European Commission

NWRM

Natural Water Retention Measures

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Case Study

Tullstorpsån

Environment

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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I. Basic Information

Application ID	*Sweden_01*			
Application Name	**Tullstorpsån**			
Application Location	Country:	Sweden	Country 2:	
	NUTS2 Code		*SE22*	
	River Basin District Code		SE4	
	WFD Water Body Code		SE614633-134828.	
	Description		*Tullstorpsån is a river in Skåne, southern Sweden. The 30km long river drains a 57400 ha catchment. Land use is predominantly agricultural. Many natural wetlands have been drained and ditches are common. The river does not meet good ecological status and there are concerns about biodiversity and the amount of nutrients exported to the Baltic.*	
Application Site Coordinates	Latitude: *56 12 00 WGS84*		Longitude: *13 46 00 WGS84*	
Target Sector(s)	Primary:	Nature		
	Secondary:	Agriculture		
Implemented NWRM(s)	Measure #1:	*N4 Re-meandering*		
	Measure #2:	*A2 Buffer strips and shelter belts (ecologically functional buffer strips)*		
	Measure #3:	*N8 Riverbed restoration*		
	Measure #4:	*N2 wetland restoration and management*		
Application short description	*Tullstorpån is a rural development project implementing multiple natural water retention measures for aquatic and terrestrial biodiversity improvement, nutrient retention and recreation. The project involves constructed wetlands, planting of riparian vegetation and riverbed restoration amongst other neasures.* *NWRM are not implemented as an end unto themselves, but as a means of providing biodiversity, nutrient retention and amenity services.* *The project is well supported by local land owners, regional government and regulatory authorities.*			

II. Policy context and design targets

Brief description of the problem to be tackled	*The altered hydrological regime in Tullstorpån has negative effects on biodiversity and nutrient fluxes to the Baltic. Restoring the natural hydrologic behavior of the catchment will contribute to alleviating these effects.*		
What were the primary & secondary targets when designing this application?	Primary target #1:	Biodiversity and gene-pool conservation in riparian areas	
	Primary target #2:	Regulation of the chemical status of freshwater	
	Secondary target #1:	Regulation of hydrological cycle and water flow	
	Secondary target #2:	Self-regulation of water by filtration / storage / accumulation by ecosystems	
	Remarks		
Which specific types of pressures did you aim at mitigating?	Pressure #1:	WFD identified pressure	*2.2 Diffuse Agricultural*
	Pressure #2:	WFD identified pressure	4.1.2 Physical alteration of channel/bed/riparian area/shore of water body for agriculture
	Pressure #3:	Other EU-Directive's identified pressure (specify)	*Habitats Directive*
Which specific types of adverse impacts did you aim at mitigating?	Impact #1:	WFD identified impact	*Nutrient Pollution*
	Impact #2:	WFD identified impact	Altered habitats due to morphological change
Which EU requirements and EU Directives were aimed at being addressed?	Requirement #1:	WFD-achievement of good chemical status	*Reduction in N and P export*
	Requirement #2:	WFD-achievement of good ecological status	*Habitat restoration*
Which national and/or regional policy challenges and/or requirements aimed to be addressed?	The overall goal of the project was for the farming community and responsible authorities to work together to develop, test and implement solutions and actions that will provide as large as possible a reduction in flows of agricultural nutrients from the catchment to the sea.		

III. Site characteristics

Dominant Land Use type(s) *CORINE LU types and codes*	Dominant land use	*211*
	Secondary land use	*313*
	Other important land use	
	Remarks	
Climate zone	cool temperate moist	
Soil type	Cambisols	
Average Slope	very gentle (1-2%)	
Mean Annual Rainfall	300 - 600 mm	
Mean Annual Runoff	300 - 450 mm	
Average Runoff coefficient (or % imperviousness on site)	0.5 - 0.7	0 - 10%
	Runoff is approximately 0.5	
Characterization of water quality status (prior to the implementation of the NWRMs)		
Comment on any specific site characteristic that influences the effectiveness of the applied NWRM(s) in a positive or negative way		

IV. Design & implementation parameters

Project scale	Large (e.g. watershed, city, entire water system)	*The project addressed features throughout the 57400 ha catchment*
Time frame	Date of installation/construction	2009-2013
	Expected average lifespan (life expectancy) of the application in years	*The measures are meant to become permanent features of the landscape.*
Responsible authority and other stakeholders involved	*Name of responsible authority/ stakeholder*	*Role, responsibilities*
	1.Tullstorpsån Economic Association	Catchment landowners responsible for decision making about measures to implement
	2.Municipality of Trelleborg	Promoted Tullstorpsån as part of sustainability project "Kretsloppet" and hired a project manager
The application was initiated and financed by	The project was initiated by the Swedish state and EU	
What were specific principles that were followed in the design of this application?	The design of this application was conducted in close collaboration with local landowners and other stakeholders. The involvement of the 90 landowners in the planning and implementation of the	

<table>
<tr><td></td><td colspan="3">measures at Tullstorpsån was a unique factor contributing to the success of the project.
The goal of the project was to reduce loading of nutrients from the catchment to the Baltic Sea with a target of 30% reduction in N loads and 50% reduction in P loads without reducing the economic value and returns for farmers and other property owners.</td></tr>
<tr><td rowspan="2">Area (ha)</td><td colspan="2">Number of hectares treated by the NWRM(s).</td><td></td></tr>
<tr><td colspan="2">Text to specify</td><td>Measures were applied throughout the catchment, which has a total area of 57400 ha. Key activities included re-meandering of the stream channel, which had been shortened by approximately 300m over the past 200 years, and restoration of wetlands, of which more than 85% had been lost during more intensive agricultural production.</td></tr>
<tr><td>Design capacity</td><td colspan="3">The design targets were related to nutrient retention (30% of N, 50% of P). There were no specific water related design capacity parameters.</td></tr>
<tr><td rowspan="6">Reference to existing engineering standards, guidelines and manuals that have been used during the design phase</td><td colspan="2">Reference</td><td>URL</td></tr>
<tr><td>1.</td><td></td><td></td></tr>
<tr><td>2.</td><td></td><td></td></tr>
<tr><td>3.</td><td></td><td></td></tr>
<tr><td>4.</td><td></td><td></td></tr>
<tr><td>5.</td><td></td><td></td></tr>
<tr><td>Main factors and/or constraints that influenced the selection and design of the NWRM(s) in this application?</td><td colspan="3">The main factor influencing the selection and design of measures in the catchment was land owner support for the project. Measures were designed which restored the natural water holding capacity of the landscape. Measures were not designed for their NWRM function per se, but for their contribution to nutrient retention, biodiversity and amenity values.</td></tr>
</table>

V. Biophysical impacts

Impact category (short name) Select from the **drop-down menu** 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			Modelling studies suggest that the construction of wetlands can help to mitigate peak flows and sustain low flows.
Peak flow rate reduction			Qualitative improvements
Impact on groundwater			Qualitative improvements
Impact on soil moisture and soil storage capacity			Qualitative improvements
Restoring hydraulic connection			There have been qualitative improvements in river connectivity.
Water quality Improvements			*The measures have led to improved water quality and fish habitat.*
WFD Ecological Status and objectives		*N and P concentrations in catchment water bodies and the Baltic*	Average total phosphorus and inorganic nitrogen concentrations showed slight declines between 2009 and 2012.
Reducing flood risks (Floods Directive)			*Unknown*
Mitigation of other biophysical impacts in relation to other EU Directives (e.g. Habitats, UWWT, etc.)			*The VIX fish status index improved in most stretches of the river between 2009 and 2013.*
Soil Quality Improvements			*Unknown*
Other		*Reduced nutrient loads to the Baltic*	Qualitative improvements

VI. Socio-Economic Information

What are the benefits and co-benefits of NWRMs in this application?	One of the key benefits of this project is a raised societal awareness of the importance of water bodies in the southern Swedish agricultural landscape, and the importance of local stakeholder involvement in their management.		
Financial costs	***Total:***	*Value in €*	*1.3 M*
	Capital:		
	Land acquisition and value:		
	Operational:		
	Maintenance:		
	Other:		
Were financial compensations required? What amount?	*Was financial compensation required: Unknown*		
	Total amount of money paid (in €):		
	Compensation schema:		
	Comments / Remarks:		
Economic costs	*Actual income loss: One of the key goals of the project was to ensure there was no net loss of actual income to the land owners, farmers and other businesses in the catchment.*		
	Additional costs: Not stated		
	Other opportunity costs: Not stated		
	The economic costs of the project were either minimized or made more acceptable because of the close dialog between land owners in the catchment and other stakeholders.		
Which link can be made to the ecosystem services approach?	The project contributed nutrient retention, biodiversity and amenity services related to tourism and recreation		

VII. Monitoring & maintenance requirements

Monitoring requirements	
Maintenance requirements	The measures have been designed to be maintenance-free
What are the administrative costs?	Unknown

VIII. Performance metrics and assessment criteria

Which assessment methods and practices are used for assessing the biophysical impacts?	Not specified
Which methods are used to assess costs, benefits and cost-effectiveness of measures?	Not specified
How cost-effective are NWRM's compared to "traditional / structural" measures?	As "traditional/structural" measures cannot achieve the goals of the measures implemented at Tullstorpsån, NWRM must be seen as being more cost-effective.
How do (if applicable) specific basin characteristics influence the	While it seems self-evident that the success of NWRMs are very dependent on the biophysical regime in which they are

effectiveness of measures?	implemented, the social environment is even more important. The Tullstorpsån project has shown that land conversion to restore the natural water retention capacity of the landscape can succeed when farmers and other land owners play an active role in the decision making process and feel a sense of ownership of the project.
What is the standard time delay for measuring the effects of the measures?	Qualitative benefits of the NWRM in terms of increased amenity value of waters in the catchment and biodiversity should be apparent almost immediately. Changes in catchment hydrology and nutrient fluxes should occur almost immediately but will be very difficult to detect quantitatively without intensive monitoring.

IX. Main risks, implications, enabling factors and preconditions

What were the main implementation barriers?	It did not seem that there were any significant implementation barriers to this project.
What were the main enabling and success factors?	Clearly, the main enabling factor for the success of this project was the involvement and commitment of the local farmers and riparian land owners.
Financing	Approximately 1.3 million euros financing was provided by the Swedish state and EU.
Flexibility & Adaptability	
Transferability	The "take home" message of a need for stakeholder engagement and involvement in successful land conversion for natural water retention can be applied anywhere. The specifics of river re-naturalization and wetland restoration should be relevant in many temperate agricultural landscapes.

X. Lessons learned

Key lessons	The involvement of local landowners is a key factor in the success of NWRM. Involving local actors in the decision making process built strong community support for the project.

XI. References

Source Type	*Website*		
Source Author(s)			
Source Title	Tullstorpsåprojektet		
Year of publication	2014		
Editor/Publisher			
Source Weblink	www.tullstorpan.se		
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