Restoration of Amalvas and Žuvintas Wetlands, Lithuania

Year of issue

2025

Summary

The WETLIFE project (2009–2012) in Amalva and Žuvintas mires sought to reverse negative changes by restoring hydrology (converting sluices to spillways, raising embankments, renovating the Amalva polder pump, blocking drainage) and by encouraging more sustainable peatland farming. It also aimed to raise awareness and provide a replicable model.

Since then, restoration has been expanded under LIFE WETLIFE 2 (2014–2018), which upgraded about 6.6 km of embankments, added spillways and a dam on the perimeter ditch, blocked underground drains and removed encroaching trees, with the goal of re-establishing “active raised bog” over ~775 ha in central and southern Amalva. Further rewetting (2019–2022, LIFE Peat Restore) targeted ~215 ha in southern Amalva with 28 retention structures across nine main ditches, four low berms with overflow crests, removal of woody growth and additional drain decommissioning.

Today the reserve operates long-term monitoring (2023–2033) of water levels and quality, while catchment management remains important due to pulsed discharges from the Simnas fishpond system that can affect Žuvintas Lake. Public access has been improved with a short boardwalk and viewing platform (2018), reinforcing outreach and stewardship.

Photo Gallery



Location

54.466, 23.58

Project

NWRM

National ID

Lithuania 01

Sector

Hydromorphology

Installation Date

2011-2012

Implementation status

Completed

Contact

JustÄ— BuzelytÄ—, BEF

Overview

Location of the project

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 km2). More than half of it (345 km2) - catchment area of the Žuvintas Lake.

Country

Lithuania

NUTS2 Code

Latvija

Sponge measures implemented in the case study

Ponds and scrapes

Lake restoration

Wetland restoration and management

Objectives

Reverse degradation across ~1,158 ha

Reconstruct sluice gates into spill-weirs

Extend dykes ~2 km (Amalva) and ~3 km (Žuvintas)

Renovate Amalva polder pump; block drains/plastic piling over ~207 ha in southern Amalva and ~6 km in Žuvintas

Tree removal on ~207 ha

Initiate grazing on ~30 ha in the polder.

Involved partners

Authority type	Authority name	Authority role	Comments	Authority responsibility
NGO	Nature Heritage Fund	Implementation	Lead party and role in administration, finances and expertise.	Responsible
Local water authority	Marijampolė municipality administration	Initiation of the measure	Legislative initiatives for the project, active planning issues	Responsible
Forest owners	Marijampolė state forest enterprise	Implementation	Legislative initiatives for the project, active planning issues	Responsible
Other	Žuvintas Biosphere reserve directorate	Monitoring	Monitoring, biological activities	Supporting

Documents

cs-lt-01-final_version.pdf (1.09 MB)

Site Information

Climate Zone

Cool temperate moist

Temperature (°C)

6.00 °C

Elevation range

85 - 131 m

Slope range

gentle (2-5%)

Vegetation class

Peat bog / mire vegetation. The case area’s dominant land cover is CORINE 412 “Peat bogs”, with communities of bog woodland (pine-dominated) and open raised-bog vegetation (Sphagnum, heather, hare’s-tail cottongrass); extensive reedbeds and sedge fens occur near Lake Žuvintas.

WFD Ecological status

Moderate

WFD Chemical status

Good

Design and Implementation

Project scale

Large

Project area

1100

Constraints

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.

Financing

Total cost

4327762.00 €

Total cost information

€1,603,996 Phase I LIFE WETLIFE (LIFE07 NAT/LT/000530, 2009–2012)
€1,564,386 Phase II LIFE WETLIFE 2 (LIFE13 NAT/LT/000084, 2014–2018)
€5,943,535 Overall project (5 countries) Phase III LIFE Peat Restore (LIFE15 CCM/DE/000138, 2016–2022), Lithuania component including Amalva : €1,159,380

Costs investment

40863324.00 €

Costs investment information

Infrastructure, equipment and purchase of land (finale report data, page 31)

Costs land acquisition

30945.54

Costs land acquisition unit

€ (total value)

Costs operation maintenance

110419016.00 €

Administrative annual costs

3298272.00 €

Administrative annual cost information

sum of: website, film, project seminars, farmers' info campaign, guidelines on farming, project promotion material, construstion of view platform, monitoring, devided by 3 (project durability)

Financing authorities

Authority name	Type of funding	Comments	Financing share
European Union	EU-funds: LIFE+	Total €2,670,915 Phase I LIFE WETLIFE (LIFE07 NAT/LT/000530, 2009–2012) : €801,998 (50 %) Phase II LIFE WETLIFE 2 (LIFE13 NAT/LT/000084, 2014–2018) €1,173,289 (75 %) Phase III LIFE Peat Restore (LIFE15 CCM/DE/000138, 2016–2022) (60%), for Lithuania €695,628	62 %
Republic of Lithuania	National funds	Remaining balance	38 %

Compensations

No

Policy and Governance

Policy description

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.

Land ownership

16 private land plots were purchased to enable restoration; Amalva polder infrastructure and rules are administered by Marijampolė municipality.

Policy targets

Improved Biodiversity

Runoff control

Pollutants Removal

Target remarks

Regulation of hydrological cycle and water flow
Self-regulation of water by filtration / storage / accumulation by ecosystems
To achieve favourable conservation status of bog and swamp wood habitats

Policy pressure

Directive	Relevant pressure
WFD identified pressure	4.1.2 Physical alteration of channel/bed/riparian area/shore of water body for agriculture
Other EU	Hydrological regime alterations impacting bog and swamp wood habitats

Policy impact

Directive	Relevant impact
WFD identified pressure	4.1.2 Physical alteration of channel/bed/riparian area/shore of water body for agriculture

Requirement directive

Requirement directive	Specification
WFD-mitigation of significant pressure	Water Framework Directive
WFD-achievement of good ecological status	—
WFD-achieving objectives for Protected areas	—
The Birds and Habitat Directives	—

Part of a wider plan

Yes

Wider plan

Wider plan type	Wider plan focus
Regional	Water
Regional	Environment & Biodiversity
Regional	Climate adaptation
Local	Agriculture

Public consultation

No

Consultation activities

Activity stage	Activity type	Key issues
Implementation phase	General project seminars	For project partners
Design phase	Information campaign on farming practices	A number of purchase negotiation meeting s with farmers, guideliness for sustainable peat grassland maangement presented to local farmers.
—	Name of policy/strategy 3	—
—	Name of policy/strategy 4	—
—	Name of policy/strategy 5	—

Activity stage	Activity type	Key issues
—	Name of policy/strategy 6	—

Has contractual arrangements

No

Contractual arrangements

Arrangement type	Responsibility	Name
Contractual agreement	Amalvas wetland drainage blocking project, Amalvas wetland water level re-naturalization activity	Hydrologist-engineer
Contractual agreement	Purchase of 25 ha land	JSC Agrogeodezija
Contractual agreement	Restoration of the drained southern part of the Amalvas wetland	JSC Alytaus melioracija
Contractual agreement	Reconstruction of Amalvas polder	JSC Sumeda, etc.

Impacts and Monitoring

Monitoring System

Monitoring parameters

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

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.

Impact Assessment Methodology

Performance impact assessment method

Edge of Field/Plot

Socio-economic Impacts

Direct benefits

• 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.
Agri-nature interface: meadow restoration (6 ha), advice for ~40 ha, adjustments to melioration to protect ~30 ha, 16 beef cattle provided to a local farmer to maintain wet peat meadows. 14 stakeholder events on mire services.

Biophysical impacts: Hydrology

Information on retained water

Phase I outcomes: water level restored to 0.0–0.3 m below surface across ~210 ha; seasonal natural water levels over ~638 ha of polder; water-level management rules set for 30–60 cm during farming season. Mire's dryness decreased, ground water level stabilized.
Second phase (LIFE WETLIFE 2, 2014–2018) at Amalva: 6.6 km of dykes raised/restored/new; two spillways + a dam on the perimeter ditch; >20 ha underground drains blocked; ~140 ha tree removal. Target: regeneration of “active raised bog” on ~775 ha in central/southern Amalva.
2019–2020 piezometers show the water table below ground most of the time (e.g., AMAL02: >99% of days below; AMAL03/04 above ground 35–42%), confirming the need for rewetting.
Third phase (LIFE Peat Restore, 2019–2022) in south Amalva (~215 ha): 28 peat/ plastic-sheet piling dams across nine main ditches; four peripheral berms with overflow wells; woody vegetation removal; subsurface drains dismantled.

Biophysical impacts: Biodiversity

Improved biodiversity

Yes

Information on improved biodiversity

Amalvas sustainable polder water pumping mode installed to ensure migratory birds population increase.
Restore the natural water level fluctuations in Lake Ž’uvintas should lead to water vegetation recovery, some fish and amphibian species spawning areas expand, and stop the spread reeds and thickets. Reconstruction and Ž’uvintas Amalvas locks-regulator installation passes, allowing fish to migrate.

Biophysical impacts: Water & Soil Quality

Information on water quality overall

Restoring of natural water level fluctuations in Ž’uvintas and Amalvas has enabled these lakes to more easily purify its waters.

Biophysical impacts: Others

Information on ecosystem impact GHG soil carbon

Total greenhouse gas emissions from degrading peat are expected to fall substantially from the currently estimated 10000 15000 t of CO2 equivalent/year.
Amalva south, ~215 ha : GEST-based estimate that emissions dropped from ~5,800 to ~800 t CO_2-eq/yr once rewetting and bog vegetation re-establish; reserve and state-forest services tasked with ongoing maintenance/monitoring.

Lessons Learned

Key lessons

Hydrology-first, multi-wave restoration is often required; Phase I created gains, Phase II expanded water-retention capacity, Phase III targeted the most drained sector.
Woody removal + ditch blocking work, but methods must adapt to site condition; at Amalva, repeated cutting failed in compacted/nutrient-rich patches and was replaced by herbicide.
Coupling with farming is key: explicit polder water-rules and grazing contracts reduced conflicts and sustained wet meadow management.
Design for safety: perimeter structures with overflow wells manage high-water events while keeping the bog wet.
Monitor for the long haul: piezometers + a formal 2023–2033 programme are essential to demonstrate outcomes and steer adaptive management.
Think catchment: external loads/abstractions (fishponds, drought) can undermine on-site gains; governance beyond site boundaries matters.
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.

Barriers

Barrier type	Barrier role	Comments
Expected maintenance needs	Secondary barrier	Simnas fishpond operations can pulse nutrients/flows, with implications for Žuvintas Lake; stakeholders called to balance pond management with protected-area needs
Market failures	Main barrier	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 daysoff), therefore personnel responsible for implementation of the projects became overloaded with work.

Drivers

Driver type	Driver role	Comments
Legal obligations	Main driver	To ensure conservation status of the area

Driver type	Driver role	Comments
Organisation committed to it	Main driver	Nature Heritage Fund is a leading organisation in country to protect and maintain species of the comunity's interest (SCI)
Availability of subsidies	Secondary driver	LIFE Nature programme is supporting the biodiversity restoration projects

Success factors

Success factor type	Success factor role	Comments
Successful coordination between authorities	Main factor	The project served as a good basis for establishing cooperation among protected area administration, municipality, environmental non-governmental organisation and local residents.

Cost effectiveness

1st project in the country that used plastic pilling dams for hydrology restoration on a big scale. It’s cost-effective method as using this material allows much faster restoration of water level and provides exceptional longevity.

Transferability

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.

Sources

Sources

WETLIFE project's final report and deliverables

Amalvos pelkėje pradedami vandens lygio atkūrimo darbai

Stakeholder meeting on mitigation of impacts of Simnas fishery ponds... (Report, 13 April 2021)

Hydrological field research factsheet – Amalva Peatland – Lithuania (DESIRE, Action 3.2)

Žuvinto biosferos rezervato monitoringo 2023–2033 metų programa (Monitoring Programme)

Žuvinto biosferos rezervate pradedami aplinkos pokyčių stebėjimai

LIFE07 NAT/LT/000530 – Restoring Hydrology in Amalvas and Žuvintas Wetlands (WETLIFE)

LIFE13 NAT/LT/000084 – Restoration of proper hydrological conditions in Amalva and Kamanos bogs (WETLIFE 2)

LIFE15 CCM/DE/000138 – Reduction of CO_2 emissions by restoring degraded peatlands in Northern European Lowland (LIFE Peat Restore)