LIFE is the EU's financial instrument supporting environmental and nature conservation projects throughout the EU

Natura 2000 is an EU wide network of nature protection areas aiming at assurance of the long-term survival of Europe's most valuable and threatened species and habitats

Layman's report

Bringing the wetlands back to life.
Restoring hydrology in Amalvas and Žuvintas wetlands.
LIFE07 NAT/LT/530 WETLIFE

The project was partly financed by the European Union and the Republic of Lithuania

The project was implemented by

Public Institution Nature heritage fund

Marijampolė municipality administration

Marijampolė state forest enterprise

Žuvintas biosphere reserve directorate

"Development of our capacities to do things is incredibly faster than development of our capacities to foresee the results of our doing."

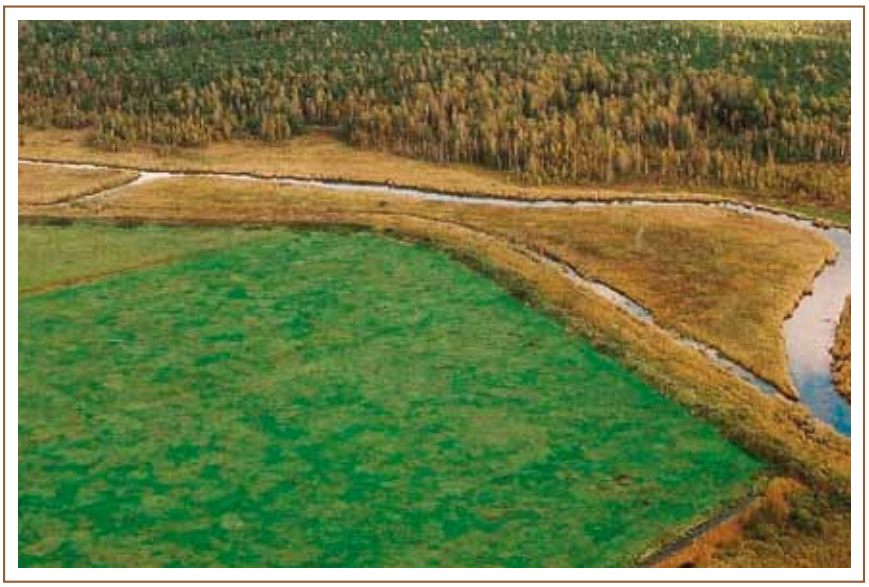
Austrian philosopher Günther Anders

Wetlands – a dumped human cradle

Wetlands were vitally important for human evolution and survival from prehistoric times until the industrial era cut off this dependence. The rapid growth of human population and the intensification of agriculture substantially increased demand for agricultural land, which, in turn, resulted in a radical undervaluation of wetlands and, consequently, they have been squeezed in the landscape. The majority of mires were drained, rivers straightened and embanked to prevent flooding and numerous lakes became regulated. Such societal choice seemed to work for a while until the eventual negative ecological consequences started accumulating and outweighing economic benefits.

Transformation of wetlands results in inevitable ecological changes

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 border between the protected Žuvintas mire and drained part for agriculture. Approximately 12 tonnes and 28 tonnes of greenhouse gases (CO2 equivalent) are emitted annually from drained peatlands used as meadows and arable land respectively. Maintenance of melioration systems is costlier in peat than in mineral soil due to peat subsidence.

Peatland fires became a common phenomenon causing lots of problems during droughty years.

Algal bloom became a common phenomenon

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.

The protection and restoration of wetlands has long term ecological and economic benefits

Even though the long term ecological and economic benefits of wetland protection/restoration have been demonstrated by scientists, short term economic interests and a lack of awareness have resulted in inertia of societal choices. High restoration cost, along with private ownership and/or built-up infrastructure, strengthens this inertia. Therefore, wetland restoration is mainly limited to protected areas with prevailing conservation interests. Funds are mainly provided through the EU LIFE financial instrument - arguably the most important means for wetland restoration in the country.

Protected areas carry out the important mission of raising awareness about the importance of wetlands.

Žuvintas biosphere reserve – a wetland dominated Natura 2000 area negatively affected by hydrological alterations.

Žuvintas mire – the biggest in the country

Žuvintas biosphere reserve (18,490 ha), situated in the southern part of Lithuania, comprises Žuvintas and Amalvas wetland complexes. Mires dominate in the reserve, with a total area of more than 8,000 ha, Žuvintas mire (6,847 ha) being the largest in the country. 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. The remaining approx. 1100 ha of the mire exhibit clear signs of drying: expansion of tree cover, the disappearance of open mire species and peat subsidence.

Amalva raised bog overgrown with woody vegetation – a clear signs of drying.

Approximately 50% of Lake Žuvintas is covered by tall vegetation, dominated by reed and bulrush. Water pollution and regulation of the level of the lake speeded up the expansion of the vegetation

The mires are in close relationship with the hydrologically more dynamic Žuvintas and Amalvas lakes with an area of 965 ha and 190 ha respectively. These shallow lakes with an average depth of less than 1 meter used to naturally exhibit seasonal water fluctuations reaching nearly 1 meter. Spring floods used to double the size of the lakes and facilitated self-cleaning capacities, along with the development of certain mire and meadow habitats, the controlled spreading of reed and bushes and provided excellent spawning grounds for pike, as well as feeding grounds for numerous migratory birds.

Regulation of the lakes was introduced in the 1970s. In Žuvintas it reduced the average water level by 30 cm and water fluctuation to approximately 30 cm. This added up to increased water pollution and resulted in the rapid degradation of water quality and significant changes in vegetation and overall biodiversity. Amalvas Lake was again more affected and switched to a state of high water turbidity with scarce submerged vegetation. Attendant endikement further squeezed floodable areas.

These alterations, together with the abandonment of the traditional management of wet meadows, resulted in a more than twofold reduction of breeding and migratory bird numbers in Žuvintas – the oldest protected area, well-known among Lithuanians as "bird paradise". Certain species completely abandoned the area.
Fortunately, many of the negative changes are reversible and every effort has been made to improve the ecological conditions in the area. The situation has started to improve since the Žuvintas biosphere reserve was declared a Natura 2000 site in 2004. A management plan was approved in 2006 and active nature restoration measures were implemented.

A sluice-regulator built on the Dovinė River below Žuvintas Lake in 1970

What did the project do to stop the negative changes?

The LIFE project was mainly aimed at the restoration of hydrological conditions necessary for the revival of the Amalvas and Žuvintas wetlands. The main aims were:

1. Stopping the degradation of more than 1100 ha of Amalva mire located on the west bank of the Amalvė River:
   - Increasing the hydrologically united area of Amalva bog by restoring the ground water level in 207 ha of the drained southern part of the bog;
   - Maintaining the highest possible ground water level in the northern part of the drained Amalva mire by reconstructing the Amalvas polder and introducing more sustainable management practices.
2. Improving hydrological conditions in 200 ha of Amalva mire located on the east side of Amalvė River by reconstructing a protective dike and restoring the ground water level in 50 ha of drained area.
3. Minimizing the effects of drainage on Žuvintas active raised bog and bog woodland habitats by blocking 5 km of ditches.
4. Restoring natural water level fluctuations in Amalvas and Žuvintas lakes to serve as a prerequisite for the development of a healthier lake and interrelated ecosystems.

The main results:


foto V. Pavardenis

Approximately 300 m of the Amalvas polder drainage ditch most influencing the Amalva bog was blocked to maintain ground water close to the soil surface. A new section (269 m) of the drainage ditch was built further from the bog to secure conditions necessary for meadow management

foto V. Pavardenis

Management of wetter meadows in the west part of the polder will be ensured by beef cattle of Hereford breed introduced on a contract basis with the local farmer

Trees were cut and drainage channels blocked in 207 ha of drained Amalva bog.
Reliable soil dams were built at the ends of the ditches.

The sluice-regulator on the Amalvė River below Amalvas Lake was reconstructed into a cascade of spillways passable by fish.

The pumping station of the polder was equipped with new automatic water pumps

Amalvas winter polder was reconstructed into a summer polder, i.e. winter/spring floods will be allowed in the area and ground water level in the peaty soil maintained at 30-60 cm from the surface for sustainable meadow management. Water regulation means in the ditches were reconstructed accordingly and the Amalva mire protective dike (2.9 km) improved.

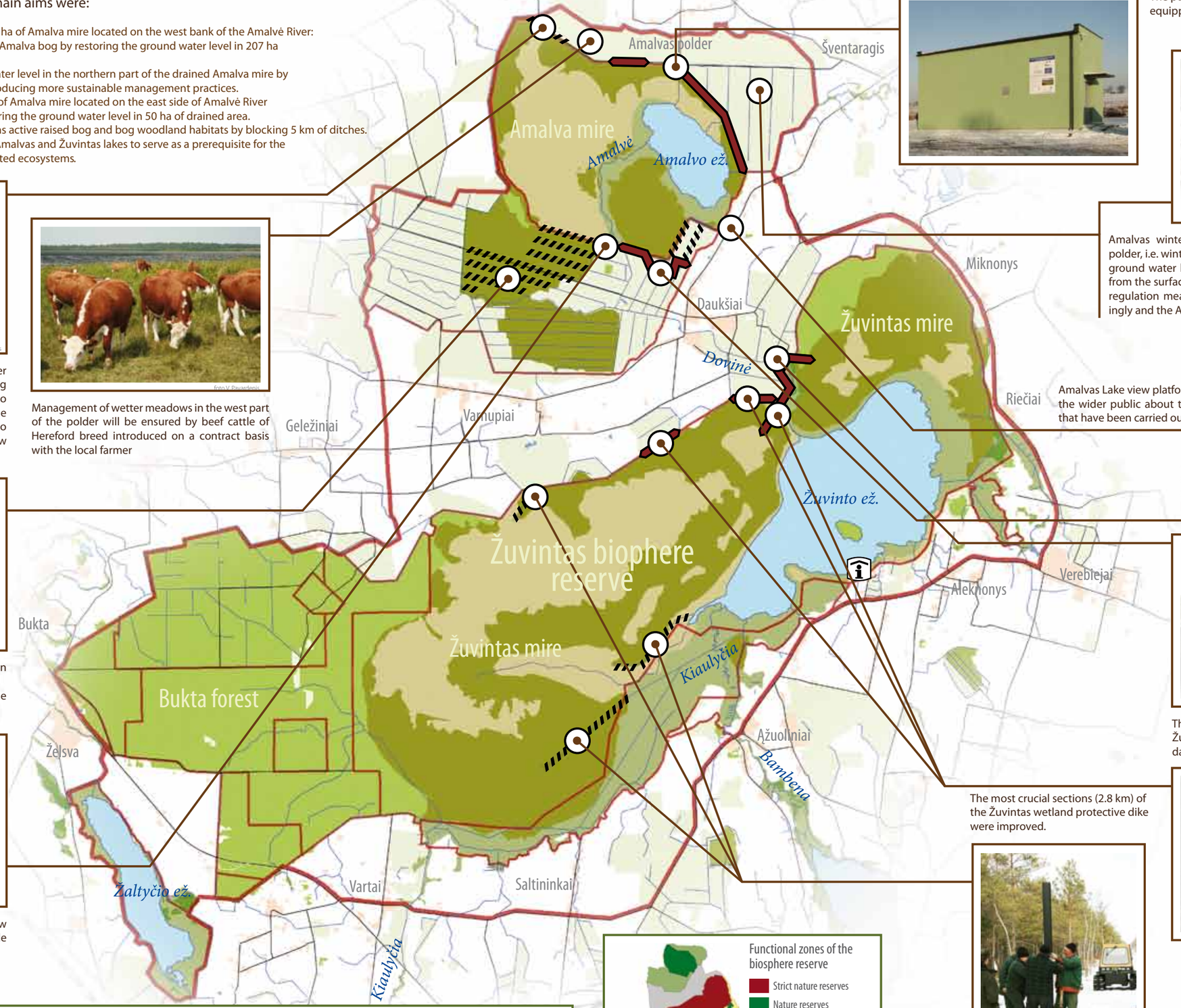
Amalvas Lake view platform was built to serve as an information point to the wider public about the Amalvas wetland and restoration activities that have been carried out.

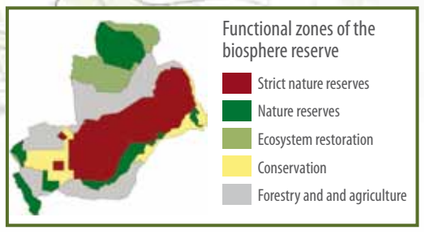
Amalva mire protective dike was reconstructed and hydrology restored in 50 ha of drained mire area. Approximately 25 ha of private land was bought to achieve this goal

The sluice-regulator on the Dovinė River below Žuvintas Lake was reconstructed into a spillway dam with fish ladder.

The most crucial sections (2.8 km) of the Žuvintas wetland protective dike were improved.

5 km of drainage ditches were blocked to improve hydrological conditions in the Žuvintas bog.
Some ditches are extremely difficult to access, therefore blocking with plastic pilling sheets was done from the ice in winter time.





Road
Railroad
River, ditch
Border of the biosphere reserve
Border of the bioshere reserve finctional zone
Raised bog and transitional mire
Fen
Forested mire
Forest
Meadow, pasture
Water body
Homestead, settlement
Žuvintas biosphere reserve visitor centre

The main long-term benefits:

For biodiversity:

1. Restoration of ground water level should enable the regeneration and conservation of priority habitats for conservation within the EU - active raised bog and bog woodland in approximately 1500 ha of Amalva mire. A 30% increase in peat moss cover in the center of the restored 207 ha area just one year after restoration is a promising result.

Active raised bog habitats are disappearing all over Europe due to drainage and atmospheric nitrogen deposition.

3. The number and species composition of migratory birds (especially waders) and wet meadow breeding birds is expected to increase due to more sustainable management of Amalvas polder (638 ha).

High numbers of migratory birds chose flooded polder meadows as a stopping point in spring of 2011.

Meadows flooded in early spring are very important for the successful breeding of pike

Typical bog plant - cotton-grass quickly recolonised the wettest parts of the restored mire

2. Reduced water run-off from the Žuvintas bog should facilitate the slowing down or even reversal of succession from an open active raised bog to bog woodland in the areas affected by drainage (approx. 500 ha).

Curlew – a near threatened bird species highly dependent on big active raised bogs.

4. Restored natural water fluctuation in Žuvintas Lake should:
- Improve conditions for submerged vegetation, especially Chara spp., which is highly important for invertebrates, fish and waterfowl populations ;
- Increase spawning grounds for pike and amphibian species;
- Facilitate development of a lake boundary zone (blue zone) important for biodiversity;
- Negatively influence the spreading of reed and shrubs.

Algae of Chara genus are very important for maintaining water quality and high biodiversity in the lake.

5. Constructed fish-ladders will enable fish migrations (gene exchange) from-to Žuvintas and Amalvas lakes and should facilitate healthier populations and bigger diversity in the basin.

For general ecological status:

6. 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.

7. More sustainable management of the Amalvas polder peatlands should result in decreased loads of nitrates and peat particles from the polder to Amalvas Lake, thus facilitating improvement in water quality.

8. Self clean-up capacities of the Amalvas and Žuvintas lakes are expected to increase due to an increase in water fluctuations. The total nutrient suspension of the Žuvintas Lake is also expected to increase due to the improved conditions for underwater vegetation, thus improving water quality in the basin below the lake.

Socio-economic:

9. 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.

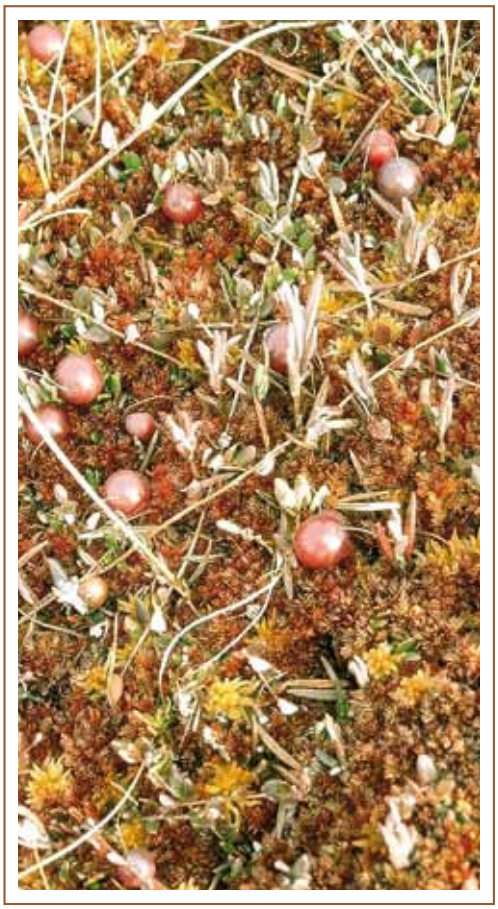
10. Less than 60% of the polder area was used last year and bushes spread in the abandoned land. Some areas by contrast went under the plough increasing peat mineralization and subsidence. It is expected that after reconstruction of the polder most of the land will be maintained as grasslands because substantial areas will correspond to the criteria of land where management can be supported by higher agri-environmental 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.

Globally threatened corncrakes and other meadow birds successfully bread if grazing of meadows starts in the second part of June.

11. 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.

12. The reconstruction of the Žuvintas and Amalvas sluice-gates into permanent spill-weirs, 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.

13. The revival of Amalva bog should significantly increase the amount of cranberries ready to be harvested by local people.



Cranberry picking in Amalva bog is a deep-rooted tradition

Educational:

14. The project is expected to serve as an example of successful wetland restoration and more sustainable use that could be replicated in other parts of the country. However, the biggest expectations are related to the changes in attitudes and awareness of local residents whose livelihoods are related to the wetlands of the Žuvintas biosphere reserve

"We all make choices, but we can not choose circumstances under which choices have to be made. Therefore terms of making our decisions must be clear and visible."

Sociologist Zygmunt Bauman

More information about the project – **www.wetlife.gpf.lt**

Published by Public Institution Nature Heritage Fund www.gpf.lt