SUCCESS OR FAILURE OF RIVER RESTORATION PROJECTS

A multi-factorial analysis in the BSR

Summary of study report under Project RETROUT for the Development, Promotion and Sustainable Management of the Baltic Sea Region as a Coastal Fishing Tourism Destination

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Background and purpose

The coastal fishing tourism industry in the Baltic Sea Region (BSR) has been identified as a sector with great potential for growth and sustainable jobs. However, despite the economic potential, the industry fails to be fully exploited because of certain key challenges that currently limit its development. One of these is suboptimal conditions of habitats essential for migratory fish species which underpins this industry. Breeding and rearing habitats are among the most important ones for sustaining viable fish populations. As anadromous fish rely on running fresh water for completing their life cycle, the condition of rivers and streams are crucial for these fish and, on their part, key for maintaining viable fish stocks in the sea. Among the common sport fish species in the Baltic Sea, sea trout (*Salmo trutta*) is one of the most desired but has been classified as 'vulnerable' in the HELCOM Red List of Baltic Sea species, 2013. The anadromous sea trout stays for 1-6 years in running fresh water where it is born, until it migrates to the sea for foraging before again migrating back to the river for spawning (usually 2 years in the river and 4 years in the ocean).

In order to achieve sustainable sea trout and other sport fish populations, it is thus essential that their freshwater habitats are accessible and in good ecological condition. However, achieving good ecological status of rivers and other freshwater bodies has been a challenge in the European Union and BSR, which poses obvious negative consequences for river-dependent fish stocks. River restoration has been put forward as a solution in such situations, and in the recent decades, several river restoration projects have been designed and implemented. However, not many restoration projects have delivered goods sufficiently, the inability to substantially improve the status of the threatened species being an indicative evidence.

RETROUT is a flagship project supported under the EU INTERREG-Baltic Sea Program. The overarching goal of the project is to develop and promote sustainable coastal fishing tourism in the BSR. The project has partners from Estonia, Latvia, Lithuania, Poland, and Sweden, as well as HELCOM as an intergovernmental organization. One of the sub-projects under RETROUT addressed the challenge of improving the ecological status of river courses in the BSR, potentially leading to larger fish stocks which is a prerequisite for a growing fishing tourism industry. This sub-project aimed to finally propose "Best Practice Solutions" for efficient and sustainable restoration measures for such rivers with a focus on the Sea Trout.

Towards this end, the implementation of river restoration measures (mainly habitat restoration and addressing migration barriers) in selected rivers was evaluated, with an aim to analyze successful and failed/non-realized river restoration projects and identify the underlying factors leading to such outcomes. The purpose of this report is to present the key findings of the study, the lessons learned, and recommendations for action to improve the performance of river restoration projects. The contents of this report constitute one of the major backbones of the "Best Practices Guidelines" published as the final outcome of the sub-project on river restoration in the form of a HELCOM report.

Methods and Materials

This study was based on a qualitative analysis of data collected from past river restoration projects planned and/or implemented in potential sea trout rivers flowing to the Baltic Sea. Considering that the evaluation involves a comparison of the different restoration projects, the 'comparative case study approach' was adopted as the basic methodology. Data collection was organized in two successive rounds. In the first round, data from a total of 96 river restoration projects located in 73 rivers in the BSR were collected through a survey conducted in the partner countries - Estonia, Latvia, Lithuania, Poland, and Sweden and additional HELCOM countries - Denmark and Russia. The projects were divided into two categories: 'completed' and 'non-realized'. The completed projects imply those that

were implemented and completed at any point of time in the past while the non-realized referred to those that were planned but never came to be implemented or completed. The completed projects were further classified as 'success', 'failure' and 'partial success´. An overwhelming majority of the 90 projects included in the study were 'completed' while only 6 were 'non-realized'. A good majority of the completed projects, numbering 51, were classified as 'success' while 19 were classified as 'partial success, and while 11 were 'failure'. The status of 9 projects could not be determined on the basis of the available data and were classified under the label 'not known'.

Based on the findings in the first round, a smaller stratified purposeful sample of 15 river restoration projects was selected in the second round for detailed interview-based case studies. Of these, 6 were success, 2 were partial success, 3 were failure, and 4 were non-realized. In addition, one restoration project was directly added in this round from Finland, increasing the total number of detailed case studies to 16. This was classified as a 'success' case by the project team. Thereafter, a country-wise analysis of the case studies was conducted to identify the most important factors contributing to success or failure of the projects or affecting their implementation. While in case of the 'success' projects, the factors contributing to success of the project were primarily analyzed, in case of the 'failure' and 'non-realized' projects, factors leading to failure were of primary concern. In case of those classified as 'partial success', the factors contributing to success as well as failure of the project were analyzed. Finally, the case-study data and their interim analytical findings were subject to comparative analysis across countries using a conceptual framework developed earlier to compile the most important factors influencing 'success' of river restoration.

Findings

Data from the first round of the study show that the overall aim of the restoration projects included: improvement of fish populations by facilitating upstream and downstream migrations for improved natural reproduction, combined with restoration of other biological diversity, enhancing recreational value, revival of cultural heritage, and other kinds of stakeholder interests. The major kinds of restoration measures carried out were removal of migration obstacles, construction of fish pass, river habitat improvement, facilitating fish transport, improved fishing rules, and stocking. In some cases, a combination of these restoration measures was observed. The temporal scale of the restoration activities varied between short and long-term, while their spatial scale ranged between short stretch to entire river or large part of the catchment. The various agencies responsible for designing and implementing the restoration projects included local authorities, regional authorities, national authorities, non-governmental organizations (NGOs), citizens and the private sector. The financial expenditure for these projects ranged from as low as < €30 000 to as high as > €5 000 000.

From the comparative case study analysis in the second round, the factors leading to success (or failure) of the sampled restoration projects were identified, as summarized in Table 1 below.

Table 1: Factors important for success of river restoration projects as emerging from the case studies

Nature of factor	**Dimension**	**Criteria**	**Factors promoting project success**
Context-based	Ecological	Ecological challenge(s) to address, the spatial scale and overall ecological status of the river stretch	Holistic knowledge and understanding of the ecological challenges adversely affecting fish populations, including water quality and quantity issues, and any other related ecological problem in the river/ basin

Nature of factor	Dimension	Criteria	Factors promoting project success
	Political	Relevant policy and legal frameworks at local, national and/or regional scale	Cohesive policies and legal frameworks that support integrated long-term solutions
		Political support vis-à-vis the proposed restoration	Long-term political support
		Political scale involved — local, national, international	Integration and coordination between different political scales involved
	Economic	Economic interests hampered or supported by the proposed restoration	Promotion of common economic interests
		Financial resources available for the restoration	Adequate and long-term availability of funds
	Social and cultural	Stakeholders and their interests around the proposed project	Consensus, cooperation and relationship based on trust and mutual support among stakeholders
		Cultural/historical values connected to the site of the proposed restoration	Recognition of cultural/historical values at the proposed restoration site
Process-based	Technical	Selection of the restoration measure	Choice of most appropriate solution, based on integrated context-analysis
		Technical designing	Ensuring effectiveness of the design
		Implementation and maintenance of technology	Effective implementation and long-term maintenance
	Project processes	Preparatory work — hydrological, environmental or other scientific assessments	Completion of preparatory studies or pre-assessments for baseline data, and project design
		Nature of the plan — e.g., long/short term, site-specific/watershed-based	Long-term integrated approach, preferably at watershed scale, combining multiple ecological goals
		Post-implementation phases included in the project – monitoring and evaluation	Plan comprising all project cycle phases — implementation, monitoring, evaluation
	Social	Project team/actors — composition, roles, skills, personal attributes, leadership, coordination, etc.	Cohesive team comprising an array of relevant actors possessing necessary knowledge and skills, including good leadership and coordination skills
		Decision-making process	Participatory decision-making, inclusive of stakeholders' perspectives
		Stakeholder management and engagement	Stakeholder involvement in all project phases, efforts at consensus building
		Project communication within team and with stakeholders	Effective and regular communication with stakeholders and within team
	Financial planning and resources	Allocation of funds for every project phase	Adequate funds allocated for supporting every project phase

Conclusions

From this study it emerges that the factors important for success of river restoration projects can be divided into two broad categories: context-based and process-based. The former concern the context in and about which the project is designed and implemented, while the latter concerns the process adopted for planning, designing, implementing and undertaking the post-implementation phases of the project. Factors within each of these categories are outlined in the table above and are equally important in deciding the fate of the project.

The identification of the factors above has important implications for defining the Do's and Don'ts with regard to best river restoration practices. First and foremost, a river restoration project must always be developed on the basis of a holistic analysis of the 'context'. This should consider four important dimensions: Ecological, Political, Economic, and Social and cultural. The contextual factors set the stage for the project, while the 'process-based' factors determine how well the project will be planned, designed, implemented and followed-up in post-implementation phases. The process-based factors should consider following dimensions: Technical, Project processes, Social, and Financial planning and resources.

The study showed that river restoration projects classified as 'successful' have strong roots in one or more of the above factors, while those that have failed to be implemented or have failed in terms of results have neglected more than one of the crucial factors listed above. If river restoration efforts in the BSR are to bear fruits and lead to improvement in the stocks and status of the Sea trout and other salmonids, it is important to overcome these weaknesses and adopt only the Best possible Practices.