentioned. This often involves strengthening a CoP to facilitate knowledge sharing and the exchanging of best practices. This type of activity plays an important role at the start of two WSS actions (A and B), while in other cases, they would be carried out continuously (Agriculture and Navigation), and other Sectors include them in their final steps (Hydropower and Peat Extraction).

Shaping policy - Although only mentioned in a few strategic visions, all Strategies incorporate actions related to policies and regulations. Most of them aim to establish policies that encourage the implementation of NbS.

Some Sectors propose specific changes - for instance, Agriculture outlines several sub-actions to make the CAP more effective and adequate for current challenges. The Navigation Strategy recommends better integration between the policies implementing the EU Green Deal such as the Trans-European Transport Network policy and the Water Framework Directive and the NRL. Hydropower and Insurance includes an action for policy shaping at a relatively early stage, before collaboration or even capacity building in Hydropower's case, suggesting that in these Sectors, an adequately supportive policy environment is even more essential to start NbS implementation.

Attracting funding - This aspect is typically among the final action points, reflecting the view that evidence gathering, knowledge sharing, capacity building, collaboration and shaping policy are prerequisites for securing adequate funding. As it was highlighted on several occasions during roundtable discussions, the lack of funding is usually a result of a lack of sufficient knowledge and evidence about NbS. Nevertheless, funding is crucial for enabling large-scale NbS implementation. Thus, in the Hydropower and WSS Strategies, it is also seen as an enabler of effective capacity building, knowledge sharing and collaboration.

Table 2: Summary of strategic action points³



³ Note: 1) The Agriculture Strategy has numbered actions instead of letters. 2) The Insurance Strategy has seven actions in total, but three of them are supportive actions which have not been detailed in the Strategy (indicated with "S"). 3) The WSS Strategy has three actions and Agriculture has two actions (3 and 6) which are realised in different phases. Thus, phase one within an Action is indicated with "A/1", for example.

3.7 Involvement of other sectors

The successful implementation of NbS in freshwater restoration relies heavily on collaboration and coordination across sectors due to their interdependencies and shared reliance on healthy ecosystems. Each Sectoral Strategy highlights key connections with others, emphasizing the need for integrated approaches to overcome challenges and leverage opportunities for transformation.

Agriculture has significant overlaps with multiple sectors, including Peat Extraction, Navigation, Insurance, and WSS. Sustainable agricultural practices, such as wetland restoration and soil conservation, can enhance water quality, regulate water levels for Navigation, and reduce flood risks, which directly benefits the Insurance sector. Improved land management can also stabilize peatlands, supporting the restoration of Peat Extraction sites. However, trade-offs like the economic reliance on drained peatlands and competition for water resources must be addressed. This can be achieved through regulatory reforms, financial incentives, and platforms for stakeholder dialogue that bring together farmers, policymakers, and private sector actors to find mutually beneficial solutions.

The **Hydropower** Strategy recognises that barriers are created for a range of functions and therefore are also linked to other sectors, including Agriculture, Insurance, Navigation, and WSS. These sectors need to be also involved in strategic discussions about which barriers are no longer required/economically viable and therefore available for removal. However, the focus of the strategy development (as with the Peat Extraction Sector, for example) was focussed mainly on understanding the overlap between barrier removal and an NbS approach. Identifying how to better consider barrier removal in practice using an NbS approach focussed on discussions within the Hydropower Sector. Therefore, the focus on cross-sectoral working is muted within the Strategy itself.

The **Insurance** Sector plays a cross-cutting role by managing risks and losses for sectors like Agriculture, Peat Extraction, and WSS. By integrating NbS into risk management strategies, Insurance companies can mitigate climate-related risks such as floods and droughts. This approach not only reduces financial risks but also encourages sectors to adopt practices that enhance ecosystem resilience. For example, promoting NbS for flood mitigation in Agriculture benefits insurers by lowering payouts for climate-related damages. To scale these efforts, supportive policies like the NRL are essential, alongside innovative Insurance products that incentivize NbS investments and reward sustainable practices.

The **Navigation** Strategy has focussed on developing ideas with those responsible for managing and maintaining navigational fairways. These ‘waterway managers’ have a remit for integrated water management, and therefore, already engage with, and manage water resources for, a wide range of different economic sectors. Due to this framing, the Strategy does not identify particular cross-sectoral working practices as these are already part of a ‘waterway managers’ remit.

Peat Extraction intersects mostly with Agriculture and WSS, especially concerning water management and land-use practices. Effective peatland restoration stabilizes water flows, improves water quality, and enhances biodiversity, delivering benefits to these sectors. For instance, rewetting degraded peatlands can reduce agricultural runoff and improve water quality for WSS. However, challenges like income loss for farmers and the impact of rewetting on waterways require coordinated policies, financial incentives such as Payments for Ecosystem Services (PES), and joint planning efforts involving local communities, policymakers, and industry stakeholders.

WSS depends on cooperation with Agriculture, Peat Extraction, and Navigation to reduce pollution and ensure sustainable water resource management. Implementing NbS at a larger scale often involves changes in land use and water management practices, necessitating collaboration with private landowners, public authorities, and other stakeholders. For example, wetlands restored in agricultural areas can filter pollutants and improve water quality for WSS operations. Such coordination can be complex and take a long time, requiring clear mandates, coalition-building, and long-term commitments. Strengthening workforce capacity and ensuring easy access to tools, methodologies, and case studies are crucial for bridging knowledge gaps and facilitating effective NbS integration.

4 Discussion

The Sectoral Strategies are focussed on how to mainstream the implementation of different freshwater restoration measures (see Section 3.3). The Strategies seek to go beyond restoration (with a focus on biodiversity/ecosystem outcomes) to specifically consider multiple benefits arising for wider society by taking an NbS approach (Waylen et al., 2024). This was a deliberate choice made when engaging with businesses who may not be primarily motivated by stewardship of the natural environment. Whilst the Strategies set out how sectoral businesses affect, and are affected by, the state of the freshwater environment; the NbS approach also brings things like democratic decision-making, economic viability and fit with wider policy processes to the forefront (see the IUCN Global Standard; IUCN, 2020).

Overall, each Sector presents unique opportunities to integrate an NbS approach benefitting society, nature and business. For instance, sustainable farming practices can balance agricultural productivity with ecosystem health, while Hydropower companies supporting the appropriate removal of uneconomic barriers offers reputation and operational benefits for the Sector, as well as the restoration of river connectivity. The Insurance Sector benefits from measures to mitigate risks associated with floods and droughts through reduced risk of major disasters and assets becoming uninsurable, and waterway management practices can be adapted to improve the ecological status of inland waterways whilst maintaining fairway conditions for transport. The Peat Extraction and the WSS Sectors are pivotal in restoring critical habitats and ensuring sustainable water management, and seek payment for these ecosystem services when they need go beyond the regulatory requirements or support measures on land not owned or managed by them (Bérczi-Siket et al., 2023; Schulz et al., 2024).

There are some important differences between the Sectors. Some Sectors produce goods and services essential for human life and are omnipresent across Europe - such as the WSS or Agriculture Sectors. WSS also tends to be monopolies at the local level. Other Sectors, such as Hydropower, Peat Extraction and Navigation, are potentially substitutable in certain locations, which creates concerns over livelihoods if the sector's social licence to operate is challenged (Stuart et al., 2023). Insurance is increasingly important due to climate change but is delivered in many different forms across Europe, making it a local monopoly in some Member States and a competitive market in others. Furthermore, how the Sector operates, the challenges faced, and the benefits provided by taking an NbS approach will also be affected by geography. For example, whilst most European countries are expected to face some degree of water scarcity, the south of Europe is much more affected than the more temperate North (EEA, 2024). Therefore, taking a 'top down' European wide perspective is challenging when there is so much diversity within each sector, and how the sector can utilise NbS is often context specific. However, this 'birds eye view' helps to identify the common strategic opportunities and bring people together to share knowledge beyond individual case studies.

The six Strategies begin by noting the purpose and audiences for their Strategies. The most contentious part of the Strategies was the choice of focus of the Strategies based on the previous 'cooperation points' from D4.1. As described in D4.1 (Bérczi-Siket et al., 2023) each nascent CoP discussed some potential areas to make the focus for their Strategy (Table 3). The language of 'low hanging fruits' was used to highlight that cooperation tends to work best when you find something of shared interest and that can be achieved relatively quickly to create a sense of progress. However, the final choice of focus was not always 'low-hanging' nor led to quick wins or simple cooperation within the CoP.

Table 3: Focus of the MERLIN Sectoral Strategies

Sector	Focus of the Sectoral Strategy
Agriculture	Engage the sector to implement NbS to increase the resilience and sustainability of the sector and society.
Hydropower	Enhancing river connectivity involving the removal of barriers of limited economic viability to improve resilience of key Hydropower operations.
Insurance	Encouraging the consideration of NbS in Insurance activities as disaster risk reduction and ecosystem-based adaptation.
Navigation	Greening the European inland waterway network by mainstreaming NbS.
Peat Extraction	Restoring Peat Extraction sites to drive NbS in the landscape.
WSS	Upstream restoration for flood management and resilience against drought.

Some Strategies selected a specific focus on restoration measures (e.g. Hydropower, Navigation, Peat Extraction Strategies) to connect with the overall focus of MERLIN (freshwater restoration); but some of the participants in the CoPs wanted broader issues to be included. This disagreement on what to include in the focus came either from an *environmental* perspective - e.g., wanting to discuss phasing out Peat as a growing media, otherwise we endorse ongoing extraction; or from a *business* perspective - e.g., a focus on barrier removal and not other environmental stewardship activities, e.g., Hydropower fish passes did not give a full overview of their current environmental practices. Other Strategies (Agriculture, Insurance, WSS) took a broad focus for their Strategies. Here there was less negative feedback. This suggests it is difficult to disagree with the general approach. However, without a specific focus, the actions may be more difficult to implement.

The audiences addressed in the Strategies (Section 3.2) are wide ranging, with all including the immediate businesses involved in their sector, but also policymakers who govern the sector. The Agricultural Strategy notes the importance of advisors, consumers and the media. The Insurance Strategy notes the importance of researchers. Furthermore, in several Strategies, the sectoral businesses often did not see a clear role or responsibility for actions (e.g. Insurance, Navigation, WSS).

The process of finalising the Strategies built some closer links within the project, particularly with the MERLIN case studies and the developing work on how to finance upscaling and mainstreaming of restoration measures (see also Section 3.6). However, as sectoral teams got closer to a final Strategy that would be widely shared with European policymakers, agreeing the final text flushed out areas of ongoing tension. As noted in the individual Strategies, some organisations who have been engaged throughout the process did not want to be associated with the final Strategies. There was suspicion that the material might be used to increase regulatory pressure on sectoral businesses, particularly when a narrow focus on freshwater restoration, not wider sustainability measures, was used.

Whilst we use the term 'Communities of Practice' it could be argued that we are still building networks and relationships, and these are not yet functioning communities. There were some tensions and conflicts exposed over what an NbS approach entails and whether there is 'business case' for action by private sector actors, or the actions remain the responsibility of State and NGO organisations. The process is still building shared understanding and trust, which means developing a co-produced Strategy was too ambitious in some cases. However, without the process of trying to develop these Strategies, such tensions may not have surfaced, and the process has helped actors think about roles, responsibilities and governance processes (King et al., 2023).

The Strategies look at how to enable an NbS approach to be taken such that specific, tangible restoration measures can be mainstreamed into sectoral planning and operations. These measures are described in Section 3.3. The Strategies describe the current situation (of both the freshwater environment and of the sectors themselves - see Section 3.4). Some Strategies (e.g. Hydropower, Peat Extraction) note there was resistance during the Strategy development to framing the current situation as a problem or suggesting that current practices within the Sector need to be changed. It is possible that we created friction by highlighting problems in these cases. The Strategies were also criticised by others for being too business-friendly and not demanding a more radical 'polluter pays' approach. Therefore, despite trying to maintain a positive but evidence-based approach, these divides over how to describe the current situation and the role of the Sector made progress on a co-constructed strategy more difficult. It created a fundamental tension in the premise of the Strategies: without a common need for change by the sector, why have a strategy, why implement any actions?

In contrast, the visions for each Strategy (see Section 3.5) are extremely positive, focussing on a desired endpoint. The timelines vary from 2030 to 2050. These longer-term timelines show just how much time (and effort) is needed for transformations in sectoral practices, particularly as, despite three years of effort, there has been little progress in building a sense of responsibility and enthusiasm for change within some of the sectors. However, having shorter milestone deadlines to drive progress seems important, given the climate, biodiversity and societal crises suggest that urgent action is needed. There may be tipping points where multiple slow change system variables interact and precipitate rapid change - such processes are emergent and therefore difficult to predict (Yletyinen et al., 2019). The visions focus on having NbS mainstreamed, but not all of them provide much detail about the outcomes (for nature, society and businesses) that would arise, which is something further to consider in our communications.

The actions (Section 3.6) have many commonalities - including actions around evidence gathering, awareness raising, knowledge sharing, capacity building, policy changes, collaboration in implementation actions and getting funding/financing for the implementation. These reflect the common challenges and enablers found in the literature on restoration and NbS (Martin et al., 2021; Mayor et al., 2012). There was a deliberate focus in this research to focus on the institutional levers for transformational changes, not the technical guidance required for individual measures. Such technical guidance is implied in actions referring to evidence, knowledge, capacity building and policy actions. There was less focus on changes in sectoral products or services, except for the Insurance Strategy and some sub-actions in the Agricultural Strategy (see paludiculture and new health products).

The Strategies consider how transformational change to mainstream restoration measures taking an NbS approach might require working with others. There are interactions between the sectors focussed on within the MERLIN project, but the context, visions and actions also imply wider collaborations with other sectors, such as the media, education, and public administration. There are also implications for groups not defined by industry sectors, such as local communities. There is a muted focus on engaging the general public or citizens in the Strategies (although Agriculture and WSS Strategies do note the need to engage citizens), probably due to the framing of the process as a strategic planning exercise with formal stakeholders. The engagement of local residents and water users has happened in other parts of the H2020 MERLIN project. However, the lack of attention to formalised stakeholder associations representing the ‘public’ is something that can be improved, given that inclusivity and societal benefits are core to the NbS standard.

As the Agriculture Strategy notes, there are system-wide challenges affecting whole societies; and issues around which sectors are responsible for the costs, and which sectors benefit from the restoration measures is at the heart of a NbS approach. Adopting NbS means considering how we ensure ‘Just Transformations’ - a process that aims to ensure there is appropriate and inclusive representation, a good process that gives space for different values held by the relevant stakeholders and sees a fair distribution of cost and benefits. The WSS Strategy highlights that costs can impact on the vulnerable populations; and the Hydropower Strategy highlights the position of small-scale Hydropower operators, who may need particular consideration.

This distributional aspect is something that intersects with the aim, as part of the IUCN global standard, to work beyond the individual restoration site. This entails coordination and governance issues across sectors (see Section 5, next steps including the cross-sectoral route-map) but also potentially across jurisdictions. The Insurance Strategy notes barriers to working at the catchment or landscape scale, where an NbS approach might protect competitors’ assets, raising the issue of the *free rider problem* where an individual benefits from something they are not paying for. The heavily regulated WSS Sector may also face governance hurdles working with large upstream interventions, if the operator has no mandate to operate or fund such activities. The need to more clearly support collective action at a catchment scale is also raised in the Agriculture and Peat Extraction Strategies. However, it remains unclear how sectors can harness payments for ecosystem services, or whether these costs should be seen as a form of ‘polluter pays’. For example, restoration of Peat Extraction sites is seen as positive for WSS, hunting and recreation/tourism but the Peat Extraction Sector does not perceive a benefit for themselves; and payments for ecosystem services beyond carbon credits are still in their infancy.

The six Strategies were designed with a transformations framework (Carmen et al., 2024) in mind, even if the framework was not explicitly used in all the Strategies. The framework (see Figure 9 below) shows the need to move from the current system to a vision of a new system that uses NbS principles. To get from the left to the right, action is needed. These can require new actions, or to maintain what already exists, or more controversially, disrupt existing practices. As discussed above, disruption of existing actions is generally resisted but where Strategies highlighted good practice, this was supported. Creating actions were also supported, but without strong commitment by members of the CoPs to create themselves, rather the focus was on some other party (often the public sector) to take on this responsibility.

Transformation implies changes at 3 different levels, personal, practical and political:

- Personal elements or levers: individual and shared subjective assumptions, values, beliefs and paradigms, which guide how people perceive issues, how problems are defined and what is and is not possible/ relevant.
- Practical elements or levers: technical, technological and behavioural aspects.
- Political elements or levers: structures, processes and mechanisms that facilitate or constrain decision making and collective action.

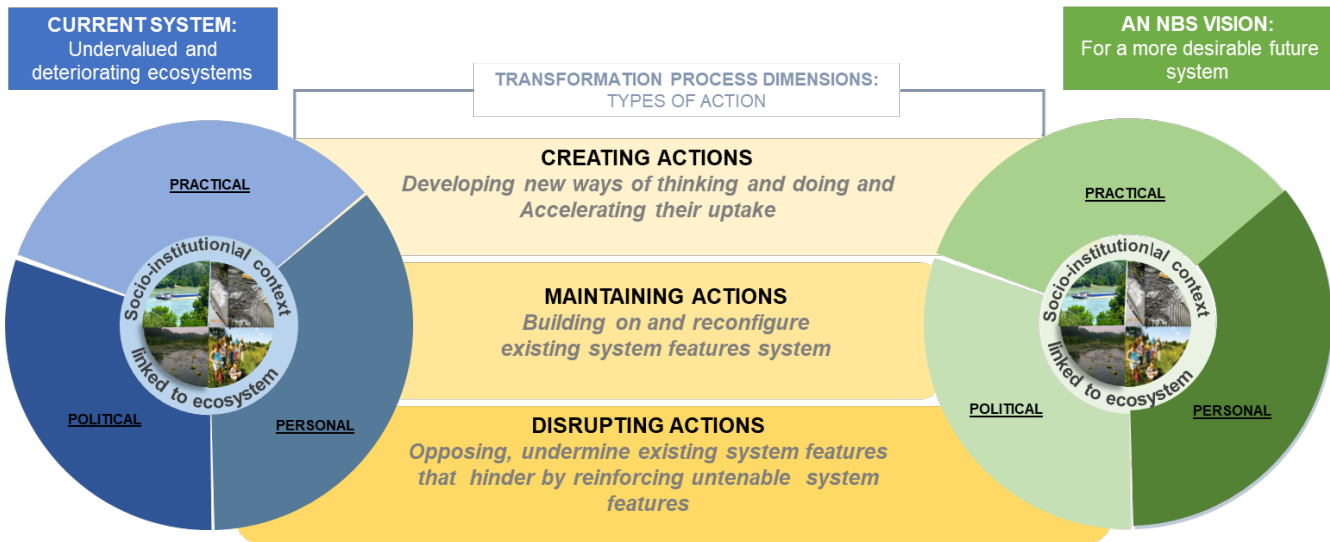


Figure 9: Transformations Framework (source: Carmen et al., 2024)

It is interesting to observe that the majority of the actions are around political elements (such as revisions to CAP in the Agriculture Strategy) or practical elements (such as generating new NbS standards in the Insurance Strategy). There are fewer personal elements visible in the Strategies. However, the resistance to the need to change, or for the Sector to be responsible for actions; and the shared focus on ‘awareness raising’ or ‘knowledge sharing’ suggests that the personal element of transformation is crucial. Practical and policy changes may not be sufficient without a paradigm shift in how sectors understand and relate to Nature.

These Sectoral Strategies need to work with European level Institutions and the content reflects many of the concerns, tensions and solutions found in these important policy drivers. The Green Deal objectives, in these Strategies, involve trade-offs between its goals (renewables, economic growth, providing livelihoods whilst protecting biodiversity), which explains the problems in trying to find common ‘entry’ points and agreed actions. The New Commission’s approach to the Green Deal is likely to reflect new political priorities regarding economic growth and competitiveness (von der Leyen, 2024; European Council, 2024; Arezki et al., 2024). The prevailing narratives from the Commission, Council and Parliament will influence how the sectoral CoPs engage with the actions set out in their Strategies.

5 Next steps

Through the process of writing the Sectoral Strategies, the sectoral Communities of Practice (CoPs) have started a journey. The main next step is to continue the engagement with the CoPs and begin the process of implementing the actions. Part of this process will be to discuss how individuals within the CoPs can take ownership of the actions or sub-actions and continue to develop them beyond the end of the H2020 MERLIN project. For example, the Navigation team are considering holding another Roundtable to discuss the final Strategy and plan next steps, including formalising their CoP. This discussion could also focus on developing a clear implementation framework, enabling CoP actors to take responsibility for action points they can address both in the immediate and long-term future, as outlined in the peat extraction sector strategy. We will also discuss how the CoPs could be sustained or amplified by existing platforms such as **Network Nature**.

Furthermore, efforts will be made to disseminate the content of the Strategies. For example, Aqua Publica Europa is developing a publication on NbS and the water sector and will hold an event to share the Strategy. This is important where there are actors identified (see Section 3.6) that have not yet been closely involved in the Strategy production. For example, the Peat Extraction Strategy has recognised that it will need to open up the CoP from a tight focus on Peat Extraction stakeholders to engage wider landowners, forestry, Member State or EU policymakers or catchment partnerships, if they want to achieve their vision.

We will reflect further on what was learnt in terms of engagement and what we could do better next time to avoid conflicts and build stronger co-creation of a shared strategy (see Section 4: Discussion); which will further advance our findings reported in D4.2 (Schulz et al., 2024).

This task, as set out in the introduction, was focussed on finding ways to get each Sector to maintain, create or disrupt their specific sectoral practices in order to mainstream the implementation of measures (see Section 3.3) using an NbS approach. Achieving such mainstreaming is likely to mean transformational change for the sectors, if all actions are taken at scale and at pace.

However, we realise that an NbS approach is a systemic approach, working with multiple sectors across temporal and spatial scales. Therefore, the insights from these Strategies will be used to build a cross-sectoral route-map (D4.7, due 2025). For example, the peat extraction sector plans to engage in discussions with the agriculture and water supply sectors to ensure that cross-sectoral issues are effectively incorporated into the cross-sectoral roadmap clearly and comprehensively. This route-map will also focus on institutional actions that can help mainstream freshwater NbS. Rather than specific sectoral practices, the route-map will look at how multiple sectors could collaborate, or at least be coordinated, to reduce trade-offs and improve outcomes for all.

This approach may be less controversial, as it allows roles and responsibilities for both the current problems, and the transaction costs of implementation, to be distributed across multiple sectors. However, such distribution comes with its own governance challenges, such as how to implement payment for ecosystem services beyond existing policy incentives. We anticipate that it will still be challenging to build a consensus about what should be done, when and by whom - but having a clear map of options to take is essential to get transformational change underway.

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7 Annex

Annex I. Participation of organisations in the preparation of the Sectoral Strategies

Sectoral lead organisations are highlighted in **blue**.

Note: The sectoral leads and teams, contributors were chosen from the consortium partners, based on their knowledge of the sectors and available capacities for the transformation working package.

Sector	Author	Contributor ⁴
Agriculture	Wageningen University (WUR) , WWF HU ⁵ , Ecologic Institute, JHI, Naturland, WWF CEE, WWF International	Deltares, Forth Rivers Trust, JHI, Provincie Oost-Vlaanderen, University of Duisburg-Essen, Warsaw University of Life Sciences (SGGW), WWF HU
Hydropower	JHI	Deltares, JHI, NIVA, SYKE, University of the Basque Country (UPV/EHU), WWF HU
Insurance	ICATALIST , Climate Risk Advisory, Business Development Group (BDG)	Ecologic Institute, JHI, UPV/EHU, WWF HU, WWF RO
Navigation	Deltares , WWF HU ⁶ , BfG, JHI, viadonau, WWF CEE	BOKU
Peat Extraction	JHI , IPS	WWF HU, SYKE, Tapio
Water Supply and Sanitation	APE , WWF HU	UKCEH, NatScot, WWF EPO, Ecologic Institute

Annex II. Updated Guidance for D4.5 – Individual Sectoral Strategies

Kirsty Blackstock, Anna Bérczi-Siket, Eva Hernandez, Fanni Nyíró

V3.0 - 30th August 2024

There should be one complete and stand-alone strategy for each of the six sectors. These will be combined to make the D4.5, but the idea is that you develop a product for your sector that can be used by this sector without needing to read the whole of D4.5.

Purpose of this guidance:

- Shared understanding of what each sectoral strategy (D4.5) should contain.
- This will generate the deliverable D4.5 (and D4.6 – infographics).
- These are part of the ingredients for the EU and MS route maps (D4.7).
- The route maps are cross-sectoral and have a different audience but will need to draw on insights from your sectoral transformation Strategies.

Purpose of the Sectoral Strategies:

- Documented set of actions for the sectoral community of practice (CoP) to implement between 2025 -2030 and until 2040, 2050.
- Stretch focus – beyond business as usual to transformation (or towards transformation)
- Something concrete to cement the CoP developed over the period of the project

⁴ WP4 coordinators were contributors in all Sectoral Strategies.

⁵ WWF HU was the sectoral lead of Agriculture from 2021 until October 2024.

⁶ WWF HU was the sectoral lead of Navigation from 2021 until November 2023.

Proposed audience:

Sectoral associations, businesses, policymakers and consultants working with the sector – in other words who has been contributing to the RTs, who is part of your CoP, who is needed to deliver the strategy at EU and MS level.

We must write a deliverable that is satisfactory as a research product.

But the main audience for the stand-alone strategies need a concise document that focusses on the need for change & strategic actions to get us to our vision of mainstreamed NbS.

We propose that some sections (see Fig X p X) can be removed for the sectoral strategies to make them suitable for a non-research audience. The visualisation (infographics) & key

Focus of the Sectoral Strategies:

The Strategies should be as concise as possible and focus on the specific transformation we have worked on in MERLIN.

The focus should be on the ‘cooperation points’ developed in D4.1 and discussed in the 2nd & 3rd Round Tables.

The focus should be on how the sector can support mainstreaming freshwater restoration and/or NbS that will deliver as many Green Deal goals as possible (with the emphasis on biodiversity and climate adaptation/mitigation goals). In general, MERLIN focusses on large-scale, rural, interventions.

Be clear about the vision (where the sector wants to be) and the mission (what is your role in reaching that vision) – what is the outcome(s) that the strategy will help to deliver.

This means the Sectoral Strategies should not try to cover all possible changes in the sector, particularly not those that are not directly related to mainstreaming freshwater NbS, or it will be impossible to consolidate the points into a clear and credible strategy.

Geographical Scale:

The Sectoral Strategies offer one way to ‘upscale’ from the regional scalability plans (driven by the case studies in WP1-2) to the Member State and EU levels by focussing on changes within a sector across the EU. If it is relevant, global initiatives or those reaching beyond the EU can be used. The scale(s) for the strategy will reflect the proposed audience (e.g. PIANC is a global organisation).

It is therefore about the ‘top down’ support from organisations and institutions to the ‘bottom up’ local restoration projects.

Temporal Scale:

We suggest that overall, the strategy aligns with the Green Deal e.g. to deliver the outcomes by 2030 where possible.

There may be important sectoral activities taking place before or after this date. The strategy can have multiple deadlines, but the aim is to get action started in the next five years.

It is also useful to have longer term vision and hopes for actions until 2040 and 2050.

Overview of workplan:

Note: The final draft Strategies are due [end of October 24] to enable the feedback from teams and CoP (November) and start the infographics based on the final draft. In addition to that to enable the lead (WWF) to combine them into the formal MERLIN deliverable template and finalise all the details before winter holidays in time for final comments from the SG, coordinators and to submit by end of Jan 2025. They cannot be delivered late!

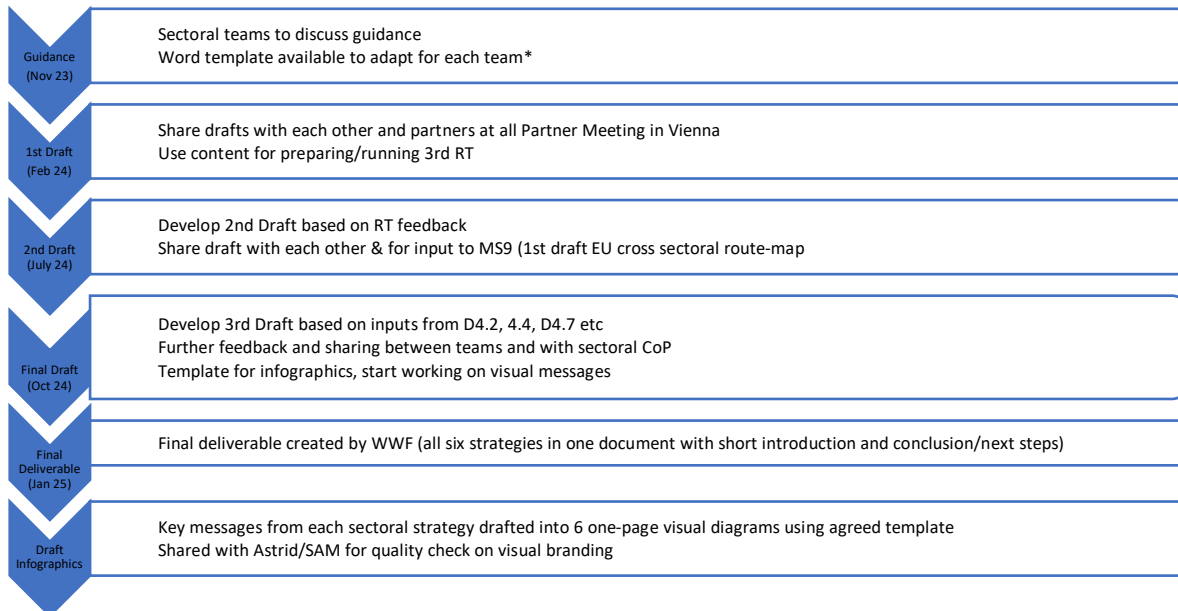


Figure A1: Workplan and Timelines

Rigorous research:

To be well reviewed, comply with research ethics and allow publication that will have impact (academic and non-academic) we need proper data collection and analysis.

1. Always get informed consent when interacting with anyone outside the MERLIN consortium. This involves (1) providing information about the purpose of the research, how the data will be used, anonymity and confidentiality, GDPR etc and (2) checking that the person(s) are comfortable with this and agree we can use their information. If unsure, please ask Kirsty or Alhassan but it is the same process we've used for interviews and RT up to now.
2. Where possible, record these interactions so we can use their actual words when reviewing our evidence. If not, take good notes. Use the Zoom (or equivalent platform) to make a transcript but please check and correct them. Hutton has limited resources to transcribe files but we can't cover everything - please ask if you need help.
3. Please file these recordings and notes so we have access to them for our work. If anonymised, they can go on the Nextcloud, but if not anonymised (most of them, as it is time consuming to anonymise) then on the restricted Nextcloud folder. Each sectoral team should make (or ask WWF to make) their own folder in Google Drive.
4. Please keep the secondary data sources (reports, indicators, policy documents) in a folder so that any references made to documents (or datasets) can be checked by others if required. Always cite these sources in the document so we can trace the evidence trail.
5. Be clear about how you have reviewed the data (which sources) and how you have summarised and synthesised these insights, including reflection on where there are gaps in your knowledge, potential bias, or multiple possible interpretations of the same material.

Suggestions:

WP4 is designed to be cumulative – so please reuse the information and thinking you've developed in the earlier deliverables, the RT notes, the CS files, all the meeting notes and the desktop reviews.

Plan the engagement and how you will divide up your resources – better to have a focussed document that is well supported by those who can implement it than an ambitious content and run out of time to discuss it with relevant stakeholders.

Consider if you want/need to translate the key messages and infographics into any relevant languages and who can help check the AI drafts. Please ask for their help early in the process.

Use plenty of visuals – diagrams, graphs, maps, photos.... To tell the story.

The Strategies may be read by non-EU readers, so consider a footnote to explain EU policies etc.

Annex III. Plain word Template for the draft Sectoral Strategy

Title page:

Image and title for YOUR strategy

Inside page:

Authors list

Organisation: list of individuals:

Date:

Version number:

Cite as:

Acknowledgements:

Key Messages

Up to 10 numbered sentences with the main messages and/or table of actions

This page is the one that will be read the most and potentially have most impact. It is the basis for your visualisation.

Table of Contents

Abbreviations and Acronyms table

1. Introduction

1-2 pages

Explain the MERLIN project, and its overall objective including ambition to transform the way we work with Nature, define the sector and the concept of a community of practice to co-create an action plan to mainstream NbS.

Here (or in Section 3) define key terms: NbS, mainstream, transformation

Checklist:

- Have you explained the MERLIN project and purpose of Strategy?
- Have you defined the sector/community of practice with/for whom the Strategy was written?

2. Methodology

1-2 pages

What are the sources of information used for this strategy?

Any caveats, problems, suggestions if doing this again? [if there are minority opinions or unresolved conflicts over content, you could write them here?]

Reuse the figure in WP4 presentations at consortium meetings to show the process of building the CoP and Strategies

Ensure you have responded to the comments made across all the RTs.

Put details in the Annex

Checklist:

- Is the process described?
- Is it clear where the evidence for the actions comes from?
- Have you noted where there were disagreements and problems?

3. Why is change needed?

1-2 pages

- **What is the relationship between the sector and MERLIN?**

Narrow the focus to freshwater restoration & 'MERLIN measures' and how these measures relate to the sector.

- **What are the current problems?**

Note here the problems with the freshwater environment (what needs restoring) but also, to follow NbS global standards, what are the societal consequences?

What problems are affecting the sector, or what problems do the sector create? What is the sector seeking, why do they want change?

Also if relevant, current actions already trying to address the issue (and where gaps remain)

- **What is the sector's role in resolving these problems?**

In this section, you will need to ensure it is clear that change is needed, what change is needed, and why the sector has a role to play.

Here, if not in the introduction, add definitions of NbS and explain the specific types of restoration being addressed with the sector.

- **What is the focus of the Strategy?**

From D4.1, this was quite contested with some sectors. Focus on the agreed cooperation points (see low hanging fruits presented (use summary slides from Vienna Meeting where you already summarised this)

Put details in Annex if this section is getting too long. Consider using a box to provide an example.

- **Checklist:**

- Is it clear why change is needed?
- Is it clear how the sector is involved (affected by and/or affect freshwater environments)?
- Is it clear what the focus of the strategy is (specific focus on freshwater rural...)?

4. What is the vision/goal of the strategy?

1-2 pages

- **Vision and mission for this sector**

By 2030, 2040,2050 what do you want to happen?

You can have an overall goal and then sub objectives.

What will achieving this goal and objectives mean for the overall goals of MERLIN and Green Deal?

- **Checklist:**

- Is it clear what the Strategy wants to achieve and how long it might take?
- Is it clearly linked back to the aims of MERLIN (Section 1) and addresses challenges (Section 3)?

5. Strategic Actions

1-2 pages per action

Identify the main actions that could be taken to get to the goal/vision - this is the core of the strategy and the most important part.

Consider the practices of the sector themselves, public policy changes (build on D4.3 and DTR plus anything specific to the sector), value chain changes (by consumer or other actors in the market – build on D4.4), finance (from WP3F and RSPs).

Showcase good practice from MERLIN Case Studies where possible, also draw on non-MERLIN examples

Suggest around 4-5 maximum.

- **Action A: [add name of the action here]**

Paragraph describing what the action is

- **Why is this action needed?**

Paragraph describing why the action is needed, how does it help respond to the challenges and get us towards the vision/goals?

- **Who could help deliver this action?**

Paragraph describing what types of stakeholders should be involved, what are the roles and responsibilities (including accountability or funding)

Use the stakeholder typology in use for WP1/4 stakeholder mapping tool

- **When will the action be taken?**

Paragraph describing when this can start and when action likely to be completed, is it a quick win or long term...if possible connect the chosen dates to a sectoral policy window of influence and/or sectoral turning points. e. g support your dates with evidence. Is your CoP in line with your proposal?

Is the action dependent on other actions in the strategy?

If possible, add a box that provides an example of the action being practiced somewhere, for inspiration. Or a particular aspect that you want to provide more detail for.

Action B, C, etc....

- **Summary Table of Actions**

Table with column of actions and columns for who/when [use the slides presented 28/8/24]

Checklist:

- Have you described each action, explained why it is needed, who will do it and when it should start/finish?
- Do you have a summary table or list of the actions (to copy and paste into the key messages and to use it for dissemination)?
- Have you get some boxes of examples from MERLIN or other cases?

6. Discussion

1-2 pages

Here you need to discuss the list of actions and reflect on what they might mean. Please add some reflections on the following:

- **Are there important differences between Member States or regions to consider?**

Mandatory

You have been telling us that the situation varies in different contexts. Please write a paragraph illustrating some important differences and how this might affect putting the actions into practice.

Here you might also want to reflect on different governance levels, whether action is needed at the local level or action is needed by EU or national stakeholders to guide/enable local actions.

[this was originally in the action Section 5 but many have not filled it in. For those who have done it in Section 5, please keep it there. For the others, we moved it to make it easier for you to fill in].

- **Do the actions require help from other Sectors?**

Mandatory

Which actions require change from other sectors? Which sectors? Are there existing levers to make these cross-sectoral activities happen? If not, why not and what is needed? Will any other sector resist the actions above and if so, why?

These can be the other 5 'MERLIN' sectors and further sectors (e.g. forestry, tourism, bio-energy). Please be explicit and name these sectors.

- **Progress on mainstreaming**

Mandatory

How 'ready' is the sector (or parts of the sector) to transform? Are they currently resisting change, preparing for change, navigating the change or institutionalising the change?

[Previously called 'readiness']

Optional further aspects of the discussion

Use the transformation matrix to discuss the actions (see table below) – put the strategic actions in the appropriate cell (s) – if there are gaps, what does this mean? Are there a mix of types of actions? [this was previously in the Vision Section 4]

	Create (to fill gaps)	Maintain (build on)	Disrupt (remove barriers)
Personal	Lorem ipsum dolor sit amet, consectetur adipiscing	Lorem ipsum dolor sit amet, consectetur adipiscing	Lorem ipsum dolor sit amet, consectetur adipiscing
Political			
Practical			

How will we know if the action has taken place – what will have changed? [this was originally in the action Section 5 but many have not filled it in. For those who have done it in Section 5, please keep it there. For the others, we moved it to make it easier for you].

Does the Strategy help towards a more ‘just’ transformation – what are the implications of the strategy for representation, procedures and distribution of outcomes?

Is ‘transformation’ likely to happen?

Checklist:

- Have you noted how things might differ across Europe?
- Have you noted where the sector also need input from other sectors?
- Have you discussed the overall set of actions and if they are likely to move from the current challenges to the vision of the strategy? How ready is the sector for change?
- Optional – have you used the transformation matrix, thought about how to monitor and evaluate change, whether the transformations will be ‘just’?

7. Conclusion and Next Steps

0.5 page

Summarise the main content of the strategy.

Explain what is planned for the CoP (from Feb 25 to end of the project and then beyond) by the sectoral team.

- **Checklist:**

- Is there a summary of the main findings?
- Is it clear what will happen next (in your control) and what you would like to happen in the future (beyond your control)?

8. Visualisation

1 page early version of the infographic that visualises the whole strategy.

Any relevant annexes with further material

e.g. summary of the types of stakeholder/target audience list etc

List of references

Please list all references in alphabetical order using APA 6th style (if working with a reference software) e.g.

Journal example:

Baulenas, E., & Sotirov, M. (2020). Cross-sectoral policy integration at the forest and water nexus: National level instrument choices and integration drivers in the European Union. *Forest Policy and Economics*, 118, 102247. Doi: <https://doi.org/10.1016/j.forpol.2020.102247>

Report example:

Baldock, D., & Bradley, H. (2023). Transforming EU land use and the CAP: a post-2024 vision. Retrieved from <https://ieep.eu/wp-content/uploads/2023/09/Transforming-EU-land-use-and-the-CAP-a-post-2024-vision-paper-IEEP-2023.pdf>

Website Example:

European Commission. (2024). Degraded Ecosystems to be restored across Europe as Nature Restoration Law enters into force. Retrieved from https://environment.ec.europa.eu/news/nature-restoration-law-enters-force-2024-08-15_en [accessed 29th August 2024]