



# Natural Water Retention Measures

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Service contract n°07.0330/2013/659147/SER/ENV.C1



## *Case Study* *Ecosystem Restoration Matsalu*



*This report was prepared by the NWRM project, led by Office International de l'Eau (OIEau), in consortium with Actéon Environment (France), AMEC Foster Wheeler (United Kingdom), BEF (Baltic States), ENVECO (Sweden), IACO (Cyprus/Greece), IMDEA Water (Spain), REC (Hungary/Central & Eastern Europe), REKK inc. (Hungary), SLU (Sweden) and SRUC (UK) under contract 07.0330/2013/659147/SER/ENV.C1 for the Directorate-General for Environment of the European Commission. The information and views set out in this report represent NWRM project's views on the subject matter and do not necessarily reflect the official opinion of the Commission. The Commission does not guarantee the accuracy of the data included in this report. Neither the Commission nor any person acting on the Commission's behalf may be held Key words: Biophysical impact, runoff, water retention, effectiveness - Please consult the NWRM glossary for more information.*

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<http://www.nwrn.eu>*

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## I. Basic Information

Application ID	<i>Estonia_01</i>			
Application Name	<b>EcosystemRestoration_Matsalu</b>			
Application Location	Country:	Estonia	Country 2:	-
	NUTS2 Code		<i>EE00</i>	
	River Basin District Code		<i>EE1</i>	
	WFD Water Body Code			
	Description		<i>Salmi coastal meadow in western Estonia in Matsalu National Park (southern shore of Matsalu bay), rural coastal area, Natura 2000 and Ramsar site. The area of the Salmi coastal meadow is approximately 350 ha which makes it one of the largest complete coastal meadow massifs in whole Europe. Land improvement works done in the past have changed the water regime and ecological communities specific for coastal meadows.</i>	
Application Site Coordinates	Latitude: N 58 <sup>0</sup> 43'		Longitude: E 23 <sup>0</sup> 40'	
Target Sector(s)	Primary:	Hydromorphology		
Implemented NWRM(s)	Measure #1:	<i>N2 Wetland</i>		
Application short description	<p>In Matsalu National Park there is a former coastal meadow site (Natura 2000 and Ramsar site) next to a big Salmi coastal meadow with many priority species. On the site the old non-functioning small ditches were closed and scraped to restore the wetland hydrology and breeding and feeding grounds for waders and amphibians.</p> <p>Before the restoration works the area was used mainly for bovine grazing and the restoration did not change the conditions for that. However, due to the activities drinking water will be better available for the cattle.</p>			

## II. Policy context and design targets

Brief description of the problem to be tackled	<i>There are some species that depend directly on the water level of the coastal meadow. In the project area there were old ditches that caused the situation that water in the coastal meadow flew quickly to ditches and from there directly to the sea. Even though a lot of the ditches were by now filled with grass and did not direct water that quickly, they were still surprisingly deep and acted as drainage for the coastal meadow – water was collected in the ditches and stayed there and surrounding areas were dry. The aim was to close and scrape the ditches and in that way restore the natural hydrological regime of the coastal meadow and via that provide suitable habitat to different (incl. protected) species.</i>
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## CS: Matsalu, Estonia

	<i>The area was used for bovine grazing and it was foreseen that the restoration works will not impact that, rather improve it via making the drinking water better available for the cattle in the area.</i>		
What were the primary & secondary targets when designing this application?	Primary target #1:	Regulation of hydrological cycle and water flow	
	Remarks	<i>Restoring breeding and feeding grounds for waders and amphibians</i>	
Which specific types of pressures did you aim at mitigating?	Pressure #1:	WFD identified pressure	4.5 <i>Other hydromorphological alterations</i>
	Pressure #2:	Other EU-Directive's identified pressure (specify)	EU Biodiversity Strategy to 2020, restoring degraded ecosystems
	Remarks		
Which specific types of adverse impacts did you aim at mitigating?	Impact #1:	WFD identified impact	<i>Altered habitats due to morphological changes</i>
	Remarks		
Which EU requirements and EU Directives were aimed at being addressed?	Requirement #1:	Other EU-Directive requirements (Specify)	EU Biodiversity Strategy to 2020
	Requirement #2:	WFD-achieving objectives for Protected areas	<i>Protection of habitats or species where the maintenance or improvement of the status of water is an important factor in their protection</i>
	Remarks		
Which national and/or regional policy challenges and/or requirements aimed to be addressed?	<p>Estonian Nature Protection Act aims to protect the natural environment by promoting the preservation of biodiversity through ensuring the natural habitats and the populations of species of wild fauna, flora and fungi at a favourable conservation status.</p> <p>In the Estonian Environmental Strategy 2030 under the topic preservation of the diversity of landscapes and biodiversity there is and objective to ensure the existence of habitats and biotic communities necessary for the preservation of viable populations of species.</p>		

**III. Site characteristics**

Dominant Land Use type(s) <i>CORINE LU types and codes</i>	Dominant land use	421
	Secondary land use	
	Other important land use	
	Habitat site of rare species - <i>Platanthera bifolia</i> , <i>Dactylorhiza incarnata</i> ). At the moment in ditches - <i>Lythrum salicaria</i> , <i>Carex vulpina</i> , <i>Schoenoplectus lacustris</i> , <i>Mentha aquatica</i> , <i>Alisma plantagoaquatica</i> , <i>Sparganium emersum</i> .	
Climate zone	cool temperate moist	


Soil type	<i>No information</i>	
Average Slope	gentle (2-5%)	
Mean Annual Rainfall	600 - 900 mm	
Mean Annual Runoff		
Average Runoff coefficient (or % imperviousness on site)		
	No information	
Characterization of water quality status (prior to the implementation of the NWRMs)	<i>The wetland had good quality water, chemical status is good. It is a Nature2000 site. No pollution has been marked. The aim was not to rise the quality of water but to restore the hydrological regime.</i>	
Comment on any specific site characteristic that influences the effectiveness of the applied NWRM(s) in a positive or negative way	<i>Positive way: The species have formerly (before the land improvement works) been living in the area so restoration works provided possibility to for suitable habitat conditions for the species.</i>	
	<i>Negative way: although the area has formerly been populated by mentioned species then only time will show if they will return to the area after the restoration works.</i>	

#### IV. Design & implementation parameters

Project scale	Medium (e.g. public park, new development district)	11,15 ha
Time frame	Date of installation/construction (MM.YYYY)	2013
	Expected average lifespan (life expectancy) of the application in years	Forever
Responsible authority and other stakeholders involved	<i>Name of responsible authority/ stakeholder</i>	<i>Role, responsibilities</i>
	1. Estonian Fund for Nature	Initiator, project manager, moderator between different stakeholders
	2. State Forestry	Land owner
	3. Environmental Board	State institution responsible for environmental aspects
	4. Agriculture Board	State institution responsible for agricultural aspects
	5. Private land owners and renters	Land owners
The application was initiated and financed by	Initiated by Estonian Fund for Nature, financed by Swedish WWF (World Wildlife Fund)	
What were specific principles	<i>The aim of the application was to test in Estonia a new methodology for</i>	

that were followed in the design of this application?	<i>restoring a wetland (based on the example from United Kingdom) and to find out if this methodology can be used also for other similar areas with similar problems (old ditches that change hydrological conditions in nature protection areas).</i>		
Area (ha)	Number of hectares treated by the NWRM(s).	11,15 ha	
	Text to specify	<i>The total area was 11,15 ha but the works were carried out on concrete 12 small ditches(network of ditches was 3,9 km)</i>	
Design capacity	No information		
Reference to existing engineering standards, guidelines and manuals that have been used during the design phase	<i>Reference</i>		<i>URL</i>
	1.	Materials from United Kingdom experience	
	2.	National standards	
	3.		
	4.		
	5.		
Main factors and/or constraints that influenced the selection and design of the NWRM(s) in this application?	The method for restoring the wetland was chosen for testing by Estonian Fund for nature and it was done in frame of a project. However, it was quite difficult to find common ground with Environmental Board, Agricultural Board and State Forestry - Estonian Fund for Nature had two years of meetings with them before they could manage to complete the project.		

## V. Biophysical impacts

Impact category (short name)  Select from the <b>drop-down menu</b> below: 	Impact description (Text, approx. 200 words)	Impact quantification (specifying units)	
		Parameter value; units	% change in parameter value as compared to the state prior to the implementation of the NWRM(s)
Runoff attenuation / control			
Peak flow rate reduction			
Impact on groundwater			
Impact on soil moisture and soil storage capacity			
Restoring hydraulic connection			
Water quality Improvements			

WFD Ecological Status and objectives			
Reducing flood risks (Floods Directive)			
Mitigation of other biophysical impacts in relation to other EU Directives (e.g. Habitats, UWWT, etc.)	<i>Applying the NWRM measure (restoring wetland by closing old ditches that drained the area and thus made it unfavorable for some protected species) restored the hydrological regime of the area and is now offering suitable habitat for waders and amphibians but also several protected species (i.e. <i>Platanthera bifolia</i>, <i>Dactylorhiza incarnate</i>).</i>	<i>Species using the area</i>	<i>No monitoring done yet</i>
Soil Quality Improvements			
Other			

## VI. Socio-Economic Information

What are the benefits and co-benefits of NWRMs in this application?	Effective implementation of the measure will restore the habitat of the coastal meadow and will thus add to implementing the Nature Protection Act and Estonian Environmental Strategy 2030. As a Natura2000 and Ramsar site the restoration activity also contributes to their requirements.		
Financial costs	<b>Total:</b>	Value in €	<i>Part of the costs were covered by WWF project - ca 11 500 eur - some practical works and costs for meetings and travel. However, part of the construction costs were paid by State Forest Management Centre in frame of one frame project so costs are not available.</i>
	<i>Capital:</i>	Value in €	<i>No information</i>
	<i>Land acquisition and value:</i>	Value in €	<i>No information</i>
	<i>Operational:</i>	Value in €	<i>No information</i>
	<i>Maintenance:</i>	Value in €	<i>No information</i>
	<i>Other:</i>	Value in €	<i>No information</i>
Were financial compensations required? What amount?	<i>Was financial compensation required: No</i>		
	<i>Total amount of money paid (in €): no information</i>		
	<i>Compensation schema: no information</i>		
	<i>Comments / Remarks: no information</i>		
Economic costs	<i>Actual income loss: No information</i>		
	<i>Additional costs: No information</i>		



	<i>Other opportunity costs: No information</i>
	<i>Comments / Remarks: No information</i>
Which link can be made to the ecosystem services approach?	Amenities : habitat protection and restoration

## **VII. Monitoring & maintenance requirements**

Monitoring requirements	As the works were finalised in 2013 then monitoring has not yet been possible. 2014 there is a plan to monitor the dams and see if they need improvement and after 5 years to see if the area is being used by birds and amphibians.
Maintenance requirements	No additional maintenance needed
What are the administrative costs?	The Environmental Board is carrying out the monitoring of the waders in the area and the monitoring will show if the birds have started to use the area – this in their annual plan

## **VIII. Performance metrics and assessment criteria**

Which assessment methods and practices are used for assessing the biophysical impacts?	<i>No information</i>
Which methods are used to assess costs, benefits and cost-effectiveness of measures?	<i>No information</i>
How cost-effective are NWRM's compared to "traditional / structural" measures?	<i>No information</i>
How do (if applicable) specific basin characteristics influence the effectiveness of measures?	<i>The effectiveness of the measure depends on the habitat -if the species formerly identified in the coastal meadow (before the land improvement activities in the past) will return to the area. However, monitoring will be needed for that and at this stage it cannot be yet confirmed.</i>
What is the standard time delay for measuring the effects of the measures?	<i>It might take several years for the species formerly found in the area to repopulate the restored coastal meadow. No specific time delay can be provided at this stage.</i>

## **IX. Main risks, implications, enabling factors and preconditions**

What were the main implementation barriers?	<ol style="list-style-type: none"> <li><i>1. It was quite difficult to find common ground with Environmental Board, Agricultural Board and State Forestry - Estonian Fund for Nature had two years of meetings with them before they could manage to complete the project.</i></li> <li><i>2. Although there was enough information about this quite small and well known site, the State Forestry did not give permission to carry out the works without the official melioration plan for getting more data.</i></li> </ol>
What were the main enabling	Engaged project team (Estonian Fund for Nature) and as it was

and success factors?	project based activity then there were financial sources to carry out the activities.
Financing	<i>Coastal meadow restoration activities were funded by Swedish WWF</i>
Flexibility & Adaptability	<i>Yes, it is. However into account should be taken time that might take to achieve common ground with all stakeholders.</i>
Transferability	<i>The method can be used in future in many coastal areas formerly ditched in Estonia -there are cases where it is also listed in the management plan of this kind of action</i>

## X. Lessons learned

Key lessons	<i>Reaching common ground with different stakeholders is a time consuming process and need moderation in order to come to agreements satisfying all involved parties.</i>
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## XI. References

Source Type	<i>Project Report</i>	
Source Author(s)	Silvia Lotman	
Source Title	Ecosystem Restoration Case Study Template	
Year of publication	2013	
Editor/Publisher	-	
Source Weblink	<a href="http://www.ceeweb.org/wp-content/uploads/2011/12/Restoration_case_study_Salmi-coastal-meadow-Estonia.pdf">http://www.ceeweb.org/wp-content/uploads/2011/12/Restoration_case_study_Salmi-coastal-meadow-Estonia.pdf</a>	
Key People	<i>Name / affiliation</i>	<i>Contact details</i>
	1. <i>Silvia Lotman</i>	<i>silvia@elfond.ee</i>

Source Type	<i>Project Report</i>	
Source Author(s)	MTÜ Põhjakonn	
Source Title	Looduskaitseline ekspertiis pilootaladele Lääne- ja Hiiumaa kraavitatud rannaniitudel	
Year of publication	2011	
Editor/Publisher	-	
Source Weblink	-	
Key People	<i>Name / affiliation</i>	<i>Contact details</i>
	1. <i>MTÜ Põhjakonn</i>	-

Source Type	<i>Other (specify)</i>	
	<i>Construction project</i>	
Source Author(s)	OÜ Inseneribüroo STEIGER	
Source Title	Salmi rannaniidu taastamine, töö nr 13/1136	
Year of publication	2013	
Editor/Publisher	-	

Source Weblink	-		
Key People		<i>Name / affiliation</i>	<i>Contact details</i>
	1.	<i>Meelis Peetris</i>	-
	2.	<i>Kaido Põrk</i>	-

## **XII. Photos Gallery**

All photos are taken from "Ecosystem Restoration Case Study Template" by Silvia Lotman.



**Figure 1 One of ditches before (Silvia Lotman/ELF)**



**Figure 2 Working with the machine (Silvia Lotman/ELF)**



**Figure 3** The area after all ditches had been scraped and closed (Silvia Lotman/ELF)