



Natural Water Retention Measures

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Case Study

Restoration of Wetlands in the Western Lowland Area of the Dümmer Lake



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	<i>Germany_03</i>		
Application Name	Restoration of Wetlands in the Western Lowland Area of the Dümmer Lake		
Application Location	Country:	Germany	Country 2:
	NUTS2 Code	<i>E92</i>	
	River Basin District Code	<i>DE4000 - Weser</i>	
	WFD Water Body Code		
	Description	<i>The Dümmer lowland in the northwest German plain consists of extensive marshes and wet grassland that are flooded in winter. It is key habitat for resident and migrating birds, including long-billed shorebirds. However, the creation of a dyke in 1953 prevented the Dümmer from flooding and affected the habitats of the corncrake (<i>Crex crex</i>) and the shy bittern (<i>Botaurus stellaris</i>), among other species, e.g. meadow birds. The drained ground became as hard as concrete when dry, making food supplies ever scarcer and less accessible.</i>	
Application Site Coordinates	Latitude: WGS84 <i>52°30'N</i>	Longitude: <i>8°21'E</i>	
Target Sector(s)	Primary:	Hydromorphology	
	Secondary:	Agriculture	
Implemented NWRM(s)	Measure #1:	<i>A1</i>	
	Measure #2:	<i>A7</i>	
	Measure #3:	<i>A12</i>	
	Measure #4:	<i>N2</i>	
Application description	short	<p>Between 2002 and 2007, EUR 3,1 million were spent on nature conservation measures within the framework of the LIFE Nature project "Wiedervernässung der Westlichen Dümmerniederung" (Restoration of Wetlands in the Western Lowland Area of the Dümmer Lake).</p> <p>Approximately 175 hectares of formerly agricultural land were bought. This meant that a total area of 2,500 ha of fen was now successfully consolidated in the European bird sanctuary of Lake Dümmer, and conditions were created for large-scale rewetting. The LIFE-project financed the construction of supporting dams and the removal of drainages.</p> <p>These measures aim to develop one of the largest areas of wet grassland in Northwest Germany as a suitable habitat for meadow birds.</p> <p>The main project goals have been:</p> <ul style="list-style-type: none"> • Rewetting of the fen • Securing and regeneration of wet meadows providing a habitat for a variety of different species • Development of wet meadows with tall herbs and reeds on the periphery 	

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II. Policy context and design targets

Brief description of the problem to be tackled	<i>Wide, open grasslands and meadow birds are a part of the historic cultural landscape of meadows and pastures in Northern Germany. Intensified agriculture in Lower Saxony, as well as in many other places, puts a threat on this landscape and local meadow bird populations. The draining of meadows, early mowing, and densification of the ground through heavy machinery render these areas practically unlivable for meadow birds. Meadow birds breed and raise their chicks on the ground in grassland areas. After hatching, the chicks need about four weeks before they are able to fly. Until then, they collect insects and worms from the vegetation and the ground under attendance of their parents. When they reach maturity, meadow birds use their long beaks to pick for food in the wet soil. Suitable habitats for meadow birds have decreased strongly in size, and the grassland remaining today, does not provide ideal conditions. Consequently, the number of meadow birds declined sharply in recent decades.</i>		
What were the primary & secondary targets when designing this application?	Primary target #1:	Regulation of hydrological cycle and water flow	
	Primary target #2:	Other (please describe in the "remarks" below)	
	Secondary target #1:		
	Secondary target #2:		
	Remarks	<i>Habitat restoration</i>	
Which specific types of pressures did you aim at mitigating?	Pressure #1:	WFD identified pressure	<i>Nutrient Pollution</i>
	Remarks		
Which specific types of adverse impacts did you aim at mitigating?	Impact #1:	Floods Directive identified impact	<i>Protected Areas</i>
	Impact #2:	Floods Directive identified impact	<i>Landscape</i>
	Remarks		
Which EU requirements and EU Directives were aimed at being addressed?	Requirement #1:	WFD-achievement of good ecological status	<i>Bird Sanctuary</i>
	Remarks		
Which national and/or regional policy challenges and/or requirements aimed to be addressed?	N.A.		

III. Site characteristics

Dominant Land Use type(s) <i>CORINE LU</i>	Dominant land use	411
	Secondary land use	321
	Other important land use	
	Remarks	
Climate zone	cool temperate moist	
Soil type	<i>Type in the relevant soil type (FAO class) from the list in Annex 3</i>	
Average Slope	nearly level (0-1%)	
Mean Annual Rainfall	600 - 900 mm	
Mean Annual Runoff	150 - 300 mm	
Average Runoff coefficient (or % imperviousness on site)		
	Remarks	
Characterization of water quality status (prior to the implementation of the NWRMs)	Although it can be assumed that the measure had reduced nutrients in the groundwater of the area, no quantitative assessments were carried out prior to the implementation.	
Comment on any specific site characteristic that influences the effectiveness of the applied NWRM(s) in a positive or negative way	<i>Before the project, over 2000 ha were already acquired for the Bird Sanctuary of Lake Dümmer. A well established, institutionalized Round Table served as a communication platform between Nature Conservationists and Farmers, so that acceptance was guaranteed throughout the process.</i>	

IV. Design & implementation parameters

Project scale	Large (e.g. watershed, city, entire water system)	2500ha
Time frame	Date of installation/construction (MM.YYYY)	12.2007
	Expected average lifespan (life expectancy) of the application in years	40
Responsible authority and other stakeholders involved	<i>Name of responsible authority/stakeholder</i>	<i>Role, responsibilities</i>
	1. Lower Saxony Water Management, Coastal Defense and Nature Conservation Agency (NLWKN)	Planning, Implementation
	2. Lower Saxony Ministry of Environment	Coordination, Management
	3.	
	4.	
	5.	
The application was initiated and financed by	State of Lower Saxony; European Commission	
What were specific principles that were followed in the design	Usability, integrative planning, acceptability	

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of this application?		
Area (ha)	Number of hectares treated by the NWRM(s).	<i>2500 ha</i>
	Text to specify	<i>Target area: 2500 ha</i>
Design capacity	N.A.	
Reference to existing engineering standards, guidelines and manuals that have been used during the design phase	<i>Reference</i>	<i>URL</i>
	1.	
	2.	
	3.	
	4.	
	5.	
Main factors and/or constraints that influenced the selection and design of the NWRM(s) in this application?	<p>The wetlands of the Dümmer lowland area are of international significance for nature conservation. The diverse natural and near-natural habitats hold a large number of bird species (reed, wading, water and meadow birds), which breed, rest or winter here.</p> <p>Various developments have greatly endangered these bird's paradise in the past. The diking of the Dümmer lake in 1953 has led to the drainage of the wetlands and the intensification of agricultural activity.</p> <p>Together with the cutting of peat in the adjacent bogs, this has caused the water to be heavily polluted with nutrients.</p>	

V. Biophysical impacts

Impact category (short name) Select from the drop-down menu below: 	Biophysical Impacts were not quantified for this application, because its 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			

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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?	<p>Two nature trails were created along the western bank of the lake, which tie up to the few years old nature trail "Dümmer" in Ochsenmoor. The special natural features of the Dümmer lowlands are displayed to cyclists and hikers.</p> <p>While the short trail around Olgahafen was specially designed for hikers, the trail stations along the further course of the bank are mainly set up for cyclists. Four of these stations have an interactive design.</p> <p>The youth- and holiday center of Vechta district is situated next to the start of the nature trails. About 10,000 people, mainly pupils with their school classes, visit this center every year. Especially for this clientele as well as for other interested visitors the "nature trail quiz rally" was developed.</p> <p>Furthermore the restoration of the habitat led to increased tourist numbers.</p>		
Financial costs	Total:	3.1 Mio	Text / Specify
	<i>Capital:</i>	Value in €	Text / Specify
	<i>Land acquisition and value:</i>	2 Mio.	Land acquisition
	<i>Operational:</i>	800,000	Supporting dams and removal of drainages
	<i>Maintenance:</i>	Value in €	
	<i>Other:</i>	300,000	Personnel, tech. Assist.
Were financial compensations required? What amount?	<i>Was financial compensation required: No</i>		
	<i>Total amount of money paid (in €):</i>		
	<i>Compensation schema:</i>		
	<i>Comments / Remarks:</i>		
Economic costs	Lease agreements are given out cheap or for free, due to heavy regulations for farming.		
	<i>Additional costs: N.A.</i>		
	<i>Other opportunity costs: N.A.</i>		
	<i>Comments / Remarks:</i>		
Which link can be made to the ecosystem services approach?	Biomass production, tourism, recreation, Water security		

VII. Monitoring & maintenance requirements

Monitoring requirements	Regularly (weekly to monthly)
Maintenance requirements	After the project could be finished, management of the rewetting areas will continuously be guaranteed by the nature conservation base Dümmer.
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?	There were no methods used to assess costs and the cost-effectiveness of the measure. The benefit was measured by monitoring the breeding success of meadow birds, though.
How cost-effective are NWRM's compared to "traditional / structural" measures?	Unknown
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?	The main implementation barrier was the integration of different socioeconomic interests, i.e. of farmers, the tourism branch, and nature conservationists. On one side, the area is highly dependent on tourism, and agriculture. Nature conservation, on the other side, is dependent on a good and effective cooperation with farmers. A common benefit of the implementation of measure had to be found between these stakeholder groups. A well-established round table, served as an arena for this discussion and led to a mutual understanding. Tourists are attracted by the restoration of a near-nature landscape, whereas farmer benefit from contractual agreements with the nature conservationists.
What were the main enabling and success factors?	<i>A well-established, institutionalized Round Table served as a communication platform between Nature Conservationists and Farmers, so that acceptance was guaranteed throughout the process.</i>
Financing	EU LIFE, State of Lower Saxony
Flexibility & Adaptability	The measure was specifically tailored for the local conditions.
Transferability	Technical solutions from this application can be transferred to other situations. These solutions include the construction of

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	supporting dams and the removal of drainages. The transferability is dependent on specific geographic conditions, so there is not one fits-all-solution. On the socioeconomic side, an exchange of opinions between stakeholders and support of trust by institutionalized round tables are transferable, if aimed at with patience.
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X. Lessons learned

Key lessons	Lessons learned in this project reach from practical and technical experience to the integration of stakeholders to achieve a high acceptance and participation of local farmers. The experience from this project also led to the initiation of the LIFE+ Project Meadow Birds, including water retention measures in 12 project areas.
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XI. References

Source Type	<i>Grey Literature</i>		
Source Author(s)	Blüml, V., Belting, H., Diekmann, M., & Zacharias, D.		
Source Title	Erfolgreiche Feuchtgrünlandentwicklung durch Naturschutzmaßnahmen. Langfristige Veränderung von Flora, Vegetation und Avifauna am Beispiel des Ochsenmoores in der Dümmeriederung.		
Year of publication	2012		
Editor/Publisher	Informationsdienst Naturschutz Niedersachsen 4		
Source Weblink	http://www.nlwkn.niedersachsen.de/portal/live.php?navigation_id=7931&article_id=112043&psmand=26#Gruenland		
Key People		<i>Name / affiliation</i>	<i>Contact details</i>
	1.	Heinrich Belting	<i>Nds. Landesbetrieb für Wassermwirtschaft, Küsten- und Naturschutz Außenstelle "Naturschutzstation Dümmer" Am Ochsenmoor 52 D-49448 Hüde Tel: +49 (0)5443 / 1393 Fax: +49 (0)5443 / 8145</i>
	2.		
	3.		
	4.		

XII. Photos Gallery



Figure 1 Winter waterlogging on grassland (Source: NLWKN)



Figure 2 Overflow congestion in the project area (right from the ditch a newly constructed fence line) (Source: NLWKN)