

After-LIFE Conservation Plan

Restoration of Raised Bog Habitats in the
Especially Protected Nature Areas of Latvia

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Prepared by:
Dr. Māra Pakalne
/Project manager/
Dr. Līga Strazdiņa
/Project information coordinator/

PREFACE

Main aim of the LIFE+ project “Restoration of Raised Bog Habitats in the Especially Protected Nature Areas of Latvia” was to re-establish hydrological regime of natural raised bogs in four Nature Reserves. It was accomplished after building of 156 peat/wood dams on drainage ditches thus restoring 488 ha of degraded area in four raised bogs.

Gained experience in dam building and achieved results of hydrological and habitat/vegetation monitoring in the project sites will serve for better understanding of raised bog functionality in further projects. While successful restoration activities in the raised bogs show a good example of efficient management of destroyed or negatively impacted habitats.

In this paper we want to show which exact activities will be continued and are still needed to represent best management practices in all four project sites once the project is completed.

1. Project history and situation analysis

Background of the project

Due to hydrological, geological and climatic conditions Latvia can be proud to maintain comparatively large number of mires from which many represent the protected and threatened EU habitat “7110* Active raised bogs”. Knowing that most of mires have gone extinct throughout the Europe, Latvia can be granted as a biodiversity hotspot for mire dwelling animal and plant species. However, numerous raised bogs were targeted as peat extraction sites also in Latvia, especially during Soviet Union times from 1960 to 1980 when wide peatland areas were drained. As a result only few raised bogs in Latvia have preserved purely untouched from anthropogenic impact.

Considering the information from the national report given to European Commission in 2013 about maintaining and/or restoring a favourable conservation status for habitat types and species from the Habitats Directive, conditions were assessed as unfavourable or bad in Latvia in both of the aimed project habitats “7110* Active raised bogs” and “7120 Degraded raised bogs still capable of natural regeneration”. At present, human activities have left an impact not only on mire ecosystems, but also to the neighboring ones, like forests, rivers and lakes. Mires are influenced mostly by drainage for peat extraction, agriculture and forestry. In addition, fires in mires and in margins of lakes, and beaver activity change the mire vegetation, as well as lake and agricultural land eutrophication and pollution with household waste. Other direct impacts on mires emerge from tree cutting around springs and illegal deforestation in nature reserves as well as building, road construction and riverbed control.

Negative influence in mires can be observed as change of mire hydrological regime, degradation of mire vegetation, loss of plant communities and species diversity, change of raised bog structure (hummocks, bog pools and lakes), decrease of the total area of mire, and changes in mire water quality. Cover of bog-moss decreases as mire becomes drier, and development of dense moss cover stops. As a result, part of hydrophilous plant species disappears and new plants that are not typical for mires appear. Carpet of heather becomes denser. Mire hydrology changes and peat accumulation is not observed anymore after mire drainage and peat extraction. Previous plants have been replaced by degraded vegetation, part of hydrophilous plant species disappear from territory.

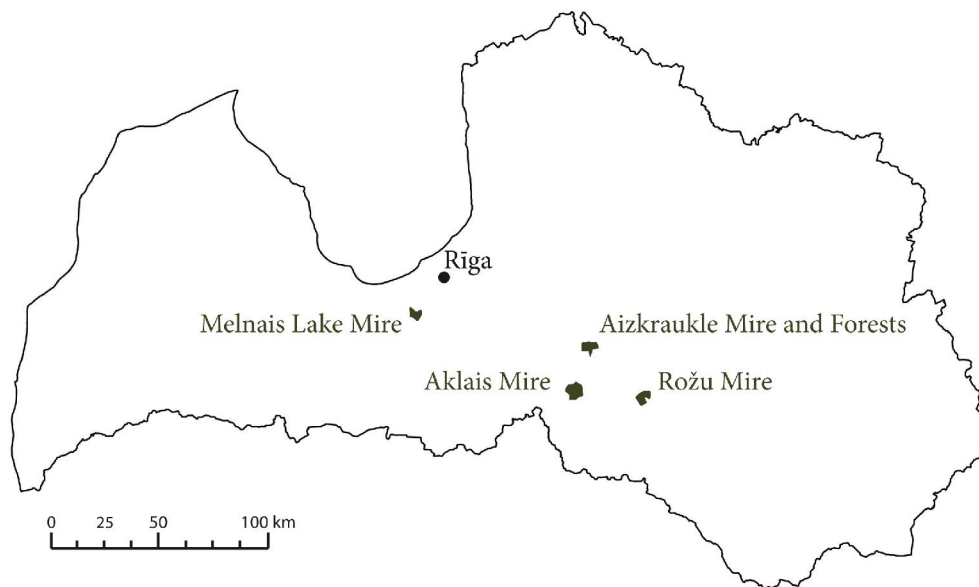
Aim and objectives of the project

The aim of the LIFE+ project “Restoration of Raised Bog Habitats in the Especially Protected Nature Areas of Latvia” was to restore the degraded areas of four raised bogs thus providing appropriate living conditions for plant and animal species, many of them rare and protected in EU, to conserve rare habitats and draw the public attention to the natural wealth of Latvia. To achieve this goal, the project involved many experts – botanists, zoologists, hydrologists, geologists, cartographers and building engineers.

Dam building on drainage ditches has been approved as the best method to stop water run-off from the mire and it was already used in mire restorations in many countries, e.g. other Baltic States, Poland, Finland, Germany and the Netherlands.

The project aimed to fulfil the following objectives and results:

- (1) to draw up Management plans for four Nature Reserves – Aizkraukle Mire and Forests, Aklais Mire, Melnais Lake Mire and Rožu Mire;
- (2) to carry out hydrological assessment to aid the re-establishment of the natural hydrological regime of raised bogs and building of dams on drainage ditches;
- (3) to monitor the effect of management actions on habitats and site hydrology at project sites via a series of long-term observations;
- (4) to organize seminars, prepare public information leaflets and boards, publish a book on raised bog management, and to arrange a travelling Photo exhibition with the purpose of education of general public;
- (5) to inform general public about project activities and results at project website www.purvi.lv and via a documentary “Mires Uncovered”.



Current results of the project

- During the LIFE+ project building of 156 peat/wood dams in four raised bogs (Aizkraukle Mire and Forests, Aklais Mire, Melnais Lake Mire, Rožu Mire) was funded.
- As a result of dam building natural hydrological regime of natural raised bogs was re-established in almost 500 ha wide area which was previously degraded due to peat extraction or mire drainage.
- The monitoring results showed that already the same year after dam building in the Melnais Lake Mire the observed vegetation changes indicated trend towards undisturbed raised bog vegetation. Species abundance now is more similar to that one of undisturbed raised bog than it was before the dam construction. Also the increase of bog pool and hollow species cover indicated it.
- As expected, rising of the groundwater level and its stabilization occurred shortly after the dam building in all project sites approving efficiency of management activities.

SWOT analysis of the situation at the end of project

Strengths	Weaknesses
<ul style="list-style-type: none"> - Management plans for four Nature Reserves - Favourable conditions and restored habitat 7110* of the project sites - Long-term data-set from vegetation/habitat and hydrology monitoring observations - Exchange of information about the mire conservation necessity between regional municipalities and local people - Experienced staff in habitat 7110* management 	<ul style="list-style-type: none"> - Ambiguous national legislation concerning mires - Lack of national strategy for peat extraction in Latvia - Insufficient funding and human resources to regional municipalities and nature conservation institutions for mire protection
Opportunities	Threats
<ul style="list-style-type: none"> - Provided further vegetation/habitat monitoring in all project sites - Closer financial cooperation with the University of Latvia - Exchange of experience with German, Polish and Estonian colleagues in INTERREG project about peatland management 	<ul style="list-style-type: none"> - Intensification of mire drainage and peat extraction near to project sites - Enact of unfavourable legislation concerning mire protection - Unstable socio-economic situation in Latvia

2. The after-LIFE objectives and methodology

To ensure that achieved mire restoration results sustain for long period and serve for purposed habitat conservation some of actions must be continued after the end of LIFE+ project. In accordance with legislation of Latvia management of all protected nature areas (including NATURA 2000 sites) goes under responsibility of Nature Conservation Agency which is supervised by Ministry of Environmental Protection and Regional Development. Unfortunately there are no strategic approaches developed in national level concerning peatland management in Latvia and mires which are not under protection are relatively easily exposed to peat mining. However, importance of recently re-established raised mire ecosystems into biodiversity maintenance was comprehended by responsible institutions and long-term inspection is guaranteed.

Territorially three of project sites (Aizkraukle Mire and Forests, Aklais Mire, and Rožu Mire) belong to the State Joint Stock Company “Latvijas valsts meži” which owns in total 8% from all mires of Latvia. Although the company mainly aims its activities at sustainable forest management including protection and research of protected forest areas, it has showed initiative and represented financial support also for mire conservation. The fourth of project sites, the Melnais Lake Mire, is located near to Riga and goes under responsibility of Riga Forests Ltd. which is also one of the project’s co-financers. The company is interested in long-term forest management and has showed a great effort in nature protection.



During implementation of the project considerable experience in mire management was gained. To retain active exchange of information, further communication will be maintained also with associated beneficiaries and regional authorities. Close cooperation was established with those municipalities on which property notice boards of each project site were set up, naming Aizkraukle, Olaine, Daudzese and Sala Municipalities.

Financial and infrastructural assistance to project completion was given from administrative units of the University of Latvia, marking out the Finance and Accounting Department, the Maintenance Department and the Botanical Garden. Also further support and participation into project longevity provision mainly through public awareness activities will be ensured.

According to the after-LIFE plan, management of all project sites will be provided under the cooperation of mentioned institutions contributing smaller or larger investment.

Dam inspection

After the end of project further inspection of built dams will be carried out by Nature Conservation Agency. In correspondence to Agency's conditions, each Nature Reserve must be visited at least once per six years by an environmental inspector. The inspector must assess also the peat extraction influence on the mire, groundwater level regime and EU habitat condition. As the project sites are located in different regions of Latvia, inspection will be carried out by representatives of corresponding region. Melnais Lake Mire belongs to the Pierīga Regional Administration while all the other project sites are under responsibility of the Latgale Regional Administration.

Vegetation/habitat monitoring

Success of dam building is easily recognized after indicators of mire restoration like decrease of pine and birch cover and heather vitality, increase of bog-moss cover etc. One of the most often used method how to follow to changes in vegetation after habitat management is to carry out a long-term monitoring. The vegetation monitoring method used in this project was developed on the basis of the Manual for the Monitoring of Mire Habitats and Species by the Latvian Fund for Nature using a

modified data form and modified shape and size of plot. The monitoring sites in the four Nature Reserves were selected by taking into account the location of the proposed dams on the ditches as well as the location of hydrological monitoring wells. The vegetation monitoring plots were not established along all dammed ditches, but only in few representative sites to show the overall trend in vegetation shifts under impact of restoration measures.

Vegetation response to groundwater level changes should be evaluated on a long-term basis in order to draw final conclusions on management effect. Therefore, further vegetation monitoring will be continued in three of project sites that belong to the State Joint Stock Company “Latvijas valsts meži”, i.e., Aizkraukle Mire and Forests, Aklais Mire, and Rožu Mire. Each of established 86 monitoring plots will be visited once per month during the active vegetation season by forester Vija Kreile from the SJSC.

Hydrological regime monitoring

Suitable conditions for the recovery of typical bog vegetation were created as a result of the rising of the water table. Groundwater level observations are integral part of the restoration measures and they were started 0.5-1 year before the construction of dams to provide data on disturbed hydrological regime. Groundwater table observations were taken in representative well profiles and there were nine profiles with 63 wells established in all project sites in total. Water level observations will be continued in 50 wells of three of project sites that belong to the SJSC “Latvijas valsts meži”. Measurements will be taken once per month throughout the year by forester Vija Kreile from the SJSC.

At present, there is a plan by the peat company to continue peat extraction in the nearby area of the Nature Reserve Melnais Lake Mire belonging to Riga Forests Ltd. Environmental Impact Assessment was carried out and advice from the project manager was taken into account in order to make as less damage to mire vegetation and habitats as possible. The hydrologist from the University of Latvia and staff of the LIFE+ project, dr. Aija Dēliņa, will continue hydrological monitoring in Melnais Lake Mire to follow the situation in site hydrology.



Public awareness

For better understanding of mire ecosystem functioning and management needs society must become more educated and responsive. To achieve that prepared informative materials of the project activities were easy of access and distributed widely to corresponding audience in the course of project. Now when the project is over most of interested people will be reached through documentary, photo exhibition and project homepage.

The project documentary “Mires Uncovered” taken by film production company, foundation “Elm Media” was approved in several international nature film festivals. The documentary can be found in both Latvian and English at the project website and at elmmedia.lv.

Raised bog exhibition “Secrets of Mires” prepared by the subcontractor “Ogres fotoklubs” has already travelled to 30 different places throughout Latvia. After the project end the exhibition was committed to the care of administration of the Botanical Garden of the University of Latvia. The large sized photos will be exposed from time to time in the exhibition room at the Botanical Garden. Besides, the interested organizations, like libraries, schools or municipalities can subscribe and exhibit 12 transportable boards including 119 photos by request.

All the actual activities of the project were constantly updated in project homepage www.purvi.lv. After the end of project the homepage will be still accessible. In addition a short description about the project is given in the homepage of the Botanical Garden <http://www.botanika.lu.lv/purvu-projekts/> where link to documentary and most important materials and leaflets in PDF-format are published.



3. Financial outlook

Conservation need	Responsible authority and possible funding source	Estimated costs per year, €
Aizkraukle Mire and Forests		
Management of especially protected plant species <i>Allium ursinum</i> habitat due to increase of deciduous tree species cover	Latvian Fund for Nature, Sēlija Forestry, SJSC "Latvijas valsts meži"	2000
Increase of deciduous tree species cover after improvement cutting	Sēlija Forestry, SJSC "Latvijas valsts meži"	5000
Forest gridline management	Sēlija Forestry, SJSC "Latvijas valsts meži"	4000
Building of watching tower (or platform) with notice board located between natural forest and untouched mire areas	Aizkraukle and Koknese Municipalities	22000
Regular vegetation monitoring	SJSC "Latvijas valsts meži"	1000
Regular hydrology monitoring	SJSC "Latvijas valsts meži"	1000
Regular monitoring of especially protected mollusk species <i>Vertigo moulinsiana</i> and EU habitats "7120 Degraded raised bogs still capable of natural regeneration" and "9020 Fennoscandian natural old broad-leaved forests"	Nature Conservation Agency	1500
Regular inspection of especially protected plant species <i>Lycopodium annotinum</i> population growing near to drainage ditches	Species and habitat expert from Latvian Fund for Nature	1000
Aklais Mire		
Pine cutting and open mire habitat establishment	Nature Conservation Agency, SJSC "Latvijas valsts meži"	5000
Maintenance of 2-5 artificial nests of osprey <i>Pandion haliaetus</i>	Latvian Fund for Nature, Latvian Ornithologist Society	800
Spruce cutting and management of EU habitat „9010* Western taiga”	SJSC "Latvijas valsts meži"	5000
Regular hydrology monitoring	SJSC "Latvijas valsts meži"	1000
Regular vegetation monitoring	SJSC "Latvijas valsts meži"	1000
Natura 2000 site monitoring	Nature Conservation Agency	1000
Establishment of 2.5 km long nature trail	Daudzese Municipality, SJSC "Latvijas valsts meži"	20000
Building of watching tower	Daudzese Municipality, SJSC "Latvijas valsts meži", Nature Conservation Agency	35000
Melnais Lake Mire		
Regular inspection of dams	Riga Forests Ltd.	1000
Liquidation/displacement of waste recovery station	Olaine and Mārupe Municipalities	50000

Conservation need	Responsible authority and possible funding source	Estimated costs per year, €
Regular vegetation monitoring	University of Latvia	1000
Regular hydrology monitoring	University of Latvia	1000
Experimental mire vegetation restoration using bog-mosses	Botanical Garden of the University of Latvia	5000
Regular monitoring of EU habitats “3160 Natural dystrophic lakes and ponds” and “7110 Active raised bogs”	Nature Conservation Agency	1000
Carry out the Environmental Impact Assessment in case of peat extraction near to Nature Reserve	Latvian Fund for Nature, JSC “Olaines kūdra”	5000
Survey of bird spatial and seasonal distribution	Ornithologist from Latvian Fund for Nature, Riga City Airport	3000
Rožu Mire		
Maintenance of 1-3 artificial nests of osprey <i>Pandion haliaetus</i>	Latvian Fund for Nature, Latvian Ornithologist Society	400
Localizing of invasive plant species <i>Herracleum sosnowskii</i>	Nature Conservation Agency	5000
Regular hydrology monitoring	SJSC “Latvijas valsts meži”	1000
Regular vegetation monitoring	SJSC “Latvijas valsts meži”	1000
Natura 2000 site monitoring	Nature Conservation Agency	1000



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Contacts
Postal address: Kandavas iela 2,
University of Latvia, Botanical Garden,
Riga, Latvia, LV-1083
Phone: +371-29511001
Fax: +371-67024420
E-mail: mara.pakalne@lu.lv
Website: www.purvi.lv