European Commission

NWRM

Natural Water Retention Measures

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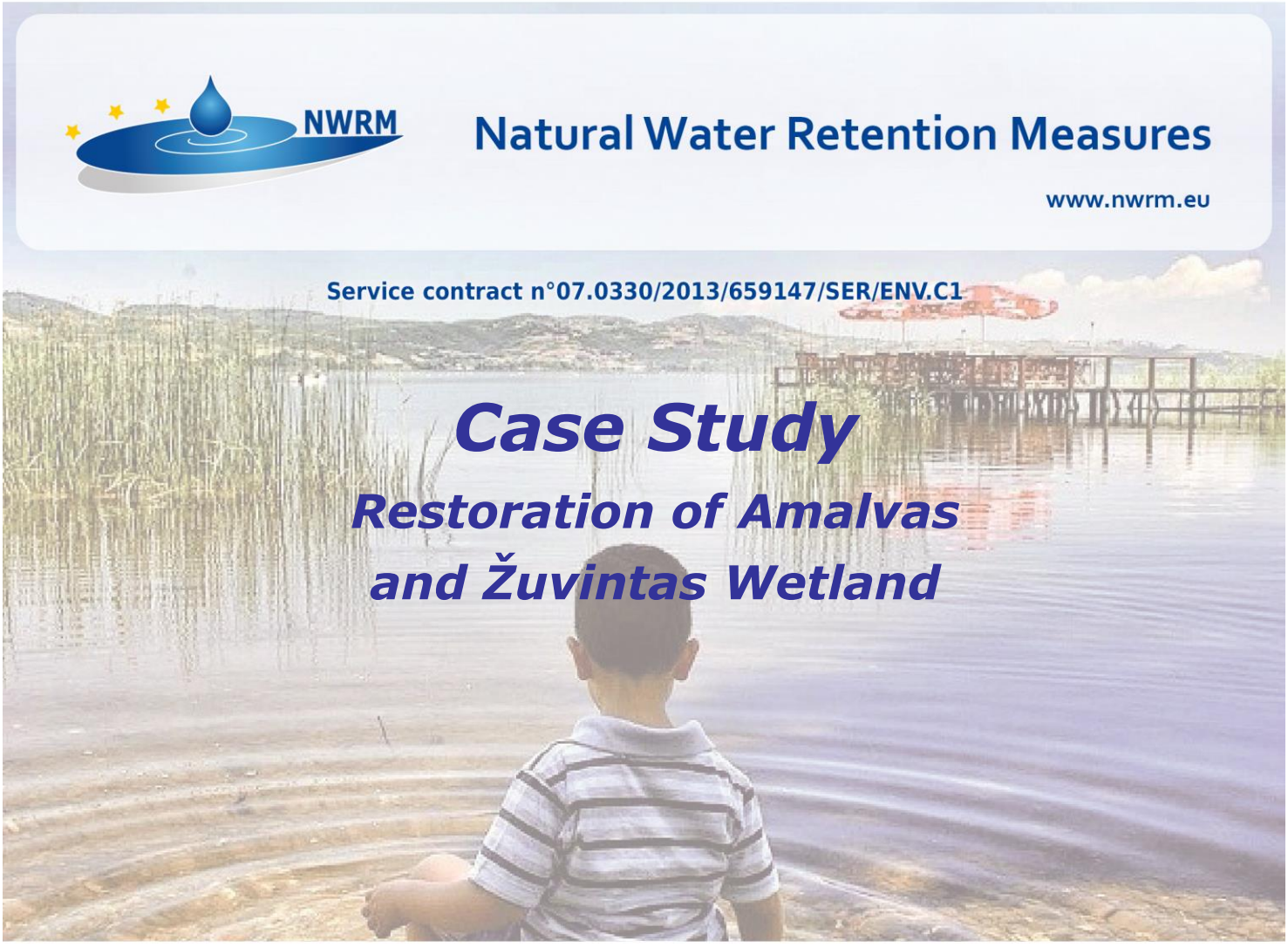
Service contract n°07.0330/2013/659147/SER/ENV.C1



Case Study

Restoration of Amalvas and Žuvintas Wetland

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	*Lithuania_01*			
Application Name	*Restoration of Amalvas and Žuvintas Wetland*			
Application Location	Country:	*Lithuania*	Country 2:	
	NUTS2 Code		*LT004*	
	River Basin District Code		*LT1100-Nemunas River Basin District*	
	WFD Water Body Code			
	Description		*WETLIFE project is implemented in the Žuvintas biosphere reserve which is situated in the southern part of the middle Lithuanian lowlands. It comprises Žuvintas and Amalvas wetland complexes, formed in a depression of the oval limnoglacial swampy plain. Žuvintas and Amalvas lakes belong to the Dovine river catchment area (589 km^2). More than half of it (345 km^2) - catchment area of the Žuvintas Lake.*	
Application Site Coordinates	Latitude: 54° 28‘		Longitude: 23° 35‘	
Target Sector(s)	Primary:	Nature		
	Secondary:	Agriculture		
Implemented NWRM(s)	Measure #1:	*N1*		
	Measure #2:	*N12*		
Application short description	Certain parts of the Žuvintas mire periphery are affected by drainage, however this is to a much lower extent than the neighboring Amalva mire which has approximately 60% drained for agriculture. Hydrology restoration action stopped the degradation of more than 1100 ha of Amalva mire.			

II. Policy context and design targets

Brief description of the problem to be tackled	*During second half of the 20th century Lithuania lost more than two-thirds of former mire area which covered 10% of the country. This had the effect of causing changes in the local and regional hydrological pattern, significant loss of wildlife and peat degradation, which in turn resulted in various secondary negative effects: CO2 emissions (approximately 25% of currently reported anthropogenic CO2 emissions, which does not take into account emissions from peatlands), water pollution due to peat mineralization products and peat subsidence. The regulation of lakes, along with increased loads of nutrients caused a rapid deterioration of water quality, siltation, and overgrowth of the lakes or even the collapse of submerged vegetation. This further led to decreased water purification capacities, as well as secondary pollution from sediments negatively affecting water bodies down the stream and, finally, the Baltic Sea – arguably the most polluted sea in the world.*		
What were the primary & secondary targets when designing this application?	Primary target #1:	Other (please describe in the "remarks" below)	
	Secondary target #1:	- Regulation of hydrological cycle and water flow	
	Secondary target #2:	- Self-regulation of water by filtration / storage / accumulation by ecosystems	
	Remarks	To achieve favourable conservation status of bog and swamp wood habitats	
Which specific types of pressures did you aim at mitigating?	Pressure #1:	WFD identified pressure	4.1.2 Physical alteration of channel/bed/riparian area/shore of water body for agriculture
	Pressure #2:	Other EU-Directive's identified pressure (specify)	Hydrological regime alterations impacting bog and swamp wood habitats
	Remarks		
Which specific types of adverse impacts did you aim at mitigating?	Impact #1:	WFD identified impact	4.1.2 Physical alteration of channel/bed/riparian area/shore of water body for agriculture
	Impact #2:	Other EU-Directive's identified impact	Hydrological regime alterations impacting bog and swamp wood habitats
	Remarks		
Which EU requirements and EU Directives were aimed at being addressed?	Requirement #1:	WFD-mitigation of significant pressure	Water Framework Directive
	Requirement #2:	WFD-achievement of good ecological status	EU Habitat Directive

	Requirement #3:	WFD-achieving objectives for Protected areas	EU Bird Directive
	Requirement #4:	WFD-restoring a HMWB	
	Remarks		
Which national and/or regional policy challenges and/or requirements aimed to be addressed?	EU Bird Directive, EU Habitat Directive, Water Framework Directive.		

III. Site characteristics

Dominant Land Use type(s)	Dominant land use	*CORINE land cover Code Level 412*
	Secondary land use	
	Other important land use	
	Remarks	
Climate zone	cool temperate moist Transitional between West European maritime and East European continental with a mean air temperature of about +6°C.	
Soil type		
Average Slope	gentle (2-5%) Altitudinal range is +82 to +131 metres above the sea level.	
Mean Annual Rainfall	300 - 600 mm	
Mean Annual Runoff		
Average Runoff coefficient (or % imperviousness on site)		
	Remarks	
Characterization of water quality status (prior to the implementation of the NWRMs)	*According to year 2005-2009 monitoring data Žuvintas lake:* *ecological status - moderate,* *chemical status – good,* *overall status – does not meet good status*	
Comment on any specific site characteristic that influences the effectiveness of the applied NWRM(s) in a positive or negative way	*Positive way:*	
	Negative way:	

IV. Design & implementation parameters

Project scale	Large (e.g. watershed, city, entire water system)	*Large*
Time frame	Date of installation/construction (MM.YYYY)	11.2011
	Expected average lifespan (life expectancy) of the application in years	

Responsible authority and other stakeholders involved	*Name of responsible authority/ stakeholder*	*Role, responsibilities*
	1. *Nature Heritage Fund*	Lead party and role in administration, finances and expertise.
	2. *Marijampolė municipality administration*	Legislative initiatives for the project, active planning issues.
	3. *Marijampolė state forest enterprise*	Legislative initiatives for the project, active planning issues.
	4. *Žuvintas Biosphere reserve directorate*	Monitoring, biological activities
	5.	
The application was initiated and financed by	Application initiated by Nature Heritage Fund. Project financed by EU LIFE+ funding mechanism and Republic of Lithuania	
What were specific principles that were followed in the design of this application?	*water-sensitivity, adaptability, integrative planning*	
Area (ha)	Number of hectares treated by the NWRM(s)	Žuvintas Biosphere Reserve – 18490 ha
	Text to specify	
Design capacity	Due to improved conditions for peat formation with the consequent CO2 accumulation in the Amalva mire and significantly reduced emissions from the Amalvas polder, total greenhouse gas emissions from degrading **peat are expected to fall substantially from the currently estimated 10000-15000 t of CO2 equivalent/year.**	
Reference to existing engineering standards, guidelines and manuals that have been used during the design phase	*Reference*	*URL*
	1. http://www.wetlife.gpf.lt/en/projekto-ataskaitos	
	2.	
	3.	
	4.	
	5.	
Main factors and/or constraints that influenced the selection and design of the NWRM(s) in this application?	One of the biggest challenge was finding a compromise with private owners regarding changing hydrology of the lands in their possession. Therefore reconstruction of the Amalvas winter polder into summer polder and south-eastern dike that required finding agreements with land owners and purchasing 16 private land plots is considered by the project team as a great success.	

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			
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 foreseen water pumping regime in the Amalvas polder, new pumps and reduced seepage through the dikes should significantly reduce annual electricity bills covered by Marijampolė municipality. • Less than 60% of the polder area was used last year and bushes spread in the abandoned land. Some areas by contrast went under the plough increasing peat mineralization and subsidence. It is expected that after reconstruction of the polder most of the land will be maintained as grasslands because substantial areas will correspond to the criteria of land where management can be supported by higher agrienvironmental payments. This, in turn, is expected to facilitate development of alternative uses of grasslands, such as the production of grass seeds, grass biomass for alternative fuel etc. • The introduced herd of beef cattle (16 units) in the Amalvas polder on a contract basis with the local farmer should increase in years to come, thereby maintaining 40- 70 ha of grazed wet meadows by 2016 and serve as an additional income source for the local farmer. It is expected to serve as a good example and involve more farmers in similar cooperation in the future. • The reconstruction of the Žuvintas and Amalvas sluice-gates into permanent spillweirs, along with a reduction in the length of Amalvas protective dike by 0.8 km and blocked ditches in 250 ha will simplify maintenance and reduce costs. • The revival of Amalva bog should significantly increase the amount of cranberries ready to be harvested by local people.		
Financial costs	***Total:***		
	Capital:		
	Land acquisition and value:	*30945,54 €*	
	Operational:	*1192267.201 €*	
	Maintenance:		
	Other:	*17188,519 €*	
Were financial compensations required? What amount?	*Was financial compensation required:* *The project was financed by LIFe programme (50 %), other part of the funding was provided by the project partners.*		
	Total amount of money paid (in €):		
	Compensation schema:		
	Comments / Remarks:		
Economic costs	*Actual income loss:*		
	Additional costs:		
	Other opportunity costs:		
	Comments / Remarks: *Some project actions were* carried out with a substantial delay (1,5 year). That was firstly due to economic crisis that led to reduction of the staff and working hours (due to budget restrictions staff has to take unpaid days-off), therefore personnel responsible for implementation of the projects became overloaded with work.		

Which link can be made to the ecosystem services approach?	- *Biomass production.* - *Amenities (associated to habitat protection): fish and plants, tourism, recreation, and others.* *Benefits of improved coastal water quality and ecological status*

VII. Monitoring & maintenance requirements

Monitoring requirements	1. Landscape, biodiversity monitoring 2. Žuvintas lake hydrological monitoring, daily 3. Meteorological monitoring, daily 4. Bambena and Dovine river flow monitoring, every 5 days 5. Amalvas hydrological and hydrochemical monitoring, every 10 days
Maintenance requirements	The reconstruction of the Žuvintas and Amalvas sluice-gates into permanent spillweirs, along with a reduction in the length of Amalvas protective dike by 0.8 km and blocked ditches in 250 ha has simplified maintenance and reduce costs.
What are the administrative costs?	

VIII. Performance metrics and assessment criteria

Which assessment methods and practices are used for assessing the biophysical impacts?	1. Landscape, biodiversity monitoring 2. Žuvintas lake hydrological monitoring, daily 3. Meteorological monitoring, daily 4. Bambena and Dovine river flow monitoring, every 5 days 5. Amalvas hydrological and hydrochemical monitoring, every 10 days.
Which methods are used to assess costs, benefits and cost-effectiveness of measures?	• Foreseen projects results before beginning of the project are compared with the monitoring results. • Reconstruction of the Amalvas polder is a good example of finding more sustainable solutions in using drained peatlands. The polder reconstruction design is currently evaluated by the Ministry of Agriculture and is expected to receive nomination of the best design of the year. This would increase visibility of the project;
How cost-effective are NWRM's compared to "traditional / structural" measures?	It was the first project in the country that successfully used plastic pilling dams for hydrology restoration on such a big scale. It's cost-effective method as using this material allows much faster restoration of water level and provides exceptional longevity comparing to other materials; It was the first project in the country that purchased land for mire restoration. This served as an important signal to other nature conservationists and land owners as well. There are already several initiatives in the country following the same road;
How do (if applicable) specific basin characteristics influence the effectiveness of measures?	
What is the standard time delay for measuring the effects of the measures?	

IX. Main risks, implications, enabling factors and preconditions

What were the main implementation barriers?	The project served as a good basis for establishing cooperation among protected area administration, municipality, environmental non-governmental organisation and local residents.
What were the main enabling and success factors?	*Ex., the key stakeholders were the project partners and other important parties, like farmers, were well integrated into activities.*
Financing	Total budget spent: 1240401,26 € EC contribution (LIFE+) 801,998 € Republic of Lithuania
Flexibility & Adaptability	
Transferability	It was the first project in the country that successfully used plastic pilling dams for hydrology restoration on such a big scale. It's cost-effective method as using this material allows much faster restoration of water level and provides exceptional longevity comparing to other materials.

X. Lessons learned

Key lessons	*Mire's dryness decreased, ground water level stabilized.* *Amalvas sustainable polder water pumping mode installed to ensure migratory birds population increase. Restore the natural water level fluctuations in Lake Žuvintas should lead to water vegetation recovery, some fish and amphibian species spawning areas expand, and stop the spread reeds and thickets. Restoring of natural water level fluctuations in Žuvintas and Amalvas has enabled these lakes to more easily purify its waters. Reconstruction and Žuvintas Amalvas locks-regulator installation passes, allowing fish to migrate.* *Policy implications:* The project made an important push in promoting agi-environmental measures in the area. There is a common understanding achieved among decision makers regarding further land use on drained peatlands. However despite of significantly increased local awareness of environmental hazards related to unsustainable management of organic peat soils, there is a great need for national and European policies regarding this issue. Abandonment of subsidies for damaging farming on organic soils would prove to be extremely beneficial for biodiversity conservation and minimizing other negative environmental consequences.

XI. References

Source Type	*Project Report*
Source Author(s)	Text
Source Title	Text *http://wetlife.gpf.lt/en* *Publications: http://wetlife.gpf.lt/en/projekto-leidiniai* *Deliverables: http://wetlife.gpf.lt/en/projekto-ataskaitos*
Year of publication	2012
Editor/Publisher	

Source Weblink	Weblink *http://wetlife.gpf.lt/en*		
Key People		*Name / affiliation*	*Contact details*
	1.	*Argaudas Stoškus, project manager*	a.stoskus(eta)gpf.lt

XII. Photos Gallery

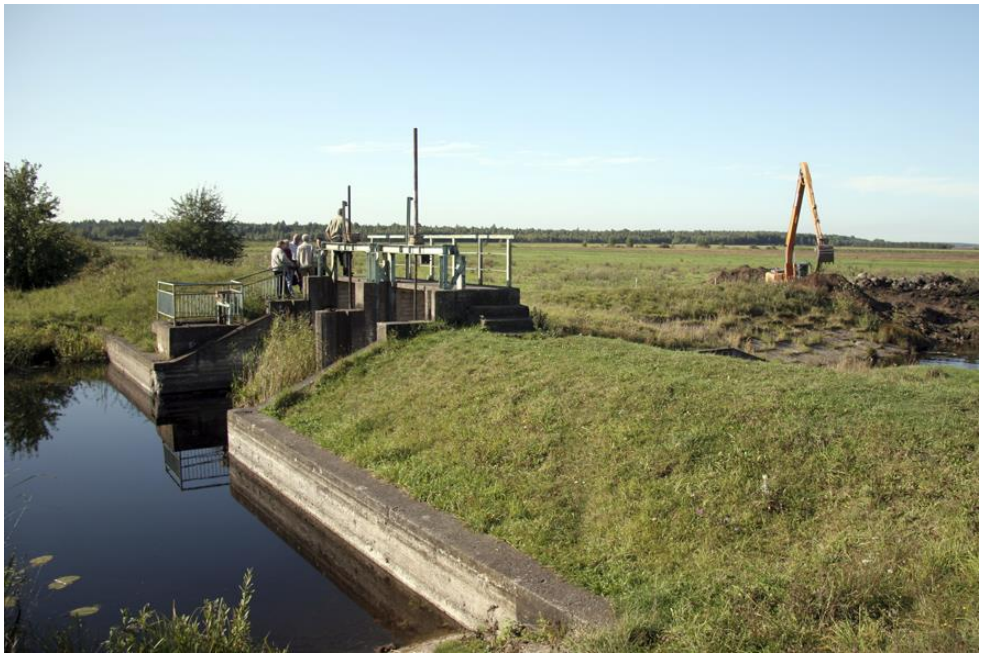

Figure 1 August 2009 - beginning of the reconstruction works of the Žuvintas sluice-regulator (Argaudas Stoskus)

Figure 2 July 2011 - Plastic pilling poles used for blocking drainage channels in ~107 ha of Amalva bog. (Arunas Pranaitis)

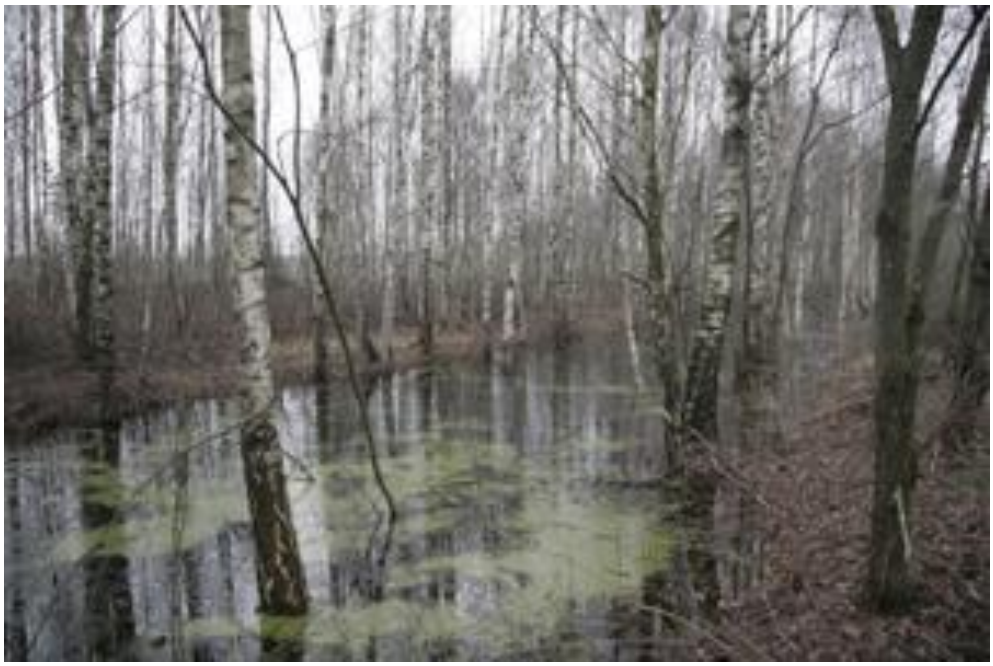

Figure 3 December 2011 - Blocking of the portion of the Amalvas polder channel neighbouring the very Amalva bog resulted in substantially elevated water levels and elimination of draining effect (Argaudas Stoskus)