Final Exploitation Dissemination and Communication Plan for Outreach

Deliverable D6.11

Author: GISIG

Contributors: IHE, Ramboll, IUCN

Acknowledgement
This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 776866

Document Information

Project Number	**776866**	Acronym	**RECONECT**
Full Title	RECONECT- Regenarating ECOsystems with Nature-based solutions for hydrometeorological risk rEduCTion		
Project URL	http://www.reconect.eu/		
Document URL			
EU Project Officer	Nicolas Faivre		

Deliverable	Number	D6.11	Final Exploitation, dissemination and communication plan for outreach
Work Package	Number	WP6	Communication and Dissemination

Date of Delivery	Contractual	07.31.2024	Actual	09.12.2024
Status	version 2.0		Updating of D6.10	
Deliverable type*	R			
Dissemination level **	PU			

*R – Report, P – Prototype, D – Demonstrator, O – Other.
**PU – Public, PP – Restricted to other programme participants (including the Commission Services), RE – Restricted to a group specified by the consortium (including the Commission Services), CO – Confidential, only for members of the consortium (including the Commission Services).

Authors (Partner)	Alessandra Marchese (GISIG)			
Responsible Author	Name	Alessandra Marchese	Partner	GISIG
Contributors (Partner)	Roderic Molina (GISIG), Zoran Vojinovic (IHE), James Dalton (IUCN), Ala Al Dwairi (IUCN), Alvaro Fonseca (Ramboll), Andreea Florea (Ramboll), Jess Penn (UNEXE)			

Abstract (for dissemination, 100 words)	The Final RECONECT Exploitation, Dissemination and Communication Plan for outreach derives from the C&D Strategy and Plans issued along the project life. This plan is issued at the project end and aim at describing the strategy and the actions to generally exploit and disseminate the RECONECT outputs across different categories of stakeholders and beyond its end. The Deliverable 6.11 has the general aim to foster the capitalization of research activities carried out along the 6 project years and the RECONECT Key Exploitable Results, to promote a new innovative concept of land planning within policies and practices. The Deliverable is public, but it will be particularly of use of project partners and stakeholders.
Keywords	Communication, Dissemination, Exploitation, Engagement, Scaling, Assessment, Impacts

Version Log				
Issue Date	Rev. No.	Author	Change	Approved by
08-09-2024	1	Marchese et al.	Final Draft	
09-12-2024	2	Marchese et al.	Revision of texts	Zoran Vojinovic

Executive Summary

The Final Exploitation, Dissemination and Communication Plan for outreach (D6.11) is intended to address the general exploitation of RECONECT results across different sectors and different categories of target users. The present deliverable doesn't deal with commercial exploitation of RECONECT results, since this is matter of WP5 and related deliverables issued under this Work Package.

This deliverable is to be considered as a reference document for maximizing the dissemination and exploitation of RECONECT outputs and related impacts beyond the project end. It is expected that this deliverable will support the partners in disseminating and capitalizing the project results and in communicating with all internal and external stakeholders and audiences and engage them.

The deliverable describes the expectations of RECONECT in terms of impacts to be achieved beyond the project end and provides guidelines to the project partners to achieve them and to properly address the activities of dissemination, exploitation and engagement towards defined categories of stakeholder's sectors such as researchers, decision and policy makers and practitioners.

The deliverable provides a comprehensive overview of tools, implemented by RECONECT and maintained for a certain time after the project end, that partners can use to maximize the exploitation and the uptake of project results and contribute to the achievement of long terms impacts. At first, the RECONECT web site will be maintained for at least five years after the project end and will represent the main entry point to the RECONECT portfolio or results. Guidelines and lessons learnt will be publicly accessible as well as the RECONECT training offer for researchers, public officers and practitioners.

The deliverable includes also a session dedicated to the portfolio of RECONECT results, their description and how they can be exploited across different categories of stakeholders. Activities of user engagement at each partner and country level (e.g. training events, workshops, conferences, liaisons with other projects and initiatives such as NetworkNature and the National NbS Hubs), are incentivized and are part of this plan.

Finally, the deliverable is supported by two important Annexes that are: I) the RECONECT Stakeholders' Engagement Strategy, that is a document outlining the current policy framework on NbS in Europe, and define some tangible actions to transfer the knowledge and the experiences of RECONECT in order to influence local institutions and decision makers and hence land planning and risk mitigation policies; II) the RECONECT Policy Brief, a short document outlining how RECONECT results can be exploited across different stakeholders categories and how they can benefit from these.

Contents

Executive Summary **5**

Contents **7**

1 Introduction **8**

1.1 Rationale behind the exploitation plan 8

1.2 Project Summary 8

1.3 Project Outputs 8

2 Exploitation, Dissemination and Communication Plan: structure and objectives **10**

2.1 The plan at a glance 10

2.2 Objectives of the plan 11

2.3 RECONECT Theory of Changes: medium and long-term expected impacts 12

3 Exploitation and Dissemination Plan beyond the RECONECT end **15**

3.1 Target audience 15

3.2 Communication and Dissemination tools and channels for RECONECT exploitation 21

3.3 Connections with thematic communities and initiatives (EU and beyond) 23

3.4 RECONECT Portfolio of Key Exploitable Results (KERs) 25

3.5 RECONECT Exploitation at partners' level 42

References **50**

Annex I. RECONECT User Engagement Strategy **51**

Annex II. RECONECT Policy Brief **109**

1 Introduction

1.1 Rationale behind the exploitation plan

The Final Exploitation and Dissemination Plan for outreach is a guidance document for addressing the dissemination, the capitalization and the exploitation of RECONECT results for some years after the project end. Due to the nature of the project and the longlasting NbS interventions done within RECONECT, a continuation of dissemination and user engagement activities after the project end is fundamental to create a significant impact and to generate the desidered changes at policies and practices level.

Hence, the purpose of this deliverable is to maintain a consistent ad uniform way to disseminate RECONECT after the project period across well defined categories of stakeholders, to make the RECONECT community grow up and RECONECT become a reference NbS project for natural risk management. All these activities are needed to generate the expected changes and to upscale the RECONECT results and demonstration activities.
An important note is that this deliverable deals only with a general exploitation of RECONECT results across the research, professional and public sectors, whilst commercial exploitation and business plans are dealt in WP5 deliverables.

1.2 Project Summary

RECONECT aims to rapidly enhance the European reference framework on Nature based Solutions (NbS) for hydro-meteorological risk reduction by demonstrating, referencing, upscaling and exploiting large-scale NbS in rural and natural areas. In an era of Europe's natural capital being under increased cumulative pressure from intensive agriculture, fisheries and forestry, and urban sprawl, **RECONECT will stimulate a new culture of co-creation of 'land use planning' that links the reduction of hydro-meteorological risk with local and regional development objectives in a sustainable and financially viable way**. To do that, RECONECT draws upon a network of carefully selected Demonstrators and Collaborators that cover a wide and diverse range of local conditions, geographic characteristics, institutional/governance structures and social/cultural settings to successfully upscale NbS throughout Europe and Internationally. To achieve these ambitious goals, the RECONECT consortium brings together an unprecedented transdisciplinary partnership of researchers, industrial partners (SMEs and large consultancies) and authorities/agencies at local and watershed/regional level fully dedicated to achieve the desired outcomes of the project.

1.3 Project Outputs

The **high-level outputs** of the project are listed and described in the following. They will benefit of a wide array of users beyond the project partners and the scientific community (see Table 2), to whom most project deliverables are relevant, and to whom dissemination and exploitation activities are addressed:

- **Holistic ecosystem-based framework** to support co-creation and collaboration around effectively implementing NbS for reducing hydro-meteorological risk. This framework integrates a monitoring and evaluation framework which is essential for developing the evidence base and further upscale large-scale NbS.

- **Guidelines for design, construction and maintenance of** NbS. NbS for hydro-meteorological risk reduction were implemented in various locations in the EU. After

their completion, these guidelines has selected multiple practical lessons drawn from three projects, in mountainous, riverine and coastal areas, through the implementation of solutions benefiting water, nature and people. The integration of these three aspects is crucial to implement a successful NBS. The output includes how goals were determined, suitable measures were chosen, and how specific barriers were overcome that arose during the project.

- **RECONECT Services Platform** supporting the evidence base of NbS, including real-time information about NbS performance. It also includes tools in support to co-creation activities in Demonstrators and Collaborators.

- **Guidelines for monitoring and evaluation** presenting a new methodology for co-evaluating the RECONECT demo sites, A and B, and to provide lessons learned for collaborators. This new methodology used the ideas of a Mixed Method Appraisal Tool, by providing content to two external reviewers. The two reviewers were then asked to binary score the demonstrator against a set number of questions in terms of their sub-goals and results for Water, Nature and People.

- **Business Model and Investment Strategy for upscaling**: the main aim of this output is to propose an NbS business model framework for developing strategic NbS business models by combining knowledge from key EU projects and lessons learned from RECONECT demonstration sites. This framework is expected to support: (i) the development of strong business cases for NbS which can account for both the cost-effectiveness of reducing hydro-meteorological risks and a wide range of multiple societal benefits; (ii) obtaining more diverse sources of funding. Both points are at the core of an effective implementation and upscaling of NbS.

- **Standards for design, implementation, management and decommissioning**: the steps, challenges, and solutions of a NbS project encountered throughout RECONECT are reported in this output in a standardized way, following the life-cycle phases of planning, design, implementation and monitoring, evaluation, and learning (MEL). These standards are complemented by concrete examples from selected Demonstrators and Collaborators to provide more tangible guidance.

- **Lessons learnt from Demo and Collaborators**: synthesis of lessons learned through RECONECT and production of a comprehensive report to the EC to be used as a roadmap for NbS in Europe and beyond. This supports the promotion of NbS and enables the uptake and mainstreaming of large scale NbS through innovative investment strategies and business models.

- **Training Framework and MOOC**, consisting of 3 webinars (2 hours each) available on-line, training material and a MOOC (Massive Open On-line Course) to introduce key concepts of NbS and RECONECT to researchers, practitioners, decision makers and push their uptake and upscaling.

2 Exploitation, Dissemination and Communication Plan: structure and objectives

2.1 The plan at a glance

The plan aims to exponentially increase awareness and understanding of how large-scale NbS can improve resilience to hydro-meteorological risks and enhance biodiversity and ecosystem services based on the experiences and lessons learnt of RECONECT Project, and at the same time support the exploitation of project resutls by target actors and stakeholders. This document will be used as a reference for dissemination of outputs related to the project, as well as for overall general explotiation to stakeholders and user engagement, includign wider target groups and other interested parties such as the media. This document is important to support the achievement of medium and long-term expected impacts and to maintain and sustain the RECONECT Brand beyond the project end and across the NbS Communities in Europe.
The present exploitation plan intends to align with business-oriented activities but take a focus on the non-commercial uptake and mainstreaming of NbS, focusing on government and other key stakeholders for policy uptake and integration within decision-making processes, from local to national to regional levels. These activities focus more on the use of RECONECT outputs in their roles under governance mandates e.g. of civil society strategies. Also, exploitation in this deliverable is addressed to scientific and research communities to make use of RECONECT results for training and academic purposes and further innovate them into new research projects.

The plan is composend by the following main paragraphs:

- Target audience for RECONECT exploitaiton, including actions to undertake and expected outcomes;
- RECONECT tools supporting dissemination and exploitation, above all the project web site and the training framework;
- Potential connections with EU initiatives and networks, on which part of the RECONECT exploitation is grounded;
- Portfolio of RECONECT KERs and potential target users;
- Exploitation of RECONECT results per lead area and per partners.

In addition, the plan has two Annexes that are:

RECONECT User Engagement Strategy (Annex I): specific activities of RECONECT were aimed to consolidate the evidence-base approach, to standardise and find exploitation opportunities for NbS in order to foster the deployment of good practices, focusing mainly on the commercial angle of the exploitation plan. Under this approach, and in connection with the above activities, the RECONECT consortium developed a strategy for the stakeholders and users engagement, embedded in this deliverable as guide for engaging users (in particular institutional ones) and transferring them the results of the project.
The User engagement Strategy will support the development of a RECONECT Network of Users which will serve to develop material (strategic guidelines, activities) aiming at lobbying national and regional authorities to support the deployment of NbS.

The rationale behind the idea to develop a User Engagement Strategy comes from three main assumptions:

- There is a saturation of NbS networks and platforms which are already doing much dissemination and engagement activities towards a general audience. RECONECT, instead, wanted to create something new and innovative and hence addressed its activities in this sense.
- By focusing on what RECONECT wants to achieve (e.g. maximize impacts; embed RECONECT outputs into decision-making processes to increase usage of NbS in Europe), the consortium thought that a User Engagement/Public Affairs Strategy approach gives more room of action, than just a simple network.
- The User Engagement Strategy can be a core element of the overall Plan for Exploitation and Dissemination, effectively becoming an arm of influence which would be very different and innovative in RECONECT consortium.

The RECONECT User Engagement Strategy provides with a clear assessment of the stakeholders (who to impact?), the rationale (why this approach?) and the plan (how to implement the strategy). However, the strategy wasn't implemented within the project but that will be applied later under another project or through a self-sustaining approach.

RECONECT Policy Brief (Annex II): the document provides enough background for the reader to understand the problem related to the need to mitigate hydro-meteorological risks through Nature-based Solutions and the regeneration of ecosystem services. The RECONECT Policy Brief tries to convince the reader that the problem must be addressed urgently and provide information about the solutiosn proposed by the project and demonstrate their effectiveness by a list of success cases implemented within thr RECONECT Network of cases. Audience of the RECONECT Policy Brief is in particular the policy and decision makers but also practitioners and researchers.

2.2 Objectives of the plan

The **key objectives of this plan** are centred on dissemination and general exploitation of RECONECT outputs and user engagement. This includes:

- Defintion of the dissemination tools and information materials, available and maintained after the project end, to be used for transferring to the to target audience experiences and demonstrations and relevance from the application of innovative NbS in building resilience to hydro-meteorological risks and achieving co-benefits across spatial and temporal dimensions. The packaged information can be used to demonstrate the practical applicability of the products based on sound scientific data, which can support informed decision making and upscaling of NbS.
- Defining the outreach approach to engage with targeted audience groups; policy makers, decision makers, practitioners, private and public stakeholders, who can help influence development, implementation, standardisation and upscaling of large-scale NbS in accordance to relevant EU, International, National and Local policies.

- Definition of medium and long-term expected impacts and of expected changes to be generated within 5 years by the project end. The RECONECT Theory of Change is the reference document to ensure consistency in messaging and actions undertaken by the RECONECT partners to exploit the results towards different categories of users and to influence policies at local and national level.

- Draft plan for lobbying national authorities to support the deployment of NbS, through the development of a User Engagement Strategy that would bring to a RECONECT Community of Users. The Community of Users will serve to develop material, share experiences and get in touch different operators in the field. The scope of the Community will be to maximize RECONECT impacts, embed RECONECT outputs into decision-making processes to increase usage of NbS in Europe).

- Carry out activities of user engagement in particular towards public stakeholders such as policy and decision makers and regional government in charge for urban planning regulations, in order to transfer to them RECONECT experiences through a series of targeted activities such as workshops, training and experts groups.

- Mapping the outputs from the project in order to build a clear plan for exploitation activities with reference to specific groups of users. This is supported by the availability of materials for training of stakeholders and final users such as workshops/webinars and MOOC, and various other outreach activities and events.

2.3 RECONECT Theory of Changes: medium and long-term expected impacts

Under RECONECT, there are eight (one became out of date during the project) general expected impacts that addressed the project activities and the vision of RECONECT. Seven expected impacts out of eight are relevant also beyond the project end, since their achievement require more time and hence targeted dissemination and exploitation activities are necessary to properly address them.

Table 1. Expected impacts of the project within and beyond the project period, and for which targeted disseminaiton and exploitation activities are needed

Expected Impacts (EI)	Achieved within the project	Achieved beyond the project end	Further dissemination and exploitation is needed
EI 1: The EU is recognised as a leader in NbS for hydro-meteorological risk reduction and climate change adaptation.		**X**	Participation in International panels and conferences Liaisons and clustering activities with EU initiatives and projects on NbS Participation in groups of experts (e.g Task Forces, NetworkNature, IWA experts groups)
EI 2: NbS is mainstreamed in land use planning, landscaping and territorial policies due to the provision of appropriate tools and best practice.		**X**	Engagement of policy and decision makers at regional and national level

Expected Impacts (EI)	Achieved within the project	Achieved beyond the project end	Further dissemination and exploitation is needed
			Training on RECONECT demonstration activities Sharing of RECONECT lessons learnt and technical guidelines
EI 3: An integrated EU- wide evidence base and a European reference framework on NbS is developed.	**X**		
EI 4: Market demand for NbS is enhanced for hydro-meteorological risk reduction and climate change adaptation.		**X**	This is dealt in the RECONECT Business Plan
EI 5: Disaster risk management is improved due to enhanced capacity for providing quantitative assessments of NbS for disaster risk reduction and climate change adaptation.		**X**	Showcase of RECONECT Demonstrators and Collaborators experiences Showcase of RECONECT tools and results from NbS evaluation
EI 6: Human and financial costs are reduced due to better and more flexible disaster risk management with NbS.		**X**	
EI 7: Implementation of EU policies for disaster risk prevention and reduction is enhanced.		**X**	Meetings and workshops with policy and decision makers at national and regional level Transfer of RECONECT experience and results to national and regional stakeholders through targeted dissemination and training actions Liaisons and clustering activities with EU initiatives and projects on NbS
EI 8: RECONECT contributes to the priorities of the EIP Water (this impact is out of date)			
EI 9: RECONECT helps to achieve the Sustainable Development Goals (SDGs), in particular SDG 15 and SDG 13.		**X**	Liaisons and clustering activities with EU initiatives and projects on NbS Participation in groups of experts (e.g Task Forces, NetworkNature, IWA experts groups)

At the mid of the project, the project team developed an overarching Theory of Change on which a project vision was built. The aim was to help measure and give evidence of how the development of specific RECONECT activities concur to reach RECONECT Expected Impacts and KPIs. This work was supported by the development of an infographic to demonstrate in a more accessible manner what impact RECONECT aimed to achieve through its vision and what change it is expected to generate. The RECONECT Theory of Change was really useful to address the project activities and the project dissemination in view of achieving the desired changes, within and beyond the project end.

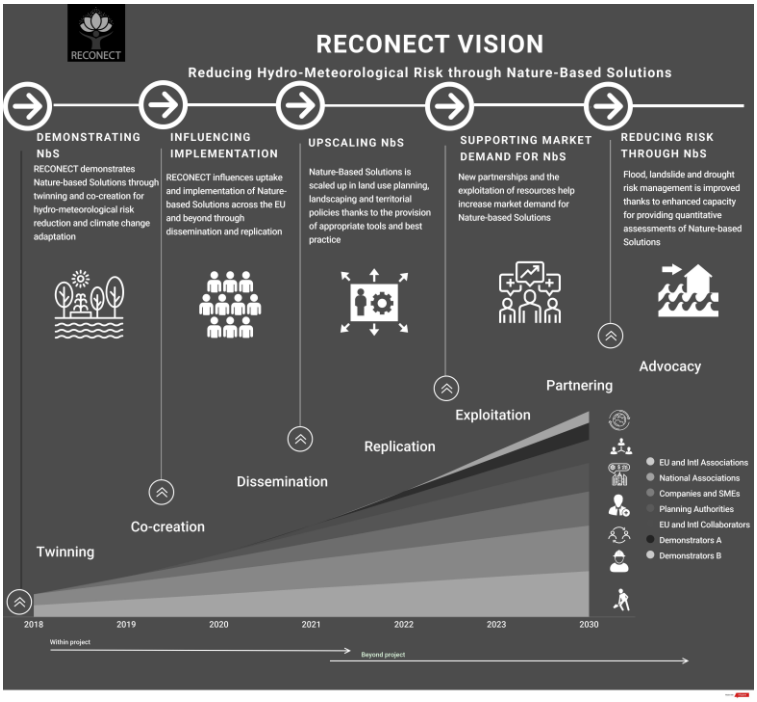


Figure 1. Infographic representing the RECONECT's vision, based on the RECONECT Theory of Change

3 Exploitation and Dissemination Plan beyond the RECONECT end

In the below section the exploitation and dissemination plan is defined. The RECONECT exploitation plan organises the exploitation process, gives orientation to the whole consortium of actions to be undertaken after the project end, and is structured by levels, establishing the aims, methods/activities, tools and target groups to be addressed.
Exploitation activities have a broader scope compared to communication and dissemination, even if they are thighty related. Exploitation includes actions such as utilising the project results in further research activities other than those covered by the concerned project, upscaling tools and standards, addressing policies on water-related risks mitigation and developing a new concept of land planning across regional governements in EU.
Shortly, the main goal of the RECONECT exploitation plan is to make use of the results for societal, scientific, or even political purposes (e.g. concretise the value and impact of the R&I activity for societal challenges). For financial purposes, a RECONECT business plan has been developed as results from other activities and aimed at pushing the market on NbS.
The project partners are the first to exploit the project results themselves, by their own efforts or facilitate exploitation by others (e.g. through making results available under open licenses). This can take place via innovation management actions, data management plan and stakeholder/users engagement, among others. Basic assumption is that RECONECT partners, in consortium or individually, will continue in disseminating the project results, will foster their upscaling and their uptake at regional government and partners level, by looking for new opportunities of developmment and application.

3.1 Target audience

The exploitation of the project results and outputs will primarily target (in order of importance):

- **Policy and Decision makers**: national and local officials in charge of policies and planning and formulate, adopt, implement, evaluate, or change policies, such as public policy managers, land planners, any researcher and officer influencing policies at local level. RECONECT results will be disseminated to policy and decision makers and regulators directly connected to the demonstrator and collaborator sites. These contacts are empowered to communicate further to partner cities, regions, local authorities at national and international level with the aim to engage them and influence their policies on land planning and risk management.
- **Government Agencies**: Agencies mandated to ensure security, planning, civil protection, environmental sustainability and health, such as Environment ministry, housing councils, tourism departments, science departments. RECONECT will disseminate project results to the immediate participating demonstrator and collaborators agencies through the various project activities. RECONECT will reach out to project's relevant government agencies EU and extra-EU to push the uptake of RECONECT results (e.g technical guidelines for NbS, guidelines for NbS evaluation) and experiences to make them exploited e.g. in drafting technical annexes to policies on water related risksks management and sustainable land planning.

- **Expert Practitioners**: professionals with expertise in engineering, regulation land use planning, biology, insurance. RECONECT partners form members of the practitioner community and disseminated project results within their networks through targeted meetings, newsletters and sharing results through targeted workshops, and provide opportunities for practitioners to engage with RECONECT activities. Beyond the project end it is expected that this community of RECONECT stakeholders is maintained and that regular meetings are organized with them by the reference partners to investigate how RECONECT results can be applied in their daily practice and which are the needs for training and technical support in making them operational on the NbS.
- **Industry (and private sector)**: those who plan or are generating revenue or enhancing their commercial image by implementing sustainability measures such as NbS, also to deal with ESG and CSRD Directive. Service and equipment providers; Private sector CSR, commercial consortiums, etc. RECONECT partners disseminate knowledge and project results within their companies and organizations and through their networks to influence uptake of well-established and standardised large-scale NbS and promote a green economy.
- **Public and Private Stakeholders**: public sector and private companies who own land where NbS activities are implemented or planned. RECONECT results are disseminated to the Public and Private Stakeholders directly connected to the demonstrator and collaborator sites.
- **Scientific Community**: Many of the RECONECT partners are heavily engaged in collaboration with other researches and projects and offer access to global networks. This enables the transfer of knowledge and the opportunity for further research and practices to achieve new knowledge and techniques concerning NbS, building resilience to hydro-meteo risks, biodiversity and ecosystem restoration and enhancement and water management technology. RECONECT scientific partners are highly motivated to provide strong evidence base on NbS for the scientific and industry communities and push the continuation of this research into other funded projects or through institutional research.
- **EU Networks, Communities and initiatives**: The relationship and connections of project partners to the various networks and communities will be leveraged to disseminate and promote project outputs and investigate new opportunities for their development and application, such as within the Task Forces on NbS and the NetworkNetwork Network, other than IWA expert groups of water-related risks.

Table 2. RECONECT Target audience, exploitation and expected outcomes

Target audience	Role as "actor of change"	Dissemination and Exploitation by RECONECT	Outcomes	Tools supporting Dissemination and Exploitation
Policy and Decision makers (local authorities with a jurisdiction over the land impacted by the NbS: cities, metropolitan government, river basin authorities, etc.)	They are in charge of land planning and can dedicate land to NbS. They set incentives or legal requirements that support the implementation of large-scale NbS. They deliver the permit for measures implementation and monitor impacts. They are not always direct users of the project outputs but have the capacity to drive their future use: - Require project stakeholders to use the outputs in order to obtain financing or permits - Influence positive behaviour around NbS.	RECONECT results are disseminated to policy and decision makers and regulators directly connected to the demonstrator and collaborator sites. These contacts are empowered to communicate further to partner cities, regions, local authorities at national and international level	- Local and regional policies are influenced - RECONECT outputs and results from Demo case are used to draft land planning approaches - They are trained to use the project outputs - Give them a way to train others	- National workshops - Training initiatives - RECONECT Policy briefs - Press releases - Showcase of RECONECT demo activities - RECONECT Public User Engagement Strategy

Target audience	Role as "actor of change"	Dissemination and Exploitation by RECONECT	Outcomes	Tools supporting Dissemination and Exploitation
Government Agencies (mandated to ensure security, protect ecosystems, improve quality of life and health)	Use of the RECONECT results: - Draft technical guidelines and technical annexes to support national and regional policies addressing NbS - Incentivize stakeholders and actors to apply sustainable policies for land planning and water-related risks management	Through targeted actions, meetings and training actions, RECONECT will disseminate project results to the immediate participating demonstrator and collaborator agencies. Beyond the project's relevant government agencies, RECONECT will reach out to EU, regional and national agencies, and where possible global networks of such agencies through the networks of IUCN, GISIG, IHE and generally all the consortium.	- Awareness on the project technical results - Convince them of the quality of the project main outputs so that they decide to use them or request their use - Train them to use the project outputs - Give them a way to train others	- National workshops - Training initiatives - RECONECT Policy briefs - Showcase of RECONECT demo activities - Focused meetings and initiatives in Demo and Collaborators
Practitioners (engineers, regulators, land use planners, biologists, insurance brokers, and all those whose practice should be affected by the implementation of innovative NbS)	Use the science or evidence base to inform decision-making and design of NbS Adapt their practice to uptake incremental innovations that strengthen NbS Deal with Technical Guidelines and Technical Annexes for design and construction of sustainable interventions for hydro-meteo risks mitigation and land planning	RECONECT partners form members of the practitioner community. They disseminate and favour the exploitation of project results within their networks through targeted meetings, newsletters, and sharing results through targeted workshops, and provide opportunities for practitioners to engage with RECONECT activities.	- Support them with materials and results to reach out to their professional partners at national and international level. - Train them to use the project outputs - Convince them of the quality of the project main outputs so that they decide to use them and support the change	- National workshops - Training initiatives - Showcase of RECONECT demo activities - RECONECT User Engagement - Scientific publications

Target audience	Role as "actor of change"	Dissemination and Exploitation by RECONECT	Outcomes	Tools supporting Dissemination and Exploitation
Industry (and private sector) Those who generate revenue or enhance their commercial image by implementing NBS (Service and equipment providers; developers of NBS; Private sector CSR)	Service providers (e.g. equipment) Innovators/Developers of NbS Disseminate a positive image/ inspire positive action around NbS - Influence others in the same industry by showcasing leading edge practice [domino effect, private sector influencing private sector (CSR, etc.)] - Deal with ESG and CSRD Directive obligations through a NbS approach	RECONECT partners disseminate knowledge and project results within their companies and organisations and through their networks to influence uptake and exploitation of well-established and standardised large-scale NbS and promote a green economy.	- Recognition of good practice - Share guidelines and standards - Support with materials that trigger positive behaviour	- National workshops - Training initiatives - Showcase of RECONECT demo activities - RECONECT User Engagement Strategy
Public and Private Stakeholders (those who own the land or have their activity on the land impacted by a specific large-scale NbS)	Adopt a positive behaviour towards NbS to enable their successful implementation and maintenance. Share positive attitude regarding NbS in the general media.	RECONECT results are disseminated to the Public and Private Stakeholders directly connected to the demonstrator and collaborator sites.	- Targeted knowledge transfer through educational/learning processes - Trigger positive behaviour and attitude versus NbS	- Press release - National workshops - Training initiatives - Showcase of RECONECT demo activities
Scientific Community	Use and build on the results for their own projects Develop ideas for the follow up of RECONECT research Contribute to developing the evidence base	Many of the RECONECT partners are heavily engaged in research and in collaboration with other projects. This enables the transfer of knowledge and the opportunity for further research and practices to	- Share publications and encourage citing - Exploitation of project results to foster synergies between projects - Exploit the RECONECT Training Framework and material to	- Scientific publications - Training initiatives - Workshops and Conferences where RECONECT is presented - PhD and master thesis where the research can be moved forward

Target audience	Role as “actor of change”	Dissemination and Exploitation by RECONECT	Outcomes	Tools supporting Dissemination and Exploitation
	Validate the results of the project	achieve new knowledge and techniques concerning NbS,	support knowledge exchange between projects	

3.2 Communication and Dissemination tools and channels for RECONECT exploitation

RECONECT website

The RECONECT project website, www.reconect.eu, is the key entry point where stakeholders and interested users can be directed to find information related to the project and can access the project results. It has been representing since the project beginning a major communication channel for disseminating information and engaging stakeholders, as well as for presenting the project outputs and the functionalities, and it is expected that it will be maintained for at least 5 years after the project end. The contents of the RECONECT website, as well as media materials, blogs, news, stories, multimedia products, results, outcomes and training material are accessible by all stakeholders through the project website. RECONECT website is also designed as a gateway to showcase and access the main project results such as the ICT Service Platform, the webinars and the MOOC, the network of cases with results and achievements from the demonstrators, the main technical deliverables and guidelines.

RECONECT social media

RECONECT produced strong and engaging content relevant for a diverse set of audiences and carried out significant social media campaigns collecting 1.750 followers overall. Starting from the project end, RECONECT social media are intended to be used to drive traffic to the project website and contribute to increase the number of visits by stakeholders to the project results. The youtube channels, hosting also the RECONECT video and the webinars, will be as maintained and enriched with new contents the partners will provide.

The following channels will be maintained:
Linkedin Company Page: RECONECT Project
Facebook Page: Reconect Project
Twitter account: H2020RECONECT
YouTube: https://www.youtube.com/@reconectproject7495

RECONECT newsletters and blog

RECONECT newsletters has been published on a regular basis twice a year, and they are all accessible by the project website at the media section.
No more newsletters are going to be published after the project end, but the articles and stories will remain available on the RECONECT blog on Medium for at least 5 years after the project end to be used by project partners to rely with their networks and stakeholders.

Press releases and media relations

Press releases are a very important dissemination tools to make local stakeholders aware of RECONECT results and stimulate their interest. Along the project life span, many press releases have been issues at local level and RECONECT became a project of interest also thanks to the commitments of local partners in engaging local press to write an article on work in progress and events. RECONECT consortium, and in particular partners responsible for project demo and collaborators, will be asked to use this dissemination media to spread information about the RECONECT achievements and results and push in this way the engagement of local stakeholders.

Scientific journals, papers, publications

RECONECT collected overall more than 60 peer reviewed scientific publications (10/years) reporting about the scientific evidence of NbS impacts to drive and expand research and science in the field and also contributing to bridge the gap between science

and practice. Speaking about general exploitation of project results, it is expected that the contributions by partners from research will be significant also after the project end, and that scientific publications as well as master and PhD thesis on RECONECT topics will be significantly encouraged. A target for RECONECT scientific publication could be 3 publications/year for at least 3 years after the project end.
RECONECT considers really important the exploitation of results from the research and their follow up and further innovation, in order to keep the project outputs updated along the years, capitalize knowledges and open to the possibility to start new research activities and projects.

Events, conference, workshops
RECONECT targeted high-profile events, conferences and workshops at the national, European and international level to participate and engage (e.g. organise technical sessions, workshops, etc. as well as a RECONECT Final Conference) with a broader audience group across the science-policy-practice interface. Engaging at this level further contributed to the exploitation strategy of RECONECT. RECONECT National Workshops were organized at the premises of each Demonstrator and Collaborators, to raise awareness of local and national stakeholders about NBS, their effectiveness and the way they can be introduced into land planning policies and risk mitigation measures.
Starting from the end of the project, it expected that:

- The RECONECT Conference "Nature-Based Solutions for Water Security and Climate Adaptation" organized in Belgrade on the July of 2024 as RECONECT Fina Conference will be periodically repeated (e.g. each two years) sponsored by private entities and promoted by the International Water Association (IWA).
- The RECONECT workshops with regional stakeholders will continue on a regular basis as action of the strategy for the user engagement and public affairs, with the aim to influence local policies on land planning and water management, and to capitalize and exploit the RECONECT technical outputs supporting the policy making.

Training
Within the project period, RECONECT developed training activities and tools and favoured learning opportunities, including training, e-learning/online courses, MOOC, webinars.

Two are the main project outcomes training oriented, which are expected to support dissemination and exploitation of RECONECT outcomes and knowledge to selected target audiences.

- RECONECT training framework (Ref. D6.4 (M34) and D6.12 (M50)), consisting of on-line based training modules and training material specifically designed to address the exploitation of project outcomes to selected categories of target audience (e.g. public officers, students, decision makers…). In particular, the training is delivered through a series of webinars supported by the training material available at (http://www.reconect.eu/webinars/). The RECONECT training framework will remain available on line after the project end and
- RECONECT MOOC (Ref. D6.5 (M60) is being exploited to a larger target audience other than undergraduate students. After the project period is over, the UNEXE will maintain the MOOC. Initially the feedback that has been collected within the first round of participants will be used to improve the MOOC and advertise a second round (RECONECT social media will be used to do this). Other Universities from the RECONECT Consortium (University of Belgrade and the Universidad del Valle, Cali-Colombia) could be interested in the MOOC as learning content for their students (Undergraduates/Postgraduates). We can argue here that. I had conversations with both Jasna and Daniel about this possibility. The University of

Exeter will also make use/exploit the learning content that has been created either in the CWS or CREWW departments potentially. Finally, there were possibilities of building more content into the MOOC following on from other H2020 NBS projects such as NATALIE, which was presented at the RECONECT conference. And/or to get members of other NBS projects to enrol and learn from RECONECT findings.

3.3 Connections with thematic communities and initiatives (EU and beyond)

RECONECT Consortium, trough the partners responsible for dissemination, joined at the beginning of the project the **EU Task Force 4 on NbS Communicators** crossing-over all related EU projects, to exchange knowledge and increase collective capacities on communication and dissemination amongst EU funded projects.
The participation in this Task Force allowed an important cross-promotion among different projects, such as the exchange of information on organized events with a cross-fertilization of respective mailing lists and lists of contacts. When the project is over, the participation in the Task Force 4 is continued in view of exploiting the results across a network of NbS projects and organizations and exploring opportunities for follow up. A first meeting will be in Brussels on the 24th of September, when RECONECT will join a discussion table on the preparation of training module on NbS and the development of project ideas on NbS training projects.

Also, RECONECT contributed to the development of an important **network of NbS projects** (http://www.reconect.eu/nbs-projects-network/) and in particular with the two sister's projects PHUSICOS and OPERANDUM and other NbS projects like UNALAB and NAIAD. This is important also in view of the exploitation of results, because:

- RECONECT and the liaised projects all together can make critical mass to influence policies and promote the use of NbS in land planning and water-related risk management;
- Results from all the research can be put together with the aim to provide a comprehensive overview of the status of NbS, barriers and drivers, and pushing the academy and the research world to continue these studies;
- Lobbying national and regional institutions and creating a group of stakeholders in particular from the Demo Sites where NbS have been implemented.
- Organizing common events and meetings and develop ideas on the projects follow up

RECONECT is also connected to **NetworkNature** (https://networknature.eu/), a resource for the Nature-based Solutions (NbS) community, creating opportunities for local, regional and international cooperation to maximise the impact and spread of Nature-based Solutions. It will maintain and add to a diverse and science-based repository of evidence on NbS, strengthen partnerships and foster new relationships around a clear, strategic framework for action. This work is underpinned by an up-to-date EU Research & Innovation NbS Roadmap and NetworkNature's six priority themes: Biodiversity enhancement and ecosystem restoration; Sustainable food systems; Zero Pollution; Climate adaptation, mitigation and resilience; Sustainable finance, investment and just transition; Sustainable urban and regional transformation.
NetworkNature's products include a NbS policy roadmap 2024 - 2030, needs and gap analysis, tailored capacity-building for local and regional authorities, decision-makers in governments, businesses and investors, and NbS hubs, as well as pre-standards and advisory services that continue to support the growing NbS community of innovators, practitioners and developers.

Together, these actions build capacities to promote a step change from siloed, project-based thinking towards an integrated, systemic and stakeholder-led approach to NbS planning, design and investment.
At national level, it is noteworthy the organization of initiatives such as the the NbS National Hubs (https://networknature.eu/nbs-hubs), to which RECONECT is going to connect with.

An annual Network Nature conference is organized. RECONECT will join this conference on the 25th of September, to explore opportunities for further cooperation and exploitation of results.

The **International Water Association (IWA)**, former partner of RECONECT, and the **International Association for Hydro-Environment Engineering and Research (IAHR)** supported the RECONECT Final Conference of Belgrade "Nature-Based Solutions for Water Security and Climate Adaptation". Members of the Scientific Committee of the RECONECT Conference are part of these international associations. In addition, and as said above, the RECONECT Conference "Nature-Based Solutions for Water Security and Climate Adaptation" is expected to become a periodic itinerant event, to be organized each two years in cooperation with the two associations. As far RECONECT is concerned, it is going to be proposed within IWA an expert group on NbS for hydro-meteorological risk mitigation to share and capitalize the results and experiences from RECONECT.

3.4 RECONECT Portfolio of Key Exploitable Results (KERs)

RECONECT developed along a project a series of valuable results and products that are listed and described in the following:

Holistic ecosystem-based framework

This deliverable provides details about the ecosystem-based framework of RECONECT that was built on the one of PEARL and EKLIPSE projects. RECONECT builds upon the PEARL framework which has been successfully applied in several case studies in Europe and outside, while the evaluation part of the framework will integrate the EKLIPSE approach to suit large-scale NbS for rural and natural areas. This has been done by grouping challenges into three categories being WATER, NATURE and PEOPLE and evaluating them in relation to spatial and temporal dimensions for the cases with and without consideration and deployment of NbS. This deliverable explains how the RECONECT framework starts from the view that risk emerges (or co-evolves) from actions and interactions within and between human systems and the natural environment. The framework will consider that human systems are socio-technical systems that consist of a social system (for example actors, behaviour, institutional structures) and a technical system, for example (urban infrastructure, drainage, flood defences, industrial networks, agricultural systems, nature-based solutions, etc.). These two co-evolve through decisions about the use of the natural and human system and its development, changing infrastructure, policy and regulation through strategic management and governance.

As the current condition of any system is the outcome of complex interactions it is important to define the system and its scale. This deliverable explains that while the physical/natural system is relatively easy to define (by following the water movement) the social system boundaries are more challenging as there are complex relations and feedback mechanisms that are difficult to capture. Therefore, RECONECT uses a transdisciplinary partnership of researchers, industrial partners and authorities/agencies at local and watershed/regional level so that the proposed “solutions” contribute not only to reduce hydro meteorological risks, but also to enable multiple benefits for the governance.

This deliverable lists the positives and challenges of NbS related frameworks that have been developed in the past. It explains why and how the PEARL and EKLIPSE will be used to inform the development of the RECONECT framework. The framework will be available to all. The provided analysis of the existing frameworks can also be beneficial for researchers and practitioners that are co-creating and collaborating to create the Ecosystem based frameworks beyond RECONECT.

The RECONECT framework will combine the strength of existing conceptual frameworks in multiple ways to ensure that it will be of use to researchers, industrial partners (SMEs and large consultancies) and authorities/agencies at local and watershed/regional level. By integrating different perspectives from relevant stakeholders, the framework will not only reduce hydrometeorological risks, but also enable multiple benefits investment and management strategies.

Based on the evaluation of the existing frameworks, it is recommended that the RECONECT framework is developed using the frameworks from the PEARL and EKLIPSE projects.

The PEARL framework focused on the assessment of risk and impacts from floods and by doing that it was also assessment solutions which included NbS at urban scale. Therefore, the framework is taken as a basis in RECONECT but needs to be enhanced to accommodate more NbS solutions (i.e. large scale) and to accommodate and account for the benefits. This is where we see the potential for innovation and integration with other frameworks such the one developed in EKLIPSE. It is recommended that EKLIPSE impact evaluation framework will be expanded for evaluation of large scale NbS in rural and

natural areas. This will be done by grouping challenges into three categories being WATER, NATURE and PEOPLE and evaluating them in relation to spatial and temporal dimensions for the cases with and without consideration and deployment of NbS. The framework continues with the identification of key stakeholders using the methodology of social innovation proposed and developed in the project.

Guidelines for design, construction and maintenance of NbS

This document represents a key outcome of the RECONECT project, aiming to serve as a comprehensive guide for entities interested in applying Nature-Based Solutions (NbS) for large-scale hydro-meteorological risk reduction projects, particularly focusing on rural and natural areas. The intended audience includes both collaborators within the RECONECT project and a broader community of NbS implementors following the project's completion.

While existing literature and guidelines have extensively covered NbS implementation, this guide seeks to enhance the practical understanding by incorporating already executed NBS projects for hydro-meteorological risk reduction—referred to as demonstrators. These demonstrators span diverse physical and social contexts, providing a valuable resource for connecting theoretical knowledge with real-world applications. The document serves as a repository of NbS projects, offering examples that can be tailored to specific environments for the implementation of new NbS initiatives. This document does not provide specific design requirements or technical details of, for example dimensions or parameters to be used. This document goes into detail instead about the practical lessons learned during the design, construction and maintenance of three example large scale NbS projects.

The structure of this document begins with an exploration of the literary background, offering a summary of existing guidelines. Following this, an in-depth overview of NbS implementation theory is presented, organized into design, construction, and maintenance phases. Subsequent sections delve into the details of each individual demonstrator project, guided by the earlier described NbS implementation theory. The elaboration on demonstrators is further summarized in tables and figures, facilitating easy navigation to relevant sections based on keywords associated with the circumstances of implementation

This document synthesizes insights gained from the NbS RECONECT demonstrator projects, focusing on NbS for hydro-meteorological risk reduction. These projects are currently either largely or completely implemented as of the time of writing. To facilitate understanding, the lessons learned are categorized based on different types of physical circumstances, with each category represented by a principal demonstrator project. The specific circumstances and projects considered are as follows (as indicated on Figure 1)

- Mountainous areas, exemplified by the NbS RECONECT project at Portofino, Italy
- Delta areas, showcased by the NbS RECONECT project at the Ijssel River, the Netherlands
- Coastal areas, highlighted by the NbS RECONECT project at Odense, Denmark

The document organizes the lessons learned for each of the mentioned circumstances and projects into distinct chapters, guided by the previously outlined Water – Nature – People framework. A comprehensive synthesis of these lessons across the three projects is presented at the conclusion of this document.

ICT Service Platform

The RECONECT Services Platform is an ICT ecosystem supporting Demonstrators and Collaborators in terms of data storage, analysis and visualisation. Each block is defined

by a product supporting specific NbS processes such as **data collection, monitoring, evaluation, modelling, operation and training**.

The Platform central node is the TeleControlNet (TCN), a SaaS used to collect in-situ data and connected with the other platform components developed by Inter Act. All RECONECT demo sites supply data to TCN, which stores it for the long term in the internal database. The data can be read directly from the sensors, which also makes real-time applications possible, or can be read in via external web portals. The collected data can be supplemented with external meta data from third parties, such as weather forecasts.
The data is presented in various process/trend/report screens. The TCN user interface is optimized for technical use. In time, the stored data will also (partly) be made publicly accessible in user-friendly and intuitively operable webpages.
The collected measurement data from all demo sites can be studied and analyzed by partners. During the project, Inter Act contributes with NbS specific applications and user screens at the request of partners. The long-term data collected during the project can serve to demonstrate the differences before and after the implementation of NBS measures.
In some cases, the data can be used to feed artificial intelligence algorithms. This allows early warning systems to be built. Or if there are control options at locations, for example by pumping or influencing water flows with locks, TCN can also Real Time Control (RTC) these remote locations with a centrally programmed set of “decision rules”.

The HydroNET dashboard is an expert platform for weather and water data aimed at water professionals. It provides several visualization and analyses tools for weather and water data. For example, water levels and flows can be compared to known thresholds such that the output can be visualized using traffic light colors. The platform is aimed at professional users (i.e. operational water management) by providing personalized dashboards with relevant information. A link between the central TeleControlNet and HydroNET platform has been established such that in-situ data is available. These in-situ measurements of water levels and flows are combined with weather forecast data in order to provide dashboards for the water indicator of the IJssel case.
Monitoring of NbS can be done with sensors, but also with the help of crowdsourcing (citizen science). In order to facilitate the collection of information by citizens, a simple web-based crowdsourcing application has been developed by HydroLogic Research. Any person can send in a report. A report can have a photo a description and a location. This allows any person to log relevant information. This information can later be displayed in the ARGOS NbS Data Viewer. Any user can create a new report. For example, a visitor in a national park might spot a leak or overflowing channel. This person can open the website to enter a new report in which he can enter the location (via GPS or manually on map), a description and even add a photo.

The ARGOS NbS Data Viewer allows exploring all the data related with the NbS in a structured way following the organization by pillars (Water, Nature and People), goals, sub-goals, indicators, and variables.
Once logged into one demonstrator, the user can explore real time measurements of the NbS monitoring equipment and other sources of information in the area, the calculated indicators for each goal and the NBS general information data. Also compare different scenarios to evaluate the risk reduction and co-benefits of the NbS.
The platform allows the users to have a single entry point to all information regarding the NBS and explore it in a simple and homogenized way.

Guidelines for monitoring and evaluation, presenting a new methodology for co-evaluating the RECONECT demo sites, A and B, and to provide lessons learned for collaborators. This new methodology used the ideas of a Mixed Method Appraisal Tool, by providing content to two external reviewers. The two reviewers were then asked to binary score the demonstrator against a set number of questions in terms of their sub-goals and results for Water, Nature and People. The interrater agreement and reliability between the two reviewers was then assessed using kappa and Proportional observed agreement. Though improvements can be made to the methodology, in general the MMAT worked well with "almost perfect agreement" for 5 of the demo sites; Aarhus, Boucholeurs, Elbe, Odense and Var, and 3 sites (Ijssel, Portofino and Thur) were in "substantial" agreement. Reviewers scored Odense the highest, followed closely by the Ijssel, Thur, Aarhus and the Elbe. The French demo sites did not score well and in general most demo sites lost points within the cost-benefit analysis section as for the majority of demo sites, this was not completed.
The report addresses in particular the following issues:

- Data Deficiency: Inadequate data for modelling and monitoring NbS; needs improvement, could be addressed by integrating with automated systems.
- Clear multi Objectives: Ambitious and well-defined objectives for people, water, and nature from the start.
- Cost-Benefit Analysis Evolution: Modern cost-benefit analysis guidelines are essential but were not common in the past, this has been a limitation for Dbs.
- Baseline Evaluation: Importance of evaluating the status quo before restoration to assess improvements.
- Communication and flexibility: Proactive and continuous communication early on with the public is essential to improve project success and reduce opposition.
- Technical Knowledge: innovative Monitoring activities/techniques are needed especially. If available Independent evaluations will increase project credibility and knowledge base.

Business Models and Roadmaps for Nature-based Solutions

This deliverable aims to bridge the gap between Nature-based Solutions (NbS) project owners and the private sector so to scale private sector investment in NbS. A key outcome is a refined version of the Investment Framework (IFW), a practical tool designed to enhance the capacity of NbS project owners to strategically communicate the value of their projects to the private sector.
Within RECONECT, three reports focus on exploring the business case for NbS. The report "Business Models and Roadmaps" includes a literature review on business models for NbS and assesses their application to large-scale NbS by applying the Large-scale NbS Business Model Framework to RECONECT Demonstrator cases. This groundwork contributed to the development of report "Governance, Business Models, and Investment Strategies for Nature-based Solutions" (D5.2, 2024), which delved deeper into the relationship between governance, business models, and investment strategies in upscaling NbS. Findings from this report indicated that NbS project owners often lack the capacity to engage the private sector and typically overlook investment sources outside the public sector, perceiving NbS as a public good without an inherent revenue model. To address this challenge, the IFW was introduced to build capacity among NbS project owners to effectively communicate their project's value to financial sector stakeholders.
Building on other two reports the Business Models and Roadmaps for Nature-based Solutions, examines how the private sector can integrate NbS into supply chains and business operations. By investing in NbS, private companies can mitigate risks, demonstrate a commitment to sustainable operations, reduce environmental impacts, and lower greenhouse gas emissions. This approach is facilitated by governance mechanisms

that incentivize private sector investments in initiatives that advance environmental, social, and governance (ESG).
To strengthen the capacity of NbS project owners to engage with the private sector, this report introduces a revised version of the IFW. The updated IFW includes an Excel-based tool that NbS project owners, including municipalities, landowner associations, non-governmental organizations, and research institutes can use to frame their projects in alignment with private sector interests. The tool features key performance indicators (KPIs) that connect corporate reporting requirements under EU regulations with best practices for monitoring and reporting on NbS implementation as defined by RECONECT. This tool aims to help NbS project owners develop "investment-ready" projects, thereby addressing the financing gap for NbS.

Standards for design, implementation, management and decommissioning

This report aims at gathering best practices from the RECONECT outputs (i.e., tools, deliverables, and reports) and overall experience, to foster the upscaling and wide implementation of large-scale NbS for hydro-meteorological risk reduction throughout Europe and beyond.
The steps, challenges, and solutions of a NbS project encountered throughout RECONECT are reported here in a standardized way, following the life-cycle phases of planning, design, implementation and monitoring, evaluation, and learning (MEL). These standards are complemented by concrete examples from selected Demonstrators and Collaborators to provide more tangible guidance.
Standards in the literature on NbS are mostly focused on pre-implementation phases (i.e., planning and design), but more information on the following phases (i.e., construction and post-implementation) is emerging. Despite the challenges in streamlining processes and gathering relevant knowledge on NbS establishment in different contexts, reports such as this can supply a first reference to build more truly all-encompassing frameworks.
In addition to processes carried out in practice within RECONECT, this report also highlights and integrates recommendations for other standards, taken from relevant literature and other NbS projects.
Therefore, this report supports the fulfilment of the standardisation requirements of RECONECT, by presenting practices developed and used based on the consensus of the different partners involved in RECONECT. Moreover, the produced standards actively contribute to both the exploitation of RECONECT results, and the upscaling of NbS through the provision of a list of steps/methods to follow/use to reach implementation.
The target audience for this document is diverse and includes a range of stakeholders involved in NbS implementation, policymaking, and research. This report is intended to have a wider impact beyond the RECONECT consortium, reaching practitioners from all areas, including consultants, councils, funds, and private practitioners, as well as governments at the city and local level, planners, businesses, and financial institutions.

Lessons learnt from Demo and Collaborators

This report presents an overview of lessons learned from the experiences of demonstrators and collaborators during RECONECT using the project lifecycle phases: planning, design, implementation, and monitoring, evaluation, and learning (MEL). The purpose of this report is to highlight key learnings from RECONECT's multidisciplinary approach to Nature-based Solutions (NbS) that can be applied to future efforts to upscale large-scale NbS for hydrometeorological risk reduction.
Demonstrators A and collaborators were engaged in planning phase activities, such a risk assessment, pre-feasibility study, business case development, and preliminary indicator selection. Lessons learned during this phase include the importance of stakeholder

engagement through co-creation methodologies, the benefits to identifying barriers and enablers for NbS implementation early on, fostering knowledge exchange through twinning activities, addressing governance and regulatory challenges through stakeholder engagement, and leveraging collaborative partnerships to overcome barriers.
In the design phase, demonstrators A focused on translating NbS concepts into actionable plans. Key activities associated with this phase include indicator and measure selection, land acquisition, and permitting. Lessons learned from the design phase include the importance of stakeholder involvement in indicator and measure selection, strategies to address challenges associated with land acquisition and permitting, and the need for a context specific approach for navigating regulatory and political complexities. Moreover, adequate allocation of time and resources for co-creation activities, coupled with fostering collaboration and knowledge-sharing platforms, will bolster project effectiveness.
The implementation phase involves construction of a physical asset and ongoing operation and maintenance (O&M). Lessons learned include the importance of a strong planning and design phase to ensure smooth implementation, the necessity of comprehensive O&M plans for long-term sustainability, and the importance of stakeholder collaboration in sharing O&M responsibilities. Furthermore, strengthening data collection, monitoring, and evaluation mechanisms is imperative to gauge NbS efficacy accurately. Twinning activities were particularly useful during this phase as they enabled knowledge exchange between demonstrators A and B.
Learnings from the monitoring, evaluation, and learning (MEL) phase, led by demonstrators B, include the importance of a robust monitoring and evaluation plan based on pre-selected key performance indicators (KPIs), engaging with stakeholders through co-monitoring activities so to monitor NbS co-benefits, and using data collected during the MEL phase to guide future decision-making. Key insights include the importance of engaging stakeholders in co-monitoring and evaluation, the role of continuous learning in driving innovation, and the significance of disseminating knowledge gained from MEL through workshops, reports, and stakeholder engagement activities.
Across the four project phases, project owners emphasised the importance of stakeholder engagement, adaptive management, and collaborative partnerships in developing feasible NbS. Lessons learned captured in this report should be considered as part of future efforts to upscale NbS in Europe and beyond.

RECONECT Training: Webinars and MOOC

The RECONECT project organized a series of 3 webinars (registrations and materials are available at www.reconect.eu/webinars) with the aim to educate and create awareness on the RECONECT experience and outcomes during live streamed events.
The First Webinar "*Introduction and opportunities for NbS: reflections from RECONECT"* introduces the context where NbS are cocreated, implemented and upscaled with the aim to reduce hydrometeorological risks. Participants in this webinar are expected to get knowledge on the EU and international policy framework supporting NbS, and on innovation and technologies for their implementation. The webinar is addressed to government agencies, decision makers, practitioners, researchers, investors, whoever wants to improve knowledge on NbS.

The Second Webinar "Sourcing the evidence base from RECONECT NbS demonstration cases" provides the attendees with knowledge and experiences from a NbS implementation process. Selected RECONECT demonstrators across Europe and representing different rural environments are showcased with the purpose to support the participants in understanding effectiveness, barriers and opportunities of a NbS approach. The webinar is targeted to public and private companies, practitioners, researchers and whoever wants to improve knowledge on NbS.

The Third Webinar “RECONECT experiences in co-monitoring and co-evaluation of NbS” deals with tools and indicators to monitor and evaluate the effectiveness of NbS for hydro-meteo risk reduction and assess their co-benefits. The participants get knowledge on the parameters to be monitored and the most suitable technologies to do that. Practical examples on how indicators are monitored and processed through the RECONECT ICT Service Platform are provided. Target audience of this webinar are public and private companies, practitioners, researchers, whoever wants to improve knowledge on NbS.

RECONECT MOOC “Nature-Based Solutions for Water Management and Climate Adaptation” developed by the University of Exeter with the support of experts from the RECONECT Consortium. The MOOC is accessible from the link www.reconect.eu/mooc and is composed by six modules covering all aspect of NbS and providing participants with critical knowledge and skills to identify adequate NbS and estimate their effectiveness to cope with potential hydrometeorological hazards:

Module 1 – Introduction to NBS for hydro-meteorological risk reduction
Introduce basic concept of NBS and explain the differences between traditional grey infrastructures.
Advantages and benefits of NBS vs grey infrastructure.

Module 2 – Planning and Assessment of NBS
Introduce the commonly used indicators for assessing the potential for NBS.
Understand how to use the above models for planning and selection of NBS.

Module 3 – Co-creation & Integrated design of NBS
Understand integrated and landscape design principles of NBS.
Understanding of different phases of the co creation phases including; NBS upscaling and suitability mapping.

Module 4 – Monitoring and Evaluation of NBS
Gain understanding of monitoring methodological techniques and instruments (Examples from Water, Nature and People).
Gain understanding of different evaluation approaches and techniques for implemented NBS.

Module 5 – Barriers, Enablers and Innovation within NBS
Gain an understanding of the most common barriers and enables involved in NBS implementation.
Learn how the commercial exploitation of NBS Innovations can support the upscaling of solutions.

Module 6 – Case Studies and Implementation
Learn about 3 RECONECT NBS examples from different catchment areas; Netherlands (Riverine), Portofino (Mountainous) and Odense (Coastal).

Target audience of the MOOC are practitioners in environmental management, postgraduate students, policy makers.

Table 3. RECONECT main KERs, potential target users and plan for their general exploitation

N	KER Name/Availability	Target users							Benefit for the users	Plan for dissemination and exploitation
		Policy and Decision makers	Government Agencies	Expert Practitioners	Industry (and private sector)	Public and Private Stakeholders	Scientific Community	EU Networks, Communities and initiatives		
1	Holistic ecosystem-based framework www.reconect.eu/deliverables		**x**		**x**		**x**	**x**	The framework integrates the different perspectives from relevant stakeholders and not only reduces hydrometeorological risks, but also enable multiple benefits investment and management strategies.	Disseminate the Framework trough scientific papers across the community of researchers and practitioners (*KPI: 2 papers/year*) Engage users on the basis of the RECONECT User Engagement Strategy to present the framework and make them adopt this in their plans. Further exploit and update the result in the framework of other research and innovation projects

N	KER Name/Availability	Target users							Benefit for the users	Plan for dissemination and exploitation
		Policy and Decision makers	Government Agencies	Expert Practitioners	Industry (and private sector)	Public and Private Stakeholders	Scientific Community	EU Networks, Communities and initiatives		
2	Guidelines for design, construction and maintenance of NbS www.reconect.eu/deliverables	X	X	X		X	X	X	Comprehensive guide aimed to enhance the practical understanding by incorporating already executed NbS projects for hydro-meteorological risk reduction—referred to as demonstrators. It provides a valuable resource for connecting theoretical knowledge with real-world applications spanning diverse physical and social contexts. It serves as a repository of NbS projects, offering examples that can be tailored to specific environments for the implementation of new NbS initiatives.	Workshops with national stakeholders to present the Guidelines and suggest how they can be integrated into regional and national policies and technical annexes to address sustainable planning and risk mitigation (*KPI: at least 1 workshop/partner country*) Showcase the results from RECONECT demonstrators in order to convince local administrations and practitioners on the effectiveness of these solutions and to foster their uptake Disseminate a new culture of sustainable land planning and hydro-meteo risk mitigation

N	KER Name/Availability	Target users							Benefit for the users	Plan for dissemination and exploitation
		Policy and Decision makers	Government Agencies	Expert Practitioners	Industry (and private sector)	Public and Private Stakeholders	Scientific Community	EU Networks, Communities and initiatives		
3	ICT Service Platform	X		X	X		X		It is a technological ecosystem supporting NbS sites in terms of data storage, analysis and visualization. Each block is defined by a product supporting specific NbS processes such as data collection, monitoring, evaluation, modelling, operation and training.	Showcase the results from RECONECT demonstrators in order to convince local administrations and practitioners on the effectiveness of these solutions and to foster their uptake (*KPI: at least 1 workshop/partner country*) Demonstrate each single technological block to potential users Train users on the use of the ICT Service Platform Further develop the results into other research and innovation projects

N	KER Name/Availability	Target users							Benefit for the users	Plan for dissemination and exploitation
		Policy and Decision makers	Government Agencies	Expert Practitioners	Industry (and private sector)	Public and Private Stakeholders	Scientific Community	EU Networks, Communities and initiatives		
4	Guidelines for monitoring and evaluation			X	X	X	X		A new methodology for co-evaluating sites where NbS have been implemented, based on the lessons learned from RECONECT. A score is assigned to each goal and sub-goal achieved in terms of KPI related to the sector water-nature-people	Workshops with national stakeholders to present the methodology and suggest how they can be integrated into regional and national policies and technical annexes to address sustainable planning and risk mitigation. Showcase the results from RECONECT demonstrators in order to convince local administrations and practitioners on the effectiveness of these solutions and to foster their uptake (*KPI: at least 1 workshop/partner country*)

N	KER Name/Availability	Target users							Benefit for the users	Plan for dissemination and exploitation
		Policy and Decision makers	Government Agencies	Expert Practitioners	Industry (and private sector)	Public and Private Stakeholders	Scientific Community	EU Networks, Communities and initiatives		
5	Business Models and Roadmaps for Nature-based Solutions				**X**	**X**		**X**	It bridges the gap between Nature-based Solutions (NbS) project owners and the private sector so to scale private sector investment in NbS. It features key performance indicators (KPIs) that connect corporate reporting requirements under EU regulations with best practices for monitoring and reporting on NbS implementation as defined by RECONECT. This tool aims to help NbS project owners develop "investment-ready" projects, thereby addressing the financing gap for NbS.	Workshops and meetings with private stakeholders and industries to present the business model and the roadmap and suggest how they can be integrated into their procedures and practices in particular reporting requirements *(KPI: at least one company/partner country)* Workshops and meetings with practitioners and NbS owners to design new “investment-ready projects” in line with RECONECT business models Dissemination of the result across EU communities and NbS networks, for its diffusion and uptake at national level also through the NbS National Hubs *(KPI: at least one conference/panel participated in one year)*

N	KER Name/Availability	Target users							Benefit for the users	Plan for dissemination and exploitation
		Policy and Decision makers	Government Agencies	Expert Practitioners	Industry (and private sector)	Public and Private Stakeholders	Scientific Community	EU Networks, Communities and initiatives		
6	Standards for design, implementation, management and decommissioning	X	X	X		X	X	X	Standard report of the steps, challenges, and solutions of a NbS project encountered throughout RECONECT, following the life-cycle phases of planning, design, implementation and monitoring, evaluation, and learning (MEL). These standards are complemented by concrete examples from selected Demonstrators and Collaborators to provide more tangible guidance. It provides wide information on standards on the following phases of a NbS implementation, enriching what already exists in the literature in terms of NbS Standards.	The produced standards actively contribute to both the exploitation of RECONECT results, and the upscaling of NbS through the provision of a list of steps/methods to follow/use to reach Organization of meetings and workshops with potential final users such as practitioners and government agencies to push their uptake and upscaling (*KPI: at least 1 meeting/partner country*) Joint initiative with other NbS projects such as the establishment of working groups and new project consortia to further develop the standards into other research and innovation projects (*KPI: at least 2 new projects*)

N	KER Name/Availability	Target users							Benefit for the users	Plan for dissemination and exploitation
		Policy and Decision makers	Government Agencies	Expert Practitioners	Industry (and private sector)	Public and Private Stakeholders	Scientific Community	EU Networks, Communities and initiatives		
7	Lessons learnt from Demo and Collaborators	X	X	X		X	X	X	This report presents an overview of lessons learned from the experiences of demonstrators and collaborators during RECONECT using the project lifecycle phases: planning, design, implementation, and monitoring, evaluation, and learning (MEL). Across the four project phases, project owners emphasised the importance of stakeholder engagement, adaptive management, and collaborative partnerships in developing feasible NbS. Lessons learned captured in this report should be considered as part of future efforts to upscale NbS in Europe and beyond.	It highlights key learnings from RECONECT's multidisciplinary approach to Nature-based Solutions (NbS) that can be applied to future efforts to upscale large-scale NbS for hydrometeorological risk reduction Integrate the RECONECT lessons learnt with results from other EU projects on NbS, in order to provide a very comprehensive view of sites (e.g. include sites coping with coastal erosion and coastal floods, and site affected by rockfall) and boundary conditions (geographical and socio-economic context)

8	RECONECT Training: Webinars and MOOC	X	X	X	X	X	X	X	The webinars provide a very quick overview of NbS concepts, design and monitoring, whilst the MOOC provides critical knowledge and skills to identify adequate NbS and estimate their effectiveness to cope with potential hydrometeorological hazards	RECONECT Webinars are maintained in the web site for at least 5 years after the project end and made available for all final stakeholders. Training material, in case, will be exploited for training actions towards final users. The RECONECT MOOC, after the project period is over, will be maintained by UNEXE. Initially the feedback collected within the first round of participants will be used to improve the MOOC and advertise a second round. At least a couple of universities within the consortium (plus IHE Delft) are interested in the MOOC as learning content for their students (Undergraduates/Postgraduates). We can argue here that the MOOC is being exploited to a larger target audience as undergraduate students were not originally the main aim. University of Belgrade and Universidad del Valle, Cali-Colombia can exploit MOOC in this sense. The University of Exeter will also make use/exploit the learning content that has been created either in the CWS or CREWW departments potentially. Finally, there were talks of building more content into the MOOC following on from other H2020 NBS

N	KER Name/Availability	Target users							Benefit for the users	Plan for dissemination and exploitation
		Policy and Decision makers	Government Agencies	Expert Practitioners	Industry (and private sector)	Public and Private Stakeholders	Scientific Community	EU Networks, Communities and initiatives		
										projects such as NATALIE, which was presented at the RECONECT conference. And/or to get members of other NBS projects to enrol and learn from RECONECT findings.

3.5 RECONECT Exploitation at partners' level

Several domains of exploitation with the associated targeted users have been identified during the project phase and represent the base upon which to base the RECONECT exploitation at partners' level.

- NbS developers consultants, advising local authorities, utilities and industrial companies in the local potential for developing NbS projects. It would estimate the potential solutions to be implemented, their expected impacts (benefits and drawbacks), identify and engage the different stakeholders required in decision-making, propose visual tools to exchange with local citizens, identify potential suppliers locally and in Europe, support site studies (soil, water, sediments, erosion, biodiversity, etc.) and efforts to get permits, support land acquisition and management, establish local networks and their sustainable governance, explore viable business models, develop local Communities of Practices, organise knowledge sharing with NbS advanced territories, provide access to reliable data for assessments. Its revenues would stem from long-term consulting contracts.
  Interested RECONECT partners: RAMBOLL, TAUW, PRONING, IWAcons (as a leading engineering consultancy) and academic partners for scentific support.
  RECONECT Outputs exploited: Guidelines for design, construction and maintenance, Monitoring and Evaluation Guidelines, NbS Standards and Investment Framework, Training Framework
  Target users: Public and Private stakeholders, Industries

- NbS ICT services consultants, designing and selling an integrated solution to monitor in real-time large NbS infrastructures, merging data from a large number of diverse sensors installed on the ground or remote. It would enable the local actor in charge of operating the NbS infrastructure (local authority, ministry, development agency, environmental agency etc.) to monitor in real-time the NbS infrastructure and its impacts and to optimize operation and maintenance activities. The service provided would be to adapt and configure the solution to the local context (GIS system, GUI, environmental parameter, etc.), establish connectors with relevant local data sources and other data sources already in the library (e.g. space data), set the crowdsourcing information infrastructure (visualization, languages, interconnection with local social media apps).
  Interested RECONECT partners: Hyds, Interact, Hydrologic, UNEXE, EUROSENSE, IHE Delft
  RECONECT Outputs exploited: RECONECT ICT Service Platform and single tools for collecting data from the ground, for processing and visualization, for modelling, for decision making, for crowdsourcing
  Target users: Public and Private stakeholders, Policy and Decision Makers

- NbS promoter, being like an entity able to influence regional and national policies through activities aimed at disseminating the experience from RECONECT Demonstrators. The promoter would support the adoption of technical annexes by regional and national policy makers, by pushing the uptake of RECONECT technical guidelines and standards and tangible experiences. This is done trough a series of meetings, workshops and trainign activities addressed in particular to the public sector and the policy makers, and through the connection with large NbS networks at EU level (e.g. NetworkNature) working together to generate a change in European legislation favoring the recognition and the adoption on NbS as main measures to mitigate the risks by hydro-meteo events.
  Interested RECONECT partners: all partners involved in Demostrators and Collaborators, GISIG and IUCN

RECONECT Outputs exploited: Guidelines for design, construction and maintenance, Standards, Guidelines for Monitoring and Evaluation
Target users: Policy and Decision Makers, Public and Private stakeholders, Research

- NbS-inspired consultancy, would build on the NbS expertise to advice local authorities, utilities, industrial companies, land planners in improving their business and its sustainability based on the findings from RECONECT on the development and implementation of large-scale NbS infrastructures. This could concern: social innovation on nature-related projects (including projects having an impact on nature like a new industrial plant), land management planning to make the best of local natural assets, governance aspects, optimize water management using local natural assets.
  Interested RECONECT partners: all partners involved in Demostrators and Collaborators, RAMBOLL as big consultancy company
  RECONECT Outputs exploited: lessons learnt from Demo and Coll
  Target users: Public and Private stakeholders, Industries

- NbS Global Networking, which would bring together the global community in NbS worldwide (practitioners, academia, promoters, cities, utilities, banks, real estate, construction companies, etc.). Networking activities would structure the knowledge into reference guidance and standard books. It would get in touch with national associations (e.g NbS National Hubs) and organize promotional activities of RECONECT outputs and joint activities. Networking activities would promote NbS towards government, produce reliable information for decision-makers (according the RECONECT User Engagement Strategy), train practitioners and organize world-class conferences. Revenues could come from sponsors and members, inspired by industrial associations and international societies.
  Interested RECONECT partners: IHE Delft, GISIG, IUCN, RECONECT institutional and academic partners
  RECONECT Outputs exploited: Guidelines for desing, construction and maintenance, standards, training framework
  Target users: EU NbS Networks, communities and initiatives

In addition, by identifying Lead Users in the area of nature-based solutions for hydro-meteorological risk reduction will help to transfer solutions that have been proven to be feasible on a smaller scale to other regions on a larger scale. Additionally, the usage of analogies from other application areas or other geographic areas might be beneficial. As Lead Users are often not interested in commercializing and scaling their inventions on their own, RECONECT might help them to jointly disseminate and transfer their innovations. Additional specific startups will be researched to exploit specific outputs developed by academic actors, for instance the co-creation tool, in NbS applications and beyond. A case-by-case approach will be undertaken. Such an exploitation activity would be conducted in connection with commercial exploitaiton and business plans as described in the dedicated deliverables of WP5.

Other exploitation opportunities with individual partners have been explored during the project and reported in the below table.

Table 4. Exploitation Plan of RECONECT results at individual partner's level

#	Partner	Type	Exploitation Plan
1	IHE	R&D	Large-scale NBS science will be embedded in teaching activities and modules Publishing scientific articles extensively in leading scientific journals Organising and delivering technical sessions/ workshops in external conferences Organization of a periodic Conference on "Nature-Based Solutions for Water Security and Climate Adaptation" NbS Global Networking
2	TUHH	UNI	Stimulate the 'NbS' Start-ups in using the RECONECT experience by liaising with/ actively supporting the TUHH in-house start-up incubators "Startup Dock" and Innovation Campus for Green Technology Large-scale NbS innovation aspects and RECONECT outcomes will be embedded in teaching activities and modules and training for professionals organised by TUHH Publishing scientific articles in leading scientific journals Promote and push the uptake of Holistic Ecosystem based framework, policy influence
3	TAUW	IND	Inclusion of RECONECT NbS into the company practice/portfolio for further projects and activities Transfer the knowledge to their relations in the Dutch water technology sector (e.g. the Water Campus, Leeuwarden) TAUW has a direct access to, stimulating the cooperation between national companies, research institutions and governments in water technology, to achieve synergy in innovation, education and entrepreneurship at a global level. (inter-)national publications and presentations
5	EUROSENSE	SME	Expanding of the enhancements of the monitoring technology into the company practice and portfolio for further projects and activities Provide actualised and precise geo-data in order to allow the regional and local authorities to use their budgets for NbS in the most optimal way; International roll-out of the applied RECONECT solutions to a large number of regions in Europe
6	NCKU	UNI	Large-scale NBS science will be embedded in teaching activities and modules Publishing scientific articles extensively in scientific journals
7	UIBK	UNI	Large-scale NBS science embedded in teaching activities and modules on Master and PhD level Publishing scientific articles in scientific journals Organising and delivering technical sessions/ workshops in

#	Partner	Type	Exploitation Plan
			external conferences Contribution of integrated design rules for retention basins including catchment NbS implementation for national guidelines and standards Estimation of Design Rainfall under Climate Change for national guidelines and standards
8	DTU	UNI	Large-scale NBS science will be embedded in teaching activities and modules Publishing scientific articles in scientific journals Organising and delivering technical sessions/ workshops in external conferences and technical and managerial committees nationally/internationally (e.g. IWA WWC Programme committee, IAHS) Utilising the Climate Change Impact Alignment Tool for the analysis of NbS potentials in current and future as supplementary material by linking to DTUs github
9	FHH	GOV	Consideration/ Implementation of the RECONECT NbS technology to the other relevant sites in the Elbe Estuary and its tributaries within the State of Hamburg Development of NbS Related Flood Risk Management plans in the sense of 2007/60/EC for the areas with significant risk assessed for the ongoing and future projects Harmonization between the goals and targets of the Directive 200/60/EC (Water Framework Directive) and the Directive 2007/60/EC (Flood Directive) and enhancing synergies applying NbS Promoting the RECONECT results through the “Hansa Office” in Brussels and a vast network of twin and partner cities and districts worldwide (including China)
10	ACA	GOV	Consideration of the RECONECT NbS technology and know-how to the other relevant sites within Catalonia, in the first instance the river catchments Ter and Muga
11	HYDS	SME	Expanding the company’s portfolio to include the products enhanced in RECONECT (Hydrometeorological processing and dissemination platforms (TLR 7-9)
12	UNEXE	UNI	Large-scale NbS science will be embedded in teaching activities and modules Publishing in scientific journals, organising technical sessions/ workshops in conferences Exploitation and update of guidelines for NbS monitoring and evaluation Exploitation and maintenance of the RECONECT MOOC
13	MON	UNI	Large-scale NbS science will be embedded in teaching activities and modules Publishing scientific articles in journals, Organising and delivering technical sessions/ workshops Collaborate with relevant Asia water community/ groups

#	Partner	Type	Exploitation Plan
			and organise joint activities for dissemination and exploitation of RECONECT results; Supporting the local authorities and river basin commissions to develop NbS flood risk management plans based on the RECONECT knowledge, experience and outputs
14	HR	SME	Expanding the company's portfolio to include the RECONECT NbS Technology (enhancements of the HydroNet and Water Detective App and HydroWatchTool (TLR5-7))
15	GISIG	SME/EU Ass	Support the exploitation of project results towards GIS scientific, technological and thematic communities and European level, including space data communities. Underpin the transfer of knowledge and the capacity building around RECONECT to target users/ new potential users, to enhance the application and the up-scaling of project products, in particular through the use of RECONECT Training Framework Investigate new research and project opportunities to continue and further develop RECONECT concepts into other EU projects Maintain the RECONECT web site for at least 5 years after the project end Take part in EU and National NbS Networks and Communities, participate in the EU NbS Task Force
16	ERCEPAN	GOV	Organising and delivering technical sessions/ workshops in external conferences Large-scale NbS science embedded in teaching activities (in cooperation with University of Lodz)
17	Warsz	GOV	Utilising the RECONECT knowledge products and services for other administrated river catchments (29 in total, such as Central Vistula or Jarft)
18	AMPHI	IND	Dissemination of the results of the R&D research and RECONECT, in the scientific and commercial fora, and developing business plan for the commercialisation of the innovation. AMPHI will use the extensive networks in the Baltic region to upscale the RECONECT NbS within the EU Life projects and various costal projects. Together with Odense, Amphi will showcase the demonstrated NbS and open it for interested public and agencies worldwide including some Mediterranean sheltered low laying coastal areas near the coast as Venice lagoon, Faro lagoon of the Croatian coastline
19	UNBELGR	UNI	Large-scale NbS science will be embedded in teaching activities and modules Publishing scientific articles in leading scientific journals Organising and delivering technical sessions/papers in conferences and other dissemination events Supporting the regional and local authorities and river

#	Partner	Type	Exploitation Plan
			basin commissions to develop NbS flood risk management plans based on the RECONECT knowledge, experience and outputs
20	PRONING	SME	Expanding the company's portfolio to include the RECONECT NbS and apply the gained knowledge and experience in the first instance for the development of the NbS related strategies at regional level Dissemination of lessons learned from RECONECT NbS to the main stakeholders as key condition to further implement NbS across the remaining river basins both Croatian and transboundary.
21	HAII	GOV	Consideration/ Implementation of the RECONECT NbS technology to the other relevant sites in the Chao Phraya River Basin, Thailand
22	BCDA	R&D	Collaborate with relevant professional associations and business clusters in Black Sea - Danube Region to organise joint activities to contribute to market innovation for NbS technologies Support creation of start-ups, jointly with the Regional Agency for Entrepreneurship and Innovation (the joint HighbTech Business Incubator project), by making use of RECONECT NbS technologies/ services Organise/deliver technical sessions/ workshops in conferences/local and national dissemination events Publish scientific articles in journals and conferences
23	InterAct	SME	Expanding the company's portfolio with the enhancements of the ICT (ICT Platform TRL 8-9; TeleControlNet 7-8 and SmartSensorKit 6-9)
24	UCA	UNI	Large-scale NBS science will be embedded in teaching activities and modules Publishing scientific articles in leading scientific journals Organising and delivering technical sessions and papers in conferences and other dissemination events
25	Ramboll	IND	Inclusion of the RECONECT NbS into the company practice and portfolio for further projects and consultancy activities
26	AAKS	GOV	Upscaling the gained knowledge and experience within the Greater Aarhus
27	Portofino	GOV	Promoting the integration of experimented NbS for climate change and hydro-geological risks mitigation into regional policies for land management planning/River Basin management plans. Disseminating at various levels (e.g. governmental, scientific) the Portofino Demonstrator and results, to promote replication, up-scaling of integrated NbS, IT solutions to mitigate climate change impacts. Acting as a "living lab" to demonstrate the applicability of the RECONECT model and to increase its replication potential in areas having similar territorial features, such as

#	Partner	Type	Exploitation Plan
			Italian coastal regions (Liguria, Campania, FVG, Sicilia) and Italian mountain regions (Piemonte, Valle D' Aosta, Veneto, Trentino), Mediterranean Islands, (Greece, Canaries…) and other specific places in the world (Chile, China…). Upscaling the gained knowledge and improve risk mitigation planning and action. Pushing the collaboration between the Portofino Park Authority and the main actors involved in the management of the area (including private land owners), to promote a new and innovative model of governance for land planning and rural activities, based on the *stakeholders participation*
28	CNR	R&D	Publishing scientific articles in leading scientific journals Organization of workshops, high-level forums and technical sessions in international conferences Collaboration with Scientific and Technical Groups to organise NbS experimental activities;
29	Odense	GOV	Consideration/ Implementation of the RECONECT NbS technology to the other relevant sites within cultivated lowland coast areas especially around fiords and lagoons sharing the knowledge within the Baltic Sea region within a number of EU Life Projects
30	Varna	GOV	Promote use of RECONECT knowledge products and services in implementation of the planned measures in the National Operational Programs "Environment", and "Regions in Growth" (EU Structural Funds). Involve local authorities from the Region to take up NbS initiative, and promote NbS technology businesses plan and potentially initiate regulatory and institutional changes, if and where appropriate, to facilitate the up scaling of the NbS innovative technologies
31	IWACons	IND	Inclusion of RECONECT NbS to the company practice and portfolio for further projects and consultancy activities The experience gained will be used to inspire and advise regional and local authorities in Western Balkans to include NbS for the water management based on the RECONECT knowledge and output
32	UFZ	R&D	Publishing scientific articles extensively in leading scientific journals Linking RECONECT with relevant exchange platforms on European level Knowledge synthesis products or European relevance informing European wide discussions on nature-based solutions; Contribute to the dissemination of RECONECT by organising session at international conferences
34	Eawag	R&D	Publishing scientific articles extensively in leading scientific journals The enhancements of the technology and methods applied to the Thur river will be used for further projects, e.g., "Water

#	Partner	Type	Exploitation Plan
			distribution" (funded by the Swiss National Science Foundation), "INSPIRATION (EU Marie Curie Project) and Swiss National River Restoration Programme (strategic programme until 2080)
36	UPM	UNI	Large-scale NbS science will be embedded in teaching activities and modules. Publishing scientific articles in journals. Collaborate with relevant Asia water community/ groups and organise joint activities and disseminate RECONECT outcomes. Supporting the local authorities and river basin commissions to develop NbS flood risk management plans based on the RECONECT knowledge, experience and outputs.
37	IUCN	INT/NGO	Publish articles in water related journals and magazines Collaborate with relevant EC Water groups and actions to organise joint activities and disseminate RECONECT outcomes Disseminate RECONECT knowledge through social (Facebook, LinkedIn, Twitter) and print media (press releases, newsletters etc. Engage IUCN Nature-based Solutions group and Members to provide feedback and disseminate RECONECT Organise RECONECT seminars and sessions at water and climate relevant conferences and meetings Networking at global level

References

European Commission (March 2004) - Aid Delivery Methods, Volume 1 Project Cycle Management Guidelines

Link to RECONECT web pages and resources:

- Website
- Social Media
  - ✓ Facebook Page
  - ✓ Twitter Account
  - ✓ LinkedIn Page
  - ✓ YouTube channel
  - ✓ ResearchGate

- Resources accessible from the Publications page of the project website:
  - ✓ Brand guide (in the section Visual Identity)
  - ✓ Newsletters
  - ✓ Project leaflet (in the section Brochures, flyers)
  - ✓ Demonstrators and Collaborators posters
  - ✓ Scientific Publications
  - ✓ Press Release

Annex I. RECONECT User Engagement Strategy

RECONECT's Engagement Strategy

Annex I of the Deliverable 6.11

Disclaimer: Ramboll contribution to deliverable D 6.11 lead by GISIG
For more information, please consult D 6.11 Final Exploitation and Dissemination Plan for outreach

Authors: Andreea Florea, Jens Christian Riise - RAMBOLL

Contributors: GISIG

Acknowledgement

This project has received funding from the European Union's Horizon 2020 Research and Innovation Programme under grant agreement No 776866

Executive Summary

The main goal for Task 6.5 is to develop an engagement strategy aiming to maximize RECONECT impacts. The engagement strategy will ultimately serve to impact decision makers, as well informing and engaging local stakeholders, with the aim of deploying NBS, by enabling a move from knowledge to action – from awareness to engagement, support, financing, and implementation of holistic NBS.

The strategy will suggest approaches which may inform and engage broader groups of stakeholders and decision makers and support the development of policies, strategies and action plans by bridging the experience and knowledge from RECONECT partners to national, regional and local decision makers, and national and local authorities eventually in charge of making change happen.

The strategy will suggest specific avenues to inform and engage targeted stakeholders to maximize RECONECT impact over time.

The engagement strategy is an important part of the necessary actions to sustain the longer-term impact of RECONECT. By directing messages to policy makers, decision makers and local authorities and stakeholders interested in NbS, the results and lessons learned from RECONECT will potentially get a broader audience and evolve into new NbS projects and actions at national, regional and local levels.

The main target groups of the engagement strategy are:

- Local and regional policy makers, paving the way for more NbS, i.e in the city/municipal governments, and administrations, supported by municipal water utilities and nature administrators;
- Local stakeholders, incl public and private property owners from the agricultural sector and other affected sectors, as well as citizens from the local areas, seeing their mutual benefits and collaborating openly and providing land and resources to support and sustain the NbS actions/interventions locally;
- National, regional and local water, nature and land-use planners, administrators and decision making /authorities, taking informed decisions, based on the available local plans, regulations and legal frameworks;

Key research findings/lessons learned from this work are:

- NbS is generally seen as a nature-positive and cost-effective way of creating climate resilient solutions integrating a holistic view on adaptation with multiple benefits;
- The legal frameworks at EU and national levels are already there to enable the use of NbS as a tool in creating local climate resilience, hand in hand with improving nature and biodiversity;
- The complexity and the hierarchy of EU legal frameworks with strong directives, such as the WFD, the Birds Directive and Natura2000 framework, and less strong strategic frameworks, makes it sometimes difficult for national and local authorities to quick decisions in favor of NbS.

Recommendations / actions that are highlighted as part of the deliverable:
Clear messages should be developed underscoring the need for

- Holistic approaches involving all relevant stakeholders and sectors in the identification of locally tailored solutions, and the necessary legal and financial opportunities.
- Communication and collaboration across national, regional and local levels is crucial to assure the buy-in and support of all relevant stakeholders.

Contents

Executive Summary 3

Contents 4

List of figures 5

List of tables 6

Abbreviations 7

1 Introduction 9

1.1 Visions, aims, objectives 10
1.2 Expected outcomes 10

1.3 Methodology 11
2 NbS: from EU-level to national-level policy 12

2.1 Policy review 12
2.1.1 Overview of NbS-related frameworks 12
2.1.2 Breaking down compliance 16

2.2 Regulatory and institutional challenges and opportunities 17
2.2.1 Regulatory gaps 17
2.2.2 Enforcement gaps 18
2.2.3 Coherence gap 18
2.2.4 Funding gap 19
2.2.5 Complexity – multiple stakeholders 19
2.3 Key messages 19

3 Definition and categorization of target audiences 23

3.1 Stakeholder analysis 23
3.1.1 Methodology for stakeholder mapping / analysis 23
3.1.2 Identification and Mapping 24

4 Engagement strategy 29

4.1 General set up 29
4.1.1 Introduction 29
4.1.2 Principles for engagement 29
4.1.3 Scaling up to wide-spread adoption 29

4.2 Engagement methodology 31
4.2.1 Introduction 31
4.2.2 Stakeholder Management 32
4.2.3 Channels for communication and activities 34
4.2.4 NbS success and limitations analysis 36
4.2.4.1 Cases 36
4.2.4.2 Success factors and limitations 39

5 Conclusion 42

References 43

Appendix A – Policy Review 47

List of figures

Figure 1: NBS related terms based on the reviewed legislation (reviewed chronologically).14

Figure 2: Hierarchy of NbS Legislation.....16

Figure 3: EU policy priorities on climate adaptation 20

Figure 4: Terminology under the NbS umbrella.....21

Figure 5: Two-dimensional power/influence and interest matrix (Eden & Ackermann, 1998) 24

Figure 6: Stakeholder Groups in RECONECT - Source: RECONECT Consortium (2018) Deliverable 4.1 25

Figure 7: Stakeholder Roles in RECONECT - Source: RECONECT Consortium (2018) Deliverable 4.1 26

Figure 8: Power and interest matrix 27

Figure 9: Moving from limited uptake to wider adoption of NbS 30

Figure 10: Decision-making map 32

List of tables

Table 1: Current regulatory environment that engages NbS……12
Table 2: Stakeholder Management of Key Stakeholders 33
Table 3: Engagement strategies and target groups 35
Table 4: Success and limiting factors for NbS implementation……38

Abbreviations

BGI - Blue and Green Infrastructure 16
CCA - Climate Change Adaptation 16
DRR - Disaster Risk Reduction 9
EbAp - Ecosystem-based Approaches 21
EbM - Ecosystem-based Management 16
FD - Flood Directive 20
GI - Green Infrastructure 16, 20
MS - Member States 15
NbS - Nature-based Solutions 9
SFM - Sustainable Forest Management 17
SFM - Sustainable Management 16
WFD - Water Framework Directive 19

1 Introduction

Devastating floods in Europe last year have shifted the outlook for the European countries, highlighting growing concern for social and economic effects of floods and the need for an integrated more holistic approach to Disaster Risk Reduction (DRR), enabling more co-benefits in terms of nature conservation and improved biodiversity, but also reducing the initial investment costs for DRR, using the Nature-Based Solutions (NbS) on a much broader scale than previously. The imperative is now not merely conservation of nature but activating NbS within DRR frameworks. Building with nature and for nature has become the new way of conceiving socio-economic benefits at the same time, as improved environmental conditions, with a focus on land use management, biodiversity and water resource management can be considered. Across Europe, biodiversity and water resources are still under growing pressure, not least due to changing climate conditions.

In light of these events, our approach aims to strengthen the synergy between flood risk management and nature conservation, united for the purpose of DRR. Across Europe, we see a growing pressure on natural protected areas in connection with flood protection planning, highlighting the needs for better integrating flood risk management with nature concerns. We also experience good examples of successful projects where flood risk management and nature restoration and conservation go hand in hand. Both in an urban and rural context, nature-based solutions must be capitalized with a strong focus on biodiversity and specifically on hydro-meteorological risk reduction.

According to EU, spatial planning, including regulation of floodplain development and relocation, should consider more ‘room for rivers’, and this approach acting as a catalyst for reducing flood risk and addressing water scarcity, could have beneficial effects for both floods and water scarcity. Nature based solutions (NbS), which do not involve large structural measures, such as dikes and pumps, are more flexible and sustainable, than the hard measures. During major events where neither pumps nor dikes suffice, it is increasingly vital to allow rivers and seas to flow along their natural courses, such as lowland fields and wetlands. It's advantageous to utilize the landscape's natural elevations as protective barriers to mitigate flooding. Using naturally occurring features as passive flood defence mechanisms forms is a central aspect of NbS.

In conclusion, there is a growing need for more holistic urban and peri-urban and rural landscape planning under changing climate conditions, where DRR becomes a central aim, balanced with environmental objectives, enabling the best solutions for the natural environment and the communities relying on it. The challenge is to find the right balance, building with nature, utilizing natural landscapes, and integrating them into climate adaptation plans, and safeguarding biodiversity and vulnerable habitats, but also protecting communities against flood in the least costly manner. This is a recalibrated environmental management approach that is foundational of this strategy. Finding the best solutions demands a holistic view and strong stakeholder involvement from planners and environmentalists to local communities, politicians, and governmental agencies.

The main goal for Task 6.5 is to develop an engagement strategy aiming to maximize RECONECT impacts and consideration of NbS from a DRR standpoint. The strategy will not only serve decision makers but inform and engage local stakeholders on the benefits of deploying NBS for climate adaptation, by enabling a move from knowledge to action – from awareness to engagement, support, financing, and execution of holistic NBS. The strategy will suggest approaches which direct attention to the role of NbS in DRR, inform and engage broader groups of stakeholders and decision makers and support the development of policies, strategies, and action plans by bridging the experience and knowledge from RECONECT

partners to national, regional, and local decision makers, and national and local authorities eventually in charge of making change happen.

To reinforce the application of NbS for hydro-meteorological risk reduction, the strategy will suggest specific avenues to inform and engage targeted stakeholders to facilitate RECONECT's long-term success.

1.1 Visions, aims, objectives

The vision of the RECONECT Engagement Strategy is to enhance and inform the engagement of key stakeholders that flood mitigation measures across Europe and abroad will be centered around holistic nature-based solutions (NbS) for DRR and less on merely hard physical structures.

Furthermore, it is the vision of the strategy that will help a broad engagement and create ownership of the holistic solutions, and that national and regional legal frameworks will support the long-term development of NbS for hydro-meteorological risk reduction.

The overall aim is to facilitate a faster adoption and implementation of NbS for DRR purposes throughout Europe and help facilitate the identification of opportunities and release of funding for NbS through relevant EU financing mechanisms.

1.2 Expected outcomes

1. Effective implementation
This document creates a basis for engaging key stakeholders at different required levels: local, regional, national, European. Engaging the right stakeholders, positions one better for successful implementation, as their input forms the execution process. Moreover, by aligning NbS advocacy with DRR targets raising awareness among the key stakeholder with a role in decision making, making use of key messages that make the case for NbS measures to support negotiations and/or awareness raising - compelling communication can significantly increase the chance of success.

2. Informed decision-making
Through targeted stakeholder engagement, decision -makers are provided with valuable insights. A deeper understanding is gained by identifying the regulatory gaps that need to be addressed to support the mainstreaming of NbS, by identifying the suitable tools and approaches for the upscaling implementation and mainstreaming of NbS, which leads to more effective action. This should also create a basis for creating coalitions/synergies between stakeholders.

3. Strengthened policy with regard to NbS
The engagement strategy should shape the development of NbS, with a long-term outcome being an improved policy relevance, responsive to the identified concerns and needs. The strategy helps position NbS as a central topic in climate action and target funding opportunities and improve accountability of decision making.

1.3 Methodology

This study adopts a comprehensive approach, drawing upon research papers, publications from institutions, and insights gathered from an interview.

Initially, the research focused on reviewing various policies pertinent to the study's scope. This involved analysing a diverse array of policy documents, reports, and publications to gain a comprehensive understanding of the regulatory landscape and contextual factors influencing the research topic.

Subsequently, in the stakeholder mapping and analysis phase, have been used previous deliverables from the RECONECT project, complemented by the team’s expert knowledge in the field. This approach allowed the identification and analysis of key stakeholders, their roles, interests, and relationships within the context of the research area.

By integrating insights from established literature and leveraging both external and internal expertise, this methodology ensures a robust and holistic examination of the research topic, facilitating a deeper understanding of the complexities involved.

2 NbS: from EU-level to national-level policy

2.1 Policy review

2.1.1 Overview of NbS-related frameworks

Table 1: Current regulatory environment that engages NbS

Name of Regulation/ Directive/Strategy	NBS terms used	Area of focus of NBS or relative terms	Level of support explicitly for DRR	Legal enforceability
EU Strategy on Adaptation to Climate Change	NBS, GI, EbAp			
EU Biodiversity Strategy for 2030	EbM, GI, NBS			
EU Forest Strategy for 2030	SFM, EbAp			
EU Soil Monitoring Law for 2030	NBS, GI, SM			
Climate Change Framework Law	NBS, EbA			
Water Framework Directive	NBS, EbA			
Flood Directive	NWRM, Sustainable land use practices			
EU Blue Economy for a Sustainable Future	NBS, GI, EbAp			
EU Action Plan on the Sendai Framework for Disaster Risk Reduction	NBS, GI, EbAp, NWRM			
The EU Green Infrastructure Strategy	NBS, GI, EbAp			
The EU Restoration Law	NBS, GI, SM, EbA			
Habitats Directive and Birds Directive	none			
EU Taxonomy	NBS, BGI			
Natura2000	none			
Land Use, Land Use Change and Forestry Regulation	SM/SFM			
EU Action Plan for Nature, People and the Economy	GI			

Legend

Level of support of DRR: Low, Medium, High

Area of focus of NBS: Climate change adaptation or climate resilience; Restoration or protection of nature/ecosystems

Legal enforceability: Guidelines; Legally binding

Within the European Union (EU), a comprehensive framework of regulations, directives, strategies and proposals has been established to address the pressing challenges of climate change, ecosystem protection and sustainability. While NbS may not be always explicitly defined, its principles are often implicitly incorporated into various legislative measures.

Beginning with foundational regulations such as the Climate Change Framework Law (2021/1119), the EU sets binding objectives for achieving climate neutrality by 2050 and reducing greenhouse gas emissions by 2030. This legal framework not only emphasizes the imperative of climate change adaptation across all policy areas but also mandates Member States (MS) to develop and implement national strategies for adapting to climate change, incorporating NbS principles to enhance resilience and mitigate risks. Overall, the law enforces obligatory measures for reaching climate adaptation objectives but only mildly endorses NbS, treating it more as a recommendation rather than actively promoting it.

Similarly, directives like the Water Framework Directive (WFD 2000/60/EC) and the Flood Directive (FD) focus on safeguarding water bodies, promoting sustainable water management, and managing flood risks. While these directives may not explicitly mention NbS, their underlying principles align with NbS measures such as land protection, restoration, and sustainable agricultural practices, even though with limitations in recognizing NbS's potential for drought resilience and disaster risk reduction. Also, the LULUCF regulation on land-use, explicitly supports various NbS projects such as the protection of wetlands, or the restoration of degraded lands, but does not make any direct reference to NbS.

Concurrently, the EU Restoration Law establishes binding targets for conserving and restoring ecosystems, explicitly designating NbS as crucial for achieving biodiversity restoration and addressing climate change impacts. The Habitat Directive and Bird Directive, although not explicitly referencing NbS, are interconnected with the EU Nature Restoration Law, recognizing the role of NbS in achieving biodiversity preservation and ecological sustainability (European Commission, 2022).

The Habitat Directive and Bird Directive are the linchpin of Natura 2000 network, the world's largest coordinated network of protected areas. Natura 2000 represents a binding commitment by the European Union to safeguard biodiversity. As the world's largest ecological network, its primary purpose is to protect natural habitats and ensure the well-being of wild fauna and flora species. Nevertheless, while Natura2000 aligns with the concept of NbS, it faces a challenge due to its conservative approach focused on preserving natural habitats without direct intervention. This contrasts with NbS for disaster risk management, which involves proactive habitat restoration measures. However, acknowledging the restorative potential of NbS, it can complement the Natura2000 framework by revitalizing ecosystems impacted by degradation and climate change hazards.

Beyond regulations and directives, overarching strategies like the EU Green Deal encompass a comprehensive set of policy initiatives designed to guide the EU towards a sustainable transition, with NbS embedded as a fundamental component. Similarly, the EU Biodiversity Strategy for 2030, the EU Strategy on Adaptation to Climate Change and the EU Forest Strategy for 2030 emphasize the adoption of NbS as necessary measures to enhance resilience, mitigate risks, and promote sustainable management practices. Specifically, the EU Biodiversity Strategy emphasizes NbS's crucial role in restoring ecosystems, promoting Ecosystem-based Management (EbM), and mainstreaming NbS into policies through financial support and regulatory measures (European Commission, 2020). The EU Strategy on Adaptation to Climate Change endorses larger-scale NbS as cost-effective measures for climate resilience, while the EU Forest Strategy, although not explicitly using the term NbS, aligns with its principles through adaptive forest restoration and biodiversity-friendly practices.

Furthermore, the EU Blue Economy for a Sustainable Future explicitly supports NbS as alternatives to traditional ‘grey' infrastructure for climate adaptation, emphasizing their role in preserving biodiversity and coastal ecosystems (European Commission, 2021c). The EU Action Plan on the Sendai Framework for Disaster Risk Reduction integrates NbS for disaster management, highlighting their cost-efficiency and co-benefits.

The EU Green Infrastructure Strategy recognizes NbS's potential in risk management approaches and emphasizes their use as partial or complete measures to achieve policy objectives. However, policies like the EU Urban Agenda acknowledge NbS but rely on member states' voluntary commitments, lacking mandatory standards or support mandates (Calliari, et al., Building climate resilience through nature-based solutions in Europe: A review of enabling knowledge, finance and governance frameworks., 2022).

The EU Taxonomy aims to direct investments towards NbS projects by incorporating NbS criteria into its regulatory framework, promoting their inclusion in economic activities (European Commission, 2023). Similarly, the EU Action Plan for nature, people, and the economy actively supports NbS through provisions for green infrastructure development and disaster mitigation. The current legal and regulatory frameworks were primarily designed with traditional infrastructure methods in mind, making it difficult to integrate Nature-Based Solutions (NbS) into this system (Davies, Chen, Sanesi, & Lafortezza, 2021). Additionally, several frameworks understand NbS from a nature protection approach, which is a challenge when the lens change to view NbS from an adaptation perspective. To fully implement NbS, governments must assess and, if necessary, modify their regulations to remove obstacles hindering NbS adoption. Drastic changes in regulations might not always be necessary; promoting NbS effectively can be achieved within existing frameworks.

The incorporation of NbS-related terms within EU legislation demonstrates their increasing relevance and evolution over time. Green and blue infrastructures are prominently featured in policies like the Biodiversity Strategy (2011), Green Infrastructure Strategy (2013), Forestry Strategy (2013) and Adaptation Strategy (2013). Specific terms like 'working with nature' are exclusive to certain policies, while others like 'natural water retention measures' are found in directives like the Floods Directive and Common Agricultural Policy. However, while terms like 'sustainable management' pre-date NbS-related expressions, most of the current terms under the NbS umbrella are newer, emerging concepts. Overall, the terms in EU legislation reflect a dual narrative: some explicitly signify the use of natural systems as infrastructures, while others are more open and ambiguous, lacking clarity regarding their NbS orientation.

.

Source: (McKenna, Abhold, Mederake, & Knoblauc, 2017)

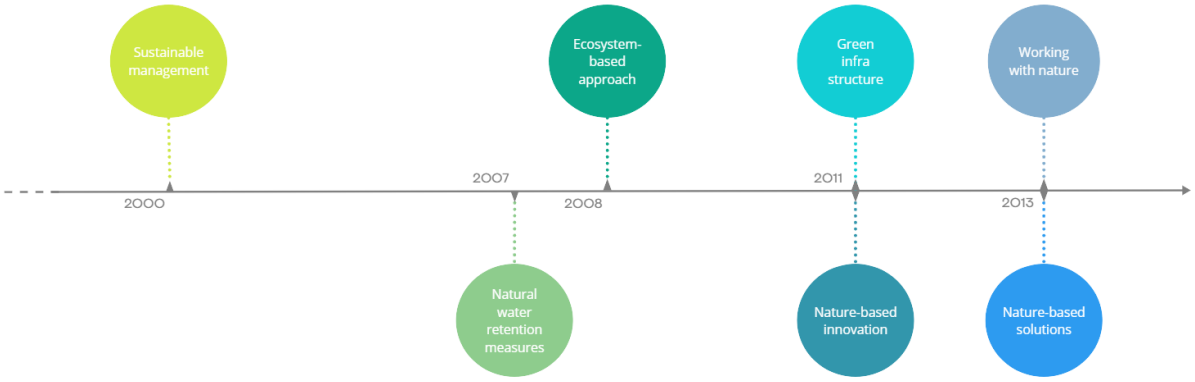


Figure 1: NbS related terms based on the reviewed legislation (illustrated chronologically)

2.1.2 Breaking down compliance

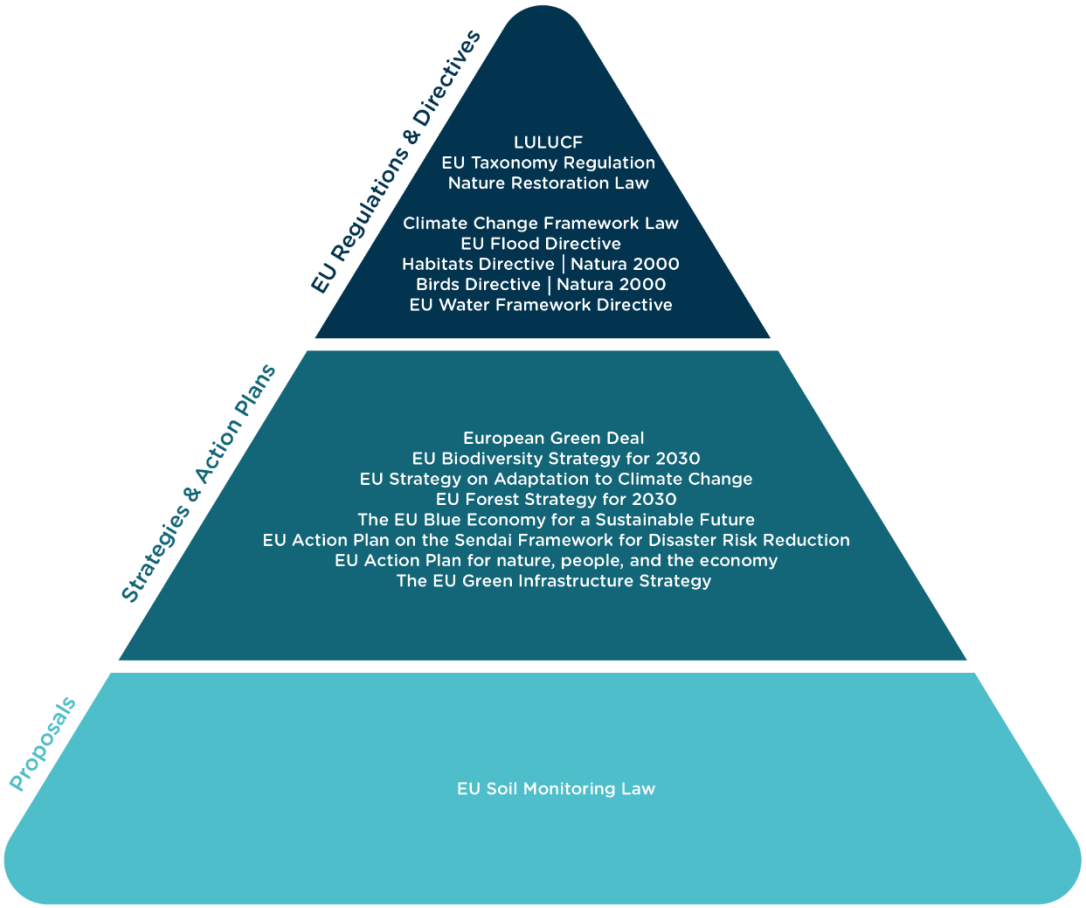


Figure 2: Hierarchy of NbS Legislation

In general, there are some shortcomings in the binding nature of existing policies, which limits their capacity to drive action effectively. The main gap that hinders NbS uptake is that mandatory requirements for including or designing NbS **are still lacking** in multilateral agreements (e.g., Paris Agreement, SDGs, SFDRR) at both global and EU levels (EEA, 2021). **Objectives are ambitious but remain non-binding**. Legal acts such as recommendations and communications can guide policy development and it encourages dialogue, but lacking establishing legal obligations, they also lack the drive of pushing the NbS agenda forward. For instance, the EU Green Infrastructure Strategy lacks measurable targets serving more as an informational resource than a catalyst for implementation. The non-binding nature of policies contributes to a gap in requirements for mainstreaming Green Infrastructure (GI) and monitoring its implementation, posing a critical challenge to the uptake of NbS (Davis, Abhold, Mederake, & Knoblauch, 2018). Similarly, the effectiveness of the EU Urban Agenda is uncertain since Member States have the flexibility to select their preferred priority themes. They are merely urged to participate in voluntary partnerships for the development and execution of action plans. Given that the adoption of supportive national and local policies is crucial for promoting the integration of Nature-Based Solutions (NbS), the absence of EU

mandates for incorporating the concept and overseeing its implementation represents a crucial gap (Trémolet, 2019).

Another characteristic example would also be the Floods Directive. Although there's some recognition of NbS potential for mitigating different disasters, the policies lack a clear push for their use. To bridge this gap, it's crucial to set specific goals, measurable targets, and a strong commitment to integrating NbS. The gap also involves a lack of effective enforcement mechanisms, highlighting the need for policies that not only recognize but actively promote and integrate NbS, ensuring a more effective and impactful approach to flood management strategies (EEA, 2021). Furthermore, integrating NBS into national and local policy instruments is necessary to enhance synergy and coordination across EU Member States. Identifying common goals and areas of synergy across different policy levels can strengthen the capacity for a unified EU-wide response (Vojinovic, 2020).

As shown in Figure 2, here is a clear “hierarchy” between different legal frameworks at EU, which seems to be a hinderance to implementation of NbS in EU. Strong and particularly important nature protection laws, such as WFD, Biodiversity law, the new Restoration law, the Birds directive and the Natura2000, are there to make sure that countries do not, by any means, reduce the areas designated for nature protection and rehabilitation.

However, NbS in practice tries to bridge between nature restoration and conservation needs and the protection of land use in broad perspective, including other considerations such as farming, urban planning, infrastructure needs etc. Unfortunately, national or regional nature-protection and administration agencies may see it is as a loss for overall nature conservation, if other issues, such as DRR, protecting valuable property for house owners, infrastructure, and farmland, are taken into consideration.

2.2 Regulatory and institutional challenges and opportunities

2.2.1 Regulatory gaps

Extensive research on diverse policies/directives and action plans addressing NbS or relative concepts, revealed that despite the integration of NbS into policy objectives, actions, and instruments over the past decade, there are some critical gaps hindering the uptake and mainstreaming of NbS strategies. These gaps pose significant challenges to assessing progress, ensuring effectiveness, and realizing the benefits of NbS initiatives. General weaknesses across policies are related to a lack of clear implementation plan with clear targets and deadlines, challenges in providing adequate funding, lack of strong enforcement mechanisms and limited coherence.

One major gap identified is the absence of established standards, requirements and quantitative targets within EU for mainstreaming Green Infrastructure (GI) and monitoring its implementation (Calliari, et al., 2022; Vojinovic, 2020). The EU Strategy on Adaptation to CC fails to detail how actions will be better integrated in planning, adding to this gap. The lack of quantitative and standardized indicators across policies for monitoring and evaluating the progress and effectiveness of NbS hinders the assessment of their benefits, co-benefits, as well as potential trade-offs and their general mainstreamed implementation (Somarakis, Stagakis, & Chrysoulakis, 2019). This gap impedes the integration of NBS into broader policy frameworks, limiting the potential for coordinated and systematic uptake (Vojinovic, 2020) and is reflected for instance in the EU Biodiversity strategy, which while touching upon ecosystem protection/restoration, does not set specific targets for NbS. This deficiency also extends to the communication of these standards to implementers and decision-makers, resulting in a need for clearer dissemination strategies (Calliari, et al., Building climate resilience through nature-based solutions in Europe: A review of enabling knowledge, finance and governance frameworks., 2022). Mechanisms such as those outlined in the EU GI Strategy, EU Restoration

Law and WFD may fail in providing measurable targets and lacking guidance or may set targets and guidelines which are directly counteracting the objectives and targets of other legal frameworks.

2.2.2 Enforcement gaps

Enforcement is a central gap, NbS being guided by soft law mechanisms, such as guidelines and recommendations, which do not create obligations, but may shape policy and legislative initiatives or funding programs. There is a general lack of legal force surrounding NbS. The strategies with the most explicit endorsement of NbS are most often the ones with less legal enforceability. For example, the EU Strategy on Adaptation to CC explicitly supports NbS, while mainly incentivizing and assisting the Member States to adopt NbS. This is done with soft mechanisms, such as guidance, capacity building, and assessments. Furthermore, the EU Action Plan on the Sendai Framework for Disaster Risk Reduction and the Urban Agenda reveal weak enforcement mechanisms and reliance on member states' self-initiative and voluntary commitments, which demonstrate the broader challenge of enforcing NbS initiatives. Moreover, laws with stronger enforcement often do not require Member States to implement NbS over other types of solutions. While for instance the EU Soil Monitoring Law establishes an extensive monitoring framework, it only mandates Member States to identify contaminated sites, not implement measures to restore the soil. Therefore, the legally binding demand for MS to incorporate NbS is missing. Lastly, the directives with effective compliance mechanisms, like the Water Framework Directive or the Flood Directive, do not explicitly mention NbS. This limited recognition and lack of guidance through those directives limits implementation, as well as funding.

Addressing these gaps requires adequate funding, which indicates a need for sustainable finance to support the delivery of objectives related to NbS, but challenges remain in securing adequate funding. The EU Strategy on Adaptation to Climate Change is an example of a policy that does not specify dedicated funding options with regards to NbS. Collaborative initiatives and enhanced funding outlined in EU-level policies, such as the Biodiversity Strategy for 2030 and the European Green Deal, are seen as key elements for achieving this, although even here the Biodiversity Strategy does not clearly outline a funding plan.

2.2.3 Coherence gap

Another significant challenge is the lack of coherence among policies at both EU and global levels. This absence of alignment creates fragmented governance arrangements, leading to limiting collaboration, synergies, and fragmented financing across diverse agendas (Trémolet, 2019; Somarakis, Stagakis, & Chrysoulakis, 2019). The most significant example is that conserving biodiversity often conflicts with climate adaptation objectives, indicating a lack of coordination between DRR and GI/NbS strategies. A significant example of this can be seen by the Natura 2000 Network to safeguard biodiversity. The strict protection systems can be a hindrance to NbS implementation because projects impacting Natura2000 sites need to undergo strict assessments and the main objective of Natura2000 is the approach of non-intervention to restore ecosystems. In addition, the EU Green Infrastructure Strategy focuses strongly on GI while not prioritizing other types of NbS, which could lead to fragmented efforts. Moreover, there often is a time lag between implementation measures and observable improvements. There is a need for further coordination of sectoral planning instruments and mainstreaming of NbS at the EU level to minimize conflicting requirements and promote cross-sectoral collaboration for multifunctional solutions.
Furthermore, there is significant potential to increase integration and ambition across existing policies; The European Climate Law proposal, the new EU Adaptation Strategy, and the EU Biodiversity Strategy 2030 can play crucial roles in enhancing policy coherence and ambition on NbS.

In conclusion, while existing policies provide some strong starting point, there is a clear need to strengthen ambition and support across sectoral policies to optimize the uptake and mainstreaming of NbS. Clear objectives, measures, enforcement mechanisms, and adequate financing are deemed essential for achieving the desired impacts and effectiveness of NbS initiatives (EEA, 2021).

2.2.4 Funding gap

One of the most frequently mentioned barriers for implementation and upscaling of NbS is the funding for implementing NbS. According to the interviewees, the relevant municipalities often do not have necessary funds available and need to prioritize other policy areas. Moreover, national funding is difficult to receive because the national government needs to see a clear need for a NbS first, often in relation to DRR. A second barrier that complements this is that the implementation of NbS is often an option, but never mandatory, which increases the difficulty of explaining the cost-benefits to convince policymakers. In addition to that, a barrier is seen in the overall missing awareness of benefits, knowledge and capacity in local and regional authorities regarding NbS. Another barrier identified by several interviewees is the private ownership of the land, making it a long and often difficult process to negotiate the terms for implementing NbS on private land.

2.2.5 Complexity – multiple stakeholders

The difficulty of managing a high number of stakeholders and communicating effectively is mentioned. However, the success of NbS implementation seems highly relying on local ownership and a common understanding of the DRR challenges and the NbS as a cost-effective way of managing floods, and at the same time enabling improved livelihoods, nature conservation and improved biodiversity.

A last barrier frequently mentioned, is at the same time sometimes seen as an enabler and it comprises local, national, and transnational legislation. Whether present legislation acts as an enabler or barrier depends on the local context. One example of a barrier is a local protection act making it more difficult to implement NbS. Furthermore, implementation requires land use change, which can pose problems with nature conservationists. At the same time, legislation can also enable the implementation of NbS through, for instance, a federal law for river restoration. Finally, policies on the European level can enable or inhibit NbS. Natura2000 was mentioned as an enabler for two of the Demonstrator sites, however with its focus on nature conservation and protection it could also act as a barrier.

2.3 Key messages

Legal frameworks for environmental protection must evolve to meet the realities of climate change conditions. Rigid conservations perspectives might not hold up against the shifting landscapes. Policies and strategies need to foster adaptive approaches and align with the dynamic changes in nature, while ensuring the sustainability of livelihoods – by connecting adaptation goals with NbS, policymakers can effectively mitigate the impacts of climate-related disasters. This is the essence of our message. The tension between the preservation efforts of environments and the need to evolve with it calls for a proactive engagement strategy that ties NbS to DRR goals, an adaptive approach to ecological management on local, regional and national levels.

The recently published European Climate Risk Assessment Report (EUCRA) speaks to the urgency to act in policy areas (see below fig), based on climate risk severity. Marine, coastal ecosystems and infrastructure for flooding are under catastrophic or critical risk and urgent action is needed, a fact that is supported by high confidence data. Considering these findings, it is crucial to reposition NbS at the forefront. Bridging this data with key messages for engagement can illustrate the direct stakes of insufficient action and the need to mobilize support for NbS as a critical support tool within DRR strategies.

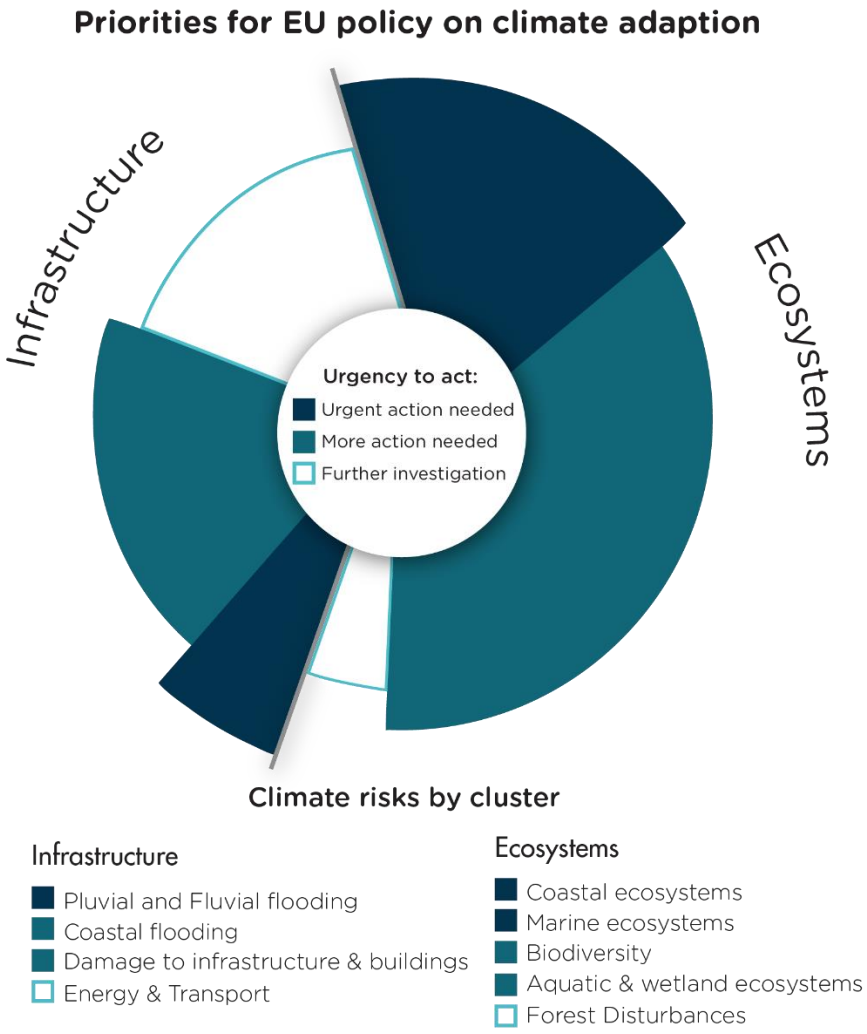


Figure 3: EU policy priorities on climate adaptation

Data source: (EEA, 2024)

Assessing NbS impacts can reinforce the evidence base, which is instrumental for gaining wider acceptance of NbS and integrating them into policy and development. An effective engagement strategy will leverage this evidence to advocate for better integration of NbS in policies and funding streams, thereby aligning with the DRR agenda.

Sharing practical experience plays a crucial role in recognizing NbS as a viable and effective type of infrastructure. To persuade decision-makers, NbS must demonstrate concrete results. In this effort, understanding the costs and benefits of NbS is imperative, as informed arguments rely on well-grounded data. Linking NbS cost-benefit analyses directly to DRR budgeting considerations can persuade financiers to allocate resources to NbS.To achieve this, dedicated funding for monitoring and evaluation is necessary to overcome knowledge gaps and instill trust in its efficacy. Identification of new funding streams and integration into current mechanisms can alleviate current financial constraints. The novelty of NbS (Figure 1) and the related concepts and the delay in observing the benefits of this measure post-implementation is a hurdle that must be overcome.

Knowledge gaps remain an issue that must be addressed (network-nature knowledge brief). By closing these gaps key stakeholders will be enabled to acknowledge the gains of NbS and champion these strategies effectively.

Additionally, the lack of awareness underscores the need for capacity building to strengthen NbS practices. Through targeted capacity building at governance bodies and planning authorities, the linkage between NbS and DRR is reinforced. The policy review identified a pressing need for comprehensive guidelines, standards, and best practices to support the implementation of NbS. With proper technical support and metrics to measure success, the quality of delivery improves, and progress can be tracked over time for a secure buy-in.

Confusion arises from the multitude of terms associated with NbS (
Figure 4). To strengthen messaging, it's important to standardize terminology across plans, strategies, and policies, ensuring stakeholders have a shared understanding of the concept and its goals. Establishing a clear vocabulary and streamlined terminology is imperative to translate scientific findings into compelling narratives and avoid misuse. Hence scientific evidence can be distilled into political action.

Figure 4: Terminology under the NbS umbrella

Strengthened and legally binding enforcement mechanisms are critical in governance, as strong enforcement at EU level is paramount to ensure NbS is prioritized across member states. With clear provisions, NbS for disaster risk can be woven into environmental policy and supported by funding at all administrative levels. Moreover, through cross-sector coordination NbS can move from a fragmented to a coherent governance.

3 Definition and categorization of target audiences

3.1 Stakeholder analysis

3.1.1 Methodology for stakeholder mapping / analysis

The identification of the key stakeholders is a crucial step for identifying and understanding the dynamics of their involvement and influence in decision-making processes and therefore produce the appropriate engagement strategy.

In general, stakeholder is a person, group or organization with a vested interest, or stake, in the decision-making and activities of a business, organization or project. Stakeholders may either hold official roles within the organization, business, or project they are invested in, or they may have no official affiliation. Regardless, stakeholders can have influence, whether directly or indirectly, on the activities or projects of an entity. In the current context, stakeholders are actors that can be influenced by, or exert influence upon, the implementation and selection of NbS as a measure for disaster risk reduction. This encompasses groups operating within the sphere of NbS influence or those directly involved in decision-making regarding NbS adoption.

The collection and analysis of data on stakeholders, can enable the understanding and the identification of opportunities for influencing how decisions are taken in a particular context. Stakeholder analysis aim to determine their relevance to a project or a policy (Brugha & Varvasovszky, 2000).

According to Grimble (1998) and Reed et al. (2009), the stakeholder analysis process consists of the following steps: i) identifying the challenge, ii) identifying stakeholders; iii) categorizing stakeholders; and iv) investigating relationships between them (Grimble, 1998; Reed, et al., 2009). The identification and categorization of stakeholders that is presented within the current analysis draws upon the findings of both previous RECONECT Deliverables 2.1 and 4.1. The former involved engagement with Demonstrators, while the latter engaged Collaborators. In essence, the results from these analyses were combined to inform the stakeholder identification and classification presented in the current analysis. This approach aspires to provide a comprehensive understanding of the stakeholders involved in the project.

Influence - interest matrix

To illustrate the influence of stakeholders, an influence - interest matrix is employed. This matrix serves as s stakeholder analysis method and is categorized as a top-down analytical tool. It divides stakeholders into four distinct groups based on their relative power and interest, or their interest and influence concerning the problem being addressed. Through this matrix, fringe stakeholders -those with limited influence and lower interest in the problem- can also be identified and considered accordingly in the decision-making or strategy development (Reed, et al., 2009). The stakeholder groups are sorted into four predefined clusters: Key players (influential stakeholders), Subjects and Context Setters (medium-influence stakeholders), and Crowd (low-influence stakeholders) (Eden & Ackermann, 1998).
The classification of stakeholders relies on assessing the influence and interest levels of the identified stakeholder groups. This assessment is conducted using the two-dimensional power and interest matrix, to place stakeholders into the predefined clusters (Eden & Ackermann, 1998):

- Stakeholder power refers to their capability to exert influence and achieve favourable results. In this case the category of influence should include actors that may be affecting negatively or positively the implementation of NBS. This could, for instance, be connected to planning policies, funding mechanisms (or lack thereof) for DRR, infrastructure, or refusal of landowners to collaborate in mitigation and adaptations actions.
- Interest refers to the level of concern or engagement that stakeholders and therefore it helps to categorize them based on their level of involvement, motivation, or concern regarding the addressed problem. In this case, stakeholders' interest reflects their level of engagement and investment in the implementation of NBS; those who are positively affected by NBS initiatives are likely to have a high interest in supporting their scale-up and integration into mainstream practices. On the other hand, stakeholders who experience negative impacts from NBS may have concerns or reservations about their expansion and integration.

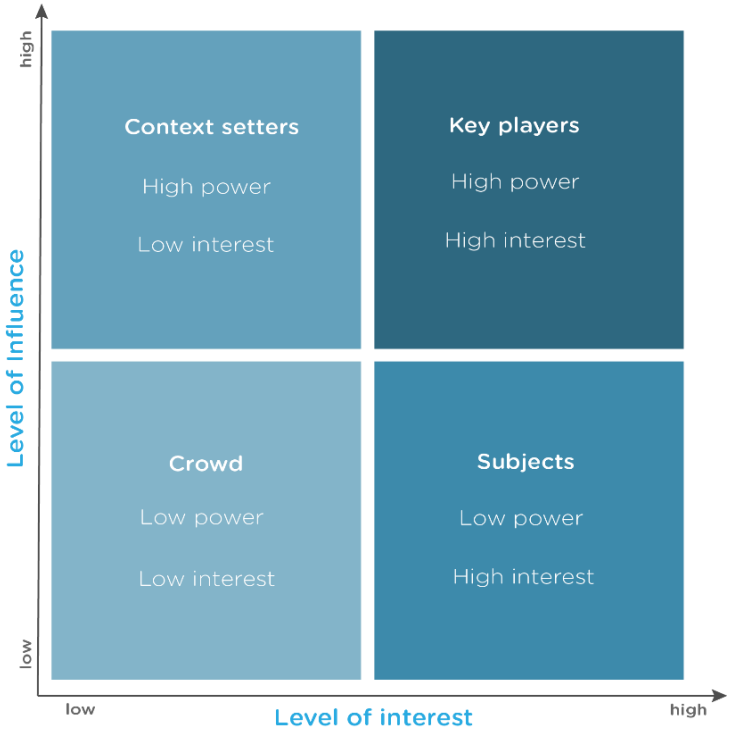


Figure 5: Two-dimensional power/influence and interest matrix (Eden & Ackermann, 1998)

3.1.2 *Identification and Mapping*

The identification of the relevant stakeholders from different policy levels (from local to transnational) is based on a stakeholder mapping process by Demonstrators (2018/2019) and a stakeholder mapping in Collaborator sites (2022), that was supplemented with an overview of EU-level stakeholders. For identifying and grouping the stakeholders, they were divided into groups and roles they play. Groups are supposed to represent the main sectors of society, including governmental actors, civil society and the private sector. Stakeholders can only be present in one group at a time. The relevant groups for RECONECT are presented in the following table.

Stakeholder (SH) group	Description
SH1: Authorities	Local, national, or regional governmental organizations with key decision-making power, and/or assigned with overseeing, monitoring or evaluating management plans. In centralized governance systems, regional or national governments might be directly responsible for managing the area. In decentralized systems, the allocation of responsibilities may not be as distinct and have for instance, a local agency responsible for building permits and a regional agency responsible for disaster relief.
SH2: Political representatives	Citizens elected to political office on behalf of their fellow citizens who do not hold political office. It is important to involve elected representatives as they are the ones who are most likely influenced by the decisions taken – or not – locally (reflected on votes).
SH3: Civil society	Individuals, civil society groups, or NGOs that have been involved in the area and issue in question and/or that may affect, gain, or be affected by the hydro-meteorological hazard(s) or the NBS.
SH4: Commercial sector	Businesses, entrepreneurs, companies, and corporations that may affect, gain, or be affected by the hydro-meteorological hazard(s) or the NBS. These actors may be involved in the construction of the NBS or may be impacted by the hazard. These may include service-providers, local businesses, producers, tourist operators, or insurance companies, to name a few.
SH5: Academia	The scientific community with thematic expertise and experience in the area.
SH6: Media	Media (mass media, print media, digital media, social media) has unparalleled reach and power to change minds and behavioural patterns and can further accelerate mitigation and adaptation by bringing DRR stories to wide audiences. To fulfil this potential, media must be brought to the table as a partner rather than just a messenger.
SH7: International and transnational organizations	These could be intergovernmental organizations composed by states (e.g., the Council of Europe, the International Council for the Exploration of the Sea, the Black Sea Commission, the Helsinki Commission). They could also be non-governmental (e.g., the International Sava River Basin Commission, Baltic Sea Action Group, Marine Stewardship Council).

Figure 6: Stakeholder Groups in RECONECT

Source: RECONECT Consortium (2018) Deliverable 4.1

The biggest group of stakeholders identified belong to the 'Authorities'-group, second being 'Civil Society'. For the Demonstrators in general, most stakeholders in all group categories are local or regional. This is especially seen for the 'Civil Society', 'Private Sector' and 'Political Representatives' groups. In those groups, all stakeholders are local and regional.

Furthermore, the stakeholders were divided into the roles they act in. While stakeholders should only be present in one group and represent one group at a time, they can have several roles. One example for this is the different role of authorities in different governance systems (i.e., centralized or decentralized). The roles relevant for RECONECT and examples of stakeholders that fit that description are presented below. For dividing the stakeholders into their several roles, the local context is of significant importance.

Stakeholder role	Description	Examples
Decision makers	Stakeholders in a position to make and execute decisions concerning a society or community (not necessarily executing them – see the following category). They can be from different (local, national, regional) levels	Representatives of government ministries, state agencies, and departments, staff in national or local administrations, members of parliament, donors, and their governments
Implementers	Stakeholders responsible for the execution or implementation of plans and policies	National authorities, NGOs, regional agencies, civil protection authorities
Coordinators	Stakeholders that coordinate a variety of actors for the implementation of plans and policies	Umbrella organizations (governmental or not)
Providers of expert knowledge	Stakeholders that provide expert knowledge and information such as research or site-specific data	Think tanks, consultants, universities, insurance companies, but also the tourist industry, energy (gas or oil) or electricity providers, extractive or food-producing companies, local informants from civil society
Funders/sponsors	Stakeholders that finance activities in the site. These may refer to governmental agencies but also private and non-governmental financing for instance research or local engagement	Public agencies, ministries, banks, international organizations, private sector actors
Lobbyists	Broad category that refers to individuals, associations and organized groups attempting to influence decision making	Individuals in the private sector, corporations, legislators, parliamentarians, government officials, advocacy groups (interest groups), financial agencies, multi-stakeholder partnerships between state and non-state actors
Mediators	Widely recognized officially posted or unofficial stakeholders with a responsibility or mandate to mediate and facilitate communication between different sections of society	Think tanks, local associations, private consultancies, journalists, influencers, knowledge-brokers, religious and other individual leaders from civil society

Figure 7: Stakeholder Roles in RECONECT

Source: RECONECT Consortium (2018) Deliverable 4.1

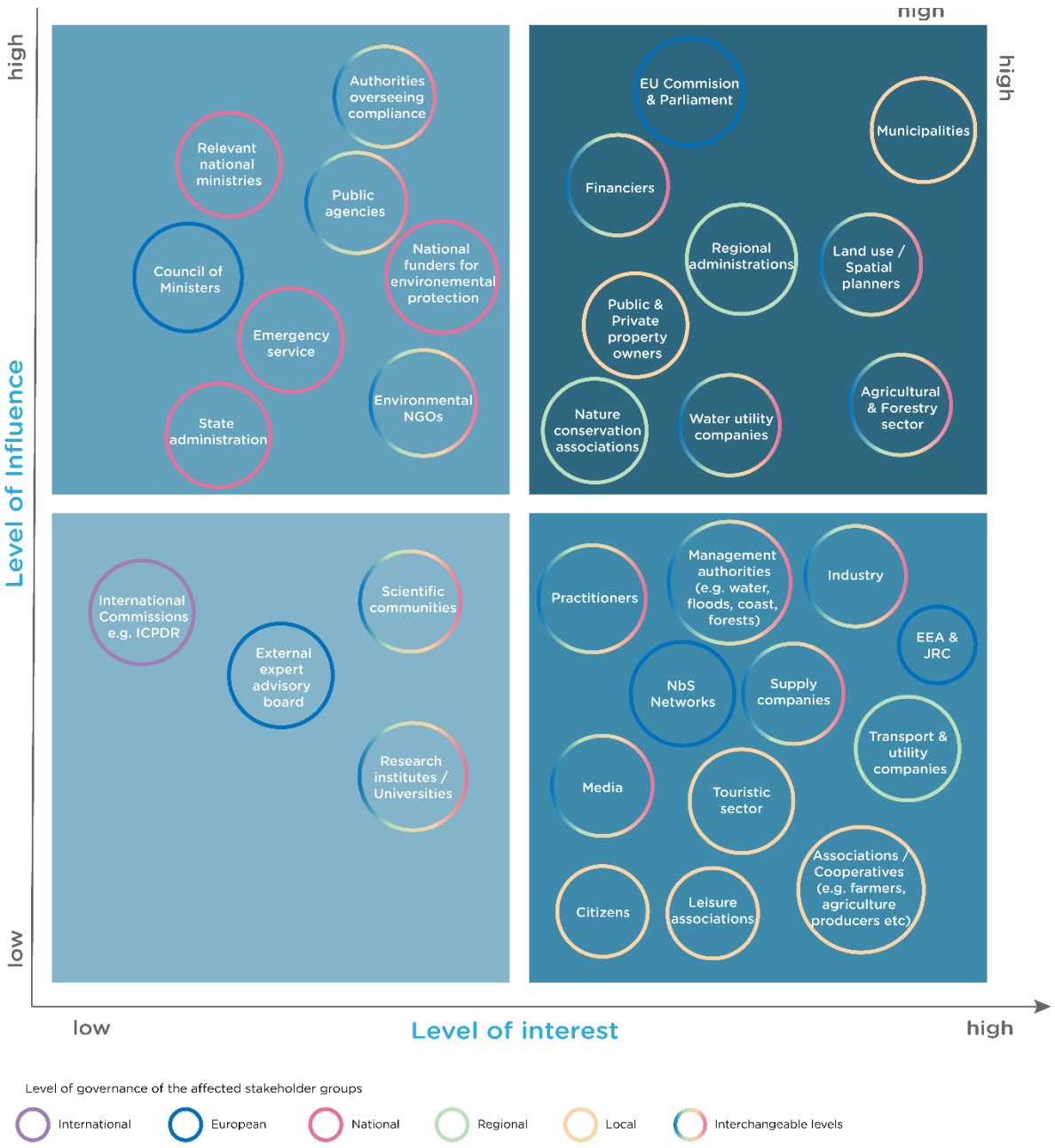


Figure 8: Power and interest matrix

The most frequently mentioned roles for the Demonstrators were the 'Lobbyists' and 'Knowledge Providers', followed by the 'Implementers', 'Decision-Makers' and 'Coordinators'. Within the 'Lobbyists'-role all relevant stakeholders are on a local or regional policy level. Similarly, the relevant decision-makers and implementers are all local or regional. The roles with the most national or transnational stakeholders are 'Knowledge Providers' as well as 'Funders & Sponsors'.

For the Collaborator sites, like for the Demonstrators, the authority group dominates the stakeholder mapping. In contrast to the Demonstrators, the civil society group is underrepresented for the Collaborators.

The stakeholder groups presented in the NbS implementation matrix have been formulated in accordance with the data as presented in deliverables 2.1 and 4.1 and complemented by EU-level stakeholders. Certain stakeholders have been redefined and repositioned within the current matrix. This reorganization emerged as a result of employing the power and interest matrix, which was perceived to offer a better method for identifying and understanding the stakeholders' dynamics in decision-making processes affecting the implementation of NbS.

However, it is essential to acknowledge that the positioning of stakeholders (e.g., state administration, regional administration and so on) may vary across MS due to differences in decision-making processes and governance structures. Stakeholders can be repositioned to reflect the specific characteristics of each country. Moreover, the level of governance of each stakeholder group can also differentiate among MS and can similarly affect the positioning of stakeholders within the matrix. Therefore, while this matrix serves as a valuable tool for analysing stakeholder dynamics in NBS implementation, it should be interpreted with consideration of potential variations across different regions and governance levels.

Based on the identification and mapping by the Demonstrator workshops, the most relevant stakeholders are mapped into a power/interest matrix, to recognize the key players, the stakeholders whose needs must be met, the stakeholders that should be kept informed as well as the ones that do not need to be prioritized. The results suggest that the key players are mostly local or regional, showing that the implementation of a NbS is very much local context related. On the other hand, a lot of national stakeholders are involved in the overall NbS process, and their needs must be met, as they are powerful and influential stakeholders. The group with a high interest, albeit not the biggest influence or power, are again overarchingly local and regional. Trans- and international stakeholders seem to mainly require less effort to keep content.

Based on this quick power-analysis of the stakeholders, the main target groups of the engagement strategy identified are:

- Local and regional policy makers, paving the way for more NbS, i.e., in the city/municipal governments, and administrations, supported by municipal water utilities and nature administrators;
- Local stakeholders, incl. public and private property owners from the agricultural sector and other affected sectors, as well as citizens from the local areas, seeing their mutual benefits and collaborating openly and providing land and resources to support and sustain the NbS actions/interventions locally;
- National, regional and local water, nature and land-use planners, administrators and decision making /authorities, taking informed decisions, based on the available local plans, regulations and legal frameworks.

4 Engagement strategy

4.1 General set up

4.1.1 Introduction

Engaging stakeholders is a strategic imperative that underpins our ability to drive change in the field of NbS. Through active collaboration and endorsement of NbS for disaster risk reduction (DRR), local stakeholders can appreciate the mutual benefits of these approaches. Incorporating diverse perspectives helps to pursue policy changes, facilitating the mainstreaming of NbS to achieve tangible outcomes.

4.1.2 Principles for engagement

Stakeholder engagement activities need to be grounded in ä philosophy that nurtures healthy professional relationships. All engagement efforts should be anchored in the following principles:

1. Purposeful: defined by the identified needs outlined in the policy review and stakeholder analysis, which should be updated on a regular basis.
2. Timely approach: engage at the appropriate times (e.g., align with political agendas)
3. Transparent: transparent engagement process and roles
4. Collaborative: inclusive approach to avoid creating disbenefits in the NbS area of influence
5. Respectful: mutual communication accompanied by respect to different opinions, expertise, and capacity to participate

4.1.3 Scaling up to wide-spread adoption

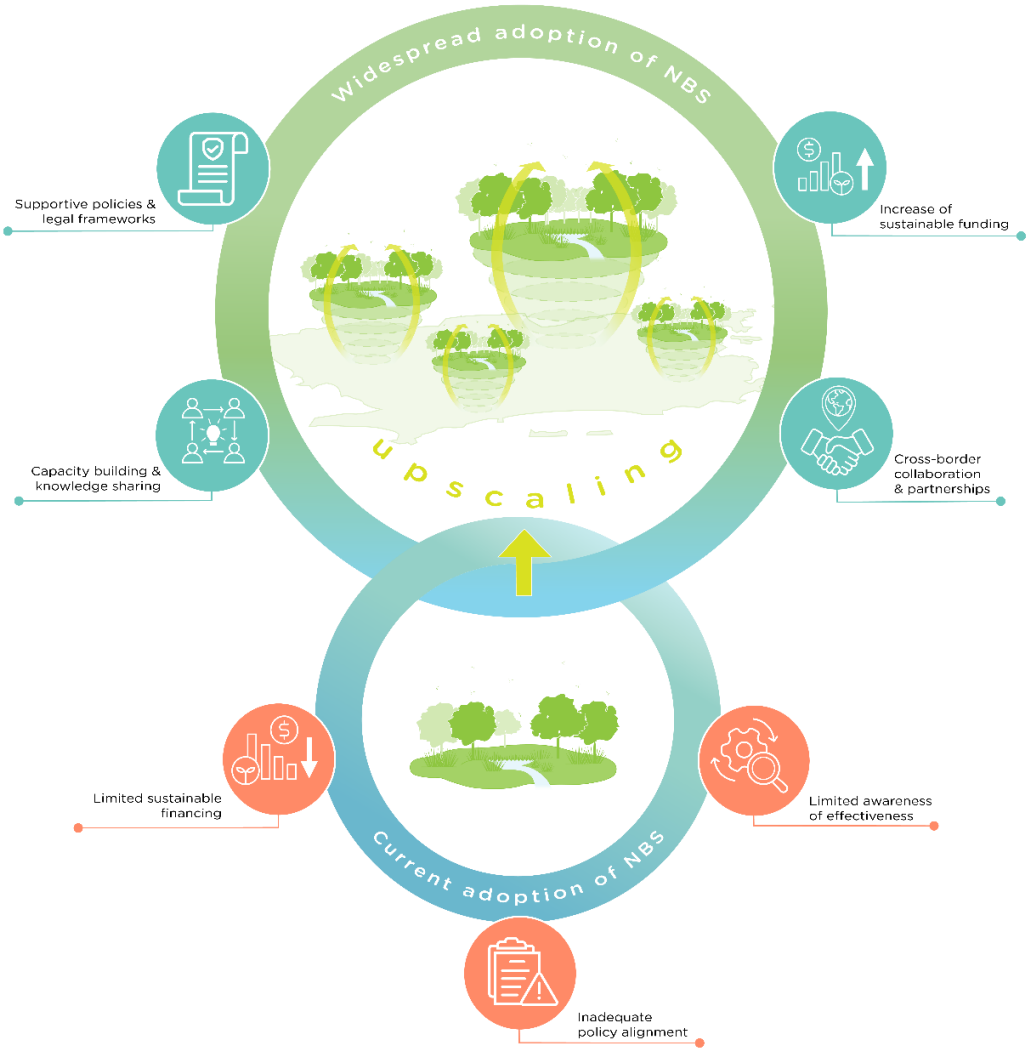


Figure 9: Moving from limited uptake to wider adoption of NbS

Currently, the adoption of NbS is mainly through small to medium-scale pilots, as presented though the RECONECT demonstrators across Europe. By focusing on the enabling factors for adoption, primarily the policy framework, financing options and awareness raising among prime stakeholders, the use of NbS in DRR across Europe may be scaled up (Figure 9).

Active collaboration not only amplifies the voice of NbS in policy dialogues but also catalyzes the development of robust, evidence-based frameworks and the monitoring of the impacts of these initiatives. By uniting expertise and resources, we can address the current knowledge gap and empower decision-makers with a firm evidence base. All these efforts should lay the groundwork for making funding and financing opportunities clear to everyone, with a distinct separation between regulation and guidelines.

Stakeholder engagement is the catalyst for translating NbS into concrete actions that shape a more resilient future, enabling national and regional policymakers to implement more NbS. Together with authorities, they can take swift and informed decisions. Moreover, participation in decision-making is the driving force behind creating ownership and leveraging local expertise, both of which are key to successful implementation.

Additionally, key stakeholders such as the media can construct narratives around RECONECT cases to guide decision-makers toward enhancing resilience.

4.2 Engagement methodology

4.2.1 Introduction

The engagement of stakeholders at different levels in the hierarchy, as presented in (Figure 10), may take different forms, dependent on the needs and the objectives. But generally, we need to ask ourselves how we engage with different stakeholders, what messages need to clearly be formulated for each stakeholder group based on their specific interest.

A guiding principle is to understand “What’s in it for us” for each stakeholder group.
For the municipalities and private property owners, there may be an interest in reducing the risk and impact of devastating floods. For farmers there may be an interest in reducing risk of failed crops/harvest in certain areas prone to flooding, for nature conservation NGOs there may be an interest in getting more nature and biodiversity to a certain area. To the national authorities there may be a need or interest in living up to certain tasks, of attaining certain goals in their implementation of the WFD or Floods Directive.

An engagement plan needs a clear goal in sight for the short-term and/or long-term. It could be making local authorities aware of the opportunities for reducing risk and making space for more nature in a cost-effective manner. It could be engaging local farmers to sell or leasing some of their flood prone farmland to the municipalities to make space for the river or the sea, during flood events.

Engagement is also about Communication, so lessons learned from RECONECT demonstrations need to be clearly communicated in the languages and terms relevant for the stakeholders, though the relevant communication channels (Table 2). Specific campaigns may be effectuated before, during or after floods, depicting the risks, the impact of floodings and the NbS in certain areas vis-a-vis more traditional methods for creating climate resilience, and depicting different financing options, comparing costs of non-action with the costs of establishing NbS.

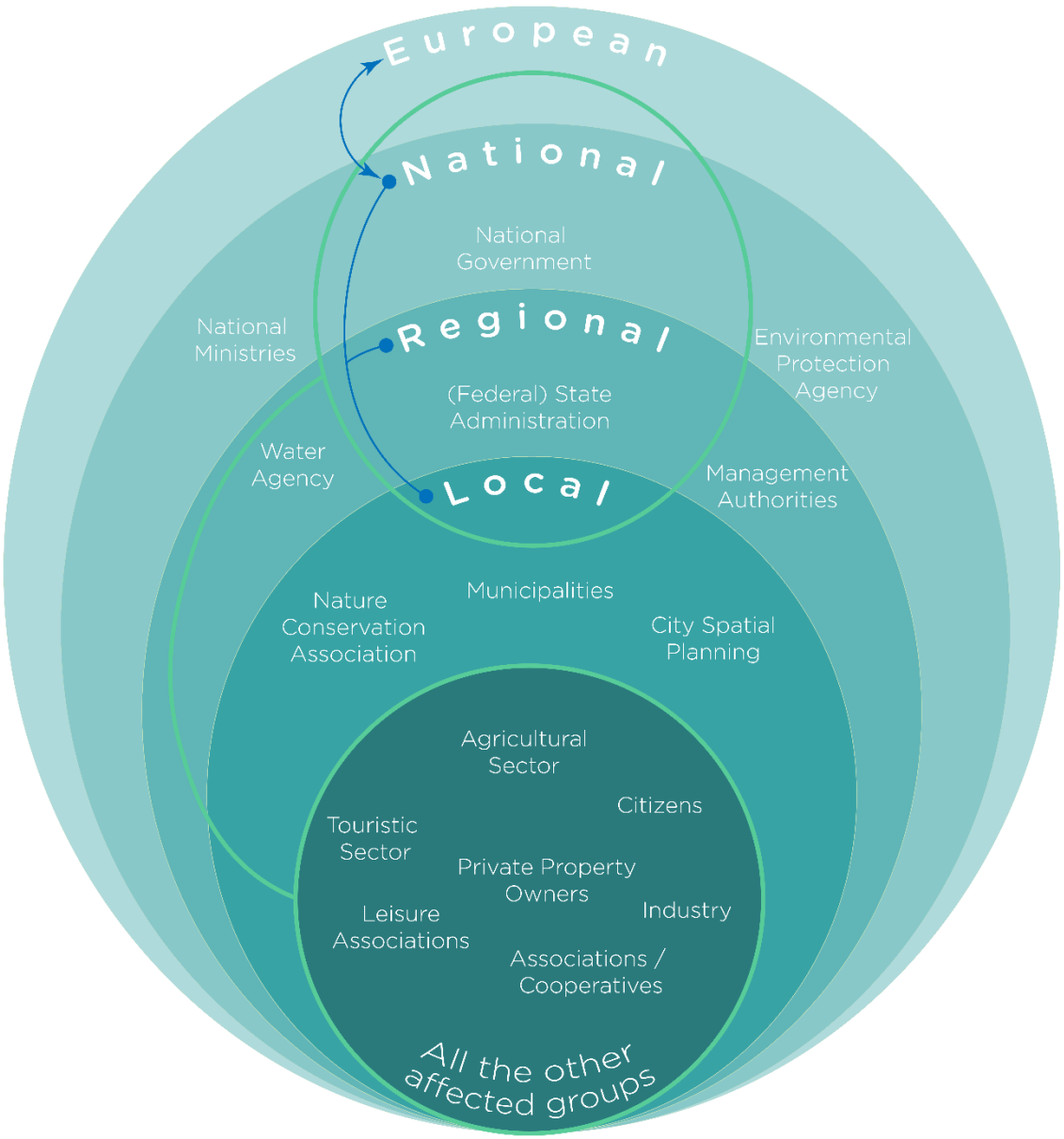


Figure 10: Decision-making map

Cross-level nature of NbS:

- Decision making in NbS implementation is taking place at several levels and dialogue needs to be facilitated between local, regional and national decision-makers.
- Partnerships need to be fostered for coordinated NbS planning

4.2.2 Stakeholder Management

Understanding the role and rationale of key stakeholders is crucial when managing their different inputs in the collaborative process towards identing possible NbS in a local context. Understanding how the stakeholders may positively or negatively influence the decision-

making process and how we may support and mitigate their different positions are key to the success of the stakeholder engagement process (Table 1).

The initial steps in the Engagement process, is often a broad knowledge dissemination, showing the positive results of previous NbS interventions (as relevant as possible) and discussing openly with all relevant stakeholders the possible ways forward in the new local context.

You may also want to engage with specific stakeholder groups, e.g., the land-use planners, with capacity building, showing the ways forward in the legal and administrative set-ups, making them better prepared for the administration of the NbS projects.

For private and public sector stakeholders, landowners in particular, it's important to identify ways of incentivizing their engagement, either by monetary inputs or making them aware of the co-benefits in combining the DRR with improved nature. Many private and public funding options are available at national and EU levels to support the roll-out of nature restoration, carbon off-setting, climate change mitigating land-use management initiatives etc., which can easily be combined with NbS solutions for DRR. But options and ways forward need to be explained and discussed with the concerned stakeholders.

At the highest decision-making level in EU, the EU Commission and the EU Parliament, the experience, possibilities, and constraints in implementing NbS need to be clearly communicated to the policy makers, eventually laying the foundations and strengthening the enabling frameworks.

Table 1: Stakeholder Management of Key Stakeholders

Stakeholder	Focus for stakeholder	Positive Influence	Support	Negative Influence	Mitigate
Municipalities / City Governments	Improve living in the municipality deliver according to political agenda, economic development	Supporting, depending on lobbyists and political agenda	Political support, RECONECT knowledge dissemination	Constrained by budgeting. Less understanding of NbS, less capacity. Support offered depending on targets and legislative provisions Bureaucratic hurdles	Build capacity Dedicated budget for NbS. Strengthened and align policy will mandate Govts to implement NbS
Land use/Spatial Planners	Urban development act according to master planning requirements/ zoning regulations	May incorporate NbS into local plans May provide technical expertise	Capacity building, policy support	Constrained by provisions in regional plans	Collaborate with authorities to align NbS goals with strategic/development plans; find opportunities to accommodate NbS
Water utilities / companies	Water management, flood control, safeguard water resources	May provide technical expertise and may support	RECONECT knowledge dissemination	May focus on traditional measures May have other priorities and	Highlight co-benefits of NbS Bring together with agencies to align on holistic approach

		NbS that improves flood control		regulatory constraints	
Regional Administration	Regional development, coordination with municipalities within the region	Policy and implementation coordination, funding	RECONECT knowledge dissemination	Bureaucratic hurdles Other priorities	Advocate for integration of NbS into regional policies and funding
Public and private Property Owners	Protect the land, increase property value	Potential for land use agreements - may provide land for NbS	Incentivize	May oppose due to loss of control or loss of revenue	Develop incentive programs Emphasize co-benefits of NbS for property value and ecosystem services
Agricultural and Forestry Sector	Land management and production profitability	Potential for land use agreements - may provide land for NbS Opportunities for sustainable land practices	Incentivize	May oppose land-use changes due to impact on profitability.	Collaborate to design solutions that align with farming practices and provide benefits to farming
Nature Conservation Associations	Protect nature, keep nature untouched	Generally supportive of NbS May provide expertise	Bring to the table with decision-makers	May oppose NbS for DRR if it impacts conservation/protection	Bring to the table with other decision-makers to find common denominator
EU Commission	EU policies and funding	Provides funding, sets policy direction	RECONECT knowledge dissemination	Other priorities may conflict with NbS	Alignment in NbS policiesMonitor regularly and maintain line of communication
EU Parliament	Represents citizens, legislative power	May pass legislation supporting NbS	RECONECT knowledge dissemination		Raise awareness, address identified policy gaps Demonstrate support for NbS - showcase benefits

4.2.3 Channels for communication and activities

The stakeholder analysis identified groups that call for different engagement levels. The below Table 2 elaborates on the engagement strategies and target groups, and levels of engagement and appropriate techniques according to each level.

With reference to Table 1 and the list of stakeholders which need to be engaged on different levels, Table 2 presents different modalities for engagement, from simple one-way communication to multi-way engagement, eventually identifying new NbS actions at local level.

It is important to understand the role and interest of the different stakeholders before engaging them and to choose whether they should be kept informed, consulted, involved, or whether closer collaboration is needed or eventually empower the stakeholders to take actions.

Table 2: Engagement strategies and target groups

Inform or educate stakeholders.	Gain information and feedback from stakeholders to inform decisions made internally	Direct work with stakeholders throughout the process to ensure that issues and concerns are understood and considered	Partner with stakeholder and/or stakeholder groups for the development of mutually agreed solutions and joint plan of action	Delegate decision-making in the hands of the stakeholders. Stakeholders are enabled/equipped to actively contribute to the achievement of outcomes
Approach: one-way communication	**Approach:** limited two-way communication	**Approach:** two way or multi-way communication where learning takes place on both sides	**Approach:** two way/multi-way communication where learning, negotiation and decision making on both sides. Stakeholders work together to take action	
Keeping stakeholders informed	Keeping stakeholders informed, listening to their concerns, consider their insights, and providing feedback on their decisions	Working with stakeholders so that their concerns and issues are directly reflected in alternatives developed and providing feedback on how input influenced the outcome	Working together with the stakeholders to agree on what will be implemented and incorporating their advice and recommendations into the outcomes to the maximum extent possible	Implement what stakeholders decide and support and complement their actions
Methods of management				
• Fact sheets and websites • Bulletins and letters • Corporate documents (annual reports) • Speeches, conference and public presentations • Media releases and advertising	• Surveys • Focus groups • One-on-one meetings • Public meetings and workshops • On-line feedback and discussion	• Multi-stakeholder forums • Advisory panels • Consultative committees • Participatory decision making processes • Workshops	• Reference groups • Joint projects • Multi-stakeholder initiatives • Partnerships	• Integration of stakeholders into governance structure (e.g. as members or shareholders on particular committees
Grouped stakeholders				
• International Commissions e.g. ICPDR • Research institutes/ Universities • Scientific communities • Media • External expert advisory board	• Associations / Cooperatives (e.g. farmers, agriculture producers etc) • Nature conservation associations • Water utility companies • Environmental NGOs • Emergency service • Transport & utility companies • Citizens • Leisure associations	• State Administration • Management authorities (e.g. water, floods, coast, forests) • Relevant national ministries • Public agencies • National funders • EU Networks • Supply companies • Practitioners • Authorities overseeing compliance	• Municipalities • Land use / Spatial Planners • Regional Administration • Financiers • Public & Private property owners • Water utility companies • Agricultural & Forestry sector • Financiers • Nature conservation associations • EU Commission • EU Parliament • Council of Ministers • EEA & JRC	

4.2.4 NbS success and limitations analysis

4.2.4.1 Cases

NbS are adopted across a wide range of issues and regions. Existing literature and case studies point at a variety of success and limiting factors in the implementation and scaling up of NbS. Some of the most important factors are (EEA, 2024):

- Level of stakeholder engagement and participatory approaches
- Availability of finance
- Level alignment of activities and objectives across different agencies
- Social benefits
- Availability of finances
- Distribution of social costs and benefits
- Demonstration of social costs and benefits
- Support from national and international regulation

Tullstorp stream project, Sweden

The Tullstorp stream project in Sweden is an example of a bottom-up initiative started by a group of farmers and landowners concerned about the poor ecological state of the Tullstorp stream (EEA, 2023). The case study encompasses the restoration of wetlands alongside the creation of a multifunctional water system within a catchment primarily utilized for agricultural purposes. By involving landowners from the outset, a strong sense of ownership was cultivated, streamlining project execution. Similar participatory approaches have been tested in other Swedish initiatives, showcasing the replicable nature of this model (EEA, 2023).

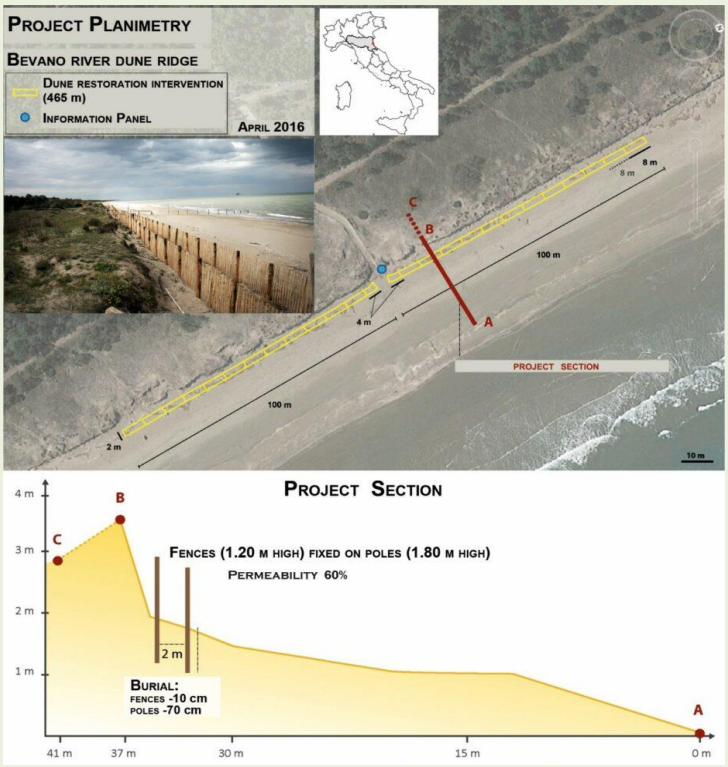
PALUDICULTURE, MECKLENBURG, GERMANY

Source: Ministerie van Landbouw, Natuur en Voedselkwaliteit

In Mecklenburg, Germany an NbS project aims to rewet and convert agricultural land to paludiculture to mitigate CO_2 emissions. The targeted land is privately owned and utilized for income generation. Transitioning to paludiculture entailed replacing traditional crops with species compatible with wetland conditions and establishing new value chains to offset income losses on farms is a time-consuming process. Additionally, coordinating crop selection across farmers is necessary to implement new value chains. Additional expenses need to be considered for technology, maintenance, capacity building, knowledge transfer, advisory services, and promoting innovation. On the other hand, rewetting reduces land subsidence and its connected risks and contributes to climate mitigation by reducing peatland emissions. In Germany, the societal benefits of rewetting peatlands are estimated at €67.5 billion in avoided climate damages, surpassing the financial requirements for the project. Additionally, due to the production of biomass capturing CO2, allows farmers to obtain EU carbon certificates. Paludiculture substitutes fossil-based materials, decarbonizes economy and increases yield stability and revenue for farmers, t enhances biodiversity and provides ecological services like water management and cooling. These advantages would be distributed among farmers and local communities, enhancing resilience. However, they are accompanied by costs and risks that farmers must be prepared to accept (EEA, 2023).

Takeaway: The implementation of NbS projects also entail risks and will necessarily come with a distribution of social costs and benefits.

BEVANO DUNE RESTORATION, ITALY



The Integrated Geoscience Research Group of the University of Bologna designed and coordinated a project to restore and manage the costal area surrounding the mouth of the Bevano River, Italy. The project was financed by ENI (Ente Nazionale Idrocarburi) as a compensation for the activities of hydrocarbon extraction in the marina area of the Ravenna region. Due to a reduction in ENI's extraction activities, the scope and budget have been gradually reduced. This led to a shift in priorities towards initiatives with more immediate economic benefits. With the budget decrease, also the objectives changed and the original intention of disseminating the outcomes of pilot projects was not realized (EEA, 2023).

Takeaway: Availability of long- term funding and the level of alignment of activities and objectives between agencies, can often be an obstacle for many NbS projects.

4.2.4.2 *Success factors and limitations*

In summary, the adoption of NbS entails various success factors and limitations that can either facilitate or impede their implementation. Prior to proceeding with implementation, it is essential to thoroughly evaluate and consider all aspects, also drawing insights from previous cases. Table 5 provides a list of success and limiting factors in NbS adoption.

Table 4: Success and limiting factors for NbS implementation

Factor	Success factors of NbS	Limiting factors for NbS
National and international regulations	Compliance with environmental objectives and EU regulations and directives	Lack of political support and policy mechanisms to address gaps and encourage NbS implementation.
Stakeholder engagement and participatory approach	Active involvement of all relevant stakeholders, including landowners and the local community, from the start of the project. Engaging a range of different stakeholders may encourage awareness building, make more voices heard and foster co-creation and co-management processes.	Limited stakeholder engagement with involvement from the local community at the project's start and a lack of communication regarding risks and responsibilities.
Effectiveness of the NbS	Displaying effectiveness for the intended purpose on a suitable scale, along with implementing sufficient monitoring mechanisms. If the community observes the effectiveness of the NBS, it will lend its support to the project, thereby enhancing the project's chances of securing public funding.	Demonstrating effectiveness that is not customized to specific purposes or lacks suitability in scale, and a disparity in knowledge sources supporting assessments (EEA, Scaling nature-based solutions for climate resilience and nature restoration, 2024). Proposed NbS solutions need to be critically evaluated to ensure they truly benefit nature rather than exacerbating existing issues.
Demonstration of co-benefits	Showing multiple co-benefits, encompassing various ecosystem services, and proving cost-effectiveness	Insufficient demonstration of the benefits of NB (EEA, Scaling nature-based solutions for climate

	compared to alternatives, including successful integration with grey infrastructure, demonstrating tangible benefits, and resulting in optimal planning and design.	resilience and nature restoration, 2024) (EEA, Understanding the scaling potential of Nature-based Solutions, 2022), either independently or in comparison with alternatives, such as due to gaps in knowledge regarding limitations and thresholds where NBS approaches may fail to provide adaptation benefits, and unclear cost-effectiveness.
Social and private benefits	Clarification of both private and social costs as well as expected benefits over the short and long term.	Knowledge gap between private benefits to individual entities and the broader social costs and benefits for communities, often accompanied by long times in realizing and observing the benefits.
Financial availability	Access to funding, with multiple financing sources tied to various benefits and ecosystem services. Early allocation of funds and responsibilities is necessary to address maintenance requirements and scaling up opportunities effectively. Community support can also be a powerful tool for investments and public funding.	Limited access to funding, with few financing sources available and challenges in securing support for various benefits and ecosystem services. Delayed allocation of funds and responsibilities hinders addressing maintenance requirements and scaling up opportunities effectively. There is often a mismatch between investors seeking tangible returns on their investments and the societal benefits derived from certain projects. In many instances, these benefits advantage society, making them more suitable for public interventions.

Upscaling potential and knowledge sharing	When considering the upscaling potential of an NbS it is important to: • Identify the success criteria of implemented projects. • Explore how these success criteria can be applied or modified to suit diverse contexts. • Understand how the knowledge and insights gained from similar projects can guide and impact decision-making processes among various stakeholders. • Take a higher systemic approach also considering socio-economic drivers, and who will experience risks and benefits of the project. Utilizing shared knowledge, monitoring efforts, and standardized indicators significantly contribute to progress in the NbS field.	Absence or sufficient monitoring activities and use of monitoring for the sole purpose of justifying investments and obtaining additional funding. Limited use of shared knowledge or absence of transferable knowledge can be an obstacle for NbS implementation. While many local initiatives can be good examples with upscaling and knowledge sharing potential, it must be kept in mind that often dynamics are case specific and are not easily transferable from one project to another.
Market development	Development of markets for new NBS products and raising awareness efforts directed to specific stakeholder groups.	Lack of development in markets for new NbS products as well as lack of analytical capacity and knowledge base to assess feasibility and benefits “ex-ante”.
Risk sharing	The public sector plays a vital role in guaranteeing risk sharing mechanisms for NbS implementation.	Absence of public sector support in developing risk sharing mechanisms.

Source: Adapted from EEA, 2024; EEA, 2022 & Interview with an EEA expert, 2024

5 Conclusion

The RECONECT Engagement Strategy seeks to promote the wider adoption of NbS for hydro-meteorological risk by informing and engaging decision makers and stakeholders at different governance levels.

The strategy focuses on investigating policy frameworks that engage and have the potential of mainstreaming NbS. It analyses the actors at different governance level, ranging from local to trans-national, while emphasizing the need for a collaborative approach reinforced by timely and equitable stakeholder engagement.

NbS is recognized as a cost-effective, nature positive approach for creating climate-resilient solutions with multiple benefits, supporting already existing EU and national legal frameworks.

The strategy advocates for better considerations of NbS for DRR, equitable and timely stakeholder involvement as well as key messages to support the development and implementation of NbS policies and actions.

To ensure continued impact and address identified gaps, recommendations for the next steps include:

1. Development of NbS information materials on the pros and cons of NBS in different contexts – with reference to specific case studies.
2. Identifying key stakeholders and contact persons for the dissemination of NbS information
3. Reaching out to key stakeholders with important messages relating to their potential role in moving NbS forward at national, regional, and local level
4. Wider dissemination of the strategy's recommendation, involving universities, research institutions and practitioners for broad academic and practical reach
5. Adoption by networks dedicated to NbS, drawing from the lessons learned in RECONECT (cite deliverable), such as:
    - Co-creation and stakeholder engagement: ensure active involvement.
    - Utilize analytical tools: standardized tools and frameworks to guide NbS in all stages.
    - Evidence-based solutions: systematic data collection and evaluation, to strengthen the case for NbS
    - Encourage cross-sector collaboration: foster knowledge-sharing and advance innovation.
    - Adaptive strategies for barriers: implement continuous learning and capacity building to navigate barriers in upscaling.
6. Reinforce the necessity of addressing the gaps identified in the previous chapter.
7. Clarify and consolidate NbS terminology.
8. Demonstrate the costs and benefits of NbS through solid evidence base
9. Finally, argue for stronger enforcement mechanisms to ensure prioritization of NbS in disaster risk and environmental policies at all required levels.

References

Brugha, R., & Varvasovszky, Z. (2000). Stakeholder analysis: a review. Health policy and planning, 15(3), 239-246.

Calliari, E., Castellari, S., Davis, M., Linnerooth-Bayer, J., Martin, J., Mysiak, J., & Zandersen, M. (2022). Building climate resilience through nature-based solutions in Europe: A review of enabling knowledge, finance and governance frameworks.

Calliari, E., Castellari, S., Davis, M., Linnerooth-Bayer, J., Martin, J., Mysiak, J., & Zandersen, M. (2022). Building climate resilience through nature-based solutions in Europe: A review of enabling knowledge, finance and governance frameworks. .

Council Directive 147/EC. (2009). On the conservation of wild birds (codified version).

Council Directive 43/EEC. (1992). On the conservation of natural habitats and of wild fauna and flora.

Davies, C., Chen, W., Sanesi, G., & Lafortezza, R. (2021). The European Union Roadmap for Implementing Nature-Based Solutions: A Review. . *Environmental Science and Policy 12, 49-67*.

Davis, M., Abhold, K., Mederake, L., & Knoblauch, D. (2018). *Nature-based solutions in European and national policy frameworks, Naturvation project. Horizon 2020 Grant Agreement No730243, Deliverable 1.5.* Retrieved from https://naturvation.eu/sites/default/files/result/files/naturvation_nature-based_solutions_in_european_and_national_policy_frameworks.pdf

Davis, M., Krüger, I., & Hinzmann, M. (2015). Coastal Protection and SUDS: Nature-based Solutions. *RECREATE Policy Brief No.4, Berlin, Ecologic Institute* .

ECA. (2018). *Floods Directive: Progress in assessing risks, while planning and implementation need to improve. Special Report No 25, European Court of Auditors.* Retrieved from (https://www.eca.europa.eu/ Lists/ECADocuments/SR18_25/SR_FLOODS_EN.pdf)

Eden, C., & Ackermann, F. (1998). *Making strategy: The journey of strategic management.* London: Sage Publications.

EEA. (2021). *EEA Report. Nature-based Solutions in Europe: Policy, knowledge and practice for climate change adaptation and disaster risk reduction .*

EEA. (2022). *Understanding the scaling potential of Nature-based Solutions.* European Environmental Agency.

EEA. (2023). *Economic enabling conditions for scaling .*

EEA. (2024). *European Climate Risk Assessment - EEA Report No 1/2024.* EEA.

EEA. (2024, February 23). *Scaling nature-based solutions for climate resilience and nature restoration*. Retrieved from https://www.eea.europa.eu/publications/scaling-nature-based-solutions

EU Regulation. (2021). Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law').

European Commision. (2013b). Communication from the commission to the European Parliament, the Council, the European Economic and Social Committee and the Commitee of the Regions 'Green Infrastructure (GI) — Enhancing Europe's Natural Capital'.

European Commission. (2013a). *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committeeof the Regions: A new EU Forest Strategy: for forests and the forest-based sector.* COM(2013) 659 final.

European Commission. (2016a). Action Plan on the Sendai Framework for Disaster Risk Reduction 2015-2030. A disaster risk-informed approach for all EU policies. SWD(2016) 205 final/2. *Official Journal of the European Union*.

European Commission. (2016b). Opinion of the European Economic and Social Committee on 'The future of the EU Urban Agenda seen from the perspective of civil society'. (2016/C 133/02). *Official Journal of the European Union*.

European Commission. (2019). The European Green Deal. *COM(2019) 640 final*.

European Commission. (2020). EU Biodiversity Strategy for 2030, Bringing nature back into our lives. *COM(2020) 380 final*.

European Commission. (2021a). *Forging a climate-resilient Europe - the new EU Strategy on Adaptation to Climate Change.*

European Commission. (2021b). New EU Forest Strategy for 2030. *COM(2021) 572 final*.

European Commission. (2021c). *On a new approach for a Sustainable Blue Economy in the EU.* COM(2021) 240 final.

European Commission. (2022). *Proposal for a Regulation of the European Parliament and the Council on Nature Restoration. COM(2022) 304 final.*

European Commission. (2023). Commission Delegated Regulation (EU) 2023/2486. *Official Journal of the European Union*.

European Commission. (n.d.). *EC EUROPA*. Retrieved from EU Taxonomy Navigator.

European Parliament. (2000). *Water Framework Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy.* Official Journal of the European Union.

European Parliament. (2007). *Flood Directive 2007/60/EC of the European Parliament and the Council of 23 October 2007 on the assessment and management of flood risks.* Official Journal of the European Union.

European Parliament. (2018). Action Plan for nature, people and the economy (2017/2819(RSP). *Official Journal of the European Union*.

European Parliament. (2023). *New EU Forest Strategy for 2030. Legislative Train Schedule*. Retrieved from https://www.europarl.europa.eu/legislative-train/theme-a-european-green-deal/file-new-eu-forest-strategy

Faivre, N., Sgobbi, A., Happaerts, S., Raynal, J., & Schmidt, L. (2018). Translating the Sendai Framework into action: the EU approach to ecosystem-based disaster risk reduction. Int. J. Disaster Risk Reduct. 32, 4–10.

Grimble, R. (1998). *). Stakeholder methodologies in natural resource management. Socioeconomic methodologies for natural resources research. Best practice guidelines.*

IUCN. (2022). *EU Nature Restoration Law: A boost for biodiversity and climate.* Retrieved from https://www.iucn.org/news/europe/202206/eu-nature-restoration-law-a-boost-biodiversity-and-climate#_ftn1

McKenna, D., Abhold, K., Mederake, L., & Knoblauc, D. (2017). Nature-based solutions in European and national policy frameworks. *NATURVATION*.

Mysiak, J., Castellari, S., Kurnik, B., Swart, S., Pringle, P., Schwarze, R., . . . Linden, P. (2018). 'Brief communication: strengthening coherence between climate change adaptation and disaster risk reduction', . *Natural Hazards and Earth System Sciences 18(11), pp. 3137-3143 (DOI: 10.5194/nhess-18-3137-2018).*

NetworkNature. (n.d.). *Taking nature-based solutions up the policy ladder: from research to policy action, Knowledge Brief1.*

Reed, M. S., Graves, A., Dandy, N., Posthumus, H., Hubacek, K., Morris, J., & ... Stringer, L. C. (2009). *Who's in and why? A typology of stakeholder analysis methods for natural resource management. Journal of Environmental Management, 90 (5), 1993-1949.*

Regulation EU 2018/841. (n.d.). On the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry in the 2030 climate and energy framework, and amending Regulation (EU) No 525/2013 and Decision No 529/2013/EU. *Official Journal of the European Union*.

Romanovska, L. (2023). *Invest4nature*. Retrieved from How EU Taxonomy supports investments in Nature: https://invest4nature.eu/2023/04/13/how-eu-taxonomy-supports-investments-in-nature/

Schwarz, U., Pokrajac, S., Bockmühl, K., & Stolpe, G. (2018). Nature-based solutions for flood risk prevention in South-Eastern Europe. Deutschland/Bundesamt für Naturschutz.

SDSN Europe. (2022). *Financing the Joint Implementation of the SDGs and the European Green Deal. Second report of the SDSN Senior Working Group of the European Deal.*

Somarakis, G., Stagakis, S., & Chrysoulakis, N. (2019). *ThinkNature: Nature-based solutions handbook, ThinkNature project.* Retrieved from https://platform.think-nature.eu/system/files/thinknature_handbook_final_print_0.pdf

Trémolet, S. (2019). *Investing in nature for European water secutiry. The Nature Conservancy, Ecologic Institute and ICLEI, London, UK. .* Retrieved from https://www.nature.org/content/dam/tnc/nature/en/documents/Investing_in_Nature_for_European_Water_Security_02.pdf

Trémolet, S. (2019). Investing in nature for European water security,. *The Nature Conservancy, Ecologic Institute and ICLEI, London, UK* .

Vojinovic, ,. Z. (2020). Nature-based solutions for flood mitigation and coastal resilience: analysis of EU-funded projects. . *Publications Office of the European Union: Luxembourg.* .

Appendix A – Policy Review

- **European Green Deal**

The European Green Deal (European Commission, 2019) is a groundbreaking initiative that comprises a set of policy initiatives designed to guide the EU towards a sustainable transition, with the ultimate goal of achieving climate neutrality by 2050. To achieve this objective, the EU Green Deal incorporates the initiatives/policy packages of the EU Biodiversity Strategy for 2030 (European Commission, 2020), Strategy on Adaptation to Climate Change (European Commission, 2021a), Forest Strategy and the EU Soil Strategy (European Commission, 2021b). These strategies aim to preserve and restore ecosystems, enhance resilience against climate change impacts, and promote sustainable forest management. Notably, they strongly emphasize the use of NbS in achieving these objectives (Calliari, et al., 2022).

- **EU Biodiversity Strategy for 2030**

As a fundamental component within the European Green Deal, the EU Biodiversity Strategy for 2030 comprises a comprehensive set of plans, measures, and actions, targeting the protection and restoration of ecosystems and biodiversity by the year 2030. Within this array of actions, the EU introduces the nature restoration plan, which aims to assist EU countries in implementing robust measures for ecosystem restoration. This plan places special emphasis on prioritizing ecosystems with substantial potential for carbon capture and storage, while concurrently addressing and mitigating the impact of natural disasters (European Commission, 2020).

The strategy recognizes NbS as crucial measures for reducing emissions, adapting to climate change, restoring degraded ecosystems, and recovering biodiversity (EEA, EEA Report. Nature-based Solutions in Europe: Policy, knowledge and practice for climate change adaptation and disaster risk reduction, 2021). The EU Biodiversity strategy for 2030 includes diverse key terms that fall under the NbS umbrella; It promotes Ecosystem-based Management (EbM) for marine conservation and highlights Green Infrastructure (GI) in urban areas, aiming to cool cities and reduce natural disaster impacts (European Commission, 2020). The main actions entail targets for protection of land and sea areas, restoration and protection of ecosystems and increasing the forest cover, all by 2030. It aims to mainstream NbS into relevant policies across different levels of governance and different sectors, promote NbS for biodiversity by setting new targets. Moreover, it prioritizes the need of provision for financial support for research, capacity building and the formulation of financial incentives for the implementation of NbS, as well as raising awareness efforts. Specifically aimed at the Member States, supervision and compliance are managed by the European Union, involving regulatory measures and periodic assessments.

In June 2023, the EC agreed on a negotiating position on the proposed Nature Restoration Law, aiming to put into legislation some of the goals of the biodiversity strategy. The regulations establish binding targets at EU level, requiring the MS to implement effective restoration measures covering a minimum of 20% of the EU's land and sea areas by 2030 (European Commission, 2020; SDSN Europe, 2022).

The strategy also established the EU Urban Greening Platform through the 'Green City Accord,' aiming at encouraging and providing guidance and toolkits for European cities to develop urban greening plans. The policy recognizes the necessity to invest in natural capital to achieve these goals. To fund and support these efforts, EC mainstreams the objectives of the EU Biodiversity Strategy throughout the EU budget for the period 2021-2027 and the EU Recovery and Resilience Facility, where at least € 20 billion a year will be devoted for spending on nature. Overall, the EU biodiversity strategy for 2030 strongly and explicitly supports NbS for Climate Change Adaptation (CCA) and Disaster Risk Reduction (DRR) (European

Commission, 2020; EEA, EEA Report. Nature-based Solutions in Europe: Policy, knowledge and practice for climate change adaptation and disaster risk reduction, 2021).

- **EU Strategy on Adaptation to Climate Change (European Commission, 2021a)**

The European Union launched the first adaptation strategy to climate change in 2013 ((European Commision, 2013b). This strategy explicitly advocated for Green Infrastructure (GI) and Ecosystem-based Adaptation (EbAp) approaches as part of a coordinated European effort to adapt to climate change (Mysiak, et al., 2018). Building on this progress, the strategy underwent a positive evaluation in 2018, showcasing consistent progress across all its actions. The EU introduced a more ambitious Strategy on Adaptation to Climate Change in February 2021 (European Commission, 2021a), as an integrated part of the European Green Deal, which recognizes adaptation as a key component to climate change and requires Member States to enhance their adaptive capacity, strengthen their resilience and reduce their vulnerability. The Strategy's goal is to foster climate-resilient societies by improving knowledge of climate impacts and adaptation solutions.
The strategy strongly endorses the adoption of larger-scale NbS as necessary measures to enhance resilience and mitigate climate-related risks (Section 7). The actions that are set out, involve protecting and restoring wetlands, coastal ecosystems, and urban green spaces, as well as addressing risks associated with climate stresses, such as flooding and coastal protection, through the adoption of NbS as cost-effective strategies for CCA. It also stresses that NbS is crucial for sustaining healthy water, oceans, and soils, with inland solutions enhancing water supply and flood risk reduction. The strategy calls for increase of investments in NbS, proposing innovative financing approaches under InvestEU and Cohesion Policy programs. Additionally, it underlines the alignment of NbS with the Water Framework Directive, aiming to improve compliance with its requirements for good ecological status, thereby reinforcing sustainable water management practices. Through the strategy the Commission aims to support NbS by providing financial and technical support to Member States, through the integration of assessments, guidance, capacity building, and financial assistance through EU funding (e.g. through financing approaches under InvestEU). This comprehensive approach aims to harness NbS implementation for CCA, DRR, biodiversity preservation, and health improvement (Section 11). It also plans to scale up resources and mobilize larger-scale adaptation finance for climate resilience, employing innovative mechanisms such as the European Fund for Sustainable Development Plus (EFSD+), and leveraging resources in bilateral channels and through EU Member States (Section 19).
Furthermore, the strategy (Section 7, 8, 9) aims to enhance and streamline the implementation of climate adaptation measures by fostering coordinated and joint actions in order to achieve systemic adaptation. It also promotes the exchange of best practices and solutions, aiming to strengthen administrative capabilities and cross-border cooperation between the European Union and non-EU countries.

- **EU Forest Strategy for 2030 (COM(2021) 572 final**

The objective of the New EU Forest Strategy for 2030, adopted by the Commission in July 2021, is to tackle the challenges faced by European forests, including those arising from human activities, natural processes, and the impacts of climate change. This strategy, initiated also under the European Green Deal framework, acknowledges the crucial effects of climate change on forest ecosystems while recognizing the role of forests as natural carbon sinks. To achieve climate neutrality, the strategy emphasizes the preservation, enhancement, and expansion of forested areas in the EU. It aims to strengthen forest protection and restoration, enhance their biodiversity, improve sustainable forest management, and improve monitoring and planning (European Parliament, 2023). Measures aiming at ecosystem restoration fall under the category of NbS, according to the Forest Strategy.

The strategy emphasizes the importance of adopting adaptive forest restoration, sustainable forest management practices, ecosystem services and ecosystem-based management approaches in response to the pressing challenges of climate change and biodiversity loss. By protecting and restoring forest biodiversity, it is possible to significantly improve the adaptive capacity and resilience of forests, enabling them to withstand the impacts of climate change and various disasters, including floods, fires, and landslides. It also emphasizes the importance of developing strong and effective methods for reducing risks associated with uncertain future conditions in forests; this awareness of the challenges and uncertainties related to the future of forests should drive the implementation of concrete actions and forest management practices that enhance adaptability and resilience.
In addition to proactive forest management, the strategy calls for significant investment in disaster prevention, preparedness, response, and post-disaster forest recovery. Moreover, the strategy provides financial incentives for forest owners and managers to include environmentally friendly forest practices. It advocates for a holistic approach, urging actions to prevent climate-related damages and strengthen forest resilience before resorting to equipment and operational interventions.
The EU Forest Strategy also acknowledges the crucial role of the Common Agricultural Policy (CAP) in supporting forests and forest management. Substantial financial commitments have been made through CAP for the period 2023-2027, where they allow Member States to tailor forest-related interventions based on their specific national needs and circumstances, aiming to reduce bureaucratic barriers. However, existing challenges are also recognized, including a low uptake of forestry measures, lack of knowledge, administrative complexities, and insufficient support for capacity building, which highlights the need for improved guidance and streamlined processes to enhance the effectiveness of forest-based adaptation activities. Furthermore, the strategy urges the use of the European Social Fund Plus (ESF+) by Member States to provide training and skills development for professionals in the forestry sector, enabling them to adopt more sustainable management practices. The Commission also aims to promote the use of rural development funds for the general implementation of the forest strategy.
In summary, while the strategy does not explicitly use the term NbS, other approaches outlined within it, such as adaptive restoration, ecosystem-based management, and biodiversity-friendly practices, are consistent with the principles of NbS and they indicate support for their implementation to address forest resilience, biodiversity loss, climate adaptation, and disaster risk reduction.

- **EU Soil Monitoring Law (latest proposal COM(2023) 416 final)**

The latest proposal on Soil Monitoring and Resilience (Soil Monitoring Law) is a pivotal component of the EU's broader strategy to address the significant challenges posed by degraded soils in Europe. It highlights the essential role of healthy soils in achieving climate neutrality and for combatting issues like desertification and land degradation. The primary objective of the law is to establish an all-encompassing monitoring framework for soils across the EU, aiming to make sustainable soil management the standard practice. By mandating Member States to identify and rehabilitate potentially contaminated sites, the law seeks to regenerate degraded soils and contribute to a toxic-free environment by 2050.
The law supports the objectives of the European Green Deal, promoting climate resilience and biodiversity. Moreover, it plays a pivotal role in supporting flood prevention efforts and initiatives, thereby recognizing the objectives also outlined within the Floods Directive and Water Framework Directive.
Furthermore, the law’s requirements and provisions for healthy soils establish a dynamic link between supporting nature and biodiversity, complementing existing relative regulations such as the Habitats and Birds Directives, the EU Biodiversity Strategy, and the Nature Restoration Law.
By recognizing the connection between soil health and environmental resilience, the law lays the groundwork for sustainable practices that benefit both ecosystems and human well-being,

serving as an instrument for implementing NbS and contributing to ecosystem restoration, biodiversity conservation, and natural water management. Additionally, the law's focus on soil health aligns with NbS strategies for natural water regulation, reducing erosion, and preventing floods.

- **Climate Change Framework Law 2021/1119**

The Climate Change Framework Law establishes a binding objective of achieving climate neutrality in the European Union by 2050 and a net domestic reduction in greenhouse gas emissions by 2030, aligning with the Paris Agreement. It has also established a legal framework obligating EU institutions and MS to prioritize climate change adaptation, enhance their adaptive capacity, strengthen their resilience, and reduce their vulnerability. The policy also requires MS to adopt and implement national adaptation strategies and plans, by incorporating NbS and ecosystem-based adaptation measures (EU Regulation, 2021).

The law requires both the European Union institutions and its MS to ensure that their policies for adapting to climate change are consistent, mutually supportive, and provide additional benefits for different sectors. The aim is to integrate climate change adaptation consistently across all policy areas, including socioeconomic and environmental policies, both at the Union level and within each member country (Article 5). Additionally, member countries are instructed to create and implement national strategies and plans for adapting to climate change. These strategies should consider the overall Union strategy on climate change adaptation, be based on thorough analyses of climate change and vulnerability and be guided by the latest scientific evidence. The strategies should particularly address the vulnerability of specific sectors like agriculture, water, and food systems, and promote NbS and EbA measures. Member countries are also required to regularly update these strategies and include the relevant information in their reports submitted to the Union.
In general, the Climate Law mandates the European Commission to assess the progress of MS every five years regarding these objectives (Article 7). If inconsistencies or insufficient progress are identified, the Commission is empowered to take necessary measures in accordance with the Treaties. Overall, the law enforcers obligatory measures for reaching climate adaptation objectives but only mildly endorses NbS treating them more as a recommendation rather than actively promoting them.

- **Water Framework Directive**

The EU Water Framework Directive (WFD 2000/60/EC) stands as a fundamental legal and binding instrument for water protection in Europe, focusing on ensuring the health of rivers, lakes, groundwater, and bathing waters, and promoting sustainable water management. The WFD was the first of its kind when it was finally agreed by MS in 2000, and still is an important legal cornerstone in the water protection across all 27 MS, as well as neighbouring non-EU countries, Norway, UK and Switzerland.
It focuses on ensuring cooperation among neighbouring countries in managing shared rivers and water bodies. The WFD aims to protect and improve the aquatic environment, promote sustainable water use, and ensure the long-term availability of water resources (European Parliament, 2000).
Although the WFD does not explicitly mention NbS, as it was developed before the creation the concept, it aligns with NbS principles, emphasizing sustainable and integrated water management approach. Measures such as targeted land protection, revegetation, riparian restoration, improved agricultural practices, and wetland restoration, align with NbS objectives, although they are not explicitly labelled as such. Compliance with the directive is overseen by the European Commission, which periodically reviews river basin management plans, which are created in connection with the FWD for each. Next to the MS also several International River Basin Districts have published separate plans. The latest update of the river basin management plans was supposed to be published in 2022. While most do not explicitly engage

with NbS, their scope is supporting of NbS and thus they are an opportunity to strengthen the case for large-scale NbS.
The WFD indirectly supports the approach by emphasizing sustainable water practices and ecosystem integrity, underpinning the need to protect, improve and restore functioning ecosystems and water bodies to provide a variety of ecosystem services (Trémolet, 2019). However, its limited recognition of NbS's capacity for drought resilience, adaptation and disaster risk reduction, may limit its integration in these areas.

- **Flood Directive**

The purpose of the EU Floods Directive (FD) is to establish a framework for the appraisal and management of flood risks, with the primary goal of mitigating the impacts for human health, the environment, cultural heritage and economic activity associated with floods (European Parliament, 2007). The FD does not provide explicit reference to terms/concepts relating to NbS, nevertheless it provides implicit support for NbS seen through DRR lens.
The Directive acknowledges the value of sustainable land use practices for usage within rural, urban, and natural areas to reduce catchment flood risk, especially as a potential measure for water retention that can be employed in flood risk management plans. These kinds of plans are to consider the characteristics of the specific catchment area and include the support of sustainable land use practices, improvement of water retention and control of flooding of certain areas in the case of a flood event (Article 7). However, while several public authorities at local and regional level have implemented NbS (e.g. using floodplain forests, relocating dams) to handle floods in a sustainable way, they still account for only a small percentage of authorities. Only a small number of flood risk management plans implement GI as a measure for flood protection (ECA, 2018; Schwarz, Pokrajac, Bockmühl, & Stolpe, 2018). The enforcement of the Flood Directive takes place at different levels. National authorities are responsible for implementation, while the EC monitors compliance. River basin authorities are also responsible to oversee flood risk management at river basin level.(https://environment.ec.europa.eu/topics/water/floods_en)
In contrast to the WFD, the FD also considers future changes in the risk of flooding that can result from climate change. The directive characteristically urges the provision of more space to rivers through the maintenance or restoration of floodplains to mitigate potential damage. By emphasizing the consideration of natural features like floodplains and periodic reviews that account for climate change impacts, the paragraph indirectly supports a nature-centric and adaptable approach to flood risk management, and therefore implicitly supports the uptake of NbS for CCA and DRR.

- **The EU Blue Economy for a Sustainable Future (COM/2021/240)**

The main focus of the EU Blue Economy for a Sustainable Future is to integrate the protection and recovery of ocean health into the broader EU economic policy. This integration is driven by the goals outlined in the European Green Deal and the Recovery Plan. It is a strategic approach that emphasizes the importance of protecting the marine environment as a key factor in contributing to nature and biodiversity restoration and protection; rather than being an exhaustive action plan, it focuses on coordination, synergy, environmental protection, and the advancement of knowledge and innovation within the blue economy.
The approach is aimed at the European Union MS and their relevant authorities, as well as stakeholders involved in the blue economy, including those in coastal regions. The goal is to encourage a shift towards sustainable practices that consider the impact on ocean health and biodiversity.
The policy explicitly endorses the implementation of NbS and green infrastructures as alternatives to traditional 'grey' infrastructure for climate adaptation; specifically, the strategy aims to achieve coastal resilience by advocating the implementation of NbS for climate adaptation and green infrastructure for the preservation and protection of biodiversity, coastal

ecosystems, and landscapes. Through this it also aims to mitigate the effects of extreme weather events (eg.flooding, storm surges). The emphasis on developing a new sector in the blue economy focused on NbS further demonstrates support for these solutions (European Commission, 2021c).
The policy likely falls under the oversight of the European Commission. Compliance is expected to be enforced through cooperation with Member States, capacity-building initiatives, and the allocation of EU funds. The strategy emphasizes long-term planning and investments for improving coastal resilience and adaptation with support from EU funds (Chapter 2.4), suggesting that compliance will be monitored and encouraged through financial incentives (European Commission, 2021c).

- **EU Action Plan on the Sendai Framework for Disaster Risk Reduction [SWD(2016) 205 final/2)]**

The EU Action Plan on Sendai Framework for Disaster Risk Reduction aims to strengthen disaster risk management within the European Union by building on the principles of the Sendai Framework. It seeks to integrate these principles into existing EU policies, leveraging the experience of the European Commission. The Plan incorporates most of the terms related to NbS, like EbAp and GI (Paragraph 28 (d)) and explicitly endorses the use of EbAp to contribute to preservation, improvement, and restoration of biodiversity, ecosystems, and ecosystem services across various settings, including urban, rural, coastal, marine and natural areas. It also demonstrates clear and robust support for the implementation of NbS for achieving DRR and resilience (European Commission, 2016a)
The action plan characterizes these solutions as a positive and cost-efficient method to support CCA and DRR, that often yields significant co-benefits such as climate change mitigation or improvements in human health, safety, and well-being. It also underlines the need to strengthen links between disaster risk management, climate change adaptation, and urban policies and initiatives (EEA, EEA Report. Nature-based Solutions in Europe: Policy, knowledge and practice for climate change adaptation and disaster risk reduction , 2021).
In particular, Key Area 2 of the action plan focuses on enhancing connections between disaster risk management, climate change adaptation, and biodiversity strategies, while Key Area 3 aims to promote risk-informed investments to facilitate the implementation of EbAp in disaster risk reduction. Additionally, the action plan advocates for the integration of NbS for urban and territorial resilience by utilizing nature's inherent complexity, power, features, and processes to address challenges. This commitment is reinforced through the EU Research and Innovation strategy, particularly under Horizon 2020, which focuses on developing a robust knowledge base regarding the cost-effectiveness, economic viability, and long-term benefits of NbS.
Additionally, the action plan ensures the practical implementation of NbS approaches by aligning with the European Structural and Investment Funds (ESIF) as assured by the thematic objective 5. This financial support mechanism underscores the plan's dedication to providing resources for the effective application of NbS.

- **The EU Green Infrastructure Strategy**

The EU's green infrastructure strategy comes as a commitment of the EU Biodiversity Strategy to develop a GI strategy. The strategy explicitly acknowledges GI’s potential to restore, protect, enhance, and provide healthy ecosystems and habitats for species. It makes direct references to green infrastructure, nature-based solutions, and ecosystem-based approaches for CCA and DRR (European Commision, 2013b). The priorities of the strategy include promoting GI in the main EU policy areas and improving information, knowledge, and access to finance, as well as contributing to the development of GI projects. The strategy underlines the significance of investing in GI solutions to strengthen disaster risk reduction efforts, facilitating societal adaptation to climate change impacts. Whenever GI is possible as an alternative to grey infrastructure measures, the green solution should be established (European Commision,

2013b). This approach aims to mitigate negative impacts, support local economies, foster green growth, and sustain livelihoods (EEA, EEA Report. Nature-based Solutions in Europe: Policy, knowledge and practice for climate change adaptation and disaster risk reduction , 2021).
Specifically, the strategy highlights the benefits of Eco-DRR and GI in innovative risk management approaches, addressing climate change-related risks and emphasizes that NbS can be used as partial or complete measures to achieve policy objectives. Recognizing that cities and local authorities are at the forefront of dealing with immediate disaster consequences, the strategy emphasizes their pivotal role in implementing preventive measures that are nature-based. It also provides concrete examples of GI applications, such as functional floodplains, riparian woodland, protection of mountainous forests, barrier beaches, and coastal wetlands (European Commision, 2013b).
The strategy outlines its intention to promote green infrastructure through climate change and environmental policies, disaster risk management strategies, health policies, consumer policies, and the common agricultural policy (EEA, EEA Report. Nature-based Solutions in Europe: Policy, knowledge and practice for climate change adaptation and disaster risk reduction, 2021).

- **The EU Restoration Law**

A new Restoration Law has been proposed by the European Commission in June 2022 and has been adopted by the European Parliament as of February 2024. The law features binding targets that add a new level of legal strength to conservation and restoration efforts of wetlands, forests, rivers, marine ecosystems, urban areas, peatlands and pollinators across Europe. The main objective of the law is to bring nature back in order to boost biodiversity, climate and people (IUCN, 2022; European Commission, 2022).
The overarching goal of the legislation is to attain a continuous, long-term, and sustained restoration of diverse land and marine habitats and ecosystems, while enhancing climate mitigation and adaptation.
The EU Nature Restoration Law includes legally binding targets for different ecosystems and will require commitments from all EU Member States. Improving monitoring and data availability are necessary to persuade MS that the required restoration actions are crucial and beneficial to them, and that the associated long-term benefits surpass the immediate and upfront costs (NetworkNature, n.d.).
The law clearly designates NbS as necessary and overarching measures to be adopted by Member States for restoring biodiversity, addressing the climate crisis, and achieving climate adaptation. Other terms featured in the Law, showcasing further support for NbS, include explicit references to green infrastructure, sustainable management, and ecosystem-based adaptation. More specifically, the Law characteristically sets out the need for MS to integrate and establish green infrastructure in urban planning in order to ensure that necessary ecosystems services are being provided, protected or restored by enhancing, expanding and increasing GI and NbS (European Commission, 2022).

- **Urban Agenda**

The EU's Urban Agenda (European Commission, 2016b) specifically mentions NbS and GI. It characteristically stresses that CCA, including GI solutions, is a priority theme, where the overarching goal is to foresee and minimize the harmful effects of climate change on urban areas. The focus is on assessing vulnerabilities, building resilience, managing risks, and considering the broader societal impacts of climate change adaptation strategies.
Another important aspect is the 'sustainable use of land and nature-based solutions,' aiming to ensure that changes in urban areas—whether growing, shrinking, or regenerating—are environmentally respectful, ultimately improving the quality of life. This involves addressing urban sprawl, developing brownfield sites, and incorporating more green spaces into urban

areas (EEA, EEA Report. Nature-based Solutions in Europe: Policy, knowledge and practice for climate change adaptation and disaster risk reduction, 2021).
Even though NbS is part of the Urban Agenda, MS can choose their priority themes and are encouraged, but not obligated, to participate in partnerships for Action Plans (Calliari, et al., 2022). In various policies, the benefits of nature are explicitly acknowledged, pointing to their potential in addressing societal challenges and encouraging actions to adopt or promote such measures. However, these policies fall short on setting standards or mandating support, relying on member states' self-initiative and voluntary commitments (Davies, Chen, Sanesi, & Lafortezza, 2021).

- **EU Taxonomy**

The European Union (EU) taxonomy showcases a strong effort to align sustainable investments with environmental objectives. It acts as a fundamental legislative enabler for directing investments towards nature, natural capital, and NbS. The taxonomy not only recognizes but actively promotes the inclusion of NbS in various economic activities, which is evident in the recently released drafts (European Commission, 2023), where activities such as "Nature-based solutions for flood and drought risk prevention and protection" and "Sustainable urban drainage systems" explicitly mention and support NbS, including sustainable wetlands, swales, ponds, bioretention areas, green rooftops and so on.
The criteria set forth in the EU taxonomy emphasize the substantial contribution of new adaptation activities, underlining a preference for nature-based solutions or reliance on blue or green infrastructure wherever feasible. This preference is further underlined in the Do No Significant Harm criteria for adaptation, making the incorporation of NbS mandatory for a majority of activities that fall under the scope of the taxonomy (European Commission, 2023).
This strategic emphasis on NbS within the EU taxonomy aligns with broader sustainability goals and reflects a commitment to integrating nature-based approaches in climate adaptation and mitigation strategies. By incorporating NbS criteria into the taxonomy, the EU aims to leverage its regulatory framework to direct investments towards projects that not only meet financial goals but also contribute significantly to environmental sustainability (European Commission, n.d.).
Entities and projects that are able to present a high alignment with the EU taxonomy's nature-related criteria can develop competitive advantages. Even for those not mandatorily covered by EU Taxonomy reporting, showcasing alignment with NbS criteria enhances the likelihood of attracting funding from investors and investment funds with a strong focus on sustainability. This dynamic interplay between the EU taxonomy and NbS highlights the pivotal role taxonomy plays in shaping investments that are not only economically viable but also environmentally responsible (Romanovska, 2023).

- **Natura2000**

Natura 2000 represents a binding commitment by the European Union to safeguard biodiversity. As the world's largest ecological network, its primary purpose is to protect natural habitats and ensure the well-being of wild fauna and flora species. Comprising special conservation areas designated by EU member states and special protection zones outlined in the Birds Directive, Natura 2000 operates as a comprehensive network.
Member states are obligated to establish conservation objectives and measures for designated areas. This includes safeguarding habitats, preventing deterioration, and avoiding disturbances to species. The encouragement of proper management of landscape features vital for migration and genetic exchange is integral. Plans or projects impacting Natura 2000 sites undergo rigorous assessment. Strict protection systems are established for animal and plant species, prohibiting deliberate harm, disturbance, or destruction. Monitoring and reporting measures are integral to ensure the well-being of these species.
While Natura2000 aligns with the broader concept of NbS, concurrently it faces a potential challenge. Its primary goal is to preserve natural habitats without direct intervention, which

contrasts with NbS that involves proactive measures for habitat restoration. The paradox lies in Natura 2000's non-interventionist approach, potentially hindering NbS implementation. Nevertheless, recognizing the restorative potential of NbS, it can serve as a valuable tool within the Natura 2000 framework, offering a means to revitalize ecosystems impacted by degradation and by climate change related hazards. Balancing these approaches requires a thoughtful understanding of when and how interventions can align with preservation goals while embracing NbS's capacity for habitat restoration.

- **Habitats Directive and Bird directive**

The older Habitats and Birds Directives, which are foundational to EU Biodiversity policy, do not explicitly employ terms such as NbS or BGI. Despite the absence of explicit terminology, these directives remain fundamental in shaping and safeguarding biodiversity within the European Union (Council Directive 43/EEC, 1992; Council Directive 147/EC, 2009).
The Birds and Habitats Directives, recognized as cornerstones of EU biodiversity policy, establish a robust legislative framework for all EU member countries to protect the most valuable and threatened biodiversity. These two directives are the linchpin of Natura 2000 network, the world's largest coordinated network of protected areas. Encompassing a diverse array of habitats, including forests, grasslands, wetlands, and marine ecosystems, the directive is designed to ensure the long-term survival of species and habitats. Member States are mandated to establish the Natura 2000 network, in order to conserve the most valuable and threatened habitats and species within the EU (Council Directive 43/EEC, 1992; Council Directive 147/EC, 2009).
While the EU Habitat Directive does not explicitly reference NbS, it is closely interconnected with the EU Nature Restoration Law, which explicitly incorporates NbS as a key element for restoring degraded ecosystems across EU. This signifies a recognition of the role that NbS play in achieving the overarching goals and ambitions of biodiversity preservation and ecological sustainability that the Directives aspire to achieve (European Commission, 2022).

- **LULUCF Regulation**

The EU Regulation on land use, land use change, and forestry (LULUCF) (Regulation EU 2018/841) plays a crucial role in addressing climate change by requiring Member States to offset greenhouse gas emissions from the land use sector and contribute to enhancing sinks in forests and soils for the period from 2021 to 2030. The regulation recognizes the significant impact of the land use sector, which encompasses cropland, grassland, wetlands, forests, settlements, and land use changes like afforestation and deforestation, covering more than three-quarters of the EU's territory (Regulation EU 2018/841).
Sustainable land-use management practices within the LULUCF sector are identified as key contributors to climate change mitigation. These practices aim to reduce emissions, maintain and enhance sinks, and preserve carbon stocks. The regulation acknowledges the need for sustainable management practices that will provide long-term stability and adaptability of carbon pools and will reduce risks associated with natural disturbances (Regulation EU 2018/841). Moreover, the LULUCF Regulation requires that Member States set up systems to monitor soil carbon stocks, with the expectation of enhanced implementation of nature-based climate mitigation in soils.
The LULUCF Regulation explicitly supports various projects, including the protection of wetlands, and the restoration of degraded lands, as examples of how the sector can enhance its contributions to climate mitigation and adaptation. This therefore indicates an indirect support of NbS practices for CCA and DRR by incentivizing sustainable practices and projects within the land use sector (EEA, EEA Report. Nature-based Solutions in Europe: Policy, knowledge and practice for climate change adaptation and disaster risk reduction, 2021).

- **EU Action Plan for nature, people and the economy**

The EU Action Plan for nature, people, and the economy, adopted in April 2017, actively supports NbS through various provisions outlined in legislative articles. One notable example is the commitment to provide guidance for the development of green infrastructure, aiming to enhance connectivity in Natura 2000 areas. The Action Plan recognizes the importance of a Trans-European Network for Green Infrastructure (TEN-G) and encourages competent authorities in Member States, along with relevant stakeholders, to employ integrated spatial planning processes (Faivre, Sgobbi, Happaerts, Raynal, & Schmidt, 2018).

It encourages the financing of increased connectivity and green infrastructure through rural development and regional development funds. Additionally, the concept of green infrastructure is seen as contributing to the establishment of a sustainable economy by maintaining ecosystem benefits while mitigating the adverse effects of transport and energy infrastructures (European Parliament, 2018).

The Action Plan also acknowledges the role of green infrastructure in mitigating the effects of natural disasters linked to meteorological and climatic changes. It specifically highlights the study of green infrastructure's contribution to mitigating the impact of extreme meteorological and climatic conditions, which are often the cause of devastating natural disasters in Europe and worldwide (European Parliament, 2018).

Annex II. RECONECT Policy Brief

RECONECTing with Nature – Short Policy Brief

Executive Summary

This policy brief introduces the RECONECT project, funded by the European Union's Horizon 2020 programme, which focuses on enhancing the European reference framework for Nature-Based Solutions (NbS) to reduce hydro-meteorological risks such as floods, droughts, and landslides. RECONECT demonstrates, references, and scales up large-scale NbS in rural and natural areas, providing valuable insights and tools for their broader application across Europe. This brief outlines the project's key results and provides policy recommendations to further advance the integration of NbS into climate resilience strategies.

Background

RECONECT- **R**egenarating **ECO**systems with **N**ature-based solutions for hydro-meteorological risk r**E**du**CT**ion.

European Union's Horizon 2020 project.

Starting date: 1 September 2018, Ending date: 31 August 2024.

RECONECT aims to rapidly enhance the European reference framework for Nature-Based Solutions (NbS) in hydro-meteorological risk reduction by demonstrating, referencing, upscaling, and exploiting large-scale NbS in rural and natural areas.

The RECONECT consortium brings together an unprecedented transdisciplinary partnership of researchers, industrial partners (SMEs and large consultancies), and local and regional authorities/ agencies, all fully dedicated to achieving the project's desired outcomes.

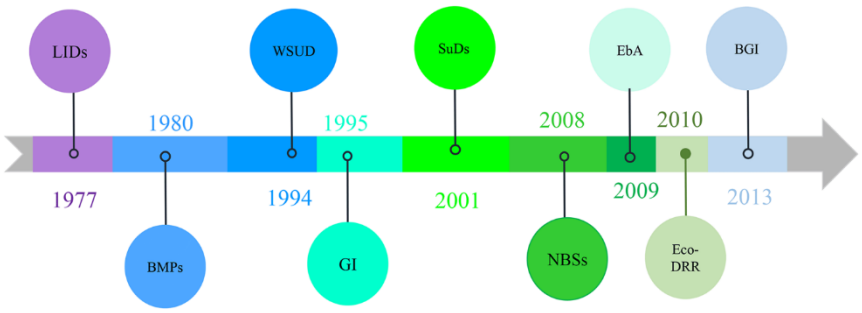
http://www.reconect.eu/

What is the issue?

The escalating impacts of climate change, including more frequent and severe hydro-meteorological hazards such as floods, droughts, and landslides, cause significant risks to both natural and human systems. Traditional approaches to risk reduction are proving inadequate in addressing these complex challenges, leading to increased vulnerability, particularly in rural and natural areas.

Why is this important?

Addressing hydrometeorological risks through Nature-Based Solutions (NbS) is crucial not only for mitigating immediate threats but also for ensuring long-term resilience. As Europe's natural capital faces unprecedented pressures, integrating NbS into land-use planning and development is essential. There is an urgent need for innovative, sustainable solutions that can effectively reduce these risks while supporting ecosystem services.



Timeline and year of origin of each term (L. Ruangpan et al., 2020)

What can be done?

To effectively tackle the urgent challenges caused by hydro-meteorological risks, it is essential to accelerate the research, implementation, and scaling of Nature-Based Solutions (NbS). Projects like RECONECT, alongside others in the EU, demonstrate the immense potential of NbS in mitigating these risks while supporting sustainable development. To enhance their impact, we need to increase financing for these solutions, leveraging both public and private sector investments, and promote stronger partnerships across all sectors. Furthermore, the uptake of results from ongoing and future projects must be prioritised, ensuring that proven NbS are integrated into mainstream land-use planning and development strategies. By doing so, we can build more resilient communities and ecosystems in the face of climate change.

Who are the actors of change?

⇒ **Policy and Decision Makers:** National and local officials responsible for land planning, policy formulation, and risk management.

⇒ **Government Agencies:** Agencies tasked with security, planning, environmental sustainability, and public health.

⇒ **Expert Practitioners:** Professionals such as engineers, land use planners, and biologists who can apply science-based evidence to enhance their practices, design NbS, and promote sustainable interventions.

⇒ **Industry and Private Sector**: Entities that generate revenue or enhance their commercial image through sustainability practices, including NbS implementation.

⇒ **Public and Private Stakeholders:** Landowners and those whose activities are impacted by NbS. Their support and positive attitude toward NbS are critical for successful implementation and maintenance, as well as for promoting these solutions within broader communities.

⇒ **Scientific Community:** Researchers and academics who can build results, validate findings, and further develop the evidence base for NbS.

⇒ **EU Networks, Communities, and Initiatives:** Various networks and communities are instrumental in disseminating and promoting broader adoption and development of NbS across Europe and internationally.

Portofino Demonstrator. Credits, G. Paliaga, 2024

Which results hold the key to progress?

RECONECT project results with potential for future exploitation include a holistic ecosystem-based framework that integrates monitoring and evaluation tools to support the effective implementation and upscaling of Nature-Based Solutions (NbS) across Europe. The project has also produced comprehensive guidelines for the design, construction, and maintenance of NbS, offering practical insights drawn from diverse real-world applications. Additionally, the ICT Service Platform provides multiple tools for real-time monitoring and co-creation support. RECONECT has also developed a business model and investment strategy framework to enhance the financial viability and scalability of NbS projects, complemented by standardised practices for project management. These results present a foundation for advancing NbS, with opportunities for exploitation in policy-making, industry application, and further research.

Demonstrating NbS

Holistic Ecosystem-Based Framework

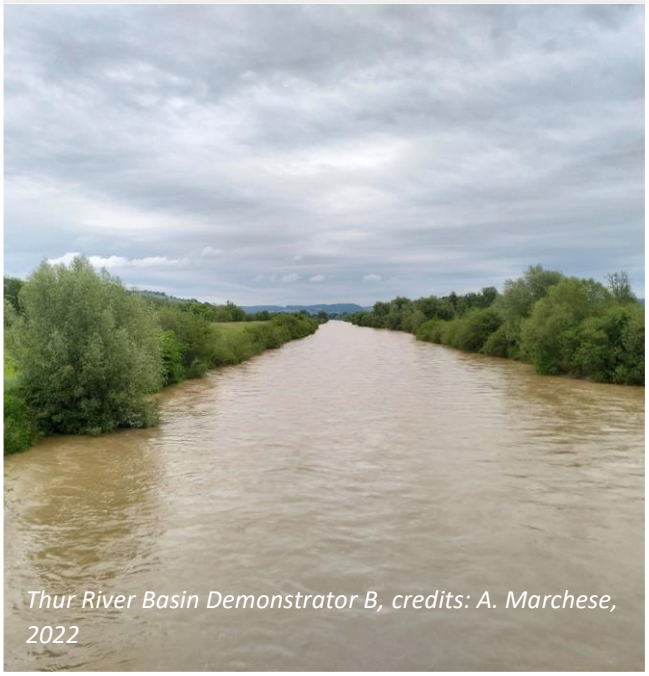
The framework is designed to support the implementation and evaluation of large-scale Nature-Based Solutions (NbS) in rural and natural areas, focusing on reducing hydro-meteorological risks. What sets the RECONECT framework apart is its structured approach to grouping challenges into three interconnected pillars: WATER, NATURE, and PEOPLE.

- **WATER:** This pillar focuses on the management and movement of water within the natural and human-altered landscapes, addressing issues such as flood risks, water quality, and availability. The framework evaluates how NbS can mitigate these risks over different spatial and temporal scales.

- **NATURE:** This pillar emphasises the role of ecosystems and biodiversity in sustaining natural processes and providing ecosystem services. The framework assesses how NbS can enhance biodiversity, restore ecosystems, and offer co-benefits such as carbon sequestration and habitat provision.

- **PEOPLE:** The third pillar integrates the social dimension, recognising that human systems—comprising social structures, behaviours, and governance—interact with natural systems. The framework evaluates how NbS can be co-created with stakeholders to deliver societal benefits, including improved public health, economic opportunities, and social well-being.

By incorporating these three pillars, the RECONECT framework goes beyond traditional risk management approaches, offering a more comprehensive method for understanding and addressing the complex interactions between natural and human systems.



Thur River Basin Demonstrator B, credits: A. Marchese, 2022

⇒ ***Actors of change:*** *Government Agencies, Industry (and private sector), Scientific Community, EU Networks, Communities and initiatives.*

Influencing NbS Implementation

The RECONECT project worked towards influencing NbS implementation across diverse environments by developing comprehensive guidelines, innovative evaluation methodologies, and standardised best practices.

- **Guidelines for Design, Construction, and Maintenance of NbS:** These guidelines serve as a crucial resource for entities seeking to implement large-scale NbS projects aimed at reducing hydro-meteorological risks, particularly in rural and natural areas. By distilling practical lessons from demonstrator projects across mountainous, riverine, and coastal areas, the document bridges theoretical knowledge with real-world applications.

  ⇒ ***Actors of change:*** *Policy and Decision-makers, Government Agencies, Expert Practitioners, Public and Private Stakeholders, Scientific Community, EU Networks, Communities and initiatives.*

- **Guidelines for Monitoring and Evaluation:** A new methodology has been introduced for the co-evaluation of RECONECT demo sites, utilising a Mixed Method Appraisal Tool (MMAT). This approach allows for a comprehensive assessment of NbS projects across multiple dimensions—Water, Nature, and People—ensuring that the full spectrum of benefits and challenges are captured.

  ⇒ ***Actors of change:*** *Expert Practitioners, Industry (and private sector), Public and Private Stakeholders, Scientific Community.*

- **Standards for Design, Implementation, Management, and Decommissioning:** best practices from RECONECT's outputs are consolidated into a standard that spans the entire life cycle of NbS projects, from planning and design through to monitoring and decommissioning. By offering tangible guidance based on the consensus of various stakeholders involved in RECONECT, these standards aim to streamline the implementation process and support the upscaling of NbS.

  ⇒ ***Actors of change:*** *Policy and Decision-makers, Government Agencies, Expert Practitioners, Public and Private Stakeholders, Scientific Community, EU Networks, Communities and initiatives.*

RECONECT draws upon a network of carefully selected Demonstrators and Collaborators that cover a range of local conditions, geographic characteristics, governance structures and social/cultural settings.

The RECONECT Demonstrators are examples of large-scale Nature-Based Solutions for hydro-meteorological risk reduction which can provide proof-of-concept for their upscaling and replication.

*RECONECT Demonstrators **Type A**: Elbe Estuary-Germany, Seden Strand-Odense Denmark, Tordera River Basin-Catalonia, Portofino Natural Park-Italy.*

*RECONECT Demonstrators **Type B**: IJssel River Basin-The Netherlands, Inn River Basin-Austria, Greater Aarhus-Denmark, Thur River Basin-Switzerland, Var River Basin-France, Les Boucholeurs-France.*

Elbe demonstrator A, Source: D. Ackermann, LSBG

Upscaling NbS

ICT Service Platform

The ICT Service Platform developed under the RECONECT project provides comprehensive tools for data storage, analysis, and visualisation, enabling Demonstrators and Collaborators to effectively manage and evaluate their NbS initiatives. Key components include:

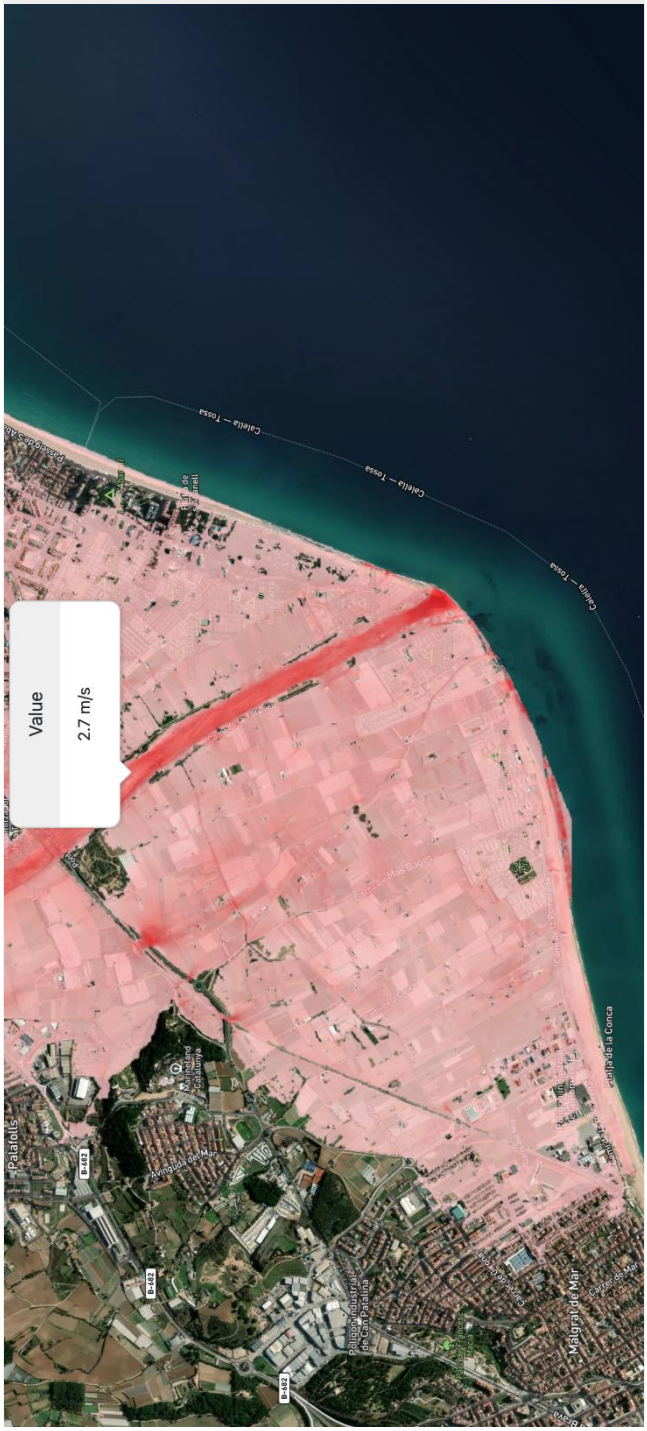
- **TeleControlNet (TCN):** The central node of the platform, TCN is a SaaS designed for real-time data collection from in-situ sensors deployed across all RECONECT demo sites. The platform is further capable of enabling Real-Time Control (RTC) at remote locations, such as managing water flows through locks, using centrally programmed decision rules. In the future, this data will be made partially accessible to the public via user-friendly, intuitive webpages, enhancing transparency and stakeholder engagement.

- **HydroNET Dashboard and Crowdsourcing App:** This integrated tool offers advanced visualisation and analysis of weather and water data. The HydroNET Dashboard allows users to compare water levels and flows against established thresholds, displaying results through intuitive indicators like traffic light colours. Additionally, it integrates data from TeleControlNet, combining in-situ measurements with weather forecasts to provide comprehensive dashboards for operational water management. The Crowdsourcing App complements this by engaging citizens in the monitoring process, allowing them to report observations, including photos and locations, directly into the system.

- **ARGOS NbS Data Viewer:** ARGOS provides a structured interface for exploring all data related to NbS, organised by the key pillars of Water, Nature, and People, along with associated goals, sub-goals, indicators, and variables. Users can log into specific demonstrator sites to access real-time measurements, view calculated indicators, and compare scenarios to evaluate risk reduction and the co-benefits of NbS.

  ⇒ ***Actors of change:*** *Policy and Decision-makers, Expert Practitioners, Industry (and private sector), Scientific Community.*

The RECONECT Services Platform is an ICT ecosystem supporting our Demonstrators and Collaborators in terms of data storage, analysis and visualisation. The Platform central node is the TeleControlNet, a SaaS used to collect in-situ data and connected with the other platform components.



Policy recommendations

By adopting the following recommendations, policymakers can help ensure that Nature-Based Solutions are effectively integrated into Europe's strategies for climate resilience, contributing to the sustainable development of communities and the preservation of natural ecosystems.

1. **Integrate NbS into National and Regional Land-Use Planning:** By doing so, NbS can be more effectively scaled and mainstreamed, leading to enhanced resilience against hydro-meteorological risks and supporting broader environmental and societal goals.

2. **Increase Funding and Investment in NbS:** The development of business models and investment strategies that demonstrate the cost-effectiveness and multiple societal benefits of NbS will be crucial in securing diverse funding sources and accelerating their implementation.

3. **Support the Development of Standardised Guidelines and Frameworks:** There is a need for the continued development and dissemination of standardised guidelines and frameworks. These should cover all phases of NbS projects, from planning and design to monitoring and decommissioning, ensuring consistency and reliability in their application.

4. **Enhance Data Sharing and Monitoring Capabilities:** The use of ICT platforms, such as the RECONECT Service Platform, should be expanded to improve data collection, monitoring, and evaluation of NbS.

5. **Encourage Public Participation in NbS Projects:** Tools such as the crowdsourcing app developed by RECONECT can be instrumental in capturing valuable local knowledge and fostering a sense of ownership among stakeholders.

For more information on RECONECT, please contact the project coordinator Prof. Zoran Vojinovic, z.vojinovic@un-ihe.org.

The RECONECT Consortium: