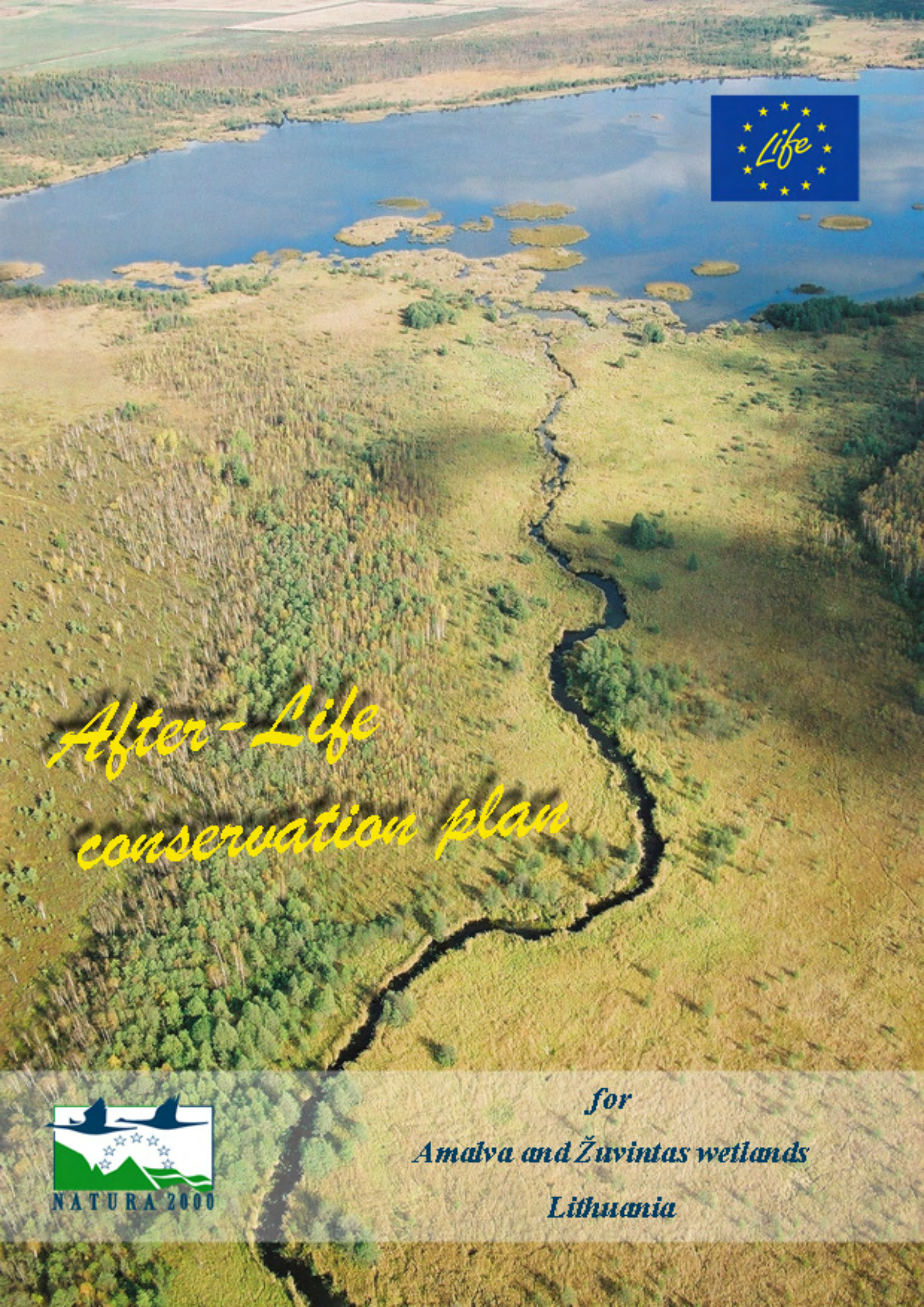

After-Life conservation plan

for

Amalva and Žuvintas wetlands

Lithuania

NATURA 2000

THE AFTER-LIFE CONSERVATION PLAN WAS PRODUCED
AS PART OF THE **LIFE07 NAT/LT/530 WETLIFE** PROJECT

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Introduction

The after-LIFE conservation plan was produced as an output of the project “Restoring of hydrology in Amalvas and Žuvintas wetlands. WETLIFE”. It focuses solely on wetland habitats targeted by the project and does not include other habitats or species of the Žuvintas biosphere reserve that are not related to the aims of the project.

The conservation plan includes relevant background information and is mainly based on already foreseen actions included in the available management plans prepared for the biosphere reserve or certain smaller areas. It also proposes additional actions considered as important for achieving the overall aims of wetland conservation. Several maps are included to facilitate text readability.

The after-Life conservation plan should not be considered as a substitution of the available management plans but rather as a document dedicated to an external reader that helps to understand the main threats to wetland biodiversity in the Žuvintas biosphere reserve, to realize the importance of the WETLIFE project in eliminating these threats, commitment and ability of the main project beneficiaries to improve the situation as well as existence of clear milestones toward achieving the goals.

Site description

Biodiversity

Žuvintas Biosphere reserve is located in the southern part of Lithuania. It is the oldest protected area and among the most valuable sites for biodiversity in the country. The current area of the reserve is 18,490 ha. Rich diversity of habitats can be found here, however those attributable to wetlands dominate in the landscape. Žuvintas mire complex is the biggest in the country and together with the neighboring Amalva mire covers more than 8,000 ha. There are three shallow lakes: Žuvintas, Žaltytis and Amalvas, which cover 965 ha, 289 ha and 190 ha respectively (Map of the area – *Annex 1*).

Žuvitas biosphere reserve was declared Natura 2000 site in 2004 (18,490 ha - pSCI, 14,198 ha – SPA). In total, 16 habitat types of Community importance are present in the site.

Code	Name of the Habitat type	Area, ha	Comment
3140	Hard oligo-mesotrophic waters wirth betnic vegetation of Chara sp.	760,0	The second biggest area of all SCI sites in the country
3160	Natural distrofic lakes and ponds	0,8	
6410	Molinia medows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)	6,7	
6430	Hydrophillous tall herb communities of plains	0,4	
6450	Nothern boreal alluvial meadows	56,3	
6510	Lowland hay meadows	7,3	
7110*	Active raised bogs	1855	Third biggest area in the country
7120	Degraded raised bogs still capable for regeneration	1158,2	The biggest area in the country
7140	Transitional mires and quaking bogs	376,5	3rd biggest area in the country
7160	Fennoscandian mineral-rich springs and springfens	2,7	
7230	Alcaline fens	59,5	
9050	Fennoscandian herb-rich forests with Picea abies	26,2	
9080*	Fennoscandian deciduous swamp woods	575,8	The biggest area in the country
9160	Sub-Atlantic and medio-European oak oro ak-hornbeam forests of the Carpinion betuli	605,4	
91D0*	Bog woodland	2857,2	The second biggest area in the country
91E0*	Alluvial forests with Alnus glutinosa and Fraxinus excelsior	860,6	One of the biggest areas in the country

Species: *Hypodryas maturna, Liparis loeselii, Saxifraga hirculus, Bombina bombina, Lutra lutra*

Bird species:

Common name	Scientific name	Criteria	Population size (mails/pairs/individuals)
Bittern	*Botaurus stellaris*	C6 /LT-1.5	15-18 m
Marsh Harrier	*Circus aeruginosus*	C6/ LT-1.5	85-90 p
Montagu's Harrier	*Circus pygargus*	C6/ LT-1.5	6-9 p
Black Grouse	*Tetrao tetrix*	C6/ LT-1.5	120 - 140 ind
Spotted Crake	*Porzana porzana*	C6 /LT-1.5	90-100 m
Little Crake	*Porzana parva*	C6/ LT-1.5	55 m
Common Crane	*Grus grus*	C6/ LT-1.5	30-35 p
Wood Sandpiper	*Tringa glareola*	C6/ LT-1.5	3 p
Middle spotted woodpecker	*Dendrocopos medius*	C6/ LT-1.5	25 p
White-backed Woodpecker	*Dendrocopos leucotos*	C6/ LT-1.5	20 -30 p
Bluethroat	*Luscinia svecica*	C6/ LT-1.5	10 p
Aquatic warbler	*Acrocephalus paludicola*	C1/ LT-1.1	10-15 m

The whole area of the biosphere reserve is also an important resting place for migratory birds:

White-fronted Goose	*Anser albifrons*	C3/LT-1.2	3000-5000 ind
Bean Goose	*Anser fabalis*	C3/LT-1.2	1000-2000 ind
Common Crane	*Grus grus*	C2/LT-1.2	600-1000 ind

Land use and conservation status

Žuvintas biosphere reserve lies in the intensive farming region, however 50 % of the area is dedicated for nature conservation, 31 % used for agriculture, 18 % - forestry and 1 % - urban areas. State ownership dominates in the biosphere reserve (68 %). Land is mainly state owned in the core area (state – 97 %, private – 3 %), while in the buffer zone private ownership reaches approximately 60 %. Private ownership prevails in the agricultural areas, while state ownership – in the forest.

The Žuvintas wild-life reserve was established in 1937 as the first nature reserve in Lithuania. Undrained part of the Almalvas wetland (1439 ha) was designated as a botanical-zoological reserve in 1992. The Žuvintas was designated as a Ramsar site in 1993. Žuvintas and Almalvas mires, Bukta forest and neighbouring farmlands were designated as a biosphere reserve (according to the national legislation) in 2002 and received UNESCO MAB nomination in 2011. Core area (9,210 ha) of the biosphere reserve consists of strict nature reserves (6,122 ha, IUCN category I) and nature reserves (3,088 ha, IUCN category IV). The buffer zone covers 9,280 ha.

Management planning

Management planning of protected areas is quite sophisticated in Lithuania. According to national legislation Lithuania requires the elaboration of two types of territorial planning documents for protected areas: territorial (physical) plans and strategical plans. Territorial plans are divided into three sub-categories: General Planning, Special Planning and Detailed Planning. For protected areas the Special Planning is of relevance, which on its turn has a number of subcategories:
a. network schemes of the protected areas;
b. schemes of the nature frame and/or ecological network formation;

c. schemes of the ecological protection zones network;
d. plans of boundaries of the protected areas and boundaries of their zones;
e. management plans of the protected areas;
f. nature management and/or heritage management projects of the protected areas.

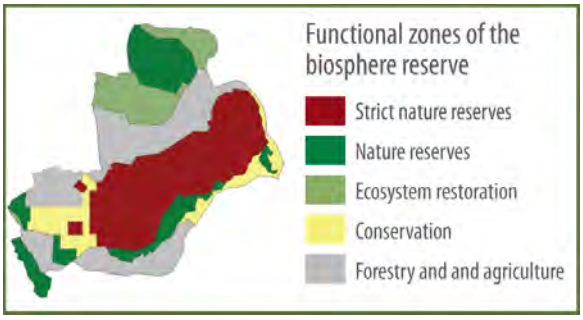
The following strategical planning documents can be elaborated for the protected areas: nature management plans, heritage management plans, different objective programs, action plans, monitoring programs of biosphere reserves and polygons.

There are three types of planning documents important for further discussion: plan of boundaries, management plan and nature management plan.

Management plans of the protected areas are based on setting landscape management zones and their regulations in order to achieve long term conservation of territorial complexes and objects of the natural and cultural heritage, as well as for landscape formation, creation of recreational infrastructure or other management means.

Nature Management Plan is a strategic planning document, containing evaluation and description of the state of a protected territory or its part, problems and possibilities to manage the peculiarities of its landscape, varieties of fauna, flora and fungi, habitats and natural habitats, the goals of the territory management, management and protection measures as well as resources and executors necessary for the realization of here above.

Functional zoning of the biosphere reserve was established in 2002 by governmental decision. It designated the boundaries and foresaw the general directions of development in every zone. The main outcome important for wetland conservation was establishment of ecosystem restoration zone covering drained peatlands of the Amalva mire.



The comprehensive biosphere reserve management plan was approved by the Minister of Environment in 2006. The plan established landscape management zones with management regulations for each zone, as well as directions for nature management/restoration and infrastructure development. The map is annexed (*Annex 1*) and the main relevant actions planned are outlined in the chapter "*Conservation priorities*" bellow.

Finally, detailed nature management plans were prepared for Amalvas peatland (incuding botanical-zoological reserve and ecosystem restoration zone) and Kiaulyčia botanical-zoological reserve. Plans were approved by the Minister of Environment in 2003 and 2005 respectively. These plans proposed detailed nature restoration and management measures for long term conservation of habitats, species and foresaw agencies responsible for implementation. Relevant actions are mentioned in the chapter "*Conservation priorities*" bellow. The nature management plan for the Žuvintas Lake is currently under preparation and should be finalized in 2012.

The main conservation issues

There are three crucial local[1] conservation issues that need to be addressed in order to ensure long term wetland biodiversity conservation: altered hydrology, water pollution, lack of sustainable management of grassland and lake vegetation.

[1] Global issues, such as climate change or general decrease in number of certain species is not discussed as can not be dealt with on local level.

Hydrology

The extent of hydrology alterations can be best understood on the scale of the whole Dovinė river basin, where the Žuvintas biosphere reserve is located (Annex 2).

The predominantly fertile soils of the basin stimulated the extension of the agricultural area and introduction of water management starting at the end of 19th century. The German map of West Russia (*Karte des Westlichen Russlands*) already depicts some ditches draining small mire areas near the lakes. In the beginning of the twentieth century several ditches were dug in the very Žuvintas bog, however the most significant alterations of water regime in the Dovinė River basin were introduced during the second half of the twentieth century, when numerous rivulets were channeled, a number of dams was built and extensive bog and fen areas drained.

Introduction of water level regulation in the Dovinė river basin

In 1965 a sluice-regulator was built 4.2 km downstream of Dusia Lake and the Simnas fish ponds were established.

With the growth of industry in the second half of the twentieth century the town of Marijampole experienced shortage of clean and fresh water during the summer periods. As the Dovinė River discharges into the Šešupė River carrying its waters through the Marijampole, weirs were built on the Dovinė River at the outlets of the Dusia, Simnas and Žuvintas lakes to retain and store part of spring-flood water. This happened in 1968 for Žuvintas and in 1972 for Dusia and Simnas Lakes. Similarly, sluice-regulator was built on the Amalvė River - outlet of the Amalvas Lake. Construction of the weirs raised the average water levels in Dusia and Simnas lakes by 0.43 m and 0.83 meters and increased the area by 17 ha and 6.8 ha respectively. The situation with the Žuvintas Lake looks quite confusing as documentation indicates an intention to raise the average water level by 0.3 meters, however the actual data show that after construction of the sluices-gate the average yearly water level dropped by 17 cm. The water level fluctuation in the Zuvintas Lake was decreased to 0.4 m. The area of the Žuvintas Lake has also decreased. In 1961 the surface area of the lake was 1009.3 ha and in 2003 it decreased to 962.1 ha. This partly can be explained by vegetation build-up and peat formation at the banks.

In 1992, after introduction of a sewage treatment plant, the system of retaining water in the lakes lost its value for the Marijampolė town.

Before regulation the main part of the river extended through the wet peaty meadows and the width of the floodplains was up till 0.6 km reaching 1 km close to the Žuvintas Lake. After regulation the average width of the river varies from 4 to 7 meters and only small parts of valley become flooded during periods of peak discharges.

Draining of mires

During the 60-80-ties of the last century, the hydrology of the area was also heavily altered due to the execution of large scale amelioration works. Big sections of the Dovinė and Kiaulyčia Rivers were canalized. Northern periphery (former fen and transitional mire) of the Žuvintas wetland was drained to enable farming. The protective dike was built at the edge, but it did not prevent from water seepage and draining effect on the Žuvintas bog periphery. Several drainage ditches were dug in the very Žuvintas bog to facilitate water runoff.

The Amalvas wetland complex was much more affected. More than 60 % of the mire area (2160 ha) was drained. Winter polder (638 ha) was established in the northern part of the mire (former fen and transitional mire). Groundwater level in the polder

was reduced by more than 2 m what in turn significantly affected the ground water level in the remnant of the mire despite of installment of protective dike. Southern part (~1500 ha of former active raised bog, bog woodland and swamp woods) was intersected with drainage channels and transformed into grasslands or left for forest development (approximately one third of the area). The drainage channel was also dug along the western edge of the Amalvas wetland and further increased water runoff from the undrained remnant of the mire.

Pollution

Both Žuvintas and Amalvas lakes are heavily affected by pollution. The catchment area of Žuvintas Lake is 345 km^2 and more than half of it – agricultural fields. Several townlets are located in the basin as well as Simnas fish ponds that several decades contributed with significant loads of phosphorus. Amalvas Lake receives most of the nutrients from agricultural fields, several villages and Palios peat extraction site. Significant amount of peat mineralization products is also pumped into Amalvas Lake directly from the Amalvas polder.

Obviously pollution was not constant during the last decades. The highest nutrient loads were transported to Žuvintas and Amalvas lakes during the 60-80'ties, when maximum concentration of mineral phosphorus in the Žuvintas Lake increased 50 times (from 0.006 to 0.3 mg/l) while nitrate and ammonium – approximately 40 times (from 0.1 to 4.6 mg/l). The maximum concentration of organic soluble nutrients increased 4 times and reached 87.8 mg/l. The situation started improving at the very end of the twentieth century due to changes in agricultural practices, establishment of sewage treatment facilities, changes in Simnas fish aquaculture practices. Nowadays concentration of phosphorus in the water coming to Amalvas and Žuvintas most of the time is below the maximum allowable level. The main source remains Simnas fish ponds. However, due to accumulated phosphorus in the sediments, secondary pollution now is of great importance. Nitrogen concentrations in the Dovinė river fluctuate around the maximum allowable level. There is a significant load of suspended particles to Amalvas Lake that can be at least partly explained by peat extraction taking place just 7 km upstream in the Palios peatland and agricultural activities in the Amalvas polder.

Lack of sustainable management of vegetation

Development of rich biodiversity in Žuvintas and Amalvas wetlands was closely linked to traditional utilization of vegetation. Biomass from grasslands, as well as lake used to find its application. Grass was mainly used as forage, reed - as roofing and litter material, water soldier (Stratiotes aloides) - as forage. Fens, alluvial meadows and drier grasslands were utilized in different periods and intensity resulting in open treeless mosaic landscape favored by different plant and animal species. The most noticeable was bird diversity.

Abandonment of traditional management practices started approximately 40 years ago and resulted in expansion of reedbeds, bushes and unification of once very mosaic vegetation cover. Fast accumulation (up to 1 cm/year) of organic material in the littoral reedbeds led to shrinkage of the lake area as well as intensive paludification of the shores.

Consequences

The above mentioned alterations and following succession along with some other factors, such as invasion of canadian mink or nitrogen deposition to bogs resulted in significant biodiversity changes.

Alterations of hydrology in Amalvas wetland caused degradation of active raised bog and part of bog woodlands (~1600 ha). Approximately 1200 ha area of the degraded raised bog habitat is still capable to regenerate. Tree cover in the mire is expanding at the expense of open places required by such species like Black grouse, Golden plover, Curlew, Wood Sandpiper. Signs of drying can also be visible in the remaining bog woodland and swamp wood areas. Fires, sometimes very severe, appear periodically in the degraded bog area and cause additional damage to the bog, however that is a secondary result directly related to hydrological situation.

Hydrological changes resulted in measurable habitat changes in the Žuvintas bog as well. Increase in tree growth is up to 8 % at a distance of ~200 m from the ditches, but the effect of superficial drainage is broader. Patches of raised bog communities start appearing at a distance of 200-400 m and become typical at ~500 m from the ditches. During the last 24 years there was observed constant reduction (~150 ha) in the open raised bog area due to encroachment by trees.

Open raised bog species significantly reduced in number. For example, Wood Sandpiper *Tringa glareola* more than 2 times comparing to 1966; Curlew *Numenius arquata* – 8 times as compared to 1966;

Regulation of water level and pollution radically deteriorated ecological status and accelerated eutrophication of Žuvintas and Amalvas lakes. Smaller Amalvas Lake turned to turbid state with very sparse underwater vegetation, high density of phytoplankton and low overall diversity of species. Eutrophic Žuvintas Lake is densely vegetated, however once typical Chara vegetation is currently very scarce. Cover of bulrush, reed and floating islands increased. Fish populations changed – pike biomass significantly decreased and cyprinid biomass increased. Once rich “bird paradice” lost half of its breeding birds. Several species disappeared completely.

Pre-LIFE conservation efforts and those carried out in parallel

Even though Žuvintas reserve is the oldest protected area in Lithuania, no active biodiversity conservation efforts were applied until recent times. The first project initiated in the area - UNDP/GEF project "Conservation of inland wetland biodiversity in Lithuania" implemented by Nature Heritage Fund started in 2001. The project identified the main biodiversity conservation problems and in 2003 gave a start for the PIN/Matra (the Netherlands) funded project "Management and Restoration of Natura 2000 sites through an Integrated River Basin Management Plan of the Dovine River", which provided comprehensive hydrological analysis of the whole river basin, evaluated conservation status of habitats of Community importance and proposed solutions for reaching favorable conservation status. Hydrological modeling (SYMGRO) was applied for the Žuvintas and Amalvas wetlands for identification of the most suitable hydrology restoration measures. Amalvas wetland nature management plan was produced basing on these findings. The project executed by International Agricultural Centre in Wageningen (the Netherlands) and Nature Heritage Fund has ended in 2006. In parallel, SEPA (Sweden) funded project "Wetland management and information" (2003-2004) was carried out in cooperation between County Administration of Wastra Gotaland and Nature Heritage Fund and supported decision making in Žuvintas wetland management and monitoring issues with Swedish expertise.

The first management plan for the Žuvintas Biosphere Reserve was partly based on the basis built by the mentioned projects.

The above mentioned UNDP/GEF project was finished in 2011. The project supported establishment of the local NGO aiming at restoration of biodiversity in the area, supported restoration of approximately 90 ha of alluvial meadows and initiated first nature management contracts with the local farmers. The project also provided with specialized equipment for lake vegetation management. As a result approximately 90 ha of the lake were cleared from bulrush and reed. It also prepared the technical projects for reconstruction of Žuvintas, Simnas and Dusia sluice-regulators as well as reconstructed the Dusia regulator. Training of the reserve's staff and setting out of the Žuvintas visitor centre including seminar/video class, nature class and exhibition was also a part of this project.

Reconstruction of the Simnas sluice-regulator and restoration of several hundred hectares of fens and alluvial meadows was financed by EU structural funds and carried out in 2011.

Pollution from the Simnas settlement and Ažuoliniai village was significantly reduced by reconstructing the sewage treatment and collection facilities. Reconstruction was implemented in 2010-2011 and funded by EU structural funds.

Input from the LIFE project

The main outcomes of the WETLIFE project are shortly described and mapped (Annex 3)

The following long term benefits are expected:

For biodiversity

1. Restoration of ground water level should enable regeneration and conservation of priority habitats for conservation within the EU - active raised bog and bog woodland in approximately 1500 ha of Amalva mire. There was registered 30 % increase in peat moss cover in the centre of restored 207 ha area in just one year. Bog related species should recover in the long term.

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

3. 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 already chose flooded polder meadows as a stopping point in spring of 2011.

4. Restored natural water fluctuation in Žuvintas Lake should:

- Improve conditions for submerged vegetation, especially Chara spp., which is highly important for invertebrate, fish and waterfowl populations.
- Increase spawning grounds for pike and amphibian species;
- Facilitate development of lake boundary zone (blue zone) important for biodiversity;
- Negatively influence spreading of reed and shrubs.

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 improved conditions for peat formation with consequent CO_2 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 currently estimated 10000-15000 t of CO_2 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 facilitate improvement in water quality;

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

Current situation

SWOT analysis was used to facilitate an assessment of the current state and to help identify future aims and objectives.

Strengths	**Weeknesses**
Conservation status Permanent staff Availability of the management plans One of the best studied areas in the country	Lacking financial resources for private land purchase and necessary hydrology restoration Insufficient cooperation between the staff of the biosphere reserve and other stakeholders (especially farmers) on sustainable vegetation management Discriminative monitoring program (exclusively dominated by bird monitoring)
Opportunities	**Threats**
Availability of agri-environmental payment schemes Increased awareness and opportunities for alternative wetland uses (biomass, grass seed production, reed harvesting)	Intensification of agriculture (expansion of arable land) in drained peatlands Increasing demand for agricultural land Pollution from the Simnas fish-ponds affecting Žuvintas Lake Pollution from the Palios peatland, used for peat extraction, affecting Amalvas Lake

Current situation is favored by the fact that Amalvas and Žuvintas wetlands have adequate conservation status and permanent staff is in the area. It is comparatively well studied area and there is a good basis of planning documents available. Nevertheless there are several possible pitfalls to be considered:

1. Žuvintas biosphere reserve directorate has limited human and financial resources, therefore fulfillment of certain needs listed bellow can be challenging, for example establishing and carrying of comprehensive monitoring system. Possible involvement of volunteers should be considered.

Communication with local stakeholders is quite patchy. Closer cooperation with farmers, hunters and other entrepreneurs could yield great benefits and should be more exploited.

2. The WETLIFE project restored hydrology on state owned land, but also pioneered private land purchase for nature conservation. Even though the project succeeded to obtain necessary private land plots this will be an increasingly difficult task in years to come due to increasing shortage of agricultural land. The issue is more complicated due to small land plots and many owners involved.

3. Intensification of agriculture is also observed in the area. There is an increase in area of arable peatlands instead of grasslands, therefore strong information campaign is necessary to reverse the process. The process was already started by the WETLIFE

project that produced and distributed “Guidelines on sustainable use of peatland grasslands” and held a seminar for local farmers.

4. Management of semi-natural habitats is completely dependent on agri-environmental payments this makes it very vulnerable to any changes in the payment system.

Conservation priorities:

The most important actions that need to be carried out are already outlined in the planning documents: Žuvintas biosphere reserve management plan, Amalva wetland nature management plan and Kiaulyčia botanical-zoological reserve nature management plan. There are just some minor management needs that are not covered by these documents. The complete list is presented in the table bellow.

Administrative needs	**Importance**	**Responsible organization**	**Possible funding source**	**Comments**
Comprehensive monitoring program of the biosphere reserve	Necessary	Žuvintas biosphere reserve directorate	State budget	
Conservation needs	**Importance**	**Responsible organization**	**Possible funding source**	**Comments**
Hydrology restoration				
Reconstruction of the melioration system in the Amalva ecosystem restoration zone on both sides of the Dovinė River to raise ground water table and increase biodiversity	Important	Marijampolė municipality administration, Žuvintas biosphere reserve directorate	EU LIFE financial instrument or similar fund	Management plan foresees only restoration of forested mire in the Amalva ecosystem restoration zone on the left bank of the Dovinė river. Prior negotiations with local farmers are necessary
Maintenance of Amalva and Žuvintas wetlands’ protective dikes	Important	Marijampolė municipality administration	Municipal budget	Most of the damaged dikes were reconstructed by WETLIFE project, but proper periodical maintenance is important
Relocation of the drainage ditch along the western border of the Amalva wetland	Crucial	Marijampolė municipality administration	EU LIFE financial instrument or similar fund	Technical project is necessary. Relocation would only be possible if local farmers agree to sell or receive compensations for the land plots necessary for relocation of the ditch
Blocking of the remaining drainage channels in the	Important	Žuvintas biosphere reserve directorate	EU LIFE financial instrument or	Prior evaluation of functioning of the ditches is

Žuvintas wetland periphery			similar fund	necessary
Reconstruction of the melioration systems north from the Žuvintas bog to minimize peat mineralization, seepage from the bog and increase biodiversity	Important	Marijampolė municipality administration, Žuvintas biosphere reserve directorate	EU LIFE financial instrument or similar fund	Technical project is necessary
Pollution prevention				
Clarification of the main Amalvas Lake pollution sources and installation of preventive measures	Crucial	Žuvintas biosphere reserve directorate	Possible funding source depends on results of the study (see the comment)	Palios peat extraction site approx. 7 km upstream could be a source of high concentration of suspended particles. A study should be developer for determination of the main pollution sources
Building of the sedimentation pond in the Simnas fish ponds	Crucial	Fisheries Service under the Ministry of Agriculture	European Regional Development Fund	Digging of the sedimentation pond is planned as part of Simnas bypass road building project
Vegetation management				
Periodical removal of Žuvintas Lake vegetation biomass in marked areas	Important	Žuvintas biosphere reserve directorate	State budget. Private	Certain areas can be harvested by directorate, however cooperation with reed harvesters is necessary
Maintaining (mowing, grazing, cutting bushes) of marked areas of open alluvial meadows, fens and transitional mires	Crucial	Žuvintas biosphere reserve directorate	European Agricultural Fund for Rural Development. Private	Cooperation with farmers and agri-environmental payments are crucial
Other needs				
Maintaining low numbers of canadian mink and raccoon dog	Crucial	Žuvintas biosphere reserve directorate	State budget. Private	Cooperation with local hunting clubs is essential
Suspending damaging plowing of drained peatlands	Crucial	Žuvintas biosphere reserve directorate		Constant communication with farmers is crucial.

Degree of importance: Crucial > Necessary > Important

ANNEXES

Annex 1

ŽUVINTO BIOSFEROS REZERVATAS
ŽUVINTAS BIOSPHERE RESERVE

TVARKYMO PLANAS
MANAGEMENT PLAN

M 1 : 15 000

0 0,5 1 km

PATVIRTINTA
Lietuvos Respublikos aplinkos ministro
2006 m. birželio 23 d. įsakymu Nr. D1-310

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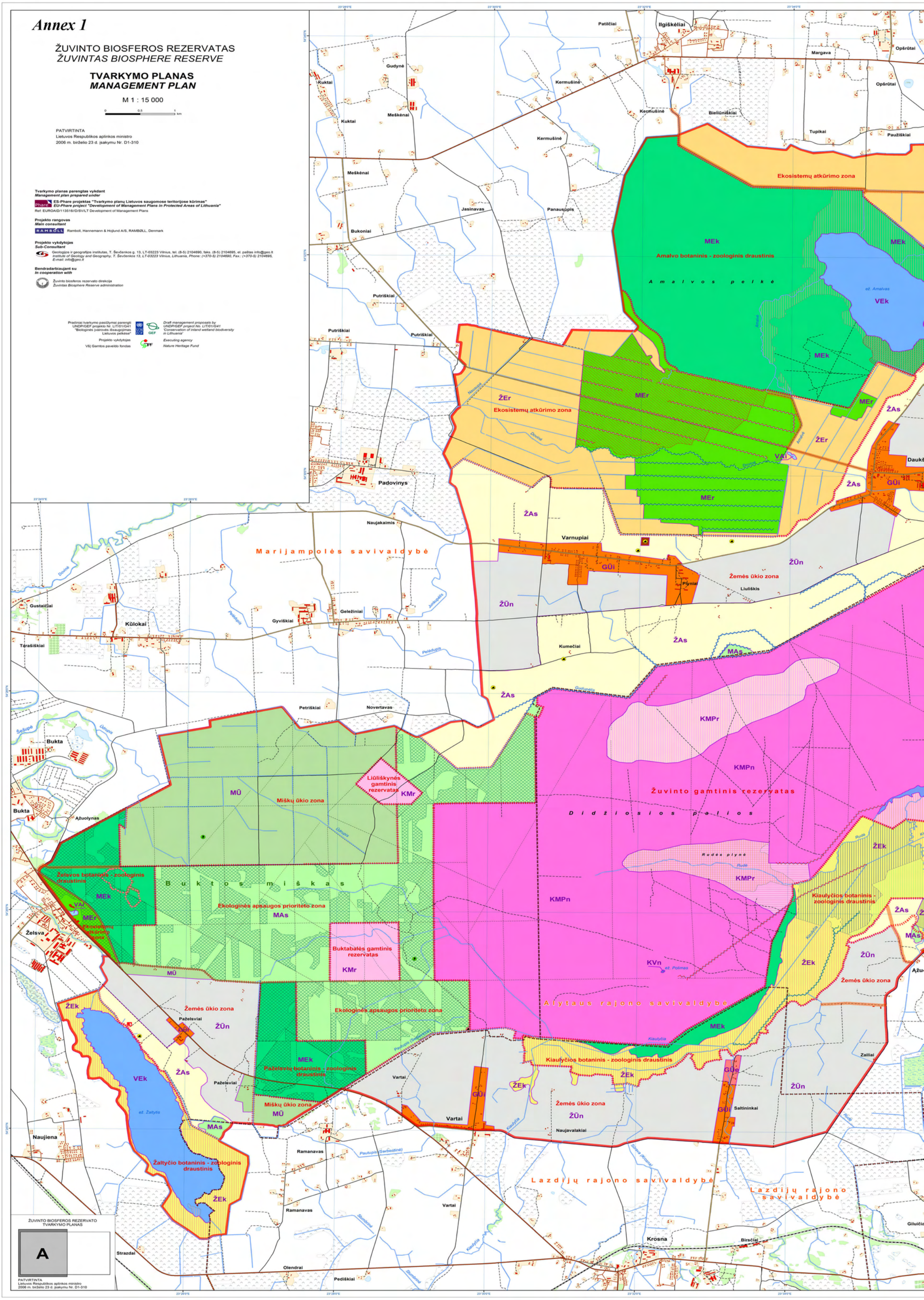
Bendradarbiaujant su
In cooperation with

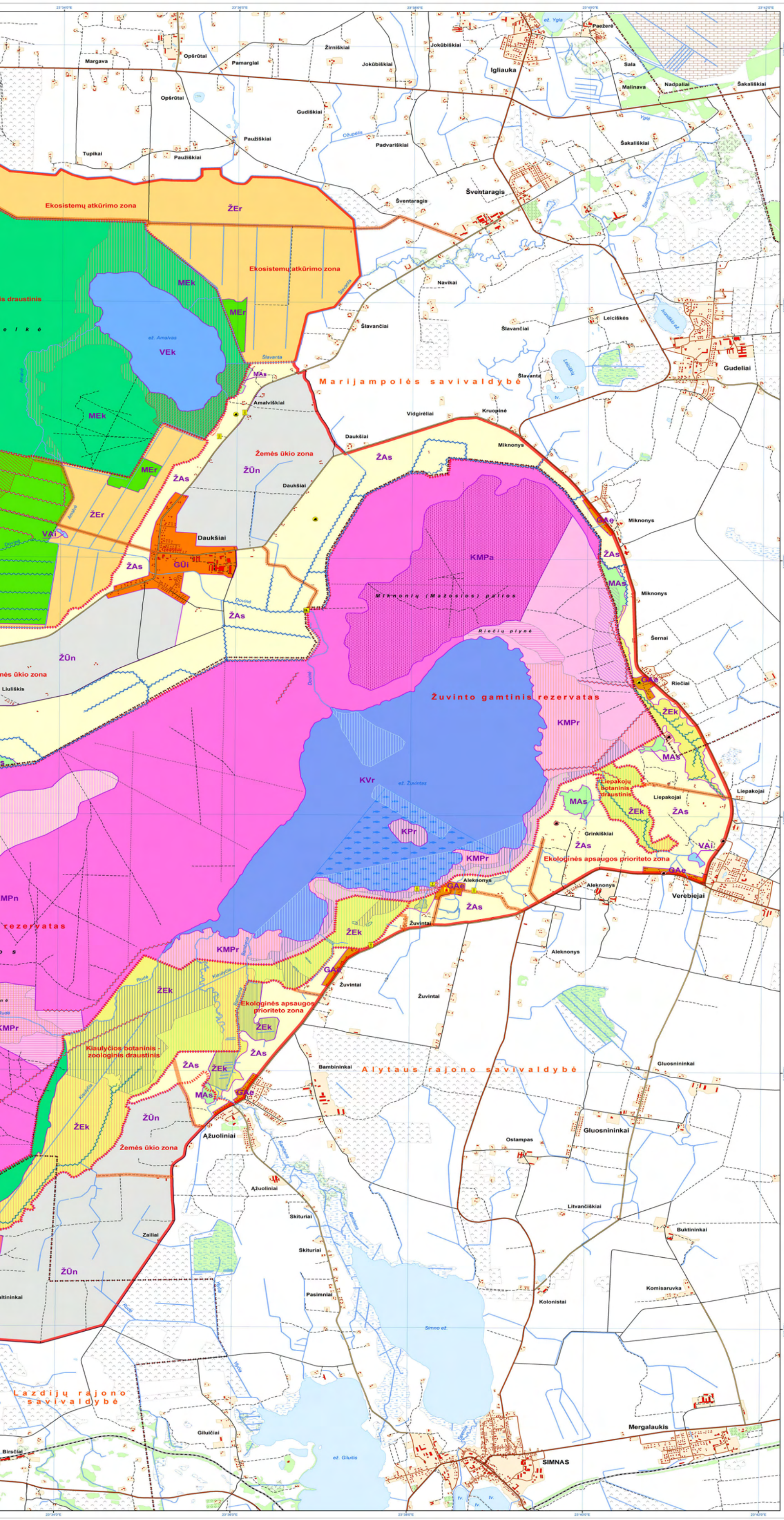
Žuvinto biosferos rezervato direkcija
Žuvintas Biosphere Reserve administration

Pradiniai tvarkymo pasiūlymai parengti UNDP/GEF projekto Nr. LIT/01/G41 "Biologinės įvairovės išsaugojimas Lietuvos pelkėse"
Draft management proposals by UNDP/GEF project No. LIT/01/G41 'Conservation of inland wetland biodiversity in Lithuania'

Projekto vykdytojas
Executing agency

VšĮ Gamtos paveldo fondas
Nature Heritage Fund





SUTARTINIAI ŽENKLAI
LEGEND

RIBOS
BOUNDARIES

Savivaldybės riba
Municipality boundary

Žuvinto biosferos rezervato riba
Žuvintas Biosphere Reserve (ŽBR) boundary

Biosferos rezervato funkcinio prioriteto zonų ribos
Boundaries of ŽBR functional priority zones

KRAŠTOVAIZDŽIO TVARKYMO ZONOS
LANDSCAPE MANAGEMENT ZONES

Kraštovaizdžio tvarkymo zonų ribos
Boundaries of landscape management zones

Konservacinės paskirties žemės kraštovaizdžio tvarkymo zonos
Landscape management zones in land designed for conservational purpose

Rezervatinai miškai, pelkės ir pievos
Forests, peatlands and meadows in strict nature reserves

- KMPa — Absoliučios apsaugos kraštovaizdžio tvarkymo zona / *Landscape management zone of absolute protection*
- KMPn — Griežtos apsaugos kraštovaizdžio tvarkymo zona / *Landscape management zone of strict protection*
- KMPr — Reguliuojamos apsaugos kraštovaizdžio tvarkymo zona / *Landscape management zone of regulable protection*

Rezervatiniai vandenys
Water bodies in strict nature reserves

- KVn — Griežtos apsaugos kraštovaizdžio tvarkymo zona / *Landscape management zone of strict protection*
- KVr — Reguliuojamos apsaugos kraštovaizdžio tvarkymo zona / *Landscape management zone of regulable protection*

Gamtos ir kultūros paveldo objektų teritorijos
Territories of natural and cultural heritage objects

- Reguliuojamos apsaugos kraštovaizdžio tvarkymo zona / *Landscape management zone of regulable protection*

Miškų ūkio paskirties žemės kraštovaizdžio tvarkymo zonos
Landscape management zones in land designed for forestrial puropse

Ekosistemų apsaugos miškai
Forests designed for ecosystem protection

- MEk — Išsaugančio (konservacinio) ūkininkavimo kraštovaizdžio tvarkymo zona / *Landscape management zone of ecosystem conservation*
- MEr — Atkuriančio ūkininkavimo kraštovaizdžio tvarkymo zona / *Landscape management zone of ecosystem restoration*

Apsauginiai miškai
Protective forests

- MAs — Specializuoto apsauginio ūkininkavimo kraštovaizdžio tvarkymo zona / *Landscape management zone of specialized protective forestry*

Ūkiniai miškai
Forests designed for economic use

- MŪ — Ūkinių miškų kraštovaizdžio tvarkymo zona / *Landscape management zone of productional forestry*

Žemės ūkio paskirties žemės kraštovaizdžio tvarkymo zonos
Landscape management zones of land designed for agricultural purpose

Ekosistemas saugančios agrarinės teritorijos
Agricultural areas designed for ecosystem protection

- ŽEk — Ekosistemas išsaugančio (konservacinio) ūkininkavimo kraštovaizdžio tvarkymo zona / *Landscape management zone of ecosystem conservation*
- ŽEr — Ekosistemas atkuriančio ūkininkavimo kraštovaizdžio tvarkymo zona / *Landscape management zone of ecosystem restoration*

Apsauginės agrarinės teritorijos
Protective agricultural areas

- ŽAs — Specializuoto apsauginio ūkininkavimo kraštovaizdžio tvarkymo zona / *Landscape management zone of specialized protective farming*

Ūkinės agrarinės teritorijos
Agricultural areas designed for economic use

- ŽŪn — Tradicinio gamybinio ūkininkavimo kraštovaizdžio tvarkymo zona / *Landscape management zone of traditional farming*

Vandens ūkio paskirties žemės kraštovaizdžio tvarkymo zonos
Landscape management zones of land designed for water economy purpose

Ekosistemas saugantys vandenys
Water bodies designed for ecosystem protection

- VEk — Išsaugančio (konservacinio) ūkininkavimo kraštovaizdžio tvarkymo zona / *Landscape management zone of ecosystem conservation*

Bendrojo naudojimo (bendrosios apsaugos) vandenys
Water bodies designed for common use (protection)

- VAi — Intensyvaus apsauginio ūkininkavimo kraštovaizdžio tvarkymo zona / *Landscape management zone of intensive conservational use*

Kitos paskirties žemės kraštovaizdžio tvarkymo zonos
Landscape management zones of land designed for other purposes

Gyvenamosios paskirties žemės kraštovaizdžio tvarkymo zonos
Landscape management zones of land designed for residental purposes

Apsauginių teritorijų miestai, miesteliai ir kaimai ar jų dalys
Settlements or their parts in zones of conservational priority

- GAe — Sugriežtinto geoekologinio reguliavimo kraštovaizdžio tvarkymo zona / *Landscape management zone of restricted geo-ecological regulation*

Bendrojo tvarkymo miestai, miesteliai ir kaimai ar jų dalys
Settlements or their parts designed for common use

- GŪe — Ekstensyvaus tvarkymo kraštovaizdžio tvarkymo zona / *Landscape management zone of extensive management*
- GŪi — Intensyvaus tvarkymo kraštovaizdžio tvarkymo zona / *Landscape management zone of intensive management*

- Gamtos paveldo objektas / *Nature heritage object*
- Kultūros paveldo objektas / *Cultural heritage object*
- Siūlomas kultūros paveldo objektas / *Proposed cultural heritage object*

TVARKYMO PRIEMONĖS
MANAGEMENT MEANS

Hidrografinio tinklo ir hidrologinio režimo renatūralizavimo priemonės
Means for renaturalisation of watercourses and hydrological regime

- Šliuzo-reguliatoriaus rekonstrukcija / *Reconstruction of sluice-gate*
- Melioracinio griovio panaikinimas / *Eliminatio of draining ditch*
- Vandens tėkmės palikimas renatūralizacijai / *Keeping of watercourse for renaturalisation*
- Melioracinio griovio vandens lygio reguliavimas / *Regulation of draining ditch water level*
- Kirtimai iš būklės Amalvo pelkės atkūrimo teritorijoje / *Elimination of scrubs and trees in Amalvas peatland restoration area*

Buveinių ir rūšių išsaugojimo priemonės
Means for preservation of habitats and species

- Atviros aukštapelkės palaikymo teritorija / *Area designed for keeping of open raised bog*
- Ganymo ir šienavimo teritorija / *Area designed for grasing and mowing*
- Sumedėjusios augalijos kirtimo teritorija / *Area designed for cutting of trees and scrubs*
- Šienavimo teritorija / *Area designed for mowing*
- Europinės svarbos miško buveinių palaikymas / *Preservation of forest habitats of Community interest*
- Raudonpilvių kūmučių buveinių (kūdrų) palaikymas ir sukūrimas / *Preservation and creation of Bombina Bombina habitats (ponds)*
- Žuvinto ežero viršvandeninės augalijos reguliavimo teritorijos / *Area designed for regulation of water surface wegetation in Žuvintas lake*

Rezervato infrastruktūros gerinimo priemonės
Means for improvement of ŽBR infrastructure

- Rezervato direkcijos pastato rekonstrukcija / *Reconstruction of ŽBR administration building*
- Apžvalgos aikštelės/bokšteliо įrengimas / *Construction of observation site/tower*
- Atokvėpio vietos įrengimas / *Instaliation of rest site*
- Prieplaukos rekonstrukcija / *Reconstruction of quay*
- Kelio įrengimas/rekonstrukcija / *(Re)construction of road*
- Mokomojo tako įrengimas / *Construction of nature trail*
- Reginius formuojantys kraštovaizdžio kirtimai / *Opening of landscape through elimination of trees and scrubs*

Gamtinių išteklių naudojimo reguliavimo priemonės
Means for regulation of natural resoursec usage

- Grybavimo teritorija / *Area designed for mushrooming*
- Uogavimo teritorija / *Area designed for berrying*
- Licencinės žvejybos teritorija / *Area designed for fishing*

KARTOGRAFINIS PAGRINDAS
CARTOGRAPHIC BACKGROUND

- Vandens tėkmė / *Water course*
- Asfaltuotas kelias / *Asphalt road*
- Žvyrkelis / *Gravel road*
- Gruntkelis / *Ground road*
- Gatvė / *Street*
- Lauko ir miško kelias / *Cart track*
- Kvartalinė linija / *Block line*
- Geležinkelis / *Railway*
- Siaurabėgis geležinkelis / *Narrow-gauge railway*
- Miškas / *Forest*
- Retas miškas / *Sparse forest*
- Jaunuolynas / *Young forest*
- Kirtavietė / *Clearing*
- Sodas / *Garden*
- Krūmynas / *Scrub*
- Durpynas / *Peatland*
- Karjeras / *Quarry*
- Dirbama žemė / *Arable land*
- Ganyklа / *Pasture*
- Pieva / *Meadow*
- Aukštapelkė / *Raised bog*
- Tarpinio tipo pelkė / *Transition mire*
- Žemapelkė / *Fen*
- Ežeras, tvenkinys / *Lake, reservoir, pond*
- Sodyba, gyvenamoji vietovė / *Farmstead, settlement*

Brėžinys sudarytas 2005 m. Geologijos ir geografijos instituto Kraštovaizdžio geografijos ir kartografijos skyriuje

Lietuvos koordinačių sistema 1994
Referencinis elipsoidas GRS 80

Brėžinio sudarymui panaudoti duomenys:
ORT10LT © Valstybinė geodezijos ir kartografijos tarnyba, 1996-2001.
Lietuvos miškotvarkos duomenų bazė M 1 : 10 000 © Valstybinis miškotvarkos institutas, 2001.

Map prepared by Department of Landscape Geography and Cartography at the Institute of Geology and Geography, 2005

Lithuanian coordinate system 1994
Reference ellipsoid GRS 80

Data used for map compilation:
ORT10LT © National Service of Geodesy and Cartography, 1996-2001.
Lithuanian forest inventory data base 1 : 10 000 © Forest Inventory and Management Institute, 2001.

ŽUVINTO BIOSFEROS REZERVATO TVARKYMO PLANAS

B

PATVIRTINTA
Lietuvos Respublikos aplinkos ministro
2006 m. birželio 23 d. įsakymu Nr. D1-310

Annex 2 The Dovinė river basin

Various stretches of the Dovinė river bear different names: the upper part of the river (headwaters) is called Sutrė (from the source till the Lake Dusia), from Lake Dusia till Lake Simnas – it is called Spernia, from Lake Simnas till Lake Žuvintas – it is called Bambena, and from Lake Žuvintas till the confluence with the Šešupė river – Dovinė.

Annex 3

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:

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

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.

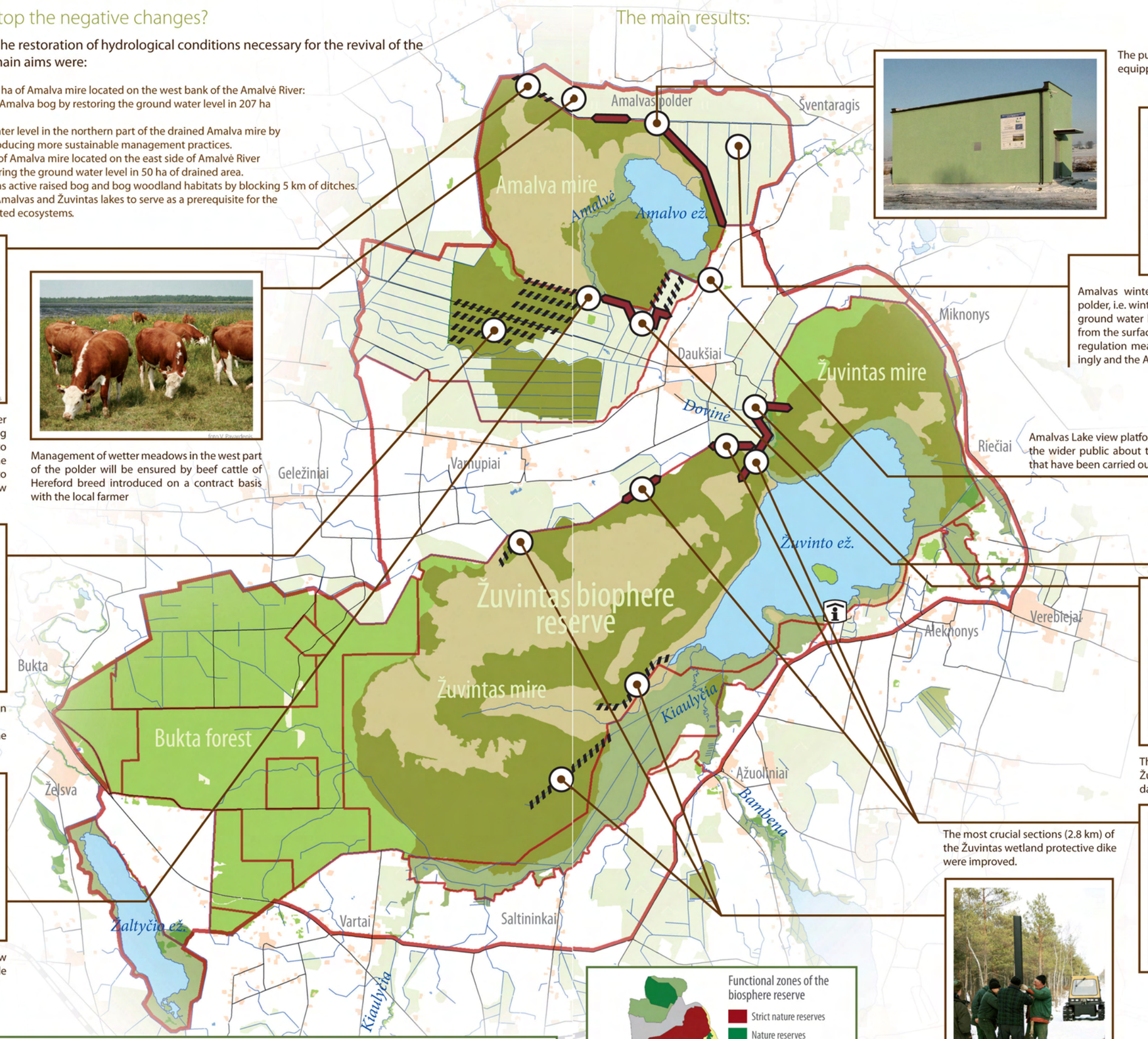
Amalvas Lake view platform was built to serve as an information point to the wider public about the Amalvas wetland and restoration activities that have been carried out.

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.



Functional zones of the biosphere reserve
- Strict nature reserves
- Nature reserves
- Ecosystem restoration
- Conservation
- Forestry and and agriculture

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