



LIFE15 CCM/DE/000138

LIFE project «Reduction of CO₂ emissions by restoring degraded peatlands in
Northern European Lowland»

LIFE Peat Restore

Report on implementation of project actions A.3 and A.4

LATVIA

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Introduction

In Latvia, within Action A.3 A3 – which refers to the ‘Study and improvement of data on project sites’ – all project sites (Augstroze, Baltezers Mire, Engure) were surveyed and vegetation units mapped using both GEST approach and classification of protected habitats according to European Union’s (EU) Habitats Directive. The work was done parallel to development of nature management plans (Action A.4), therefore implementation of both actions were tightly related. During development of management plans, vegetation mapping, fauna and flora inventories, as well as inventories of drainage systems and hydro-geological modelling was done. In Augstroze, peat stratigraphy was studied. Results of all inventories are crucial both for using GEST approach/monitoring and implementation of restoration measures.

Within Action A.4 three management plans were developed. Two of them (Augstroze Nature Reserve and Baltezers Mire Nature Reserve) were developed according to the Regulation of the Cabinet of Ministers No. 686 (09/10/2007) on the contents and procedure of developing nature management plan for protected nature areas. The third plan (Lake Engure Nature Park) is a detailed management plan for the project area and its surroundings. Its development, though not proposed in the project, was decided to improve planning and to involve the relevant stakeholders that, in turn, enhanced the collaboration among the involved institutions. In case of Lake Engure site, the site management plan proposes actions which are not provided by the officially approved nature management plan for Lake Engure Nature Park (approved for the period from 2011 to 2025).



Field measurements in Augstroze Nature Reserve, Madiešēnu Bog, by hydrogeologist Oļģerts Aleksāns.



LIFE Peat Restore experts discussing the management approaches with the representatives of involved stakeholder institutions at Engure fen.



LIFE Peat Restore experts Līga Strazdiņa and Agnese Priede discussing tree removal options in Baltezers Mire with the representatives of JSC Latvian State Forests.

Development of management plans for Augstroze and Baltezers included inventories of drainage systems (analysis of field survey and remote sensing data), hydrogeological modelling, inventory of habitat types and species (vascular plants, bryophytes, birds, invertebrates, mammals). All results were summarized into reports prepared by the involved experts (all of them certified according to national legislation). Inventories of habitats and plant species were done both by the project expert

Līga Strazdiņa and several external experts. The rest of habitats (freshwaters, grasslands, partly forests) and bird, invertebrate and mammal inventories were done by external experts. Hydrological surveys and hydro-geological modelling was done by project expert Oļģerts Aleksāns. Development of both plans were organised by staff managers of management plans Gundega Ābelīte and Sandra Ikauniece.

Site management plan for the project area in Lake Engure Nature Park was developed by project experts Agnese Priede and Oļģerts Aleksāns in collaboration with Lake Engure Nature Park Fund (project partner), land manager JSC Latvian State Forests and Nature Conservation Agency. Some details were communicated with the researchers from the National Botanic Garden and Institute of Biology (University of Latvia) and discussed within the project's networking activities. The plan was agreed among all involved parties and has a status of non-binding recommendation. However, it serves as an important tool to organise the fen restoration within LIFE Peat Restore project, provides substantiation of proposed restoration actions and helps to receive the necessary permits from the responsible governmental institutions (Nature Conservation Agency, State Forest Service) and JCS Latvian State Forests, as well as proposes management actions for the future (after LIFE project).

Results of mapping of GEST types (including maps and calculations of emissions) were summarized in the first GEST monitoring report by University of Latvia (GEST Analysis Report Latvia: <https://life-peat-restore.eu/en/publications/>). Results of habitat maps and species inventories are incorporated into nature management plans developed within Action A.4.

Lake Engure Nature Park

Lake Engure Nature Park is a significant area for alkaline fen conservation. The nature park hosts large areas of alkaline fens with *Schoenus ferrugineus* and *Cladium mariscus* which are rich in protected plant and animal species. One of such fen areas is selected as LIFE Peat Restore project area.

The site management plan was developed for the project restoration area and adjacent areas, as they are hydrologically related and in longer term management of the entire area would be logical. In total the area for which the site management plan was developed covers 238 ha, out of them 65 ha are covered by fens. The fens are unfavourably affected by two old ditches and due to cessation of low intensity grazing the open fens are invaded by trees.

In this area, habitat inventory and mapping was done, the maps are included in the site management plan, and spatial data of habitats, proposed management actions and field data forms submitted to the Nature Conservation Agency to be integrated in the national nature data system. The

hydrological conditions were surveyed in field, hydro-geological modelling was done, including evaluation of potential changes in groundwater and surface water table after blocking of ditches.

The site management plan provides an overview on the land use history in this area, described the current situation (land use, habitats, plant species), impacts and threats. The plan defines conservation objective for the area (to ensure sustainability and ecosystem functions of alkaline fens supporting typical species and communities) and tasks to be done (preventing drainage effects, restoring open fens, reducing the fragmentation of fens, improving the vegetation structure). The document includes detailed action plan for restoration and maintenance of restored habitats, prioritisation of all actions, as well as responsibilities of the involved parties, cost estimate and potential sources of funding.

The major actions are as follows: blocking of two ditches, clearing of shrubs and trees (in the nearest future within LIFE project and after LIFE) and long-term management by introducing light seasonal grazing within large fenced area connected to the current grazing area on the lakeshore. Several actions include alternatives (what should be done if the best option is not possible). As agreed among the involved parties, blocking of ditches and removal of trees in 20 ha will be done using resources of LIFE Peat Restore, whereas the future management will be overtaken by Lake Engure Nature Park (funding attracted through projects, perhaps in collaboration with Nature Conservation Agency, and using agri-environmental scheme).

Maps of habitats, management areas, results of hydro-geological modelling, proposed monitoring sites with coordinates of sample plots and piezometer locations (monitoring started within LIFE Peat Restore in 2018) are added to the plan. The document includes also detailed monitoring plan (vegetation, water table); during LIFE Peat Restore the monitoring will be carried out by the project experts and later overtaken by Lake Engure Nature Park Fund.

Analysis of relevant regulations which must be taken into account prior to planning any management actions and assessment of risks related with management was added to the site management plan. Additionally, supporting letter received from the Nature Conservation Agency supplements the plan.

During development of the plan, all interested parties were invited to contribute. Three meetings were organised (two of them with field visits) and actively participated by the land manager JSC Latvian State Forests, Nature Conservation Agency and Lake Engure Nature Park Fund. Between the meetings, there was communication among involved parties using e-mail and phone communication. The field inventories were done in 2017 and 2018 including planning of management, initiation of vegetation and water table monitoring and expert discussions in field conditions. Several stages of plan development were communicated also through the project website. The plan is available at the

project's website: <https://life-peat-restore.eu/lv/wp-content/uploads/sites/9/2018/02/par-planu.pdf>
(in Latvian).

Baltezers Mire Nature Reserve

Baltezers Mire Nature Reserve was established in 2004 to protect transitional mires and quaking bogs, bog woodlands and oligotrophic to mesotrophic lakes. In total, six protected habitat types of EU importance (listed in the EU Habitats Directive) cover 71% from the area of the nature reserve (228 ha). There are numerous rare species, especially plants, in the area, such as *Ophrys insectifera*, *Isoetes lacustris* and *Galium triflorum* that are rare and protected in Latvia with only few known localities. Beside forest, mire and freshwater flora, also bird fauna was explored. In total, 36 protected plant and animal species were recorded in Baltezers Mire Nature Reserve. All survey results are summarized in the nature management plan. In 2005, the first management plan was developed for ten years time period. In the frame of LIFE Peat Restore project, the management plan was updated including more detailed plan for restoration activities.

Major unfavourable factors that affect the mire and forest are drainage (still functions), forestry activities and removal of dead wood after windfalls (in the previous decades), beaver activity resulting in increased water level in Lake Baltezers causing eutrophication, and airborne calcium carbonate particle deposits from the nearby Brocēni cement factory (in the past, up to the 1990s). Invasive plant species pose potential threat, as some of them were recorded in the nature reserve or in adjacent areas. Small scale manual peat cutting took place in the mire until 1940, however, the peat layer is only approximately 2 m deep (maximum 3.7 m), therefore industrial peat extraction is not cost effective and thus not applied.

To eliminate the drainage impact, after developing of hydro-geological models it was decided to build eight peat dams to block the ditches. To increase the efficiency of mire restoration and to reduce the evapotranspiration, removal of trees is proposed. Tree removal would be done by the land manager JSC Latvian State Forests (details already agreed).

The management plan proposes also monitoring actions (vegetation and water table). Nine piezometers were installed in 2018 within LIFE Peat Restore to monitor the fluctuations of groundwater table in the surroundings of ditches before and after building of dams. Changes in vegetation are already monitored by LIFE Peat Restore experts (started in 2018). Vegetation monitoring is planned as long-time activity, to be continued after the end of the project (responsibility of the Nature Conservation Agency).

Future management of Lake Baltezers was agreed in cooperation with local Brocēni municipality (their responsibility would be reed cutting on the eastern shore) and with the local hunters' society about controlling the beaver activity.

All activities were agreed among the involved parties (University of Latvia, Nature Conservation Agency, Brocēni Municipality, State Forest Service, State Environment Service, etc.). The plan is agreed with the local municipality and Nature Conservation Agency and submitted to the Ministry of Environmental Protection and Regional Development. The plan, except for appendices, is available here (not officially approved yet): <https://files.fm/u/c8v2v67h> (in Latvian). After approval by the minister the plan will be permanently available at the website of Nature Conservation Agency (https://www.daba.gov.lv/public/lat/iadt/dabas_liegumi/baltezera_purvs/).

Augstroze Nature Reserve

Augstroze Nature Reserve has been established in 1977 to preserve raised bogs and transitions mires, near-natural forests, lake habitats, and rare, threatened bird species. In 2017–2018, the nature management plan was developed by LIFE Peat Restore project. It includes assessment of the current situation (including inventories which are integrated into the plan) and provides actions for management of the area, including restoration of deteriorated peatlands and monitoring plan.

Inventory of species and habitats was performed by 11 experts in 2017, both project experts and external experts. In total, 16 habitat types of EU importance cover 70% of the area of nature reserve (4007 ha). Most of the area is covered by raised bogs (62%), forests (16%) and lakes (16%). In total, 114 rare and protected plant and animal species were found in the area, for example, vascular plants *Corallorhiza trifida*, *Lobelia dortmanna*, moss *Dicranum viride*, beetle *Osmoderma barnabita* and golden eagle *Aquila chrysaetos*.

To characterize the composition of peat and development history of Madiešēnu Mire (i.e. the largest raised bog in Augstroze Nature Reserve), peat stratigraphy was studied by researchers from the University of Latvia. They concluded that the mire has started to develop approximately 2800 cal BP; the peat is poorly decomposed and is composed of *Sphagnum* spp.

Augstroze Nature Reserve has rich cultural heritage, therefore nature management action were planned considering presence of historical monuments, historically important sites which in some cases are also popular tourism destinations.

In the 1980s, drainage system was established in the northern part of the nature reserve, in Madiešēnu Mire. After investigating the drainage system and analyzing remote sensing data, along with hydrogeological modelling, it was decided to build 25 peat dams to prevent further degradation of the raised bog. Hydrological restoration will be done within LIFE Peat Restore project.

Other management activities, such as control of beavers, reed cutting in lakes, habitat maintenance for rare beetle *Osmoderma barnabita*, providing functioning of culverts, as well as establishment of recreational infrastructure and tourism activities should be ensured by local municipality and other involved parties.

During communication within the plan development process, the local community including two local municipalities, had objections against several management activities, restrictions of large public events and goose hunting in reserve zone. Though the proposed actions caused resistance, at the final stage the plan (including the LIFE Peat Restore restoration activities) was agreed among all involved parties.

In the monitoring scheme provided by the management plan, vegetation sample plots and piezometers for water table measurements are located near the ditches to evaluate the restoration success. Both water table and vegetation monitoring was commenced in 2018 by LIFE Peat Restore team.

The plan is agreed with the municipalities and Nature Conservation Agency, and submitted to the Ministry of Environmental Protection and Regional Development. The plan, except for appendices, is available here (not officially approved yet): <https://files.fm/u/dq3e5tr9> (in Latvian). After approval by the minister the plan will be permanently available at the website of Nature Conservation Agency (https://www.daba.gov.lv/public/lat/iadt/dabas_liegumi/augstroze/).