Mainstreaming and Upscaling Nature Based Solutions in North West Europe: the INTERREG ResiRiver Project

R.M.J. Schielen[a], N. Rem, Y. Snoek and S. Wilson
Ministry of Infrastructure and Water Management, DG Rijkswaterstaat, Utrecht, The Netherlands
[a] Delft University of Technology, Delft, The Netherlands

S. Duverney
Symsagel, Noeux les Mines, France

J. Rijke
HAN University of Applied Sciences, Arnhem, The Netherlands

S. Schreier
Federal Waterways and Shipping Administration, Bonn, Germany

ABSTRACT: Creating Resilient River Systems by Mainstreaming and Upscaling Nature-based Solutions or 'ResiRiver' for short, is an EU Interreg project focusing on the creation of Resilient River Systems through the mainstreaming and upscaling of Nature-based Solutions (NbS). Today, most North-West European (NWE) river systems face significant challenges, largely resulting from past anthropogenic riverine alterations (regulations and interventions) which have greatly exacerbated the negative effects of climate change like flooding and drought. These changes also put additional pressures on existing land-use-claims, and other societal/economic interests like shipping, agriculture and water quality and cause continued biodiversity-loss. In recent years, NbS have emerged as a novel and sustainable approach in river management, capable of mitigating these threats while also strengthening climate resilience. They fit well within the EU's 'Blue Economy' ambition and provide undeniable benefits for both human well-being and biodiversity. However, the widespread integration (mainstreaming) and implementation (upscaling) of NbS in riverine systems has yet to become common practice. The ResiRiver project therefore aims to accelerate the upscaling and mainstreaming of NbS through a curated partnership of full-scale North West Europe NbS projects by gathering, transferring, and synthesizing knowledge and experiences, whilst ensuring that this is done at all relevant partner/national/EU levels.

1 INTRODUCTION

River managers today are faced with the challenge of adapting to climate change while also having to sustainably secure all important functions in a healthy river system for society. Nature-based Solutions (NbS) have proven themselves effective across a multitude of contexts, providing integrative approaches for river restoration, conservation and sustainable management. Hence, NbS ensure both climate change adaptation, whilst also contribute to climate mitigation and biodiversity recovery for generations to come. NbS are multi-faceted and more importantly, they are effective when it comes to addressing multiple complex societal challenges (e.g. reducing flood risk, increasing natural values and biodiversity, ecosystem services and human well-being) as they provide a novel, integrative and coherent approach. Despite the significant and rapidly growing foundation of scientific evidence regarding the effectiveness of NbS in riverine systems management (see e.g. Bridges et al., 2021), the actual uptake and application of NbS on a larger (EU) scale is still in its early phase. From a current EU-institutional perspective a major barrier to the wider uptake and application of NbS in riverine systems remains the lack of 'Upscaling' and 'Mainstreaming' within regional and national water authorities. Within this context, upscaling is defined as applying NbS on long(er) river stretches, and beyond the pilot-phase. Worded differently, upscaling involves coping with our limited experience in scaling solutions beyond their local niche. Mainstreaming is considered to be any action that enables NbS to become a standard working practice in project planning considerations related to reducing flood risk/river restoration for the responsible organizations. For upscaling, it is important to study whether the same principles apply for NbS on long river stretches, compared to NbS-pilots. Mainstreaming can be considered on different levels: the level of individual water management authorities to national level

and international level. Our lack of standardized methods for quantitative assessment and monitoring of ecosystem services and benefits related to NbS hinders replication and application at a wider scale.

2 THE INTERREG RESIRIVER PROJECT

The Interreg North West Europe project ResiRiver (Creating Resilient River Systems by Mainstreaming and Upscaling Nature-based Solutions, see https://resiriver.nweurope.eu/) is a close partnership between local, regional and national water management authorities, municipalities and NGO's in stakeholder engagement. Universities from France, Germany, Ireland, Belgium and the Netherlands participate in ResiRiver. The project has had its kick-off last year (2023) and is currently working towards its overarching goal of Upscaling and Mainstreaming Nature based Solutions. ResiRiver aims to overcome the challenges related to the limited application of NbS by bridging the gap between practice, science, society and policy. To ensure a structured and coherent approach, it has adopted three separate work packages (WP's, see also Figure 1). WP1 considers the individual projects, which vary in terms of their geographical location within river systems, as well as their institutional and governance contexts. The projects themselves can be broadly subdivided into two groups: i) physical projects and ii) study projects. In both categories, each project focusses on specific enablers (opportunities) that may contribute to successful NbS implementation, as well as barriers (challenges) that may prevent this (Moons et al., 2021). One of the first ResiRiver milestones was to apply the 'IUCN Standard for Nature-based Solutions' (IUCN, 2020, Berg, 2022) to assess the current state of the projects and in extension, to identify possible NbS improvements. The IUCN Standard aims at being an overarching assessment framework for NbS, while also promoting its application by reporting on its use. Intermediate WP1-findings may therefore in turn be used to improve the IUCN guiding questions and elements within the self-assessment tool. ResiRiver recognizes that the IUCN Standard is a process-based

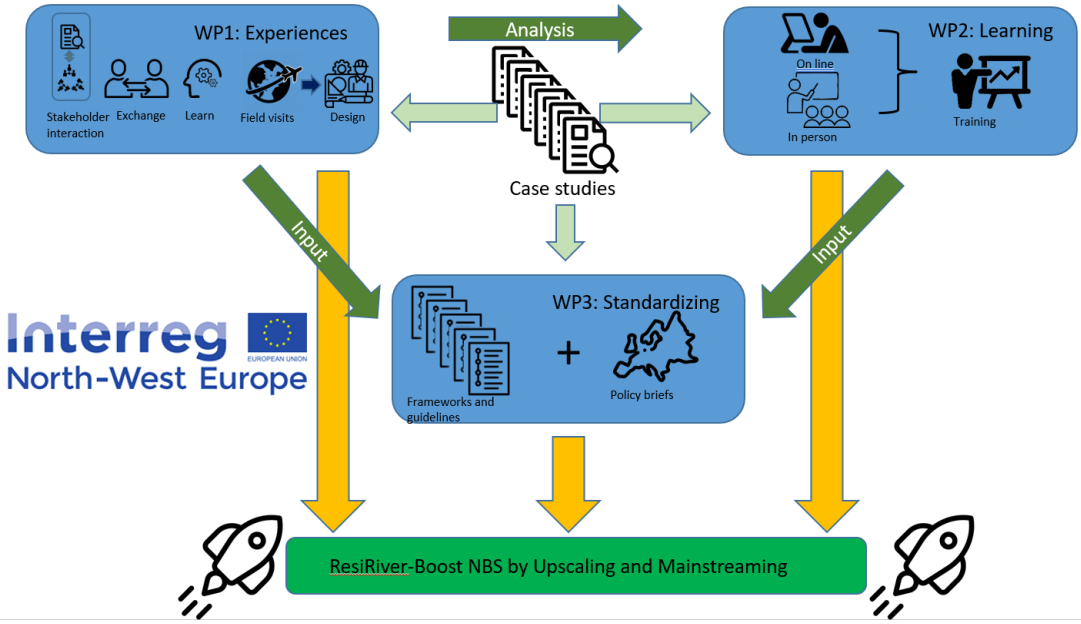

Figure 1: Graphical summary of ResiRiver, with the three WP's and the overall goal: Upscaling and Mainstreaming Nature based Solutions.

framework (see Berg, 2022), rather than a results-based framework. This means that, currently, adhering to the standard only implies that the essential processes (as defined by the IUCN) have been incorporated in the project, but depending on the level of adherence, possibly only to some degree. These essential processes include, among others, up-to-date risk management, inclusive stakeholder engagement, continuous adaptive management and long term monitoring. WP2 focusses its efforts on the development of training methods and materials. It uses the knowledge and experience gained from the projects, learning-needs studies, as well as insights gained from

past NbS projects and scientific literature. The training materials themselves should contribute to a solid knowledge foundation that can support specific acceptance of NbS across various levels (implementation, planning and policy) within river management organizations. The outcomes will be used to develop a learning platform and tailor-made training programmes for the eleven project partners across the Netherlands, Germany, France, Belgium and Ireland. Finally,WP3 aims to develop strategies, action-plans and guidelines that build upon existing materials, and can be used to assess NbS projects and quantify co-benefits in those initiatives. Findings are coupled to the Societal Readiness Level (SRL) and the Technical Readiness Level (TRL) where the SRL gives an indication of how receptive society may be to particular innovations while the TRL gives an indication of technology maturity from a market-readiness perspective. Parallel with its other activities, WP3 intends to write policy-briefs at regional, national and European levels in order to positively influence policy formation and adoption.

3 FIRST RESULTS

At this stage, ResiRiver's primary activities include the development and execution of IUCN baseline assessment studies for all projects, reflection and exchange of the results between the projects, the design and improvement of specific NbS-technologies, and the advancement of suitable frameworks schemes that serve to evaluate and monitor the effectiveness of proposed measures.

The first application of the Standard to the projects (WP1) revealed interesting findings. In order to get the best out of the assessment a multidisciplinary team was involved. Dependent on what stage a project is in, it was not always possible to answer all of the IUCN guiding questions. The more early/conceptual, the more difficulties arise when trying to answer the guiding questions. This influences the score, but also revealed that there is room for improvement for the Standard itself. These findings will be used to propose adaptations and changes to the Standard (which will be done in WP3). In applying the standard, it was confirmed that the IUCN self-assessment lacks an evaluation of project objectives. Therefore, in the ResiRiver projects there is a need to apply also result-based frameworks in order to assess the outcome and output of the project.

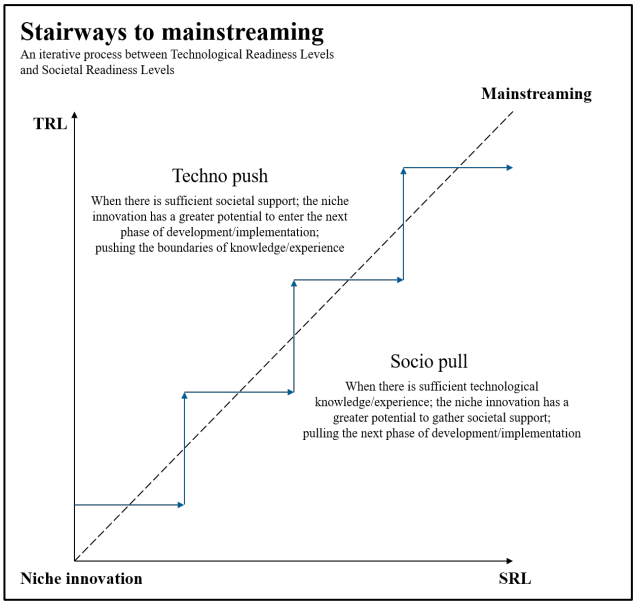

Figure 2: Visualization of the 'Stairways to Mainstreaming' staircase, building upon SRL and TRL

In WP2, we started to work on an important project-element: the creation of hands-on training schemes and materials, based on the knowledge and experience gained from these projects which serve to support and inform not only the project partners, but also the river management community as a whole. This was done by sending out a questionnaire, that focused on target audience, target audience's learning needs, training materials, intended use of learning platform and training

modules. After evaluating these, a workshop was organized to identify the learning needs in more detail and link them to the SRL and the TRL. From this, it became clear that some organizations require a technological push, while other organization require a societal pull with regards to the NbS technologies they intend to adopt.

Finally, in WP3, in order to facilitate the mainstreaming and upscaling of NbS beyond local contexts in the future, ResiRiver aims to continually work on the improvement of existing frameworks and guidelines for NbS through experimentation and critical analysis. To achieve this aim, it builds on the concepts of societal pull and technological push which, when combined, can be used to create theoretical 'staircase to mainstreaming' (see figure 2). These staircases are the preferable iterative process of pulling and pushing between the SRL-TRL-level as one without the other cannot achieve the end-goal of mainstreaming. The challenge WP3 aims to address, is to combine the SRL and TRL with an additional IRL (Institutional Readiness Level) which may serve as a roadmap that can accelerate upscaling and mainstreaming by providing recommendations based on a NbS's position on the scale. By combining these theoretical concepts with a pragmatic objective in mind, WP3 is working towards establishing a new Readiness Level: the NbS Readiness Level (NRL) (see figure 3). This figure merely shows the conceptual model. The levels itself, the description of the levels (in the figure, they are still based on the TRL-descriptions) and how to integrate SRL, TRL and IRL into NRL is subject of further research in ResiRiver. The challenge will also be to combine this with the IUCN-assessment. The outcome of the IUCN assessment might indicate the NRL-level of the pilot, and the actions that are needed to increase the NRL-level (i.e. by improving the stakeholder process, or by implementing a monitoring plan). In the long-term, WP3 intends to embed the best-practice insights at relevant policy-levels by actively contributing to the development of local, national and EU-based policy papers and guidelines. In doing so, ResiRiver intends to play a pivotal role in making NbS a standard measure for river management.

4 NEXT STEPS

ResiRiver is a 5 year project and will end in 2028. By then, we expect to have learned from experiences in the field, both from completed field projects, as well as those that are currently in the planning phase. Our goal is to ensure that the latter projects benefit from experiences and gained knowledge from the ResiRiver projects. During the ResiRiver, we will conduct field visits

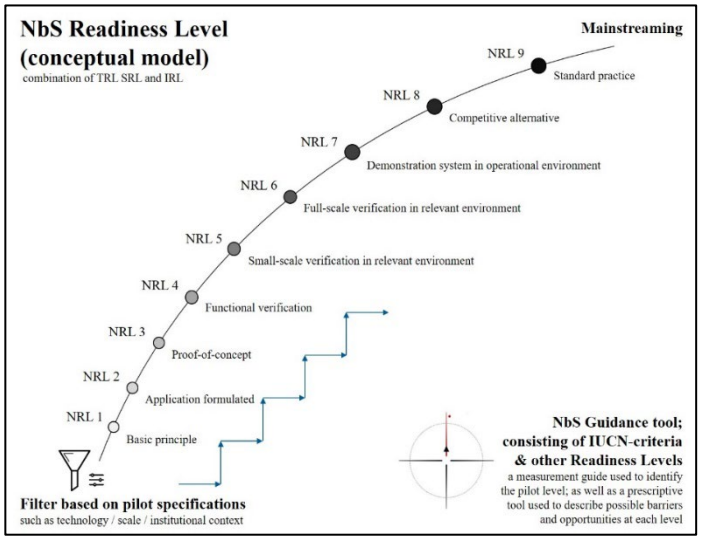

Figure 3: Conceptual model of a NbS Readiness Level framework, depicting the proposed tools and levels that can be used to prescribe best-practices at specific levels in order to navigate relevant barriers and opportunities

to all projects and share knowledge on the technical NbS measures, the quantification of ecosys-

tems services, stakeholder engagement and on the challenges and opportunities that the responsible parties run into. We expect to identify differences from project to project, depending on the context, the scale, locations within the catchment and national legislation.

Based on the application of the IUCN Standard, we will propose adaptations, such that the Standard will become more suited as a widely used assessment framework without running into ambiguity or confusion about the guiding questions. We will also start working on policy recommendations, to ensure that NbS becomes well embedded within the participating organizations, and hence contributes to the mainstreaming of NbS at local, national and European levels. Furthermore, we are going to standardize the concept of NbS Readiness level. This will contribute to more wide use of NbS, because it can act as a way of standardization and assessment of on what level NbS's are now, and what is needed to elevate them to a higher level.

Lastly, we are using the scientific partners and associated partners in the project to set up a Science Team that takes up the scientific challenge to develop new concepts for mainstreaming and upscaling, based on the experiences gained in the projects and the discussions in the various WP's. The newly developed concepts will be tested and reflected scientifically and published in journals, such that the knowledge is stored and can be used by the NbS-community.

During the last couple of months (late 2023, early 2024), many of the ResiRiver projects suffered from very high discharges in the smaller streams and bigger rivers. At some locations this lead to severe flooding problems, while at other locations, the high water levels acted as a reminder of near-floodings in the past. In almost all cases, it raised awareness that our river systems are still vulnerable, and that the changing climate is testing our system to the maximum extent possible. These occurrences of high discharges increases the need for more natural solutions to keep our rivers robust, climate proof and resilient. Nature based Solutions, and the INTERREG ResiRiver project will contribute to these more resilient river systems.

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