European Commission

NWRM

Natural Water Retention Measures

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

Case Study

Holter-Hammrich Area

Flood Protection and Nature Conservation

ACTeon environment research & consultancy

Office International de l'Eau

amec foster wheeler

BEF LATVIA

enveco Environmental Economics Consultancy

I.A.CO Ltd Environmental & Water Consultants

institute IMDEA water

REGIONAL ENVIRONMENTAL CENTER

REKK

SLU

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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	*Germany-01*			
Application Name	**Holter-Hammrich Area - Flood Protection and Nature Conservation**			
Application Location	Country:	Germany	Country 2:	
	NUTS2 Code	*DE94*		
	River Basin District Code	*DE4000 - Weser*		
	WFD Water Body Code			
	Description	The Leda-Jümme area is a flat, broad valley of the lower Ems river. Because of its low position, it is threatened by strong water inflow, but above all by storm surges from the sea. Initially, dykes were built to secure the area. However, the marshy ground could not carry dykes of sufficient height, so in 1954, the Leda Protection barrier was built in Leer. Storm floods were denied access to the lowlands from then on. Dykes at Leda and Jümme could be built with correspondingly smaller dimensions. However, the closure of the last dike breaches, and the further expansion of pumping stations for drainage of the area led to new problems: After heavy rainfalls flood loads led to higher water levels, dykes were threatened to breach leading to floods at unpredictable places. More storage space was needed and finally built for excessive headwater.		
Application Site Coordinates	Latitude: 53.1982	Longitude: 7.6115		
Target Sector(s)	Primary:	Hydromorphology		
	Secondary:	Agriculture		
Implemented NWRM(s)	Measure #1:	*N2*		
	Measure #2:	*A1*		
	Measure #3:	*A8*		
Application short description	*As a secondary result of structures and buildings of flood water protection, NWRMs aiming at nature conservation can be implemented in the Holter-Hammrich Area.* Structures for water level regulation allow fluctuations, as they occur in natural wetlands.			

II. Policy context and design targets

Brief description of the problem to be tackled	Due to the natural site conditions, in particular the height variations of the area, the Holter Hammrich serves common goals of flood protection and nature conservation. The closure of the last dike breaches, and the further expansion of pumping stations for drainage of the area led to new problems: After heavy rainfalls flood loads led to higher water levels, dykes were threatened to breach leading to floods at unpredictable places. More storage space was needed and finally built for excessive headwater. Extensification or abandonment of agricultural use and high water levels in spring support an increase of characteristic breeding birds for example. Amphibians benefit from standing water bodies.		
What were the primary & secondary targets when designing this application?	Primary target #1:	Other (please describe in the "remarks" below)	
	Primary target #2:	Flood control and flood risk mitigation	
	Remarks	*Biodiversity and gene pool protection in meadow areas, Habitat restoration*	
Which specific types of pressures did you aim at mitigating?	Pressure #1:	WFD identified pressure	*Nutrient Pollution*
	Pressure #2:	Floods Directive identified pressure	*Natural Exceedance*
	Remarks		
Which specific types of adverse impacts did you aim at mitigating?	Impact #1:	WFD identified impact	*Protected Areas*
	Impact #2:	WFD identified impact	*Landscape*
Which EU requirements and EU Directives were aimed at being addressed?	Requirement #1:	Other EU-Directive requirements (Specify)	*Habitat Directive: Otter protection, habitat restoration*
Which national and/or regional policy challenges and/or requirements aimed to be addressed?	The Lower Saxony otter protection programme and the Lower Saxony wetlands protection programme were aimed to be addressed.		

III. Site characteristics

Dominant Land Use type(s)	Dominant land use	*Pastures*
	Secondary land use	
	Other important land use	
	Remarks	
Climate zone	cool temperate moist	
Soil type	Fen, river marsh	
Average Slope	nearly level (0-1%)	
Mean Annual Rainfall	0 - 300 mm	
Mean Annual Runoff	150 - 300 mm	
Average Runoff coefficient (or % imperviousness on site)		
	N.A.	
Characterization of water quality status (prior to the implementation of the NWRMs)	N.A.	
Comment on any specific site characteristic that influences the effectiveness of the applied NWRM(s) in a positive or negative way	*Positive way:* Due to the natural site conditions, in particular the height variations of the area, the Holter Hammrich serves common goals of flood protection and nature conservation.	
	Negative way:	

IV. Design & implementation parameters

Project scale	Medium (eg. public park, new development district)	
Time frame	Date of installation/construction (MM.YYYY)	*05.2011*
	Expected average lifespan (life expectancy) of the application in years	*40*
Responsible authority and other stakeholders involved	*Name of responsible authority/ stakeholder*	*Role, responsibilities*
	1. Lower Saxony Water Management, Coastal Defense and Nature Conservation Agency (NLWKN)	Promoter, developer, supervisor
	2. Leda-Jümme-Verband	promoter
The application was initiated and financed by	Lower Saxony Ministry for Environment, Energy and Climate Change	
What were specific principles that were followed in the design of	Integration of demands, integrative planning, functionality	

this application?			
Area (ha)	Number of hectares treated by the NWRM(s).		*223*
			Subarea "Leysser Hammrich" (143 ha), Habitat for grassland birds - landuse with different requirements (extensification) - use of controlled water level increase in winter and spring Subarea "Altes Tief" (80 ha) diverse mosaic of shallow water zones, shrubs, reeds and wet grassland - Mostly free vegetation development (succession) - use of ca 40 ha year-round wet areas of shallow water
Design capacity	3.8 million m^3 storage capacity		
Reference to existing engineering standards, guidelines and manuals that have been used during the design phase		*Reference*	*URL*
	1.		
	2.		
	3.		
	4.		
	5.		
Main factors and/or constraints that influenced the selection and design of the NWRM(s) in this application?	For the present area an independent concept has been developed that fitted the local requirements of nature conservation and flood protection.		

V. Biophysical impacts

Impact category (short name) Select from the **drop-down menu** below:	**Biophysical Impacts were not quantified for this application, because it's primary target was the ecological land restoration of the area.**	**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.)			
Soil Quality Improvements			
Other			

VI. Socio-Economic Information

What are the benefits and co-benefits of NWRMs in this application?	The extensification or abandonment of agricultural use on the basis of high water levels in spring support an increase of characteristic breeding birds for example. Amphibians benefit from standing water bodies. The objectives of nature conservation and flood protection are mediated by information boards at various locations. Three rest areas are located on distinctive vantage points along the circular path.		
Financial costs	***Total:***	*12.6 Mio €*	
	Capital:	*Value in €*	
	Land acquisition and value:	*4 Mio.*	
	Operational:	*5.5 Mio €* *80,000* *3 Mio.*	*Technical constructions* *Specially prepared trail with nature information and experience* *New roads for farmers*
	Maintenance:	*Value in €*	
	Other:	*Value in €*	
Were financial compensations required? What amount?	*Was financial compensation required: No*		
	Total amount of money paid (in €):		
	Compensation schema:		
	Comments / Remarks:		
Economic costs	*Actual income loss: Lease Agreements are given out for free, due to heavy regulations for farming*		
	Additional costs:		
	Other opportunity costs:		
	Comments / Remarks:		
Which link can be made to the ecosystem services approach?	The application can be linked to biomass production, recreation, and information.		

VII. Monitoring & maintenance requirements

Monitoring requirements	Regularly
Maintenance requirements	Maintenance schemes have not been set up. The state of Lower Saxony is contractual responsible for any maintenance required.
What are the administrative costs?	N.A.

VIII. Performance metrics and assessment criteria

Which assessment methods and practices are used for assessing the biophysical impacts?	N.A.
Which methods are used to assess costs, benefits and cost-effectiveness of measures?	N.A.
How cost-effective are NWRM's compared to "traditional / structural" measures?	N.A.
How do (if applicable) specific basin characteristics influence the effectiveness of measures?	N.A.
What is the standard time delay for measuring the effects of the measures?	1-5 years

IX. Main risks, implications, enabling factors and preconditions

What were the main implementation barriers?	There were no major implementation barriers, although the benefit for nature conservation aspects were doubted by nature conservation NGO's. It was argued that the use of the structure as a flood protection and water storage facility would counteract the habitat restoration means in extreme cases of floods. By a continuous and open discussion these uncertainties were resolved.
What were the main enabling and success factors?	Willing stakeholders and a positive public perception were the major enabling factors. A continuous and open discussion between all involved groups led to a high acceptance of the overall process. The availability of financial resources and cooperation between all stakeholders led to a smooth implementation of all measures.
Financing	Land acquisition for the implementation of NWRMs was paid by the State of Lower Saxony. Other measures were financed from different sources due to the various goals. NWRM unrelated constructions of dykes and technical facilities were paid from water management sources, whereas reconstructions of roads were paid by rural development funds. The cost for a specially prepared trail with nature information were covered by European funds.
Flexibility & Adaptability	For the present area an independent concept has been developed that fitted the specific requirements of nature conservation and flood protection as well as the specific landscape. In similar settings, the technical dimension of the measure is adaptable.
Transferability	The most important precondition for a similar applications is a consistency and cooperation between different stakeholders, so that various financial instruments can be activated to achieve a common goal.

X. Lessons learned

Key lessons	A continuous and open discussion between all involved groups led to a high acceptance of the overall process. It was a key lesson of this measure that cooperation between different sectors (flood protection, nature conservation etc.) as well as different stakeholder groups (government agencies, NGO's) are able to cooperate in effective networks, when a consistency of goals is given.

XI. References

Source Type	*Interview*		
Source Author(s)	Martin Wendeburg		
Source Title	Modelprojekt Holter-Hammrich		
Year of publication	2014		
Editor/Publisher	Tamer Fawzy, NLWKN Lower Saxony		
Source Weblink	http://www.nlwkn.niedersachsen.de/naturschutz/biotopschutz/modellprojekt_polder_holte/101386.html		
Key People		*Name / affiliation*	*Contact details*
	1.	*Martin Wendeburg*	Nds. Landesbetrieb für Wasserwirtschaft, Küsten- und Naturschutz Betriebsstelle Brake-Oldenburg, Ratsherr-Schulze-Straße 10, D-26122 Oldenburg

XII. Photos Gallery

Figure 1 The Holter Hammrich Area (Source: NLWKN)

Figure 2 Holter Hammrich Observation Platform (Source : NLWKN)