LIFE08 NAT/LV/000449

Final Report
Covering the project activities from 01/02/2010 to 31/08/2013

Reporting Date
30/10/2014

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

Data Project	
Project location	Latvia
Project start date:	01.02.2010.
Project end date:	31.08.2013.
Total budget	€ 726.714
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(%) of eligible costs	€726.714

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2. Executive summary

Active raised bog (7110*) is a priority habitat of Habitats Directive and one of Europe's most rare and threatened habitats. Raised bogs occur throughout Latvia although during the last decades they were influenced by various human activities, like drainage, peat extraction, forest planting and land reclamation.

Aim of the the LIFE project LIFE 08 NAT/LV 000449 "Restoration of Raised Bog Habitats in the Especially Protected Nature Areas of Latvia" ("Raised bogs") was to re-establish active raised bog habitats (7110*) in the areas influenced by drainage, restore project site hydrology and to protect raised bog bird species of EU importance. Project restoration actions benefited to priority habitats – active raised bog (7110*) and bog woodland (91D0*). The restoration actions favoured other habitats of EU importance, like degraded raised bogs still capable of natural regeneration (7120), transition mires and quaking bogs (7140), depressions on peat substrates of the *Rhynchosporion* (7150), natural dystrophic lakes and ponds (3160) that are an integrated part of raised bog ecosystem.

Active raised bog habitat (7110*) restoration was planned to cease further damage of raised bogs and stop desiccation due to drainage that was causing negative changes the project sites - Melnais Lake Mire, Aizkraukle Mire and Forests, Aklais Mire and Rozu Mire. Restoration actions were aimed to increase the area of active raised bog habitats by building dams on drainage ditches and to raise groundwater level.

After rising groundwater level in the project sites, suitable conditions for typical raised bog species were established, target habitats have started to re–generate in degraded areas of the project sites and active peat formation was restored.

Project objectives

- Secure most favourable conservation status and restoration for priority active raised bog habitat (7110*) of Habitats Directive and raised bog bird species of Birds Directive.
- Promote and demonstrate good practice for management of active raised bog habitats by holding seminars for various interest groups and hosting project web site.
- Demonstrate and share results of raised bog conservation and restoration by involving local society and stakeholders in the conservation and management activities as well as to explain the need for restoration actions.
- Raise public awareness regionally to influence local inhabitant's attitude towards safeguarding of internationally valuable active raised bog habitat as well nationally and internationally through practical raised bog restoration works and awareness raising activities as well as improve understanding of current nature conservation issues, habitats of EU importance and Natura 2000 network.

Key deliverables and outputs

- The 4 Management plans for the project sites – Melnais Lake Mire, Aizkraukle Mire and Forests, Aklais Mire and Rozu Mire were elaborated in accordance with national requirements and approved by Ministry of Environment and Regional Development of Latvia;

- Restoration of active raised bog habitat (7110*) and natural hydrology by blocking drainage ditches in the degraded areas was implemented in the project sites (488 ha of raised bog restored); in total 156 peat dams were built on drainage ditches to stop raised bog desiccation;
- Success of raised bog restoration was approved by the results of groundwater level and habitat monitoring in the project sites and revealed in Monitoring Reports;
- In total 4 information boards were prepared and set up in the project sites;
- To demonstrate project results 6 seminars, including an International seminar "Sharing experience on raised bog restoration" and meetings during elaboration of Management plans for different interest groups (stakeholders, schoolchildren teachers and local public) were organised in order to involve local people in the planning and implementation of project actions and raise awareness about international value of the active raised bog habitat (7110*);
- The 5 project information booklets, Raised bog photo exhibition "Secrets of mires", home page www.purvi.lv has raised awareness about the value of active raised bog habitat (7110*) as well as for bird species of Birds Directive and the need of their conservation and restoration regionally, nationally and internationally.
- Methodology "Raised Bog Management for Biodiversity Conservation in Latvia" that is based on the experience on raised bog restoration of the LIFE project "Raised bogs" and other LIFE projects in Latvia and other EU countries was elaborated to demonstrate the best practice on active raised bog habitat conservation and restoration and distributed to the stakeholders and experts and available on the project home page www.purvi.lv;
- Project has made a significant contribution to the further active raised bog conservation in Latvia.

Final Report includes Technical and Financial part. Technical part has the following chapters – Executive Summary, Introduction, Administrative part, Technical part (Action description and results, Evaluation, Analysis of long-term benefits, Dissemination issues), Comments on financial report, 21 Technical Annexes including Final table of indicators, Financial report and other 11 Annexes.

In the Introduction background of the project is presented and main conservation issues addressed. In the next chapter Administrative part, project management system is described and evaluated. In the Technical part, task by task is described. Finally, evaluation of the project is presented, the applied methodology is discussed, and planned actions compared with results, long-term benefits and information about dissemination issues are discussed. Next follows comments on financial issues.

The 16 project actions were implemented to stop the threats for active raised bog habitat (7110*) and raised bog bird species of Birds Directive. Project actions have reversed the destructive processes and over time will significantly increase the overall area of active raised bog habitat in the project sites – Melnais Lake Mire, Aizkraukle Mire and Forests, Aklais Mire and Rozu Mire Nature Reserves.

The coordinating beneficiary Unversity of Latvia and 2 associated beneficiaries – Latvian Fund for Nature, "Foundation ELM MEDIA" participated in the implementation of the project actions.

3. Introduction

Active raised bog habitat (7110*) restoration was planned in the project sites to cease further degradation of raised bogs and stop desiccation due to drainage that is causing negative changes in active raised bog habitats. Restoration actions aim to increase the area of active raised bog by building dams on the drainage ditches and to raise the water level. In the project sites such conditions were established that typical raised bog species and habitats re-generate and peat formation takes place in degraded areas.

Project restoration actions have benefited also other habitats of EU importance, like degraded raised bogs still capable of natural regeneration (7120). Raised bog is an important habitat in terms of conservation for the bird species of Birds Directive of raised bogs. Therefore, also the raised bog bird species of Birds Directive benefit from the restoration of active raised bog.

The project includes 4 especially protected nature areas (Nature Reserves) that are Natura 2000 sites: Melnais Lake Mire, Aizkraukle Mire and Forests, Aklais Mire and Rozu Mire with the total area of 4843 ha, from which 290 ha were degraded areas in critical need of restoration as are subjected to the influence from drainage and peat extraction.

Project objectives

- Secure most favourable conservation status and restoration for priority active raised bog habitat (7110*) of Habitats Directive and raised bog bird species of Birds Directive.
- Promote and demonstrate good practice for management of active raised bog habitats by holding seminars for various interest groups and hosting project web site.
- Demonstrate and share results of raised bog conservation and restoration by involving local society and stakeholders in the conservation and management activities as well as to explain the need for restoration actions.
- Raise public awareness regionally to influence local inhabitant's attitude towards safeguarding of internationally valuable active raised bog habitat as well nationally and internationally through practical raised bog restoration works and awareness raising activities as well as improve understanding of current nature conservation issues, habitats of EU importance and Natura 2000 network.

Main conservation issues targeted

1. Negative influence from drainage

Establishment of drainage systems in the project sites – Melnais Lake Mire, Aizkraukle Mire and Forests, Aklais Mire and Rozu Mire had affected natural raised bog succession, leading to reduction of open mire habitats where drainage system was still functioning. Desiccation of raised bog habitats had taken place due to the water runoff through drainage ditches. In the project sites the total length of drainage system reaches 46.3 km and due to drainage influence plant species composition near drainage ditches had changed and degraded raised bog habitats with low species diversity have developed there. Growth of the whole range of typical bog bryophytes was restricted and results in their extinction and replacement by other less typical species for raised bog habitats. In the degraded areas coverage of *Sphagnum* species was lost and instead of *Sphagnum* carpet typical for raised bogs, dense cover of *Calluna vulgaris* had developed.

2. Loss of active raised bog bird species of Birds Directive due to drainage

Intact raised bogs show a considerable natural variation both within and between bogs in surface topography (raised bog pools, hollows, hummocks and lawns, carpets), extent and seasonally open water and composition structure of raised bog vegetation. There is a link to this variation among the breeding and wintering raised bog bird species. Active raised bog habitat (7110*) is highly important for the conservation of raised bog bird species. They are significant not only for breeding but also as a resting and feeding place during migration. Active raised bogs include open areas that are of high significance for the active raised bog bird species of Birds Directive, like *Grus grus, Tringa glareola, Pluvialis apricaria, Pandion haliaetus, Haliaetus albicilla, Botaurus stellaris, Philomachus pugnax, Circus aeruginosus* that are known in Melnais Lake Mire, Aizkraukle Mire and Forests, Aklais Mire and Rozu Mire. When raised bogs start to overgrow with pine, from these areas also disappear bird species of Birds Directive.

3. Lack of awareness about conservation and restoration need of active raised bog habitat

In Latvia raised bogs have been mostly considered as a peat resource, but not a habitat that has to be protected. Therefore, it is important to raise awareness about raised bog values. Not always the role of raised bogs in climate change and as carbon sinks is recognised. General public, schoolchildren and teachers may not be aware about the negative consequences of drainage that damages active raised bog habitat (7110*) and causes great changes in fauna of raised bogs that includes also bird species of Birds Directive as well as habitats. If there is a lack of knowledge about raised bog values, impact on the greenhouse effect, people may be more interested in peat extraction rather than conservation and restoration of active raised bogs. People may not be aware that raised bogs have a value in the maintenance of hydrological balance in the area as from raised bogs originate rivers and raised bogs are a source of water.

Project long-term results include:

- The elaborated Management plans for the 4 project sites – Melnais Lake Mire, Aizkraukle Mire and Forests, Aklais Mire and Rozu Mire foresee management actions until 2020 and favour sustainability for conservation of active raised bog habitat (7110*) and species of EU importance;
- Restoration of active raised bog habitat and natural hydrology was implemented in all the project sites; in the area 488 ha desiccation of habitats was stopped;
- The water level rise and restoration of raised bog habitats was achiewed by building 156 dams on the drainage ditches;
- Project dissemination activities – home page www.purvi.lv, information booklets and boards, Raised bog photo exhibition "Secrets of Mires", Methodology "Raised Bog Management for Biodiversity Conservation in Latvia" that is based on the experience of raised bog restoration in LIFE projects in Latvia and Lithuania and project documentary "Mires Uncovered" has raised awareness about the value of active raised bog habitat (7110*) as well as for the bird species of Birds Directive and the need of their conservation and restoration regionally, nationally and internationally .
- Implementation of project actions is a significant contribution to the further active raised bog (7110*) conservation in Latvia.

4. Administrative part

4.1 Description of the management system

The LIFE project "Raised bogs" included 2 phases:

1. Preparatory actions – elaboration of Management plans and Technical designs for the project sites.

2. Practical actions – restoration of raised bog habitats and hydrology by building of dams on the drainage ditches.

The first phase included elaboration and approval of Management plans for the project sites by associate beneficiary "Latvian Fund for Nature" as well as elaboration of Technical designs by sub-contractor "Meliorprojekts". In the second phase, practical raised bog hydrology and habitat restoration was carried out by building of dams on the drainage ditches.

Project team included project manager Dr. biol. Mara Pakalne, project assistant Aivars Slisans, information coordinator Daiga Brakmane, from April, 2012 replaced by Edite Plokste and from November, 2012 by Liga Strazdina and field manager Gunars Balodis (Fig. 1). The project manager coordinated the timely execution of project actions, was a contact person with project associated beneficiaries and co-financers. Planning of the work was on daily basis as well as during project staff meetings which were organised every week to discuss progress of project actions.

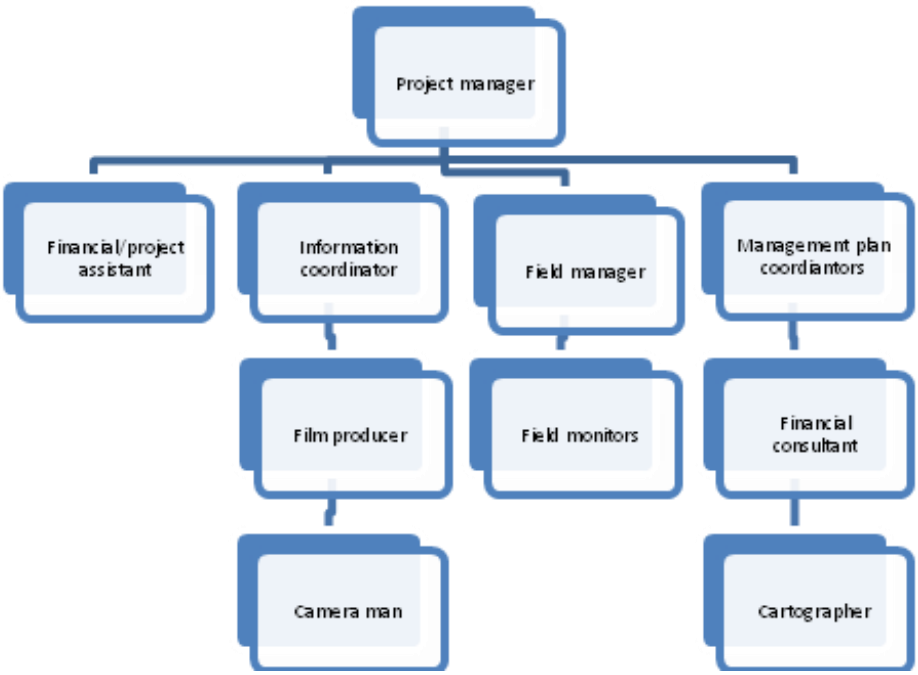


Figure 1 - Organigramme of project team

Project Steering Group meetings were organised with the interval of 6 month, in total there were 6 meetings when the project staff reported about the progress of project actions and results.

Project implementation was supported by Administration of the University of Latvia and its Departments (Fig. 2). Financial and infrastructural assistance for project completion was given by Finance and Accounting Department, Department of Development and Planning where the original

project documentation is kept. The project staff worked in the premises of the Botanical Garden, University of Latvia.

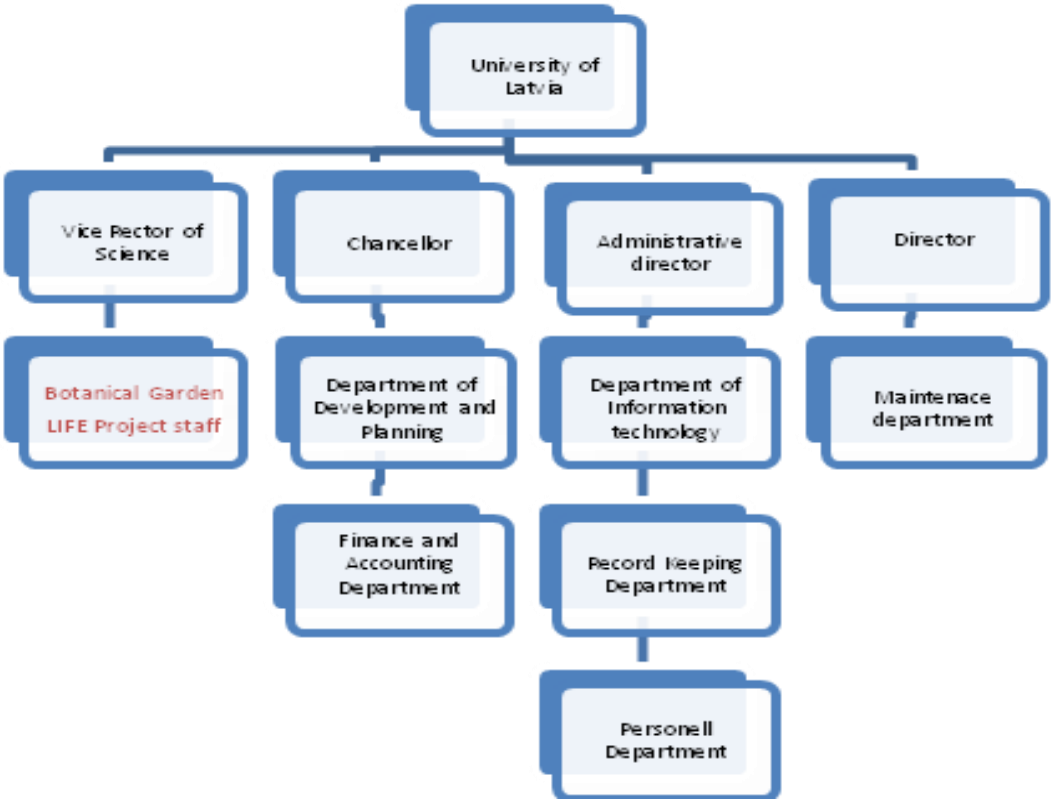


Figure 2 - Structure of the University of Latvia

The project has submitted to the EC the Inception Report, Mid-term Report and Progress Report. Digital copies are added in Annex 7.19.

4.2 Evaluation of the management system

Project team implemented actions in cooperation with 2 associate beneficiaries – Latvian Fund for Nature that elaborated Management plans for the 4 project sites and "Foundation ELM MEDIA" that produced a documentary "Mires Uncovered". There was co-operation between associated beneficiaries as film includes also results of expert studies carried out by Latvian Fund for Nature.

All the 16 project actions were implemented (Table 1), including practical raised bog restoration work and monitoring of site hydrology and habitats.

During implementation of the project considerable experience in mire management was gained. Close co-operation was established with those municipalities where the project sites were located, naming Aizkraukle, Olaine, Daudzese and Sala Municipalities.

List of project deliverables and milestones are summarised in Table 2 and 3.

Table 1 - Summary of project actions

Name of Action	Action	Time plan	Status at the end of the project
Elaboration of Management plans	A1	I 2010 – II 2011	4 Management plans for all the project sites – Melnais Lake Mire, Rozu Mire, Aklais Mire, Aizkraukle Mire and Forests were completed and approved by Regulations of the Minister of Environment and Regional Development of Latvia
Hydro-geological studies for the elaboration of Technical designs for building dams	A2	II 2010 – III 2011	4 Technical designs for Melnais Lake Mire, Rozu Mire, Aklais Mire, Aizkraukle Mire and Forests were completed
Organization of public tender, preparation of agreements and contracts	A3	I-II 2010 – I-II 2011	In total 5 price quotations were organised for the Actions (A2, C1, D3, D6 and E1)
Re-establishing the active raised bog habitats and natural raised bog hydrology	C1	I 2011 – III 2013	In total 156 dams were built in the project sites and raised bog hydrology restored in the area of 488 ha
Organization of seminars	D1	I,IV 2010; II-III 2011; I-II 2012	In total 6 project seminars were organised including the International seminar
Creation and updating of the home page of the project	D2	I 2010 – III 2013	Home page www.purvi.lv was updated with the latest information about project actions
Elaboration and publishing of information booklets and boards	D3	I 2010; I-IV 2011	In total 5 project booklets were prepared and published
Elaboration of Methodology for active raised bog restoration in Latvia	D4	II 2011 – III 2013	Methodology for active raised bog restoration in Latvia was prepared in 2013
Production of a documentary	D5	I 2010 – IV 2012	Documentary “Mires Uncovered” (30 minutes) was produced in 2012
Establishment of the Raised Bog photo exhibition	D6	II 2011 – III 2013	Raised Bog photo exhibition “Secrets of Mires” was prepared in December 2010
Preparation of Layman’s report	D7	III-IV 2012 – III 2013	Layman’s report was prepared in August 2013
Project administration by the University of Latvia	E1	I 2010 – III 2013	Project team was established and all the planned project actions were carried out
Monitoring the effects of management actions on raised bog habitats, bird species and site hydrology	E2	I 2010 – III 2013	Groundwater and habitat monitoring was carried out in the project sites
Cooperation with LIFE+ projects, participation in study tours, seminars and conferences	E3	II-IV 2010; II-IV 2011; II-IV 2012	In total 5 Study tours were organised and project staff participated in seminars and conferences
Independent audit of the project	E4	II-II 2013	Independent audit of the project was completed in August 2013
Elaboration of After-LIFE Conservation Plan	E5	II-III 2013	After-LIFE Conservation Plan was elaborated in August 2013

List of deliverables and milestones of the project

Table 2 - Deliverables of the project

Name of the Deliverable	Action	Deadline	Progress
The first project booklet published in Latvian and English	D3	May 2010	Completed, Inception Report Annex 6.2.
Up-to date photographic information about the progress of the project	D2	April 2010	Home page updated with latest information about project actions. Inception Report Annex 6.10.
Up-to date photographic information about the progress of the project	D2	July 2010	Home page updated with latest information about project actions. Inception Report Annex 6.10.
Up-to date photographic information about the progress of the project	D2	October 2010	Home page updated with latest information about the project actions. Inception Report Annex 6.10
Raised bog exhibition prepared	D6	November 2010	Completed in December, 2010. Mid-term Report, Annex 6.7, 6.12, 6.16 and 6.17.
Monitoring Protocols summarised in Monitoring Reports	E2	November 2010	Completed in December, 2010. Mid-term Report Annex 6.14.
Up-to date photographic information about the progress of the project	D2	January 2011	Home page updated with latest information about project actions. Mid-term Report Annex 6.8.
4 technical designs for the restoration of active raised bog habitats and hydrology in Aklais, Melnais Lake, Aizkraukle Mire and Forests and Rozu Mires completed	A2	February 2011	Action completed, all the Technical designs were prepared until June, 2012. Mid-term Report Annex 6.6.
Management plans for Aizkraukle Mire and Forests, Aklais Mire, Rozu and Melnais Lake Mire completed	A1	March 2011	Rozu Mire Management Plan was completed in March 2010 and approved by the Ministry of Environment and Regional Planning on March 14, 2011. Mid-term Report Annex 6.5. Melnais Lake Mire Management Plan was completed in March, 2010 and approved by the Ministry of Environment and Regional Planning on April 5, 2011. Mid-term Report Annex 6.5. Aizkraukle Mire and forests Management Plan was completed in March, 2010 and approved by the Ministry of Environment in and Regional Planning on April 15, 2011. Mid-term Report Annex 6.5. Aklais Mire Management plan completed in May, 2010 and approved Ministry of Environment in and Regional Planning on July 20, 2011. Mid-term Report Annex 6.5.
Up-to date photographic information about the progress of the project	D2	April 2011	Home page updated with latest information about project actions. Mid-term Report Annex 6.8.
Up-to date photographic information about the progress of the project	D2	July 2011	Home page updated with latest information about roject actions. Mid-term Report Annex 6.8.

Name of the Deliverable	Action	Deadline	Progress
Information booklets about Aizkraukle, Aklais Mire, Rozu Melnais Lake Mire Nature Reserves published	D3	September 2011	Completed in November/December 2011. Mid-term Report Annex 6.9.
Information boards for Aizkraukle Mire and Forests, Rozu Mire, Aklais Mire and Melnais Lake Mire set up	D3	September 2011	Information boards printed in December 2011 and set up in January 2012. Mid-term Report Annex 6.9.
Up-to date photographic information about the progress of the project	D2	October 2011	Home page updated with latest information about project actions. Mid-term Report Annex 6.8.
Monitoring Protocols summarised in Monitoring Reports	E2	November 2011	Completed in November 2011. Mid-term Report Annex 6.14.
Up-to date photographic information about the progress of the project	D2	January 2012	Home page updated with latest information about project actions. Progress Report Annex 6.7.
Up-to date photographic information about the progress of the project	D2	April 2012	Home page updated with latest information about project actions. Progress Report Annex 6.7.
Up-to date photographic information about the progress of the project	D2	July 2012	Home page updated with latest information about project actions. Progress Report Annex 6.7.
Up-to date photographic information about the progress of the project	D2	October 2012	Home page updated with latest information about project actions. Progress Report Annex 6.7.
Monitoring Protocols summarised in Monitoring Reports	E2	November 2012	Monitoring Reports completed in December 2012. Progress Report Annex 6.7.
One documentary produced	D6	December 2012	Completed in December, 2012. Progress Report Annex 6.6.
Up-to date photographic information about the progress of the project	D2	January 2013	Home page updated with latest information about project actions. Final Report Annex 7.17.
Up-to date photographic information about the progress of the project	D2	April 2013	Home page updated with latest information about project actions. Final Report Annex 7.17.
Up-to date photographic information about the progress of the project	D2	August 2013	Home page updated with latest information about project actions. Final Report Annex 7.17.
Methodology for the active raised bog restoration published	D4	July 2013	Completed in August, 2013. Final Report Annex 7.8.
Monitoring Protocols summarised in Monitoring Reports	E2	July 2013	Completed in August, 2013. Final Report Annex 7.14.
Layman's report published	D7	July 2013	Completed in August, 2013. Final Report Annex 7.11.
After-LIFE Conservation Plan prepared	E5	July 2013	Completed in August, 2013. Final Report Annex 7.16.

Tabe 3 - Milestones of the project

Name of the Milestone	Action	Deadline	Progress
First project Seminar in organised	D1	March 2010	Completed in March 2010, Inception Report Annex 6.5
Project Steering Committee established	E1	March 2010	Completed in March 2010, Inception Report Annex 6.8
Information for the web page prepared	D2	March 2010	Completed in April, 2010
Monitoring plots established	E2	September 2010	Completed in October, 2010
Monitoring wells established	E2	November 2010	Completed in December, 2010
Second project seminar organised	D1	November 2010	Completed on December 17, 2010
Third project seminar organised	D1	May 2011	Completed on May 17, 2011
Fourth project seminar organised	D1	September 2011	Completed on September 22 and 23, 2011
International seminar organised	D1	June 2012	Completed in July, 2013
Final project Seminar organised	D1	January 2013	Completed in August, 2013
Independent audit of the project realised	E4	July 2013	Completed in August, 2014
Dam building completed in Rozu Mire	C1	July 2011	Completed in November, 2012
Dam building completed in Melnais Lake Mire	C1	July 2011	Completed in March, 2012
Dam building completed in Aizkraukle Mire	C1	October 2011	Completed in November, 2012
Dam building completed in Aklais Mire	C1	October 2011	Completed in November, 2012
Final acceptance of the built dams from the sub-contractor	C1	July 2013	Completed in July, 2013

5. Technical part

5.1. Task by task - description

A. Preparatory actions, elaboration of management plans and/or of action plans

ACTION A.1

Name of the action: Elaboration of Management plans

Time plan: I 2010 – II 2011

Progress: Management plans (MP) for the 4 project sites – Aizkraukle Mire and Forests, Aklais Mire, Melnais Lake Mire and Rozu Mire Nature Reserves (NR) were elaborated by the project associated beneficiary Latvian Fund for Nature and completed as planned in the Time Schedule. They were prepared under the guidance of Management plan coordinators who summarised the information for the MP that was collected and handed in as expert reports. For the MP the following experts were hired by the Latvian Fund for Nature – habitat and plant species experts, geologist, hydrologist, ornithologist, invertebrate expert, expert in mammals, freshwater expert, expert in amphibians and cartographer.

Management plans include the following chapters – Summary, information about legislation, plant and animal species, habitats, including species of EU importance, and those protected in Latvia and management actions. All the habitats of EU importance were mapped, like active raised bogs (7110*), bog woodland (91D0*), degraded raised bogs still capable of natural regeneration (7120), transition mires and quaking bogs (7140), depressions on peat substrates of the *Rhynchosporion* (7150), natural dystrophic lakes and ponds (3160). MP include maps with information about raised bog restoration and monitoring areas as well as evaluation of biodiversity values and negative factors that had influenced the project sites.

Rozu Mire Management plan was completed in March 2010 and approved by the Order of the Ministry of Environmental Protection and Regional Deveopment Nr. 156 on March 14, 2011.

Melnais Lake Mire Management plan was completed in March, 2010 and approved by the Order of Ministry of Environmental Protection and Regional DeveopmentNr. 224 on April 5, 2011.

Aizkraukle Mire and Forests Management plan was completed in March, 2010 and approved by the Order of the Ministry of Environmental Protection and Regional Deveopment Nr. 231 on April 15, 2011.

Aklais Mire Management plan was completed in May, 2010 and approved by the Order of Ministry of Environmental Protection and Regional Deveopment Nr. 355 on July 20, 2011.

Copies of Management plans were added to Mid-term Report Annex 6.5 and include also the Orders on the approval of the Management plans.

Management plans and the maps are published in the project home page www.purvi.lv, home page of Latvian Fund for Nature www.ldf and Nature Conservation Agency http://www.daba.gov.lv/

Variations/complications/delays: In the project proposal the planned restored area was 290 ha but according to the management plans the area increased up to 488 ha.

Additional information: Annex 7.2 Lists of especially protected plant and animal species and habitats of Latvia and of EU importance in the Project sites, Annex 7.3 Management actions in the

project sites, Annex 7.4 List of Management Plan Steering Group meetings, Annex 7.17 Photos of the project actions, Annex 7.20 Electronic version of project photos.

ACTION A.2

Name of the action: Hydro-geological studies for the elaboration of Technical designs for building dams

Time plan: II 2010 – III 2011

Progress*:* In order to carry out restoration of active raised bog habitats in the drained parts of the 4 project sites – Aizkraukle Mire and Forests, Aklais Mire, Melnais Lake Mire and Rozu Mire Nature Reserves, hydrological assessment of the sites and peat stratigraphical analysis was carried out. The impact after the change of the water level and the possible risk of flooding of surrounding area was determined and is revealed in Management plans for the project sites.

The four Technical designs (TD) for the project sites were elaborated by subcontractor – "Meliorprojekts" State Ltd. according to Latvian legislation. Sub-contactor was chosen after organisation of public tender by the University of Latvia. The possible implications of management of the site were evaluated during the preparation of Technical designs and discussed during the meetings of Management Plan Steering Group meetings. Aerial photographs and GIS (Geographical Information Systems) for site management as well as historical maps were used. Precise number of dams is a part of Technical designs, where also their size and construction type is stated. According to detailed studies carried during the elaboration of Management plans and Technical designs, the exact location and number of dams was determined. Copies of Technical designs for building of dams and the results of geological and paleovegetation studies in Melnais Lake Mire, Rozu Mire, Aklais Mire and Aizkraukle Mire and forests Nature Reserves were added to the Mid-term Report Annex 6.6.

Variations/complications/delays: Action was delayed due to the fact that the sub-contractor "Meliorprojekts" State Ltd. prepared the Technical designs in June, 2011 but was very slow in the reconciliation process of the Technical designs.

Technical design for Melnais Lake Mire was completed in November 2011, but for the other 3 sites – Rozu Mire, Aklais Mire and Aizkraukle Mire and Forests in March 2012.

Additional information: Annex 7.17 Photos of the project actions, Annex 7.20 Electronic version of project photos.

ACTION A.3

Name of the action: Organisation of public tender, preparation of agreements and contracts

Time plan: I – II 2010, I – II 2011

Progress*:* According to Latvian legislation, University of Latvia organised public tenders for the following project actions:

1) Hydro-geological studies for the elaboration of technical designs for building dams (A2);
2) Renting of project cars (E1);
3) Preparation of Raised Bog photo exhibition (D6);
4) Printing of informative booklets and information boards (D3),
5) Re-establishing of active raised bog habitats and raised bog hydrology (C1),
6) Expert studies for habitat and hydrological monitoring (E2).

Public tender for printing of booklets has been organised for whole the University of Latvia and there was no need to organise a separate for the project.

For public tenders Terms of Reference were prepared containing a set of requirements needed for the actions, also methods and resources as well as the final result was identified. After receiving of the proposals they were evaluated by Public Tender Commission of the University of Latvia. After tenders agreements were prepared and signed with the selected organisation. Agreements were made and signed with the project associate beneficiaries and co-financers.

As a result of public tender, technical designs for building of dams were elaborated by the sub-contractor "Meliorprojekts" State Ltd, Raised Bog Photo exhibition was prepared by Photo Society "Foto klubs Ogre". Project first project booklet was printed in printing house "Latgales druka" and "Auto 26" Ltd. Was chosen for renting of the project cars.

In September, 2011 the lawyers from the Procurement department of the University of Latvia organised the public tender for the preparation and printing of the 4 project information booklets and boards. According to the results of the public tender, the text of the booklets and boards was prepared by 2 experts (Valda Baronina and Gundega Freimane) ; the design of the booklets was prepared by "Stencil" Ltd. (design Daiga Brinkmane), printed in "A-Druka" Ltd., but the information boards were printed by the sub-contractor "LATSIGN" Ltd.

As in November, 2011 the technical design with all the documentation was completed only for Melnais Lake Mire Nature Reserve, public tender for building dams on the drainage ditches was organised only for this site. Three sub-contractors had expressed their will to carry out this action. From them one was chosen "E-Buvvadiba" Ltd. with which agreement was prepared and signed.

In March 2012 public tender was organised for building of dams in the other three project sites - Rozu Mire, Aklais Mire and Aizkraukle Mire and Forests. For the public tender Terms of Reference were prepared. There were received proposals from three sub-contractors – "Riga Rent" Ltd., "E-Buvvadiba" Ltd. and "Monter" Ltd which were evaluated by Public Tender Commission of the University of Latvia. Due to highest points and best price the sub-contractor "E-Buvvadiba" was chosen for building of dams in the project sites. Tender agreements were prepared and signed with the selected sub-contractor E-Buvvadiba Ltd in April, 2012.

Variations/complications/delays: No

Additional information: No

B. Purchase/lease of land and/or compensation payments for use rights

NON APPLICABLE

C. Concrete conservation actions

ACTION C.1

Name of the action: Re-establishing the active raised bog habitats and natural raised bog hydrology

Time span: I 2011 – III 2013

Progress: After detailed studies during the elaboration of Management plans (Action A1) and Hydro-geological studies for elaboration of Technical designs for building dams (Action A2), the exact location of dams was determined. Number of dams is slightly smaller than in the project proposal but the restoration area is significantly larger.

As a result of public tender for building of dams on the drainage ditches sub-contractor "E-Buvvadiba" was selected.

In Melnais Lake Mire, Rozu Mire, Aizkraukle Mire and Forests and Aklais Mire, restoration of raised bog habitats started after the approval of Technical designs prepared under Action A2. Building of dams on the drainage ditches in Melnais Lake Mire was completed in February 2012 but in the other three project sites in November 2012.

In total 54 dams were built in Melnais Lake Mire, 59 dams in Rozu Mire, 29 dams in Aizkraukle Mire and 14 dams (out of the 16 planned) in Aklais Mire Nature Reserve (Table 4). In Aklais Mire it was not possible to built 2 dams as the beavers had already flooded the area by building their dams there.

Table 4 - Number of dams in Management plans and project proposal

Project site	Number of dams	
	in management plan	in project proposal
Melnais Lake Mire NR	54	70
Rozu Mire Nature Reserve	59	28
Aizkraukle Mire and Forests NR	29	55
Aklais Mire Nature Reserve	14	40
In total:	**156 dams**	**193 dams**

Site hydrology restoration included building of peat dams by excavator and peat/wood dams built by hand, the type and size of which was determined by the Technical designs. In Melnais Lake and Rozu Mire the dams were built from peat using the excavator but in Aizkraukle and Aklais Mire by hand as the areas were not accessible by technique. There was lots of rain in autumn 2012. Therefore, the project technical staff checked the quality of the dams, if needed reparation was carried out.

The total planned restoration area is larger than planned in the project proposal – from 290 ha to 488 ha where the positive effect of raised bog restoration action by rising of the water level is felt (Table 5). So, the current restoration area is significantly increasing the target restoration area, but did not increase the action budget.

Table 5 - Planned restored area in management plans and in the project proposal

Project site	Actually restored area	
	in the management plans for the project sites/	in the project proposal
Melnais Lake Mire NR	75 ha in the degraded area, 36 ha in peat fields – in total 111 ha	73 ha
Rozu Mire NR	235 ha in the degraded area	72 ha
Aizkraukle Mire and Forests NR	82 ha in the degraded area and human influenced area	85 ha
Aklais Mire NR	60 ha in the degraded area, positive impact in the area of 623 ha	60 ha
Total:	**488 ha**	**290 ha**

Results of raised bog restoration work were presented in the 5th project Steering group meeting on October 22, 2012 by the project staff and the sub-contractor "E-Buvvadiba" Ltd (Progress Report, 2012, Annex 5.6). Positive effect after building of dams is clearly evident in all the project sites. It is proved by the results from habitat and hydrological monitoring that show that groundwater level has risen and raised bog vegetation develops in the degraded areas.

Results of raised bog restoration were summarised in the Methodology "Raised Bog Management for Biodiversity Conservation in Latvia" and the project film "Mires Uncovered".

Variations/complications/delays: Detailed field studies carried out by project experts (hydrologist, geologist, habitat and species expert) as well as site inventory by subcontractor "Meliorprojekts" Ltd. show that changes were to be made in the location of dams. There is larger drainage influenced area in Rozu Mire, but less in Aizkraukle Mire, as some places are already flooded by beavers and very wet habitats have already established there. Due to slow project reconciliation process by the sub-contractor "Meliorprojekts" State Ltd. building of dams on drainage ditches was delayed. Building of dams on the drainage ditches in Melnais Lake Mire was completed in February 2012 but in the other three project sites in November 2012.

Additional information: Annex 7.1 Maps of the project sites, Annex 7.3 Management actions in the project sites, Annex 7.17 Photos of the project actions, Annex 7.20 Electronic version of project photos.

D. Public awareness and dissemination of results

ACTION D.1

Name of the action: Organisation of seminars

Time span: I, IV 2010, II – III 2011, I – II 2012

Progress: In total, 6 seminars were planned during the project.

On March 30, 2010 the first project seminar was organised in Viesite Town Municipality for the stakeholders of the project sites, municipalities, representatives from regional environmental boards and project associated beneficiaries and co-financers. In total, there were 26 participants.

The aim of the first project seminar was to inform about the start of the project, its objectives and planned activities as well as to establish contacts between stakeholders involved in various project activities. Seminar was organised in co-operation with stakeholder that provided facilities for seminar in Viesite Town. First project seminar was attended by representatives from "Riga Forests" Ltd, Joint-Stock Company "Latvian State Forests", local municipalities, Nature Conservation Agency, Regional environmental boards, project associated beneficiaries and co-financers. More information in Inception Report Annex 6.5.

On December 17th, 2010 the second project seminar "The value of raised bog conservation" was organised in Viesite Town Municipality for schoolchildren as well as for stakeholders of the project sites, Nature Conservation Agency, representatives from Regional environmental boards and project associated beneficiaries and co-financers. Project Raised Bog Photo Exhibition was opened there. Seminar was attended by 102 participants, most of them included schoolchildren. Aim of the seminar was to tell about the nature values of raised bogs and project sites. Also importance of Natura 2000 network was explained. At the beginning of seminar, project manager Dr. Mara Pakalne told about raised bog values and actions planned in the project. Project expert and ornithologist Aivars Petrins told about birds of raised bogs. Also a small contest about raised bogs

was organised. During the seminar film about raised bogs was shown that was elaborated by project associated beneficiary "Foundation ELM MEDIA".

On May 17th, 2011 the third project seminar "Education of teachers on conservation and restoration need of active raised bog habitats" was organised. Teachers from Olaine and Marupe vicinity were invited as Melnais Lake Mire is located in this area, as well as teachers from Riga. Altogether there were 31 participants in the seminar. It was possible for all teachers to see also Raised Photo Exhibition "Secrets of Mires" that was exhibited in Olaine Museum of History and Art.

First part of the seminar included theoretical information about Melnais Lake Mire, conservation and management actions, species and habitats of EU importance. Project manager Dr. Mara Pakalne informed about nature values in the bog. Ornithologist from the University of Latvia Aivars Petrins told about bird species occurring in raised bogs, paying special attention to birds living in Melnais Lake Mire: European Eagle-Owl *Bubo bubo*, Whooper Swan *Cygnus cygnus*, ducks and geese. Hydrology of bogs and influence of ditches was explained by Dr.geol. Aija Delina – project hydrologist. Second part of the seminar included field excursion to Melnais Lake Mire where Project manager Dr.biol. Mara Pakalne introduced with different plants of raised bogs, for example, *Sphagnum* species, cotton-grass *Eriophorum vaginatum* and sundew *Drosera rotundifolia*. Dr.biol. Iluta Dauskane explained dendrochronological peculiarities of raised bogs using pine wood rings. It was also possible to take a sample of wood with Prestler incremental borer. Methodological materials were prepared for teachers and distributed at the seminar.

On September 23rd, 2011 the fourth project seminar "Education of schoolchildren on raised bog values" was held in Daudzese Primary School. In total 36 participants together with nature experts got to know raised bog plants and animal species as well as value of dendrochronological studies. Seminar was actively attended by children of different age. After watching the film about raised bogs all the participants went to Aklais Mire to learn the plants growing in the bog. Also a competition for children "What do you know about active raised bog habitats?" was organised. Information leaflets were distributed to schoolchildren and teachers. Children had a possibility to learn plant species growing in the bog and mark them in the leaflet. It was a great experience for them and they actively participated in learning process. In this seminar both during the presentations of the experts, as well as in the bog, schoolchildren were educated about the value of active raised bog habitats (7110*), their role in climate change and as carbon sinks habitats and species of EU importance. Seminar for schoolchildren was planned so that the young generation can understand the value of the raised bogs and the need of their conservation and restoration.

Agenda of the seminars, copies of the presentations, minutes and list of participants for the 2nd, 3rd and 4th seminars were attached to the Mid-term report Annex 6.7.

From July 22-25, 2012 the fifth project International seminar "Sharing experience on raised bog restoration" was organized. Seminar was attended by 50 participants from different countries, like France, Germany, Norway, Lithuania, Poland, Russia, as well as Latvia. On the first day oral and poster presentations about raised bog restoration were given. Experts from Norway, Lithuania, and Russia presented papers about diversity of bogs and activities on raised bog conservation. Seminar participants listened to the experience of raised bog restoration in Latvia within a number of LIFE projects. Papers were given by Janis Kuze and Dr.geogr. Agnese Priede about the results of LIFE project LIFE02 NAT/LV/008496 "Conservation of wetlands in Kemeri National Park", Ilze Kuze from LIFE project LIFE10NAT/LV/000160 "Restoring the hydrological regime in the Kemeri National Park". Dr.geol. Aija Delina, Uvis Susko, Dr.geol. Laimdota Kalnina and Dr. biol. Mara Pakalne presented results of the LIFE project LIFE08 NAT/LV/000449 "Restoration of Raised Bog Habitats in the Especially Protected Nature Areas of Latvia".

On the first day seminar participants had a possibility to see results of raised bog hydrology restoration in the LIFE project site – Melnais Lake Mire. On the second and on the third day field trips to the LIFE project sites – Rozu Mire and Aklais Mire were organised. On the third day, Vasenieki Mire was visited where both habitat and hydrology was restored within a LIFE project LIFE04NAT/LV/000196 "Implementation of Mire Habitat Management Plan for Latvia" on 2007. Good results in mire restoration were observed – groundwater level in the bog had significantly raisen and bog vegetation was developing in the degraded areas. Information and program of seminar, as well as minutes was published on the project home page www.purvi.lv and attached to the Progress Report Annex 6.3.

On August 13, 2013 the final seminar of Project „Raised Bogs" took place in Old Riga. This was the last official meeting between the Project team and experts, partners, co-financiers and other people interested about bogs. At the beginning, presentation was given by project manager Dr.biol.Mara Pakalne. Participants were introduced with the main results achieved during three years in the four project sites – the Aizkraukle Mire and Forests, Melnais Lake Mire, Aklais Mire, Rozu Mire. Meeting was continued by film director Kaspars Goba from "Foundation ELM Media", and documentary "Mires Uncovered" was demonstrated. After the official part of the seminar, in spite of the rain participants were invited to look at raised bog restoration area in Melnais Lake Mire. In addition, detailed information about origin and development of Mire was given by Dr.geogr. Laimdota Kalnina. Main results of dendrochronological research of pines and dwarf shrubs of Nature Reserve were explained by Dr.biol. Iluta Dauskane. Excursion was concluded by project assistant Aivars Slisans who taught to participants some tricks of macro-photography.

Variations/complications/delays: No.

Additional information: Annex 7.5 List of Project Seminars, Annex 7.6 Program of the Final Seminar, minutes of seminars and list of participants, Annex 7.17 Photos of the project actions, Annex 7.18 Publicity of the project, 7.19 Electronic version of project publications, informative boards and booklets (D3), vegetation and habitat monitoring protocols (E2), Annex 7.20 Electronic version of project photos.

ACTION D.2

Name of the action: Creation and updating of the project home page

Time span: I 2010 – III 2013

Progress*:* The project home page (www.purvi.lv) was established in April, 2010 and was regularly updated with information about current actions of the project and is available also after the end of the project.
Home page includes photo galleries, information about Project Steering Group meetings, study tours, participation in seminars, and location of the Raised Bog Photo Exhibition. Information is given in Latvian and English. Home page was administrated (information and updating) by Public Awareness Coordinator.

Both, the total number of visitors (i.e. unique persons) and the number of visits were analysed after the project end to summarize the project home page popularity and necessity. Total number of homepage visitors in the time period from April 20, 2011 to September 30, 2013 was 5 664 unique persons from which many visited the home page more than once (Fig. 3). Average number of home page visitors per month is 205 persons. In total, the home page was viewed 9 465 times. Most of the visitors represent Latvia, in total 8 409 or 88.84 % from all visits. Then follow Germany, Estonia and Lithuania with respectively 130, 106 and 98 visits.

The home page with informative materials, documentary and information booklets in PDF-format will be available also after the end of the project, although new information won't be added there anymore as all project actions are completed and no further activities are planned.

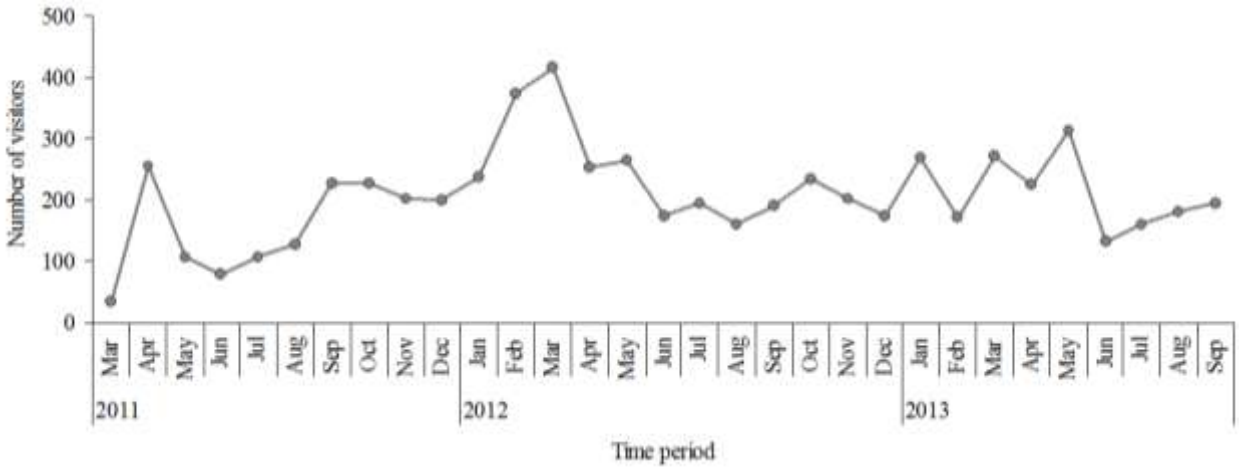


Figure 3 - Number of home page visitors from 20/04/2011 to 30/09/2013

Variations/complications/delays: Home page was planned as a part of home page of University of Latvia but was decided that all information about the project will be lost in the huge amount of information given in the home page of University of Latvia. Therefore, the project had its own home page. Home page is linked with Botanical Garden of University of Latvia and Latvian Fund for Nature home pages.

Additional information: No

ACTION D.3

Name of the action: Elaboration and publishing of information booklets and boards

Time span: I 2010, I – IV 2011

Progress*:* First booklet about the project was prepared and printed in May, 2010 (2000 copies) in Latvian and English and consists of information about project aims, activities, planned actions, nature values and general information about the project sites (Inception Report Annex 6.2).

In November/December 2011 the four booklets and information boards about the project sites – Melnais Lake Mire, Aklais Mire, Aizkraukle Mire and Forests and Rozu Mire Nature Reserves were prepared and printed. Booklets are in Latvian and in English and were printed on environmentally friendly paper in 2000 copies each. For booklet preparation public tender was organised in September, 2011.

Five booklets and information about the location of 4 information boards were published in project home page. Informative booklets were distributed in different Project public actions – during Photo Exhibition "Secrets of Mires", study tours and seminars, as well as during Project administration by the University of Latvia. Copies of booklets were added to Mid-term Report Annex 6.9. All the 5 booklets are published in project home page.

Four information boards for the project sites Melnais Lake Mire, Mire Rozu, Aklais Mire and Aizkraukle Mire and Forests in size 2A0 each were prepared and printed in December, 2011. The

information boards include the wooden part and the information board itself. The large-size boards include the maps of the project sites, location and general information. From the information boards visitors can get acquainted with the information about the project sites. There are photos of the priority habits of EU importance – active raised bogs (7110*) and bog woodland (921D*) as well as Bird species of Birds Directive.

The 4 information boards were set up, one for each of project site – Aklais Mire, Melnais Lake Mire, Rozu Mire, and Aizkraukle Mire and Forests. Information is given in Latvian, however short summary of each site in English is also included. Information boards are richly illustrated with pictures of typical mire habitats, plant and animal species, maps and 3D relief models. Maps show precise border of each Nature Reserve, access paths and nearest populated places. Details about location of each information board are given in the project home page www.purvi.lv.

Variations/complications/delays: There was a delay in this action due to long tendering procedure that was carried out by the lawyers of the Procurement department of the University of Latvia. It was planned to print the booklets and information boards until September 2011 but they were printed in November/December 2011 by the subcontractor – LATSIGN Ltd. At first information boards were set up near to project sites (except the Rozu Mire information board which was originally set up in the centre of Sala Town). Following directions of EC monitor expert, also other three information boards were later transferred to more public places easily reached from regional motor ways. Now the boards are set up on the main way through Daudzese Town (for Aklais Mire board), on the main way through Aizkraukle City (for Aizkraukle Mire and Forests board), and on the main building of Olaine Municipality (for Melnais Lake Mire board).

Additional information: Annex 7.7 Distribution of informative booklets, Annex 7.17 Photos of the project actions, Annex 7.19 Electronic version of project publications, informative boards and booklets (D3), vegetation and habitat monitoring protocols (E2), Annex 7.20 Electronic version of project photos.

ACTION D.4

Name of the action: Elaboration of Methodology for active raised bog restoration in Latvia

Time span: II 2011 – III 2013

Progress: Until the end of the project Methodology "Raised Bog Management for Biological Diversity Conservation in Latvia" was prepared and includes 15 papers in Latvian and English where results of the LIFE project "Raised bogs" and other LIFE projects in Latvia and Lithuania are summarised.

During the elaboration of Management plans for the 4 project sites – Aklais Mire, Rozu Mire, Melnais Lake Mire and Aizkraukle Mire and Forests, valuable data about plant species of raised bogs and those of EU importance was collected.

Papers for the Methodology were prepared by experts who worked in the project sites. Papers include information about the project sites – geology, hydrology, habitats and species of EU importance.

Methodology includes results and experience obtained after carrying out habitat and hydrological monitoring by project experts – Dr.geogr. Agnese Priede, Dr.biol. Liene Aunina and Dr.geol. Aija Delina. Papers analyse habitat and hydrological monitoring results as well as show the positivive effect of raised bog habitats restoartion.

Papers comprise analysis of results before and after carrying out the management actions – rising of water level in the project sites by building of dams on the drainage ditches in 2012. Results of

habitat and hydrological monitoring were compared between the drainage influenced and intact areas of raised bogs supplemented by maps and photos from project sites.

Methodology includes analysis of the raised bog habitat and hydrology experience from other LIFE projects sites in Latvia, like Kemeri Mire, Teici Mire and Lubana wetland complex as well from Aukstumala Mire in Lithuania. Besides, an overview about mire formation and history about development each of project site is given by Dr.geogr. Laimdota Kalnina.

Methodolgy was published in August 2013 on 244 pages (ISBN 978-9934-517-36-5). Due to mistake in finance planning, only 15 copies were printed in paper format. All the hard copies were distributed to authors of papers included in the mehodology. It is available also in PDF-format on the project home page (ISBN to digital version 978-9934-517-37-2).

Variations/complications/delays: Due to mistake in finance planning, limited funding for preparation of the Methodology was remained and reduced number of copies was printed.

Additional information: Annex 7.8 Copy of the Methodology "Raised bog management for the biological diversity conservation in Latvia", Annex 7.19 Electronic version of project publications, informative boards and booklets (D3), vegetation and habitat monitoring protocols (E2). The book is available on the project home page www.purvi.lv.

ACTION D.5

Name of the action: Production of a documentary

Time span: I 2010 – IV 2012

Progress*:* To illustrate the project activities and allow a wider audience to learn about the raised bog habitats and importance of their conservation and restoaration a documentary "Mires Uncovered" was produced. This activity was implemented by project associated beneficiary – "Foundation ELM MEDIA". Film director and cinematographers filmed project activities, like site visits, field studies of experts work on Management plans, installation of groundwater monitoring wells in Melnais Lake Mire and other activities. In addition, flora and fauna of the project sites at different times of the year was filmed – raised bog habitats and pool systems in Aklais Mire and Rozu Mire, degraded raised bogs in Melnais Lake Mire, forest islands and old linden deciduous forests in Aizkraukle Mire, natural dystrophic lakes and ponds in Aklais Mire. Also practical raised bog restoration action was filmed in Melnais Lake Mire, Rozu Mire, Aklais Mire and Aizkraukle Mire as well as public awareness actions, like seminars and Raised Bog Photo Exhibition in Riga and Jekabpils. In addition, interviews with project manager and habitat experts were video recorded.

The documentary "Mires Uncovered" briefly tells about history of the project idea, includes information about project activities – habitat research carried out before preparation of Management plans, discussions in the meetings, hydro-geological studies, groundwater monitoring and building of dams as well as project public awareness activities. Duration of the documentary is 30 minutes; it is in Latvian and English. Film „Mires Uncovered" is available on disc and in the Project home page www.purvi.lv.

The film was published on the DVD in 1500 copies. 890 copies were given to 210 Latvian schools, nature education centers, museums, libraries and other educational institutions as teaching tools but the rest of the DVDs will be used to promote the values, conservation and restoration need of the active raised bog habitat among different organisations working in the field of nature protection, public administration institutions and other stakeholders interested in the project results.

Documentary was presented to participants of the Project Steering group and the Project Final seminar, to children attending the Plant Conservation Day 2013 in the Botanical Garden of the

University of Latvia, in two international nature film festivals (Matsalu, Estonia on 18.-22.09.2013; Portugal on 19.-26.10.2013) and other events. Film was distributed to the experts in other countries, like Germany and Estonia.

Variations/complications/delays: No

Additional information: Annex 7.9 Copy of documentary "Mires Uncovered", Annex 7.10 Distribution of project documentary, Annex 7.17 Photos of the project actions, Annex 7.18 Publicity of the project, Annex 7.20 Electronic version of project photos.

ACTION D.6

Name of the action: Establishment of Raised Bog exhibition "Secrets of Mires"

Time span: II 2011 – III 2013

Progress*:* Raised Bog Exhibition was prepared by subcontractor "Ogres fotoklubs" who was selected after organisation of public tender by the University of Latvia. Exhibition was opened in December 17, 2010 in Viesite Municipality at the project seminar.

Since opening Raised Bog Photo exhibition has been shown in 30 places in Latvia (Table 6). Raised Bog exhibition "Secrets of Mires" includes 12 transportable boards that consist of 119 photos where rare and characteristic plant species, raised bog habitats are shown.

In the photos there is information about project sites, habitats and species of EU importance, both intact and degraded, hydrological situation, habitats to be restorated. Photos from the LIFE project sites and study tours to Germany and Wales were included in Photo exhibition. There is a stress to active raised bog habitat that is a priority habitat in EU. Exhibition includes photos of various photographers – both the professionals, as well as expert photos who worked in the project sites during the elaboration of the Management Plans.

Authors of the photos are as follows: Valda Baronina, Irena Berza, Daiga Brakmane, Davis Drazdovskis, Kaspars Freimanis, Vitauts Mihalovskis, Maruta Pakalne, Mara Pakalne, Aivars Petrins, Marita Rauba, Inguna Roze, Andreta Strade, Aivars Slisans, Voldemars Spungis, Uvis Susko and Aldis Vite. Edmunds Racinskis recorded bird voices from bogs which were greatly admired by the visitors of the exhibition, especially children.

There was a great interest from local libraries and municipalities to install the exhibition.

Table 6 - Location of raised bog photo exhibition

	Date	Place
	Year 2010	
1	17.12.10	Viesite Culture House
	Year 2011	
2	13.01.11 – 07.02.11	Ogre Culture Centre
3	08.02.11 – 08.03.11	Aizkraukle Municipality
4	09.03.11 – 18.03.11	Secondary School of Sala town
5	21.03.11 – 25.03.11	Ministry of the Environmental and Regional Development of Latvia
6	26.03.11 – 11.04.11	The Cabinet of Ministers of the Republic of Latvia
7	11.04.11 – 26.04.11	Ministry of Defense of Latvia

	Date	Place
8	27.04.11 – 09.05.11	Daugavpils University
9	12.05.11 – 20.05.11	Olaine Museum of History and Art
10	23.05.11 – 31.05.11	Saeima (Parliament) of Latvia
11	06.07.11 – 02.08.11	Ventspils Library
12	02.08.11 – 05.09.11	Jelgava Scientific Library
13	06.09.11 – 24.10.11	Botanical Garden of the University of Latvia
14	26.10.11 – 02.12.11	Jekabpils Library
	Year 2012	
15	02.12.11 – 12.01.12	Jaunjelgava Library
16	12.01.12 – 15.02.12	Akniste Library
17	15.02.12 – 24.02.12	Daudzese Primary School
18	01.03.12 – 31.03.12	EU House in Riga
19	04.04.12 – 05.05.12	Bulduri Library
20	08.05.12 – 08.06.12	Vaivari Rehabilitation Centre
21	15.06.12 – 15.07.12	Stockholm School of Economics in Riga
22	08.08.12 – 16.09.12	Code Library
23	17.09.12 – 19.10.12	Riga City Central Library
24	22.10.12 – 15.11.12	Riga City Council
	Year 2013	
25	14.01.13 – 31.01.13	Dundaga Library
26	04.02.13. – 28.02.13	Tinuzi Elementary School Library
27	01.03.13 – 03.04.13	Laubere Library
28	03.04.13 – 03.05.13	Slate Library
29	07.05.13 – 10.06.13	Sala Library
30	11.06.13 – 02.07.13	Botanical Garden of the University of Latvia

On January 13th, 2011 additional seminar was held during the opening of the Project Raised Bog Photo exhibition “Secrets of Mires” in Ogre Culture Centre. It was organised to raise public awareness about values of raised bog conservation, inform wider public about the project. In the first part of seminar the 60 participants were informed about the exhibition and invited to look at it. On the second part project manager Dr. biol. Mara Pakalne told about nature values of raised bogs, their formation and project actions. After presentation, participants of seminar watched film "Story about Bog" made by project associated beneficiary “Foundation ELM MEDIA”.

On March 9th, 2011 project team visited Sala Secondary School to tell about raised bog values for 93 participants and to set up project Photo exhibition "Secrets of Mires". Participants of the seminar watched the film "Story about Bog" made by “Foundation ELM MEDIA”. Seminar included lecture of the Project manager Dr.biol. Mara Pakalne who told about nature values of raised bogs (plants, animals, raised bog habitats) mire origin and development. The project site - Rozu Mire is located near Sala Village and schoolchildren got to know about the site. To check what children have learned from the lecture, contest about raised bogs was organised. In the end of the seminar, an exhibition "Secrets of Bogs" was opened. Seminar for schoolchildren was planned so that the young

generation can understand the value of the raised bogs and the need of the conservation and restoration.

On July 6th, 2011 the Project Photo exhibition "Secrets of Mires" was opened in Ventspils Public Library. It was attended by 35 participants. After opening ceremony, it was possible to watch film "Story about Bog" made by "Foundation ELM MEDIA". The aim of the seminar was to open exhibition and to educate about raised bog values.

On January 14, 2013 there was a seminar in Dundaga library with the opening of the Project Photo exhibition "Secrets of Mires".

On March 1, 2013 there was a discussion about Raised bog conservation and management in Laubere library. The visitors could see also the Project Photo exhibition "Secrets of Mires".

At present the Photo exhibition "Secrets of Mires" is located in the premises of the Botanical Garden, University of Latvia and is exhibited at such events as "Plant Conservation Day", Scientific Night and other events and will be a part of the other exhibitions of the Botanical Garden devoted to nature conservation.

Variations/complications/delays: No

Additional information: Annex 7.17 Photos of the project actions, Annex 7.20 Electronic version of project photos.

ACTION D.7

Name of the action: Elaboration and printing of Layman's Report

Time span: III – IV 2012 – III 2013

Progress: Layman's Report was written by information coordinator Liga Strazdina, graphic design and composition was prepared by Daiga Brinkmane. Volume of Layman's Report reaches 20 pages; information is given in Latvian and in English. Content of Layman's report guides through all the actions and is richly illustrated with colour photos and diagrams.

Layman's report includes objectives of the project, comprises general information about the project sites, , main actions and results, information about elaboration of Management plans results of raised bog restoration in the project sites – Melnais Lake Mire, Aklais Mire, Rozu Mire, Aizkraukle Mire and Forests by building of 156 dams on the drainage ditches, habitat and hydrological monitoring results, informative and educational activities (booklets, information boards, Raised bog photo exhibition "Secrets of Mires", Methodology "Raised Bog Management for Biological Diversity Conservation in Latvia", organisation of 6 seminars, production of documentary "Mires Uncovered" and exchange of experience.

Variations/complications/delays: Due to mistake in finance planning, no funding for printing of Layman's Report was remained and it is available only in electronic format in the Project home page www.purvi.lv.

Additional information: Annex 7.11 Copy of the Layman's Report, Annex 7.19 Electronic version of project publications, informative boards and booklets (D3), vegetation and habitat monitoring protocols (E2).

E. Overall project operation and monitoring

The project is being realised in cooperation with the project stakeholders, 2 associate beneficiaries and 2 co-financers (Fig. 4).

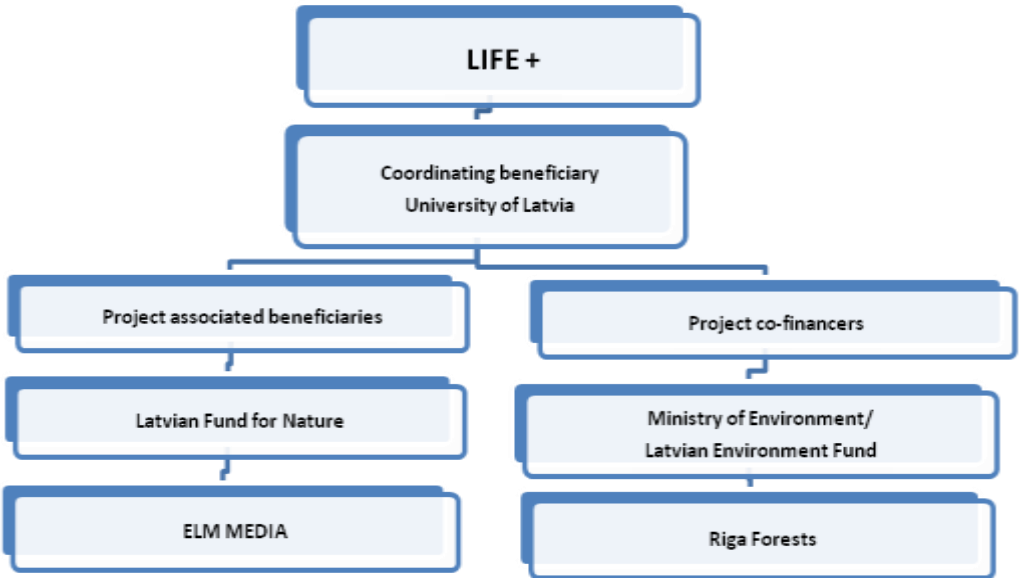


Figure 4 - Project structure and coordination

ACTION E.1

Name of the action: Project administration by the University of Latvia

Time span: I 2010 – III 2013

Progress: Project management team at the University of Latvia consisted of project manager, project assistant, information coordinator and field manager.

Project manager (part-time contract) Dr.biol. Mara Pakalne coordinated overall project performance (Action E1), smoothly and timely execution of project actions, controlled the whole project and teamwork. Project manager organised 5 study tours, cooperation with other LIFE+ projects in Latvia and in other EU countries (Action E3), coordinated monitoring of management actions (Action E2) and prepared Technical Reports for the European Commission.

Project assistant/financial assistant (part-time contract) Aivars Slisans kept project documentation and accounts, checked financial reports from associated beneficiaries, prepared documentation for public tenders, as well as agreements (Actions E1, A3), participated in organisation of seminars (Action D1), study tours (Action E3), prepared Financial reports for the European Commission.

Information (public awareness) coordinator (part-time contract) Daiga Brakmane, replaced by Edite Plokste and from November 2012 by Dr.biol. Liga Strazdina, participated in organisation of seminars (Action D1), prepared information for the home page in Latvian and English (Action D2), was responsible for sending information letters about seminars and meetings, organised correspondence with project partners, stakeholders, organised meetings of Project Steering Group, as well as provided feedback from partners, participated in organisation of study tours (Action E3).

Field manager (part-time contract) Gunars Balodis participated in field work concerning the elaboration of Technical designs and building of dams on drainage ditches.

Field monitors (3) were subcontracted by the University of Latvia (2 habitat experts and a hydrologist) to monitor changes of raised bog restoration in the project sites. Dr.biol. Liene Aunina was responsible for habitat monitoring in Melnais Lake Mire, but Dr.geogr Agnese Priede – in the other 3 project sites – Aklais Mire, Rozu Mire and Aizkraukle Mire and Forests. Dr.geol. Aija Delina carried out hydrological monitoring in the 4 project sites.

On August 19th, 2010 in Olaine Museum of History and Art the 1st meeting of project Steering Group was held. In total, 21 participants attended the meeting, representing stakeholders, project associated beneficiaries, co-financers and project experts. Meeting of the project Steering Group was opened by Vija Busa from Ministry of Environmental Protection and Regional Development, Department of Nature Protection. At the start of the meeting project manager Dr.Mara Pakalne informed about results in LIFE+ project – field studies at the project sites, study tour to LIFE project areas in Germany (Lower Saxony and Bavaria), participation in the symposium of the International Mire Conservation Group in Slovakia and Poland, as well as planned activities of the project. Dr.geol. Aija Delina – the project hydrologist and monitoring expert told about hydrological studies and planned management activities – rising of water level in the drained areas of the project sites.

Latvian Fund for Nature was represented by Valda Baronina who was the coordinator for Melnais Lake Mire and Aizkraukle Mire and Forests Nature Reserve Management Plans. Valda Baronina informed about field studies in the project sites and progress of elaboration of Management plans. Project Information coordinator Daiga Brakmane informed about the home page as well about the booklet and presented further public activities for the project: seminars, exhibition, booklets, information boards and Methodology. Representatives from project associate beneficiary "Foundation ELM MEDIA" Kaspars Goba and Ieva Goba told about the progress of film production – shooting of project actions, elaboration of film scenario with innovative technical solutions, even using a digital camera with macro filming. Project assistant Aivars Slisans informed about the project financial situation – project income and expenditure. Program of the Steering group meeting, copies of presentations, lists of participants were added to Inception Report Annex 6.8.

On 1st March, 2011, the 2nd Project Steering Group meeting was organised in Olaine Museum of History and Art, close to one of the project sites – Melnais Lake Mire Nature Reserve. Steering group was informed about currently implemented and planned project activities. In total, 23 participants from various institutions, including project co-financers, associate beneficiaries and stakeholders attended the meeting. Meeting was chaired by Vija Busa from the Ministry of the Environmental Protection and Regional Development, Nature Protection Department. At the start of the meeting project manager Dr.biol. Mara Pakalne informed about the main activities during the reporting period – elaboration of the Management plans, habitat and hydrological monitoring, study tour to Wales blanket bog LIFE project, representatives from which visited Latvia, as well as about project Raised Bog Photo Exhibition "Secrets of Mires".

Coordinators of Management Plans from Latvian Fund for Nature – Gundega Freimane, Janis Reihmanis and Valda Baronina told about results of Management Plan elaboration, informed about Management Plan Steering group meetings, management actions to restore habitats and hydrology of raised bogs. Project Information coordinator Daiga Brakmane presented the main public awareness activities: home page updates, opening and transfer in Latvia of the Project Photo exhibition "Secrets of Mires" and seminars, general publicity of the project. The next speaker was Ieva Goba from associated beneficiary "Foundation ELM MEDIA". She informed about the progress of project film production. At the end of the meeting, the project assistant A. Slisans

presented the overview about the project budget. Expenditure was as planned in the project application. Program of the Steering group meeting, copies of presentations, lists of participants were added to Mid-term Report Annex 6.13.

On September 6, 2011 the 3rd Project Steering Group meeting and opening of Raised Bog Photo exhibition "Secrets of Mires" took place in the Botanical Garden, University of Latvia. At the start of the meeting Raised Bog Photo Exhibition was opened at the Botanical Garden. After that, project manager Dr.biol. Mara Pakalne informed about the results in LIFE+ project – field studies, study tour to the LIFE+ projects in Eastern Latvia and to Estonia, as well as about further activities of the project, like publishing of project information booklets and planned seminars. Next speaker was project monitoring expert Dr.geogr. Agnese Priede. She told about raised bog habitat monitoring results in summer 2011. Next talk was given by Dr.geogr. Laimdota Kalnina from the University of Latvia who presented results of geological and paleovegetation studies in the project sites - in Rozu, Melnais Lake, Aklais and Aizkraukle Mire and Forests. Participants of the Steering group were greatly interested in the new results obtained from these studies. Afterwards was the presentation of the project information coordinator Daiga Brakmane who told about Public awareness activities. Next speaker was Ieva Goba who represented project associated beneficiary "Foundation ELM MEDIA" and told about the progress of the film. The Steering Group meeting was completed by the presentation of the project assistant Aivars Slisans with an overview about project finances. Program of the Steering group meeting, copies of presentations, lists of participants were added to Mid-term Report Annex 6.13.

On March 1, 2012 the 4th Steering group meeting was held in the EU house. It started with the opening of Raised bog photo exhibition "Secrets of Mires". The 4th Steering group meeting was chaired by Inga Belasova from the Ministry of the Environmental Protection and Regional Development, Presentations were given by the project staff, project experts and sub-contractor from „E-Buvvadiba" Ltd. Project manager Dr.biol. Mara Pakalne started the meeting with an overview about the progress of project actions. After that the floor was given to Arnis Staris representing sub-contractor from „E-Buvvadiba" Ltd. Next speaker was Dr.biol. Iluta Dauskane; she presented results of dendrochronological studies in Melnais Lake Mire. After that presentation was given by project information coordinator Daiga Brakmane who told about public awareness actions. After that the floor was given to Ieva Goba representing project associated beneficiary „Foundation ELM MEDIA" who showed a fragment from the film about Melnais Lake Mire Nature Reserve. Final presentation was given by project assistant Aivars Slisans who informed about project financial situation. Program of the Steering group meeting, copies of presentations, lists of participants were added to Progress Report Annex 5.6.

On October 22, 2012 the 5th Project Steering Group meeting and opening of Raised Bog Photo exhibition "Secrets of Mires" took place at the Riga City Council. At the beginning, photo exhibition was opened by project manager Dr. Mara Pakalne. Afterwards, floor was given to Deputy Head of Riga City Council Andris Ameriks and representative of the project co-financer "Riga Forests" Ltd. Aivars Taurins and the Chair of "Ogres fotoklubs" who has prepared the exhibition – Vitauts Mihalovskis. The 5th Project Steering Group meeting was attended by 22 participants from various institutions, including project co-financers, associated beneficiaries and stakeholders, Ministry of Environment and Regional Development and Nature Conservation Agency. The meeting was opened and chaired by Inga Belasova from the Ministry of Environmental Protection and Regional Development. Project manager Dr. biol. Mara Pakalne informed about progress of project actions – restoration of site hydrology, habitat monitoring, International seminar and a study tour to Lithuania. Dr.geol. Aija Delina told about results after rising of water level in the project sites by building of dams and the positive effect on site hydrology. Dr.biol. Liene Aunina informed about the on-going habitat monitoring in Melnais Lake Mire where after raising of water level in winter 2012, the coverage of the main peat building

species – *Sphagnum* and cotton-grass has increased in the monitoring plots. Project sub-contractor E-Buvvadiba informed about building of dams in the project sites. Ieva Goba from the project associated beneficiary „Foundation ELM MEDIA" told about the progress of project film and showed three short video clips. Project assistant Aivars Slisans informed about finances of the project. Program of the Steering group meeting, copies of presentations, lists of participants were added to Progress Report Annex 5.6.

On May 17, 2013, the 6th Project Steering group meeting was held at the Botanical Garden of the University of Latvia. At the beginning, the project Raised bog photo exhibition was opened by the project manager Dr.biol. Mara Pakalne. The 6th Project Steering Group meeting was attended by 22 participants from various institutions, including project co-financers, associate beneficiaries and stakeholders, Ministry of Environment and Regional Development and Nature Conservation Agency. Meeting was opened and chaired by Laura Seile from the Ministry of Environment and Regional Development. Project manager Dr. biol. Mara Pakalne informed about the results of the project actions – restoration of site hydrology and habitat monitoring. The information coordinator Liga Strazdina informed about project photo exhibition "Secrets of Mires", maintenance of project home page and introduced with content of the project book. Project assistant Aivars Slisans told about finances of the project. After the meeting, associate beneficiary „Foundation ELM MEDIA" presented the film "Mires Uncovered" to the visitors of the Botanical Garden.

Information about Steering Group meetings is published on the home page of the project www.purvi.lv

Variations/complications/delays: No

Additional information: Annex 7.4 List of Project Steering group meetings, Annex 7.13 Program of the 6th Project Steering group meeting, list of participants, Annex 7.17 Photos of the project actions, Annex 7.19 Electronic version of project publications, informative boards and booklets (D3), vegetation and habitat monitoring protocols (E2), Annex 7.20 Electronic version of project photos.

ACTION E.2

Name of the action: Monitoring the effects of management actions on raised bog habitats, bird species and site hydrology

Time span: I 2010 – III 2013

Progress: Action included monitoring of success of active raised bog habitat (7110*), site hydrology restoration in the 4 project sites – Melnais Lake Mire, Aklais Mire, Aizkraukle Mire and Forests and Rozu Mire Nature Reserves. Monitoring was started in 2010 and continued until the end of project in August 2013. Results of habitat and groundwater monitoring were summarised in Final Monitoring Reports prepared by monitoring experts and published on the project home page www.purvi.lv.

There were 3 monitoring experts. Project monitoring expert in hydrology and geology (Dr. geol. Aija Delina) evaluated hydrological situation drained and intact areas the project sites, project habitat monitoring experts (Dr.geor. Agnese Priede for the 3 project sites – Rozu Mire, Aklais Mire, Aizkraukle Mire and forests, Dr. biol. Liene Aunina for Melnais Lake Mire) carried out habitat monitoring.

Habitat and hydrological monitoring was carried out in the project areas where raised bog restoration by building of dams on the drainage ditches was carried out (Action C1) as well as for reference compared to the intact raised bog area. Monitoring Methodology for Mire Habitats developed in Latvia was applied. Changes in plant cover and hydrology of raised bog habitats

resulting from raising water level after building of dams on drainage ditches in the project sites were evaluated. In 2010, in total 21 plots in the diameter of 4 m was set up in Rozu Mire, 20 in Aizkraukle Mire and Forests, 30 in Aklais Mire and 52 in Melnais Lake Mire Nature Reserve. In 2011, the 16 new monitoring plots were set up in the project sites, from them 5 plots in Aizkraukle Mire and Forests, 5 plots in Rozu Mire and 6 plots in Melnais Lake Mire to compare the degraded areas with the intact raised bog vegetation (Table 7).

Table 7 - Number of habitat monitoring plots and groundwater monitoring wells in the project sites

Project site	No of habitat monitoring plots	No of groundwater monitoring wells
Melnais Lake Mire	58	13
Rozu Mire	26	8
Aizkraukle Mire and Forests	25	26
Aklais Mire	35	16
In total:	**144**	**63**

In the project sites habitat monitoring was aimed at assessment of effects of mire habitat restoration. Monitoring plots in the project sites were established on ditches where dam building was planned, in the raised bog area most likely influenced by dam building; in remnants of non-flooded cutover peat fields, on intact areas of raised bog to compare with the drainage and peat extraction influenced sites. Monitoring plots were located in transect lines perpendicularly to drainage ditches and in sites relatively less affected by drainage, five plots at each transect line. In all cases, the transect lines were parallel to transects of hydrological monitoring.

Habitat monitoring plots were described according to a Standard protocol, including parameters such as micro-relief, vegetation structure, cover of vascular plant, moss and lichen species (estimated in percent) and vitality of trees, shrubs and dwarf shrubs (estimated in four degrees). Each plot was attributed by an ID code. The size of the monitoring plots has a diameter of 4m or 1m. Geographical coordinates of each plot were recorded and a digital data file created. Additionally, digital photographs of all plots were taken and named according to the ID codes.

Habitat monitoring indicators were as follows – groundwater level in the project sites, plant species in monitoring plots and bird species in the project sites. Sources of verification include – raise of groundwater table after building of dams on the drainage ditches, re-establishment of *Sphagnum* species in the drainage ditches, re-appearance of typical active raised bog species in the degraded project areas, occurrence of raised bog bird species in the open active raised bog areas. Wetness of the sites was recorded and included surface water evaluation, identification of adjacent pools *Sphagnum* dominated vegetation. At the dry points, records about tree, shrub or *Calluna* dominated vegetation were made.

From 2011-2013, the habitat monitoring plots were repeatedly visited and all parameters estimated according to the Standard protocol.

Groundwater monitoring wells were installed in November 2010 before building dams on the drainage ditches. They are located as transects in the project sites to cross the degraded areas of raised bogs and pass intact parts of raised bogs. The groundwater level was measured in the groundwater monitoring wells twice per month. The location of well profile was selected based on the following assumptions: (1) ditch is located in typical area of mire; (2) dams are constructed on the ditch. Wells in the profile were located so that there is short distance between the wells closer to

the ditch and longer distance further away from the ditch. The total length of profile was 500 m, except some areas, where it is 250 m. The last well in the profile represented the natural, undisturbed hydrological regime in the mire.

Totally in the project sites there are nine profiles with 63 wells. Groundwater monitoring wells are about 3 m deep, depending on the thickness of peat layer. Perforated PE pipe was installed in each location. Elevation and coordinates of each well were measured using Leica GPS 900cCS.

Groundwater table observations showed that the disturbing effect on the hydrological regime of mire depends on the type of ditch. Several types of ditches were recognized at the project sites:

(1) deep ditches partially filled with water, (2) deep, wide ditches completely filled with water, (3) small, shallow ditches and (4) wide ditches, overgrown with *Sphagnum* species. Therefore, the effect of restoration measures depended on the type of the ditch as well.

Groundwater table changes (GWT) are more significant near deep, partially water filled, draining ditches, like in Aizkraukle Mire at profile A3 or in Melnais Lake Mire at profile M2 or near wells M1-3 and M1-4 (Figure 5). Difference between higher and lower GWT reaches 0.45–1.2 m in wells located up to 10–25 m from the ditch. GWT in the further wells also shows the ditch impact, but it is not so significant.

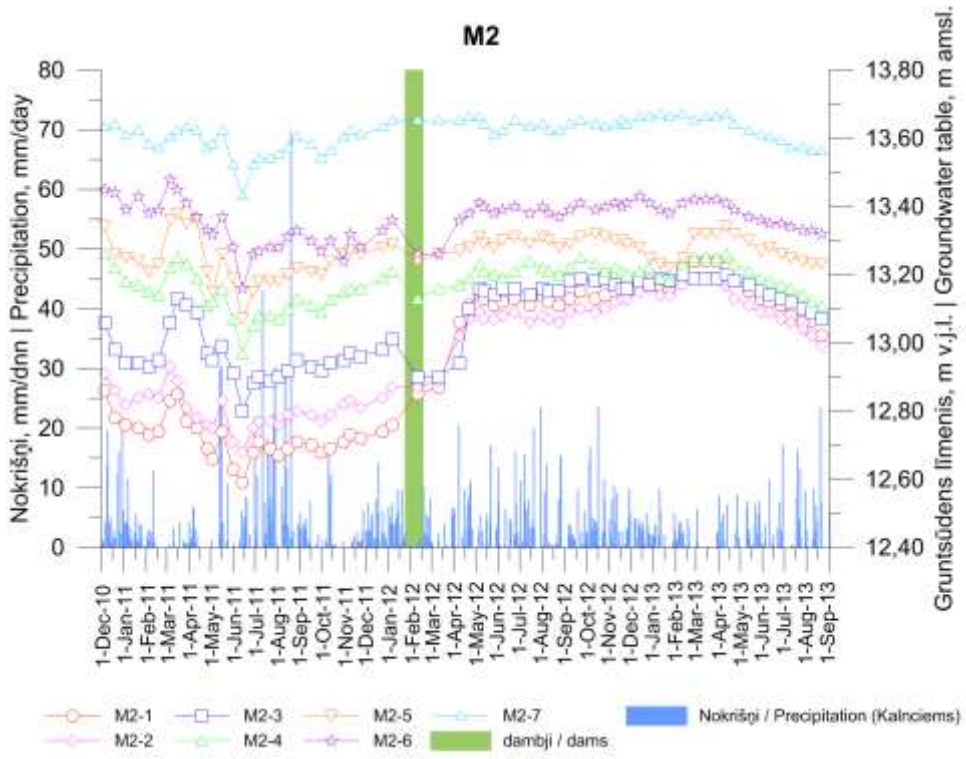


Figure 5 - Groundwater table in profile M2 near deep, draining ditch in Melnais Lake Mire

Construction of dams had obvious effect in drainage ditches. GWT observations, for example in Melnais Lake Mire it can be observed that GWT has raised for 10–25 cm in spring after dams were built, and maintained this level until summer 2013, when slight lowering of GWT was observed. GWT lowering since summer 2013 has been observed in all other profiles as well, proving impact of long-term water level changes dependant on climate conditions of the site.

Groundwater table fluctuations near wide, completely water filled ditches, like in Rozu Mire and in Aizkraukle Mire are similar to the ones near wide, draining ditches. Total range of GWT fluctuations is even a little larger than near draining ditches and reaches 30–80 cm, but they are slower, with less significant individual peaks and falls and they are more related to seasonal water level changes rather than separate intense rain-fall events. Before dam construction here difference between higher and lower GWT in particular time period is 50–60 cm, GWT changes from 0–10 cm above earth surface (well surroundings are flooded) to 40–90 cm below earth surface.

Dam construction on such ditches rises and stabilises groundwater table in mire near the ditch. GWT observations show that after dam construction total range of GWT fluctuations have minimised and maintain within 10–25 cm. GWT has risen and reaches from +5 ÷ +20 cm above earth surface to 20–25 cm below earth surface.

Direct impact of those large completely water filled ditches extends just to 5 m from the ditch, but stabilisation of GWT is observed in the further wells as well, even 250–500 m from the ditch.

Small, shallow ditches (depth up to 0.5 m, width around 0.2 m) are located in NE part of Aizkraukle Mire. Data obtained on GWT changes are rather surprising. It could be expected that the impact of such small, shallow ditches on hydrological regime of mire will be minimal. However, the observations showed the opposite – the small dimensions of ditches did not assure that the impact is minimal.

In small ditches range of GWT fluctuations before the dam construction is just a bit smaller than near above mentioned large ditches, reaching 30–50 cm, and groundwater table depth is 0–55 cm from earth surface. After the dams construction groundwater table has risen up to +10 cm near the ditch and about 20 cm below earth surface further in mire.

Wide *Sphagnum* overgrown ditches, like in Aklais Mire also drain mire, but their impact is less obvious. It is proved by smaller GWT fluctuations before the dams are constructed – GWT changes is about 25 cm during observation period, but after the dams are constructed the GWT is stabilised even more and the range of GWT fluctuations decreases to 10–15 cm.

Effect of raised bog restoration measures is obvious in all project sites. Groundwater table observations show that after construction of dams, groundwater table has rised and is kept stable for the rest of the observation period. Comparing to the "pre-dam" period, when groundwater table fluctuation reached 0.5–1 m, the groundwater table fluctuations during the "after-dam" period is just 0.1–0.15 m. Besides, most intensive effects are observed closer to the ditch (distance 1–10 m), but but the water table stabilization is observed also in the distance of 100–250 m from the ditch. There the groundwater table fluctuations have minimized from around 20 cm to around 5 cm before and after the dam construction.

Positive influence of raised bog restoration was observed also in the raised bog vegetation. There was an increase of Sphagnum cover in Melnais Lake Mire already six month after dam construction vegetation. Changes were observed within 40m distance from dammed drainage ditch beeing the most significant within a 20 m zone from a drainage ditch. Amplitude of vegetation changes did not correlate with the distance from the ditch as it also is influenced by mire vegetation structure and species assemblage before dam construction. In areas with severe drainage influence, where shrub and tree layer are well developed, vegetation changes were less significant than in raised bog area with moderate or small drainage influence. The observed vegetation changes indicated trend towards undisturbed raised bog vegetation.

Variations/complications/delays: No

Additional information: Annex 7.14 Final Reports of Habitat and Hydrological Monitoring, Annex 7.17 Photos of the project actions, Annex 7.19 Electronic version of project publications,

informative boards and booklets (D3), vegetation and habitat monitoring protocols (E2), Annex 7.20 Electronic version of project photos, Annex 5.14 Habitat and Hydrological Monitoring (in Mid-term Report), Annex 6.7 Habitat and Hydrological Monitoring (in Progress Report).

ACTION E.3

Name of the action: Cooperation with LIFE+ projects, participation in study tours, seminars and conferences

Time span: II – IV 2010, II – IV 2011, II – IV 2012

Progress: For successful implementation of project actions that include practical active raised bog habitat restoration, monitoring the success of the habitat and hydrology management and also public awareness actions (A2, C1, D4, E1, E2) it is of high importance to know about the results of similar actions carried out within the other LIFE-Nature and LIFE+ projects in other European countries. It was important to share project results with other countries and learn the experience of other LIFE projects. Therefore, study tours to other LIFE project sites were organised as well as project staff participated in seminars and conferences.

Study tours

From June 6-18, 2010 the project team including project manager Dr.biol. Mara Pakalne, project assistant Aivars Slisans, information coordinator Daiga Brakmane and field manager Gunars Balodis went on the first study tour was to Germany to see the results of the project LIFE05NAT/D/000053 "Rosenheimer master basin bogs". Ralf Strohwasser, the manager of the project, introduced the project team with the raised bog area where the water level was successfully raised by building dams 70–100 long. Raised bog habitat restoration has started there – bog hummocks and hollows were developing. To show the bog values near the Bad Feilnbach in Sterntaler Filze a board walk was built there. The project team went also to Lower Saxony, in Wiefelstede, Stapeler Moor where under the guidance of Heinrich Belting and local experts the project team was taken to the peatlands where the bog restoration was started nearly a decade ago. This milled area is surrounded by natural raised bog vegetation which is included in a protected nature area. Suzanne Belting in Großen Torfmoores near Lübbecke, the manager of LIFE project "Regeneration des Großen Torfmoores" guided to the restored areas of the raised bog. More information in Inception Report Annex 6.11.

From September 1-7, 2010 the LIFE+ project team including the project manager Mara Pakalne, project assistant Aivars Slisans, information coordinator Daiga Brakmane and field manager Gunars Balodis were on study tour in Wales to get to know the experience of EC LIFE 07NAT/UK/000948 project "Anglesey and Lleyn Fens – Restoring Alkaline and Calcareous Fens within the Corsydd Mon a Llyn (Anglesey & lleyn Fens) Special Areas of Conservation in Wales" and LIFE 06NAT/UK/000134 "Restoring Active Blanket Bog in the Berwyn and Migneint Special Areas of Conservation in Wales" Mr. Les Colley who works for Countryside Council for Wales guided to the sites of the EC LIFE project "Anglesey and Lleyn Fens – Restoring Alkaline and Calcareous Fens within the Corsydd Mon a Llyn (Anglesey & lleyn Fens) Special Areas of Conservation in Wales" and introduced with the restoration work carried out in Anglessey and Llyn fens. The EC LIFE project manager Mike Morris and his team working for the LIFE project "Restoring Active Blanket Bog in the Berwyn and Migneint Special Areas of Conservation in Wales" showed the project sites around Lake Vyrnwy and blanket bogs where bog restoration has been carried out since 2007. The area near Penan was also visited where the excavator was building dams on the drainage ditches. More information in Inception Report Annex 6.11.

On September 21-22, 2010 the Welsh colleagues from the EC LIFE project "Restoring Active Blanket Bog in the Berwyn Migneint and Special Areas of Conservation (SACs) in Wales" visited EC LIFE project sites in Latvia where raised bog restoration was carried out – the area of LIFE project "Conservation of wetlands in Kemeri National Park" (guided by Janis Kuze, project manager). During the project restoration of mire habitats and hydrology was carried out both in the peat fields and in the areas influenced the drainage ditches, Cena Mire – the site of EC the LIFE project "Implementation of Mire Habitat Management Plan for Latvia". The EC LIFE+ project manager Dr. Mara Pakalne introduced with the experience of bog restoration and monitoring in Cena Mire Nature Reserve, Engure Lake Nature Park where EC LIFE project "Implementation of management plan for Lake Engure Nature Park" was carried out. The visit of the representatives from the Welsh LIFE project was a great possibility to discuss the raised bog restoration results in Latvia and compare them with those in the Welsh LIFE sites. More information in Inception Report Annex 6.11.

On May 10, 2011 the LIFE+ project team including project manager M.Pakalne, project assistant A. Slisans and field manager G. Balodis visited LIFE+ projects in Eastern Latvia: "Conservation of rare reptiles and amphibians in Latvia" (LIFE09 NAT/LV/000239) and "Restoration of Corncrake habitats in Dviete Floodplain Natura 2000 site" (LIFE09 NAT/LV/000237). At first the project team visited Daugavpils University where the Project Raised Bog Photo Exhibition "Secrets of Mires" was exhibited. There was a possibility to meet representatives from the LIFE+ project "Eremita Meadows" (LIFE09 NAT/LV/000240). Next meeting was with the manager of the EC LIFE+ project "Conservation of rare reptiles and amphibians in Latvia" Mihails Pupins who shared his experience about the results of the activities caried out in the project at Daugavpils ZOO and also in the field where the reptiles and amphibians are grown. In Eastern Latvia another LIFE+ project is carried out "Restoration of Corncrake habitats in Dviete River floodplain Natura 2000" (LIFE09 NAT/LV/000237). Local guides introduced to objectives of the project. More information in Mid-term report Annex 6.15.

On August 25-29, 2011 the LIFE+ project team including project manager Mara Pakalne, project assistant A. Slisans, information coordinator D.Brakmane and field manager Gunars Balodis visited Estonia to raise knowledge about raised bog restoration in neighbouring bogs. In Estonia, the project team met Marika Kose, earlier LIFE manager and the representatives from Estonian Ministry of Environment. The project team visited Tolkuse Mire that includes both natural and degraded raised bog vegetation. Raised bog restoration and monitoring actions were carried out there. Estonians have established experimental areas with planted *Sphagnum* species and cranberries in degraded area of the bog. Beavers were also promoting to restore raised bog habitats by building of dams.

Project team also visited Nigula Nature Reserve together with Agu Levits from Nature Protection Agency of Estonia. There were a lot of discussions about dam building methods and types. In Nigula, dams were built by hand, not by the excavator. Agu Levits mentioned that Latvian experience was used in this site. After discussions everyone agreed that beaver dams sometimes can be even better than those made by humans. After field trip raised bog conservation in both the countries was discussed. Further Vidumae Nature Reserve was visited in Estonia where was a meeting with Tenu Talvi, an expert from Vidumae Nature Reserve – there was a discussion about nature conservation problems both in Latvia and Estonia. More information in Mid-term report Annex 6.15.

From September 30-October 7, 2012 the project manager Dr. Mara Pakalne and the project assistant Aivars Slisans participated in a Study tour to the LIFE project LIFE07NAT/LT/000530 "WETLIFE – Restoring Hydrology in Amalvas and Zuvintas wetlands" and Aukstumala Raised bog. During the study tour it was possible to see the results of raised bog restoration in Amalvas and

Zuvintas bogs where forest has been cut and plastic dams built on the contour ditches and the smaller ones inside the bog. Results showed that groundwater level had slowly raisen and bog plant species have started to re-appear in the restoration area.

As in the LIFE project in Latvia raised bog restoration is carried out, it was important to get to know Lithuanian experience to compare the results. It was concluded that building of peat dams in Latvia by an excavator give a faster result in raising of raised bog groundwater level than the plastic dams in Lithuania. More information in Progress Report Annex 5.8.

Participation in seminars and conferences

On March 2-3, 2010 project manager Mara Pakalne and assistant Aivars Slisans participated in the kick-off meeting for LIFE08 projects in Tallinn. The meeting has given valuable information about technical and financial aspects of LIFE + projects. More information in project home page www.purvi.lv.

On September 7-9, 2010 project manager Mara Pakalne and assistant Aivars Slisans participated in Aberystwyth and Corsa Fochno seminar which was dedicated to the Welsh raised bog protection and management. It was a part of the Study tour to Wales. Workshop was organized by the specialists from Countryside Council for Wales. It included both presentation and field visits to the raised bog where discussions on wetland management and hydrological observation methodology were continued. During study tours project manager and other project staff members told about the first project results and the planned activities as well as distributed the first project booklet. More information in Inception Report Annex 6.11.

On July 5-18, 2010 project manager Mara Pakalne participated in the Field symposium and a conference of the International Mire Conservation Group in Poland and Slovakia. Presentation about the LIFE project was given by Mara Pakalne under the title "EC LIFE+ project "Restoration of Raised Bog Habitats in the Especially Protected Nature Areas of Latvia". The project booklet was distributed at the conference. More information in Inception Report Annex 6.11.

On April 4-10, 2011 project manager Mara Pakalne and assistant Aivars Slisans participated in the 20th seminar of the European Vegetation Survey in Italy, Rome and presented a paper under title "Changes in raised bog vegetation in the LIFE project sites in Latvia. See project home page www.purvi.lv

On February 25-27, 2012 project manager Mara Pakalne and the project assistant Aivars Slisans participated in the International Conference in Germany "Mire Conservation in Germany". The Conference included expert presentations representing various organisations where different projects concerning raised bog restoration are implemented. There were over 100 participants that gave a possibility to establish new contacts and obtain new knowledge for raised bog conservation and management in Latvia. Contacts were maintained also after the LIFE project and joint projects planned. There was also a poster session where the project poster "Raised Bog restoration in Melnais Lake Mire" was presented. More information in home page www.purvi.lv

On April 8-13, 2013 project manager Mara Pakalne and assistant Aivars Slisans participated in the 21st seminar of the European Vegetation Survey in Italy, Rome and presented a poster „Restoration of raised bog habitats in Melnais Lake Mire in Latvia" (conference home page http://www.scienzadellavegetazione.it/22th_workshopEVS2013/).

On April 20-26, 2013 project manager Mara Pakalne and assistant Aivars Slisans participated in the International Workshop „AWARE – Approaches in Wetland restoration" in Poland, Warsaw and presented a poster „Restoration of raised bog habitats in Melnais Lake Mire in Latvia".

On June 25-30, 2013 project manager Mara Pakalne and Public relations expert Liga Strazdina participated in the 56th IAVS Symposium „Vegetation patterns and their underlying processes" in Estonia, Tartu. Project manager gave oral presentation "Raised bog studies, monitoring and management" (conference home page http://iavs2013.ut.ee/).

Variations/complications/delays: No

Additional information: Annex 7.15 List of the Study tours, Annex 7.17 Photos of the project actions, Annex 7.18 Publicity of the project, Annex 7.20 Electronic version of project photos.

ACTION E.4

Name of the action: Independent audit of the project

Time span: II – III 2013

Progress*:* Independent audit for financial statements of the project was performed during preparation of Final Report. Auditor has verified the accounts with respect to national legislation and accounting rules, certified that all costs incurred according to the LIFE+ Common Provisions. The audit report was prepared.

Variations/complications/delays: Due to delayed preparation of Financial report, independent audit was also delayed

Additional information: Annex 8.11 Copy of Independent audit Report.

ACTION E.5

Name of the action: Elaboration of After-LIFE Conservation Plan

Time span: II – III 2013

Progress: After-LIFE Conservation Plan was prepared by project manager and information coordinator. It was written in English on 14 pages and includes detailed information about project actions and background, SWOT analysis, objectives that should be achieved after the end of project and financial outlook of necessary activities.

Variations/complications/delays: Due to mistake in finance planning, no funding for printing of After-LIFE Conservation plan was remained and it is available in electronic format in the Project home page www.purvi.lv.

Additional information: Annex 7.16 Copy of After-LIFE Conservation plan, Annex 7.19 Electronic version of project publications, informative boards and booklets (D3), vegetation and habitat monitoring protocols (E2).

5.2 Evaluation

Methodology for habitat and hydrology monitoring in the project site

Mire Habitat Monitoring Methodology developed in Latvia was applied in the project sites - Aizkraukle Mire and Forests, Aklais Mire, Melnais Lake Mire and Rozu Mire Nature Reserves for the implementation of Action E2. For groundwater table monitoring, groundwater wells were used and groundwater table measurement carried out twice per month. Monitoring results showed that at the same year after dam building in Melnais Lake Mire the observed vegetation changes indicated

trend towards undisturbed raised bog vegetation. Coverage of raised bog species indicated that species of wetter habitats are re-esablishing in the degraded areas. As was expected, rising of groundwater level and its stabilization occurred shortly after the dam building in all project sites and approves the efficiency of raised bog restoaration actions. The chosen monitoring methodology can be considered as successful as it gave information about results and success of raised bog restoration in project sites.

Methodology for active raised bog habitat restoration

Re-establishment of active raised bog habitats and site hydrology was carried out by building of dams on the drainage ditches and raising the water level of the raised bogs in project sites – (Action C1). The action was carried out after elaboration and approval of Management plans (Action A1) and Technical designs for building dams (Action A2) that are the pre-condition for implementation of this project action.

Positive results after building of dams were observed at once as the groundwater level has risen in the ditches and the surrounding areas and prove that active raised bog restoration methodology was successful. If the dams are built correctly, the water at once started to fill-in the ditches. Construction of dams on ditches slowed water outflow from mire, thus rewetting area adjacent to the ditch and maintaining favourable living conditions for moisture demanding mire vegetation. It was proved that the most effective are dams built by excavator as they are wider and more heavily compacted than those built by handwork.

Comparison between project results and the objectives

Project objectives were successfully achieved (Table 8, Annex 7.21 Final table of indicators):

- The best possible conservation status of priority habitats and species of Community importance was secured after implementing the management actions in the project sites;
- Local society and stakeholders were involved in the conservation and management activities;
- Public awareness and enhance the understanding of the current nature conservation issues, habitats of EU importance and Natura 2000 network was significantly increased.

Table 8 - Summary about planned actions and project results

Task	**Elaboration and approval of 4 Management plans for the 4 project sites**
Foreseen	Management plans elaborated and approved
Achieved	In total 4 Management plans elaborated and approved
Evaluation	Management plans were the basis for the implementation of raised bog restoration actions
Task	**Restoration of Active raised bog (7110*) habitats and hydrology in project sites**
Foreseen	Active raised bog restoration foreseen was 299 ha
Achieved	The Active raised bog restored area is 488 ha
Evaluation	The restored area is larger than planned
Task	**Building of dams on the drainage ditches**
Foreseen	In total 193 dams were planned
Achieved	Totally 156 dams were built in the project sites, including 29 dams in Aizkraukle Mire and forests,

	14 dams in Aklais ire, 54 in Melnais Lake Mire and 59 dams in Rozu Mire
Evaluation	It was possible to reach the aim with a smaller number of dams
Task	**Involvement of local society and stakeholders in the conservation and management activities**
Foreseen	In total 6 seminars planned
Achieved	In total 6 seminars were organised for all interest groups and an International seminar organised with the participation of stakeholders and local society
Evaluation	There was an interest from national and international audience
Task	**Raise public awareness and enhance the understanding of the current nature conservation issues, habitats of EU importance and Natura 2000 network**
Foreseen	In total 5 project booklets and Methodology on habitat management and conservation published; project film produced; raised bog exhibition prepared
Achieved	In total 5 project information booklets published; raised bog photo exhibition "Secrets of Mires" established; methodology "Raised bog management for biological diversity conservation in Latvia" published; documentary "Mires Uncovered" produced
Evaluation	People educated about the conservation and nature values of the project sites

Methodology "Raised Bog Management for Biological Diversity Conservation in Latvia" includes not only recommendations for raised bog restoration but also summarises results of project actions as well as experience from other LIFE projects in Kemeri Mire, Teici Mire, Lubana wetland complex and in Lithuania. There was a great interest about the project documentary "Mires Uncovered" not only from the side of project partners, stakeholders, teachers who want to use it for teaching purposes but also from experts in other countries.

Another success of the project is the contribution to the education of general public about species and habitats of EU importance, conservation and management actions of the EU priority protection habitat – active raised bog. Understanding of project stakeholders about the need of raised bog restoration has greatly changed in comparison with the start of the project when there was little information available. It was also stressed by participants of the project Final Seminars that they have learned a lot about the raised bog conservation and management. Also news, short or long papers published in 34 newspapers, 8 TV broadcasts, 3 Radio broadcasts and interviews, 139 internet portals or news agencies have raised awareness of public about raised bog values (Annex 7.18 Publicity of the project).

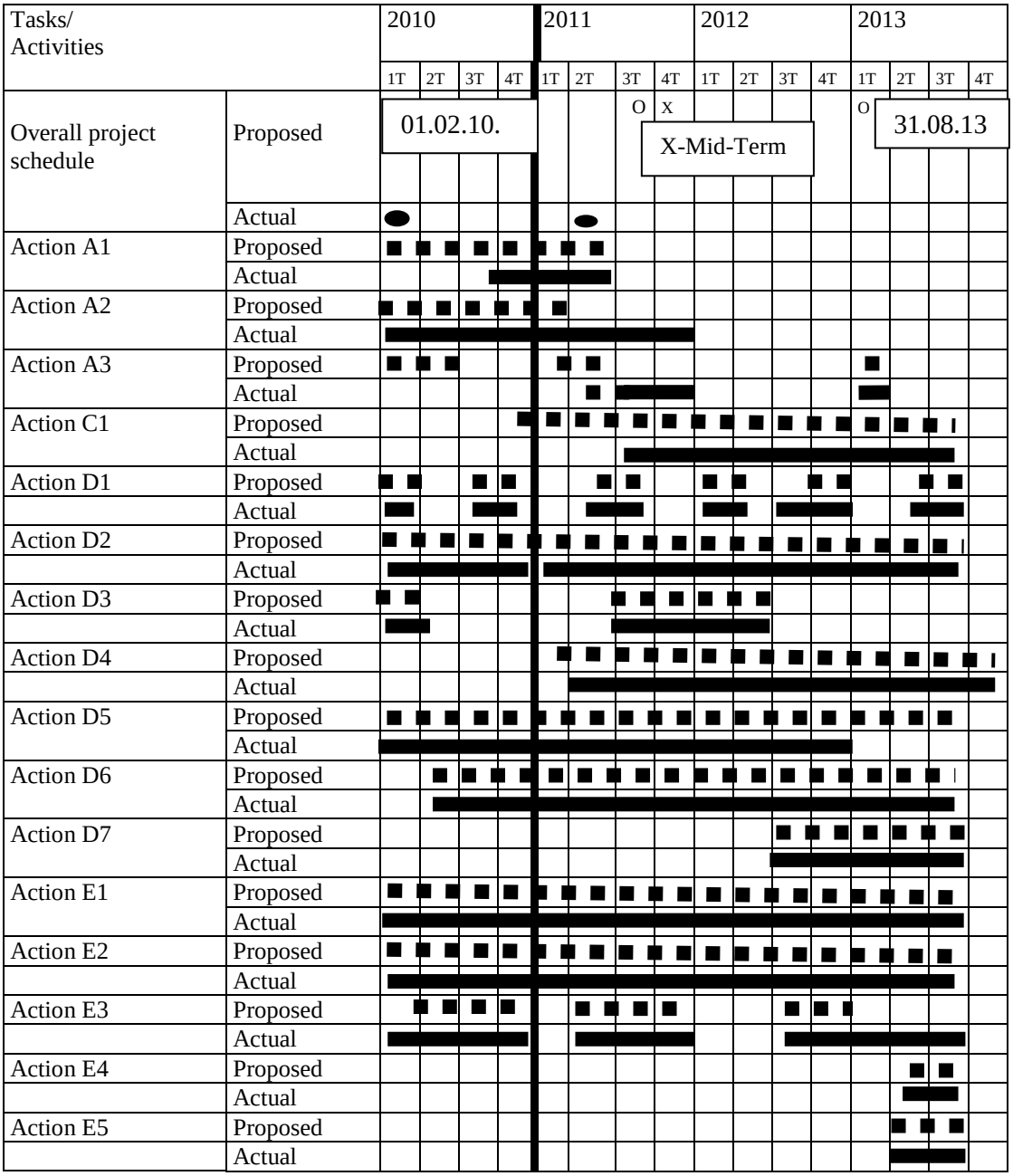
Project staff has gained wide experience about mire management practices, and was invited to share it also after project end in following public events:

- October 14, 2013. Live interview with project manager Mara Pakalne to Radio LR1 in the broadcast "Zinamais nezinamaja" (The Known in the Unknown);

- December 5, 2013. Project NAT-PROGRAMME mire habitats seminar, project manager Mara Pakalne gave a lecture about raised bog restoration methods and results;

- February 20-21, 2014. International seminar on peatland restoration in Germany, project manager Mara Pakalne gave a presentation under title "Restoration of mires in Latvia –the European responsibility".

Table 9 - Time schedule of the implementation of project actions



5.3 Analysis of long-term benefits

Environmental benefits and long – term sustainability

Management plans for Melnais Lake Mire, Rozu Mire, Aklais Mires, Aizkraukle Mire and Forests serve as guidelines for future activities and management of these Natura 2000 sites. Until 2020 they foresee the best possible conservation status for the priority habitats of EU importance as well as species of EU concern and include the necessary management actions that would not be possible if there is no management plan for the site.

Environmental benefits for the project sites due to implementation of raised bog restoration (Action C1) are significant as further degradation of the active raised bog habitat (7110*) in the

area of 488 ha was stopped. Rising of water level in the degraded raised bog areas of the project sites by building of peat dams ensures long-term restoration of the drained areas. Habitat and hydrological monitoring results provide evidence that after raise of the water level, re-establishment of typical raised bog species has started.

Management plans are of high importance for municipalities and landowners for management and maintenance of nature values in the Natura 2000 sites. They set management goals and measures for the project sites, they are a tool to be used for Nature Protection Agency, Regional Environment protection boards and local inhabitants to ensure sustainable conservation of the sites.

After the end of the LIFE Project, the main actions will include maintenance of the restored active raised bog (7110*) area in the project sites as well as implementation of other conservation and management action set by the Management plans. SJSC "Latvijas valsts mezi" will be responsible for long-term maintenance of most favourable conservation status for raised bog habitats that include also the maintenance of the built dams on drainage ditches in Rozu Mire, Aklais Mires, Aizkraukle Mire and Forests, but about Melnais Lake Mire – Riga Forests Ltd. will take care.

After the end of the LIFE project number actions will be carried out:

1. Implementation of site conservation and management measures prescribed by Management plans.
2. Maintenance of the restored raised bog areas where dams were built on the drainage ditches in Melnais Lake Mire, Rozu Mire, Aklais Mire, Aizkraukle Mire and Forests.
3. Continuation of habitat and hydrological monitoring to follow the effect of project management actions.
4. Demonstration of the effect of raised bog restoration methods applied in the project by guiding interesents from LIFE projects in Latvia and other EU countries.

After-LIFE Conservation plan objectives and methodology

To ensure that the achieved active raised bog restoration results sustain for a long period and serve for purposed habitat conservation some actions must be continued after the end of LIFE+ project. In accordance with Latvina legislation management of all especially protected nature areas (including NATURA 2000 sites) are under responsibility of Nature Conservation Agency which is supervised by Ministry of Environmental Protection and Regional Development of Latvia. Unfortunately there are no strategic approaches developed in national level concerning peatland management in Latvia and mires that 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.

Stakeholder for the three project sites (Aizkraukle Mire and Forests, Aklais Mire, and Rozu Mire) is State Joint Stock Company "Latvijas valsts mezi". Although company mainly aims its activities at sustainable forest management including protection, it has showed initiative and a financial support 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.

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

Inspection of raised bog restoration area

After the end of the LIFE project further inspection of dams will be carried out by inspectors from Nature Conservation Agency. In correspondence to Agency's conditions, each nature reserve must be visited at least once per year by an environmental inspector. The inspector must assess also the peat extraction influence to 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 the corresponding region. Melnais Lake Mire is under the responsibility of Lielriga Regional Administration while all the other project sites - Latgale Regional Administration.

Continuation of raised bog habitat and hydrology monitoring

Success of dam building is easily recognized after indicators of raised bog restoration, like decrease of pine and birch cover and heather vitality and increase of *Sphagnum* cover etc.

After the end of the LIFE project, active raised bog habitat monitoring will be continued in the three of project sites by State Joint Stock Company "Latvijas valsts mezi", i.e., Aizkraukle Mire and Forests, Aklais Mire, and Rozu Mire. Habitat monitoring plots will be visited once per vegetation season by habitat expert from the SJSC. In Melnais Lake Mire habitat and hydrological monitoring will be continued by experts from the University of Latvia.

Groundwater level observations in the project sites will be continued in 50 wells of three of project sites of SJSC "Latvijas valsts mezi". Measurements will be taken twice per month throughout the year by forester from the SJSC. Hydro-geologist from the University of Latvia Dr.geol. Aija Delina will continue hydrological monitoring in Melnais Lake Mire to follow the situation in site hydrology.

Demonstration value of the project

LIFE project had a demonstration role in the restoration of active raised bog habitats (7110*) – it was one of the few projects in Latvia that implement raised bog by building peat dams by excavator.

Demonstration of the effect of raised bog restoration was carried out during a number of project seminars, as well as by participation with posters and presentations in various international seminars.

The documentary "Mires Uncovered" produced by "Foundation ELM MEDIA" has already been shown at libraries, schools, Universities and will be used for education purposes also in the future. After the project completion the documentary was presented in several international nature film festivals:

- September 18-22, 2013 Awards of the Matsalu Film Festival 2013, Estonia (http://www.matsalufilm.ee/);

- October 19-26, 2013 Competição International Curtas-Metragens, Portugal (http://www.cineecoseia.org/).

During the project seminars, including the International seminar "Sharing experience on raised bog restoration" results of active raised bog (7110*) restoration were demonstrated to representatives from LIFE projects as well as to mire experts from other European countries and were considered as successful by national and international experts.

The attitude of the general public to the raised bog conservation and restoration issues has greatly changed especially thanks to the Raised bog photo exhibition "Secrets of Mires" that has been in many libraries in Latvia and shown on TV as well as to other public awareness actions carried out within the project, like publishing of information booklets, TV and radio broadcasts.

5.4 Dissemination issues

The objectives of public awareness actions were as follows:

- Promote and demonstrate good practice for the management of active raised bog habitats by holding seminars for various interest groups and hosting project web site.
- Demonstrate and share results of raised bog conservation and restoration by involving local society and stakeholders in the conservation and management activities as well as to explain the need for restoration actions.
- Raise public awareness regionally to influence local inhabitant's attitude towards the safeguarding of internationally valuable active raised bog habitat as well nationally and internationally through the practical raised bog restoration works and awareness raising activities as well as improve the understanding of the current nature conservation issues, habitats of EU importance and Natura 2000 network.

5.4.1 Dissemination: overview per activity

On all the LIFE project documents, goods, publications, as well as in presentations logo of LIFE and Natura 2000 was used.

Results of project dissemination actions are summarised in Table 10 and in Annex 7.7 Distribution of informative booklets and Annex 7.10 Distribution of project documentary.

Table 10 - The main results of project dissemination actions

Project action	Results
D1 Organisation of seminars	In total 6 seminars organised, including an international seminar "Sharing experience on raised bog restoration"; local public and stakeholders educated about the nature values in the project sites, active raised bog restoration results
D2 Creation and updating of the project home page	Project home page regularly updated with the latest information about the progress of actions
D3 Elaboration and publishing of information booklets and boards	In total 5 information booklets published and 4 boards set up
D4 Elaboration of Methodology for active raised bog restoration in Latvia	Methodology "Raised bog management for the biological diversity conservation in Latvia" produced
D5 Production of a documentary	Documentary "Mires Uncovered" produced
D6 Establishment of the Raised bog exhibition	Raised bog photo exhibition "Secrets of Mires" prepared
D7 Elaboration and printing of Layman's Report	Layman's Report prepared

5.4.2 Layman's report

Layman’s report includes project objectives, information about project sites, overview of project actions, methodology and results of raised bog habitat (7110*) conservation and management. It comprises information about Management plans for the project sites, the positive impact of raised bog restoration actions on the project sites – Melnais Lake Mire, Rozu Mire, Aklais Mire, Aizkraukle Mire and Forests Nature Reserves.

The success restoration of raised bog habitats by rising of water table in the degraded areas, monitoring of management actions is described in the Layman’s report.

Finally the importance of project dissemination activities is stressed – publishing of 5 information booklets, setting up of information boards, the value and interest of public about Raised bog photo exhibition „Secrets of Mires”, organisation of the project seminars.

Project results are described in the Methodology “Raised Bog Management for Biological Diversity Conservation in Latvia” and shown in a documentary „Mires Uncovered”. The active raised bog restoration methodology can be considered as transferrable as there is an interest to apply it within other LIFE projects in Latvia.

7. Annexes

7.1 Map of the project sites

Location of four especially protected nature areas and raised bogs

7.2 Lists of especially protected plant and animal species and habitats of Latvia and of EU importance in the Project sites (A1)

Total area (ha) of rare and protected habitats in the four Nature Reserves

Especially protected habitats of EU	**Aizkraukle Mire and Forests**	**Aklais Mire**	**Rozu Mire**	**Melnais Lake Mire**
3160 Natural dystrophic lakes and ponds	4.0	25.6	-	18.4
7110* Active raised bog	591.5	480.6	495.5	125.1
7120 Degraded raised bogs still capable of natural regeneration	54.8	4.6	346.8	82.7
7140 Transition mire and quaking bog	87.1	17.2	-	3.7
7150 Depressions on peat substrates of the *Rhynchosporion*	18.0	-	9.9	-
9010* Western taiga	12.4	102.0	-	5.1
9020* Fennoscandian natural old broad-leaved forests	135.6	4.3	-	-
9080* Fennoscandian deciduous swamp forests	49.9	84.3	4.9	-
91D0* Bog woodland	400.0	888.8	99.1	31.3
In total:	**1353.3**	**1607.4**	**956.2**	**266.3**

Number of rare and protected species in the four Nature Reserves

Especially protected species of EU and Latvia	**Aizkraukle Mire and Forests**	**Aklais Mire**	**Rozu Mire**	**Melnais Lake Mire**
Plants (including fungi, lichens and bryophytes)	47	29	10	2
Invertebrates	5	8	3	2
Birds	21	22	15	18
Mammals	12	16	12	9

Rare and protected fungi, lichen and plant species in the Project sites

Scientific name	Red-listed species in Latvia	Especially protected in Latvia	EU Habitat directive species	Aizkraukle Mire and Forests	Aklais Mire	Rozu Mire	Melnais Lake Mire
Fungi							
Fomitopsis rosea		1		+			
Rhodotus palmatus	2	1		+			
Lichens							
Arthonia byssacea	2	1				+	
Lobaria pulmonaria	2	1		+	+		
Pertusaria pertusa	3	1		+			
Thelotrema lepadinum	3	1		+			
Bryophytes							
Anastrophyllum hellerianum		1		+	+		
Barbilophozia attenuata	0	1		+	+		
Bazzania trilobata	2	1		+	+		
Dicranum spurium	4				+		
Dicranum viride	3	1	II, IV	+			
Geocalyx graveolens		1		+	+		
Jamesoniella autumnalis	3			+	+		
Jungermannia leiantha		1		+	+		
Lejeunea cavifolia	2	1		+			
Leucobryum glaucum	2			+	+		
Metzgeria furcata	2			+	+		
Neckera complanata	2			+		+	
Neckera pennata	2			+	+	+	
Odontoschisma denudatum		1		+	+		
Plagiothecium latebricola		1		+			
Scapania apiculata	0			+			
Scapania irrigua	1			+	+		
Schistostega pennata	3	1		+	+		
Trichocolea tomentella	2	1			+		
Vascular plants							
Agrimonia pilosa		1	II, IV		+	+	
Allium ursinum	3	1		+			
Androsace filiformis	2			+			
Botrychium virginianum	2	1		+			
Carex disperma	3	1		+			
Carex paupercula	3	1		+	+		
Corallorhiza trifida	3	1		+			
Dactylorhiza baltica	4	1		+			
Dactylorhiza fuchsii	4	1		+	+		
Dactylorhiza incarnata	4	1		+	+	+	
Dactylorhiza maculata	4	1		+	+	+	
Dactylorhiza russowii	4	1		+			

Scientific name	Red-listed species in Latvia	Especially protected in Latvia	EU Habitat directive species	Aizkraukle Mire and Forests	Aklais Mire	Rozu Mire	Melnais Lake Mire
Dentaria bulbifera	3	1		+			
Dianthus arenarius		1			+		
Diphasiastrum complanatum	4	1	V		+		
Epipogium aphyllum	1	1		+			
Euonymus verrucosa		1		+		+	
Festuca altissima	3	1		+			
Gladiolus imbricatus	3	1		+			
Glyceria lithuanica	3	1		+			
Hammarbya paludosa	3	1		+	+		
Huperzia selago	4	2	V	+	+	+	
Lycopodium annotinum	4	2	V	+	+	+	+
Lycopodium clavatum	4	2	V		+		+
Malaxis monophyllos	3	1		+	+		
Platanthera bifolia	4	1		+		+	
Platanthera chlorantha	4	1		+			
Poa remota	3	1		+	+		
Salix myrtilloides	3	1		+	+		
In total				**47**	**29**	**10**	**2**

Protected insect species in raised bog habitats and mire periphery in Project sites

Species name	Aizkraukle Mire and Forests	Aklais Mire	Rozu Mire	Melnais Lake Mire
Species in mire habitats				
Dark whiteface *Leucorrhinia albifrons* *	+	+	+	+
Yellow-spotted whiteface *Leucorrhinia pectoralis* **		+	+	+
Species in a periphery of mires				
Long-horned beetle *Necydalis major* ***	+	+	+	
Roman snail *Helix pomatia* *	+			
Scarabaeid beetle *Liocola marmorata* ***	+			
Rove beetle *Oxyporus mannerheimii* **		+		
Scarce fritillary *Euphydryas maturna* **	+			
Scarce heath *Coenonympha hero* *		+		
Woodland brown *Lopinga achine* *		+		
Large copper *Lycaena dispar* *		+		
Ant *Lasius fuliginosus* ***		+		
In total	**5**	**8**	**3**	**2**

* EU Habitat directive species, ** EU Habitat directive species and microreserve species in Latvia, *** Species protected in Latvia

List of especially protected bird species in Project sites

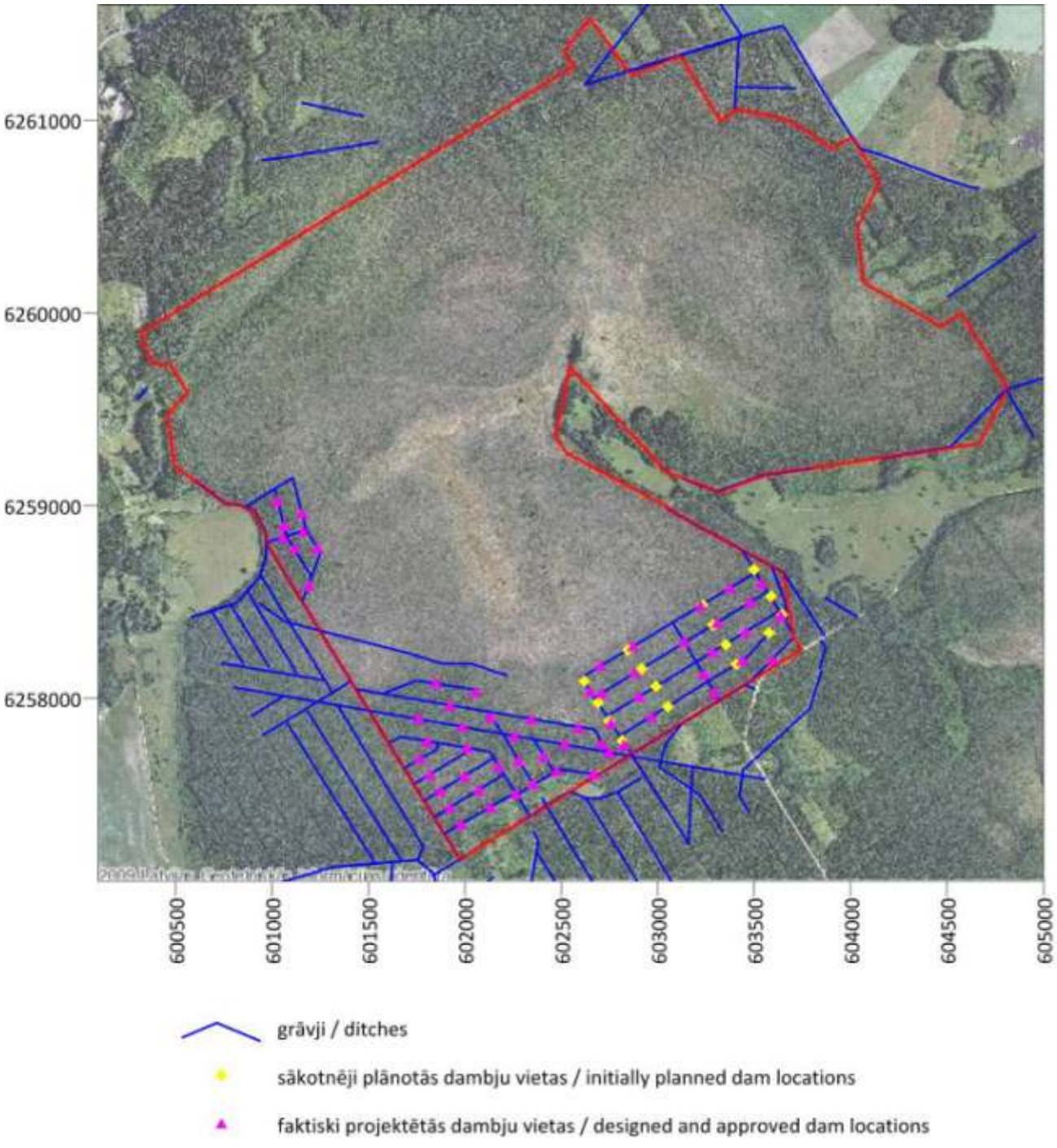
Species name	Aizkraukle Mire and Forests	Aklais Mire	Rozu Mire	Melnais Lake Mire
Hazel Grouse *Bonasa bonasia*	+	+	+	
Black Grouse *Tetrao tetrix*	+	+	+	+
Western Capercaillie *Tetrao urogallus*	+	+	+	+
Whooper Swan *Cygnus cygnus*		+		+
Smew *Mergellus albellus*				+
Arctic Loon *Gavia arctica*		+		
Black Stork *Ciconia nigra*	+	+	+	
Great Bittern *Botaurus stellaris*				+
Osprey *Pandion haliaetus*	+	+	+	+
European Honey Buzzard *Pernis apivorus*	+	+		
Black Kite *Milvus migrans*				+
White-tailed Eagle *Haliaeetus albicilla*	+	+		
Marsh Harrier *Circus aeruginosus*	+		+	+
Lesser Spotted Eagle *Aquila pomarina*	+		+	
Little Crake *Porzana parva*				+
Spotted Crake *Porzana porzana*				+
Common Crane *Grus grus*	+	+	+	+
Golden Plover *Pluvialis apricaria*	+	+	+	
Wood Sandpiper *Tringa glareola*	+		+	+
Ruff *Philomachus pugnax*				+
Eurasian Eagle-owl *Bubo bubo*				+
Ural Owl *Strix uralensis*	+	+		
Eurasian Pygmy-owl *Glaucidium passerinum*	+	+		
Boreal Owl *Aegolius funereus*		+		
Eurasian Nightjar *Caprimulgus europaeus*	+	+		+
Middle Spotted Woodpecker *Dendrocopos medius*	+			
White-backed Woodpecker *Dendrocopos leucotos*	+	+	+	
Eurasian Three-toed Woodpecker *Picoides tridactylus*	+	+	+	
Black Woodpecker *Dryocopus martius*	+	+	+	+
Grey-faced Woodpecker *Picus canus*	+	+		
Red-backed Shrike *Lanius collurio*		+		+
Wood Lark *Lullula arborea*		+	+	+
Red-breasted Flycatcher *Ficedula parva*	+	+	+	
In total	**21**	**22**	**15**	**18**

Rare and protected mammal fauna in Project sites

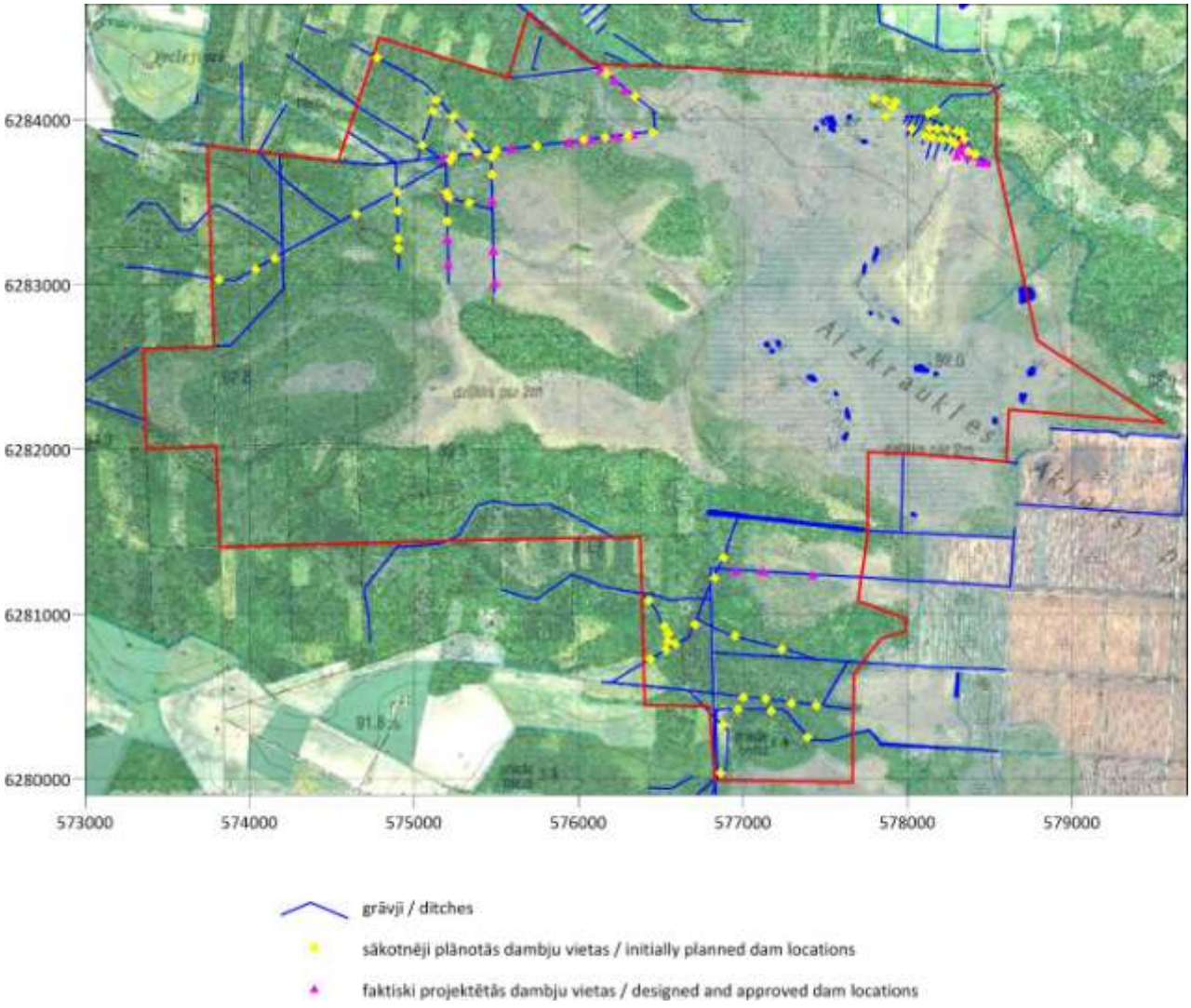
Scientific species name	Red-listed species in Latvia	Especially protected in Latvia	EU Habitat directive species	Aizkraukle Mire and Forests	Aklais Mire	Rozu Mire	Melnais Lake Mire
Daubenton's bat *Myotis daubentoni*		1	IV		+	+	+
Pond bat *Myotis dasycneme*	2	1	II, IV		+		
Common noctule *Nyctalus noctula*		1	IV	+	+	+	
Nathusius' pipistrelle *Pipistrellus nathusii*		1	IV	+	+	+	
Common pipistrelle *Pipistrellus pipistrellus*	3	1	IV	+	+		
Northern bat *Eptesicus nilssoni*		1	IV	+	+	+	+
Brown long-eared bat *Plecotus auritus*		1	IV	+	+		+
Mountain hare *Lepus timidus*		2	V	+	+	+	+
Common dormouse *Muscardinus avellanarius*	3	1	IV		+	+	
Northern birch mouse *Sicista betulina*	3	1	IV	+	+	+	+
Brown bear *Ursus arctos*	3	1	II, IV		+		
Gray wolf *Canis lupus*		2	II, IV, V	+	+	+	+
European polecat *Mustela putorius*		2	V	+	+	+	+
European pine marten *Martes martes*		2	V	+	+	+	+
European otter *Lutra lutra*	4	1	II, IV	+	+	+	
Northern lynx *Felis lynx*		2	II, IV	+	+	+	+
In total				**12**	**16**	**12**	**9**

7.3 Management actions in the project sites (A1)

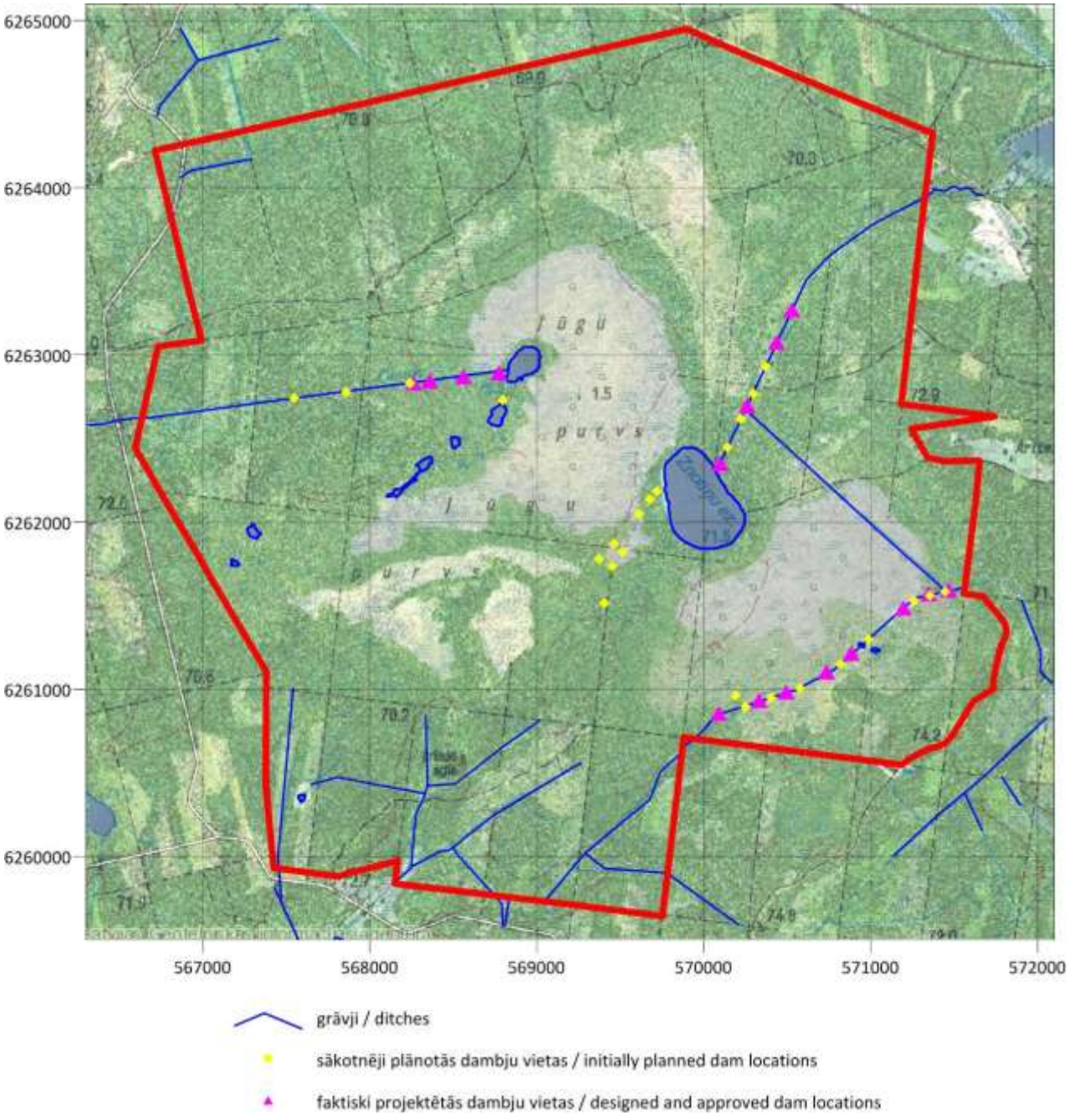
Dam building area in Rozu Mire Nature Reserve



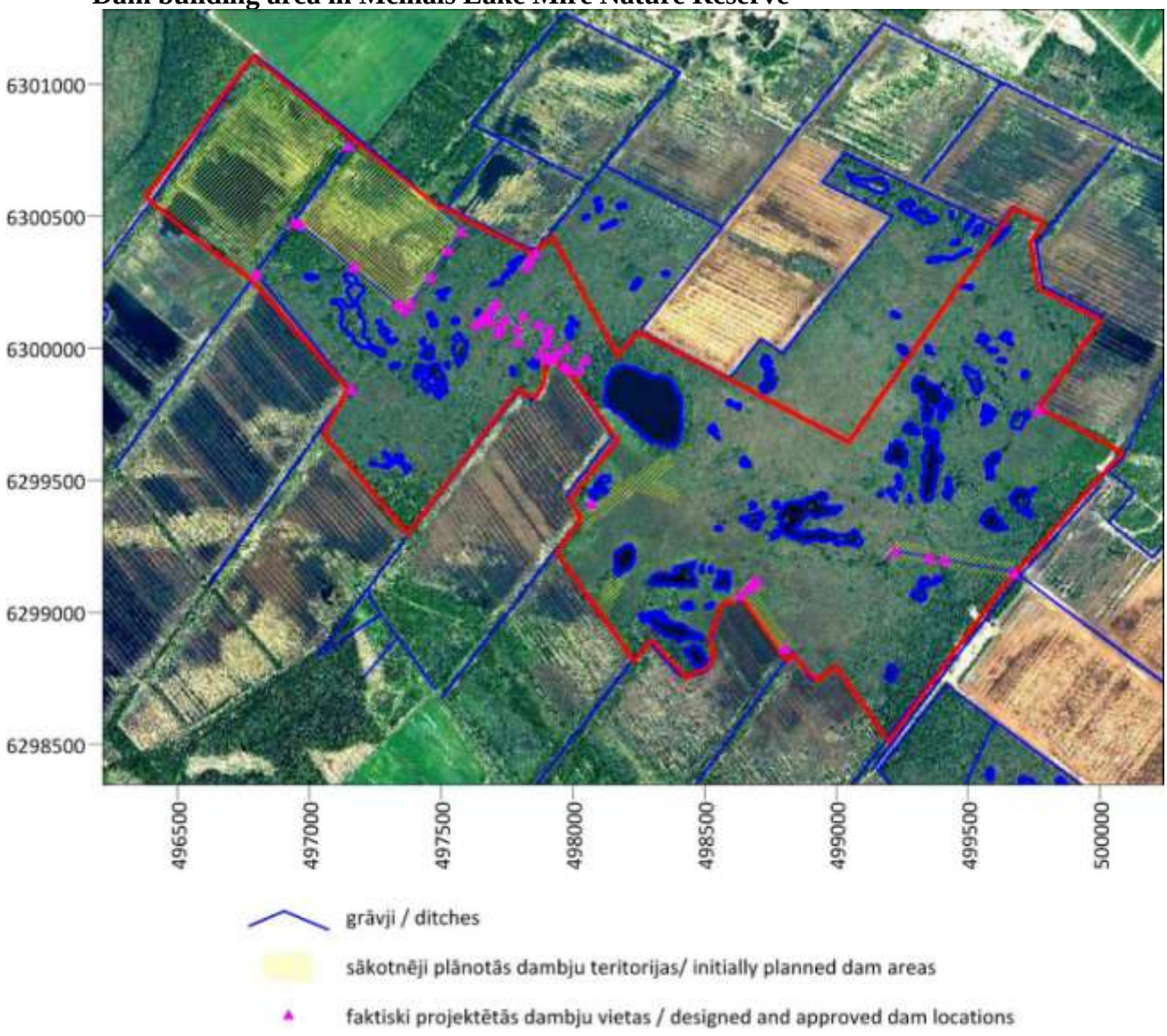
Dam building area in Aizkraukle Mire and Forests Nature Reserve



Dam building area in Aklais Mire Nature Reserve



Dam building area in Melnais Lake Mire Nature Reserve



7.4 List of Management Plan Steering Group meetings (A1)

No	Data	Place	Title
1	June 3, 2010	Olaine Museum of History and Art, Olaine	Information meeting about the start of elaboration of Management Plan for Melnais Lake Nature Reserve
2	May 26, 2010	Aizkraukle District Municipality, Aizkraukle	Information meeting about the start of elaboration of Management Plan for Aizkraukle Mire and Forests Nature Reserve
3	June 21, 2010	Sala Municipality, Sala	Information meeting about the start of elaboration of Management Plan in Rozu Mire Nature Reserve
4	June 21, 2010	Daudzese Municipality, Daudzese	Information meeting about the start of elaboration of Management Plan in Aklais Mire Nature Reserve
5	September 17, 2010	Sala Municipality, Sala	The first Management Plan Steering Group for Rozu Mire Nature Reserve
6	October 4, 2010	Olaine Museum of History and Art, Olaine	The first Management Plan Steering Group for Melnais Lake Reserve Management Plan
7	October 14, 2010	Aizkraukle Municipality, Aizkraukle	The first Management Plan Steering Group for Aizkraukle Mire and Forests Management Plan
8	October 14, 2010	Daudzeva School, Daudzeva	The first Management Plan Steering Group for Aklais Mire Nature Reserve management plan

7.5 List of Project Seminars (D1)

No	Data	Place	Title
1	March 29, 2010	Viesite Municipality, Viesite	First Project Seminar
2	December 17, 2010	Viesite Municipality, Viesite	The Value of Raised Bog Conservation Seminar
3	January 13, 2011	Ogre Culture Centre, Ogre	Opening of Secrets of Mires Exhibition Seminar
4	March 9, 2011	Sala Secondary School, Sala	Seminar about Raised Bog Values for Schoolchildren
5	May 17, 2011	Olaine Museum of Art and History, Olaine	Seminar about Raised Bog values for teachers
6	July 6, 2011	Ventspils Library, Ventspils	Opening of the Raised Bog Photo Exhibition "Secrets of Mires"
7	September 22, 2011	Daudzese Elementary School, Daudzese	Seminar about Raised Bog Values for Teachers
8	September 23, 2011	Daudzese Elementary School, Daudzese	Seminar about Raised Bog Values for Schoolchildren
9	July 23-25, 2012	Maritim Park Hotel, Riga	International Seminar "Sharing experience on Raised Bog Restoration"
10*	August 13, 2013	Conference Hall of the University of Latvia, Riga	Final Seminar of the Project „Raised Bogs"

* only of this seminar the programme, copy of presentations, minutes of seminar and list of participants are included in the Final Report while for others it was added to Mid-term Report or Progress Report

7.6 Program of the Final Seminar of the Project „Raised Bogs", minutes of seminar and list of participants

LIFE 08NAT/LV/000449
Restoration of Raised Bog Habitats in the Especially Protected Nature Areas in Latvia

Final Seminar of the Project "Raised Bogs"

Conference Hall of the University of Latvia, Valnu street 10, 5th floor, Old Riga
August 13, 2013

Programme

12.00-12.30 **Restoration of Raised Bog Habitats in the Especially Protected Nature Areas in Latvia**. Project Manager Dr.biol. Mara Pakalne

12.30-13:00 **Documentary „Mires Uncovered"**. Foundation ELM MEDIA.

13.30-15.00 **Field excursion** to Melnais Lake Mire Nature Reserve.

Contact information:
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Field manager: Gunars Balodis, e-mail: gunars.balodis@lu.lv

7.7 Distribution of informative booklets (D3)

Action / Place	**No. of booklets**
Project partners and co-finansers	
Latvian Fund for Nature	50
ELM Media Foundation	50
Latvian Environmental Protection Fund	50
Riga forests Ltd.	50
Project seminars	
The Value of Raised Bog Conservation Seminar (December 17, 2010)	30
Seminar about Raised Bog Values for Schoolchildren (March 9, 2011)	30
Seminar about Raised Bog values for teachers (May 17, 2011)	20
Seminar about Raised Bog Values for Teachers (September 22, 2011)	20
Seminar about Raised Bog Values for Schoolchildren (September 23, 2011)	30
International Seminar „Sharing experience on Raised Bog Restoration" (July 23-25, 2012)	250
Final seminar of the Project "Raised Bogs" (August 13, 2013)	200
Nature Management Plan Meetings for Nature Reserves	
Aizkraukle Mire and Forests	60
Rozu Mire	50
Aklais Mire	50
Melnais Lake Mire	40
Project Photo Exhibition "Secrets of Mires"	5 booklets are attached to exhibition boards permanently
13.01.-07.02.11 Ogre Culture Centre	30
08.02.-08.03.11 Aizkraukle Municipality	30
09.03.-18.03.11 Secondary School of Sala	30
21.03.-25.03.11 Ministry of the Environment and Regional Development of Latvia	30
26.03.-11.04.11 The Cabinet of Ministers of the Republic of Latvia	30
11.04.-26.04.11. Ministry of Defence of Latvia	30
27.04.-09.05.11 Daugavpils University	30
12.05.-20.05.11 Olaine Museum of Histiory and Art	30
23.05.-31.05.11 Saeima of Latvia	30
06.07.-02.08.11 Ventspils Library	30
02.08.-05.09.11 Jelgava Scientific Library	30
06.09.-24.10.11 Botanical Garden of University of Latvia	30
26.10.-02.12.11 Jekabpils Library	30
02.12.11-12.01.12 Jaunjelgava Library	100
12.01.-15.02.12 Akniste Library	100
15.02.-24.02.12 Daudzese Primary School	100
01.03.-31.03.12 EU House in Riga	100
04.04.-05.05.12 Bulduri Library	100
08.05.-08.06.12 Vaivari Rehabilitation Centre	100
15.06.-15.07.12 Stockholm School of Economics in Riga	100

Action / Place	No. of booklets
08.08.-16.09.12 Code Library	100
17.09.-19.10.12 Riga City Central Library	100
22.10.-15.11.12 Riga City Council	100
14.01.-31.01.13 Dundaga Library	100
04.02.-28.02.13 Tinuzi Elementary School Library	100
01.03.-03.04.13 Laubere Library	100
03.04.-03.05.13 Slate Library	100
07.05.-10.06.13 Sala Library	100
11.06.-02.07.13 Botanical Garden of the University of Latvia	100
Project experience exchange and study tours	
Visit to Germany (June 6-18, 2010)	15
Field Symposium of the International Mire Conservation Groups in Slovakia and Poland (July 5-17, 2010)	20
Visit to United Kingdom, Wales (September 1-7, 2010)	10
69th Scientific Conference of the University of Latvia (January 31, 2011)	10
Informative Seminar about LIFE Projects (March 23, 2011)	30
20th Annual Meeting of European Vegetation Survey in Italy, Rome (April 6-9, 2011)	20
Visit to Eastern Latvia (May 2011)	12
Visit of German raised bog specialists to Latvia (June 1-6, 2011)	13
Experience exchange with Estonian colleagues (August 2011)	100
Visit to Estonian raised bogs (August 2011)	10
Meeting to experts of LIFE project “Riga against flood” (December 2011)	5
International Conference in Germany “Mire Conservation in Germany”(February 27-28, 2012)	50
Study tour to Amalvas and Zuvintas wetlands and Aukstumala raised bog in Lithuania (October 8-15, 2012)	100
22nd Annual Meeting of European Vegetation Survey in Italy, Rome (April 7-12, 2013)	20
International Workshop “Approaches in Wetland Restoration” in Poland (April 21-26, 2013)	40
56th International Association of Vegetation Science Symposium in Estonia, Tartu (June 25-30, 2013)	20
Project administration by the University of Latvia	
Plant Conservation Day 2012 in the Botanical Garden of the University of Latvia	250
European Researchers Night 2012 in the Botanical Garden of the University of Latvia	250
Plant Conservation Day 2013 in the Botanical Garden of the University of Latvia	550
Education Department of Municipality of Aizkraukle county	44
Education Department of Municipality of Riga city	500
Education, Culture and Sport Department of Municipality of Pieriga counties	120
	In total: 5164

7.10 Distribution of project documentary (D5)

Action / Place	**No. of booklets**
Final seminar of the Project “Raised Bogs” (August 13, 2013)	50
Project photo exhibition “Secrets of Mires” in different libraries	40
Botanical Garden of the University of Latvia	15
The University of Latvia Press	4
Latvian Fund for Nature	8
Latvian Nature Conservation Agency	8
Eastlatvia regional administration of Latvian Nature Conservation Agency	3
Pieriga regional administration of Latvian Nature Conservation Agency	3
Westlatvia regional administration of Latvian Nature Conservation Agency	3
Nature education center of Kemeri National Park	8
Nature education center of Razna National Park	8
Nature education center of Gauja National Park	8
Information center of the Nature Park 'Dviete Floodplain'	5
Latvian Ornithological Society	3
Foundation “Institute for Environmental Solutions”	3
Daugavpils University	5
Cesis Culture and Tourism center	3
Association of Heritage and Historical Area Protection in Latvia	2
Riga Special boarding school for hearing impaired	3
Cēsis Elementary school No 2	4
Jelgava Spidola gymnasium	3
Turaida Elementary school	4
Vecpiebalga Secondary school	4
Dundaga Secondary school	4
Kolka Secondary school	5
Bebrene Secondary school	5
Bebrene Vocational Secondary school	4
Education, Culture and Youth Department of Municipality of Olaine county	25
Education Department of Municipality of Aizkraukle county	45
Education and Culture Department of Municipality of Jekabpils county	60
Education Department of Municipality of Jekabpils city	15
Education Department of Municipality of Kekava county	20
Education Department of Municipality of Plavinu county	15
Education Department of Municipality of Koknese county	25
Education Department of Municipality of Riga city	380
Education, Culture and Sport Department of Municipality of Pieriga counties	90
	In total: 890

7.12 List of Project Steering group meetings (E1)

No.	Data	Place	Title
1	August 19, 2010	Olaine Museum of Art and History, Olaine	1st Project Steering Group meeting
2	March 1, 2011	Olaine Museum of Art and History, Olaine	2nd Project Steering Group meeting
3	September 6, 2011	Botanical Garden of the University of Latvia, Riga	3rd Project Steering Group meeting
4	March 1, 2012	EU House, Riga	4th Project Steering Group meeting
5	October 22, 2012	Riga City Council, Riga	5th Project Steering Group meeting
6*	May 17, 2013	Botanical Garden of the University of Latvia, Riga	6th Project Steering Group meeting

* only of this meeting the programme, copies of presentations and list of participants are included in the Final Report while for others it was added to Mid-term Report or Progress Report

7.13 Programme of the 6th Project Steering Group meeting, list of participants

LIFE 08NAT/LV/000449
Restoration of Raised Bog Habitats in the Especially Protected Nature Areas in Latvia
6th Project Steering Group meeting
May 17, 2013
Botanical Garden of the University of Latvia, Kandavas street 2, Riga

Programme

10.30 Tour trough the EK LIFE Project's exposition in Plant Conservation Day
11.00 Opening of the steering group meeting – representative from The Ministry of Environmental Protection and Regional Development;
11.10 An overview of the results of the LIFE project "Restoration of Raised Bog Habitats in the Especially Protected Nature Areas of Latvia" – *Dr. biol. Mara Pakalne*, University of Latvia, Botanical Garden, the project manager.
11.30 Public awareness activities – *Dr. biol. Liga Strazdina*, University of Latvia, Botanical Garden, information coordinator.
11.45 Overview of the project finances – *Aivars Slisans*, University of Latvia, Botanical Garden, the project assistant;
12.00 Presentation of the project documentary „Mires Uncovered" – *Ieva and Kaspars Goba*, film production company ELM MEDIA;
12.30 Discussions and coffee;

Project coordinator: University of Latvia
Co-financers: Ministry of Environment of Latvia/ Latvian Nature Protection Fund, "Riga Forests" Ltd.
Project associate beneficiaries: Latvian Fund for Nature and "Foundation ELM MEDIA".

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7.14 Report summaries of Habitat and Hydrological Monitoring (E2)

Vegetation monitoring in Rozu, Aizkraukle and Aklais Mires

Report summary 2013

Dr. geogr. Agnese Priede, Kemeri National Park

Ievads

Monitoringa mērķis ir veikt purva biotopu un apsaimniekošanas pasākumu monitoringu projekta teritorijās – Rožu purvā, Aizkraukles purvā un mežos un Aklajā purvā 2010., 2011., 2012. un 2013. gada veģetācijas sezonās. Visos trijos purvos paredzēti purva atjaunošanas pasākumi, paaugstinot ūdenslīmeni, veicot grāvju aizdambēšanu.

Darba uzdevumi

- apsekot projekta vietas, izvēlēties vietas parauglaukumu ierīkošanai gan ietekmētās vietās, kur paredzēta aizsprostu būve, gan arī dabiskajās purva daļās;
- projekta vietās ierīkot patstāvīgos biotopu novērošanas parauglaukumus gan purva ietekmētajās, gan neskartajās daļās;
- sagatavot purva biotopu monitoringa protokolus iesniegšanai atskaitei.

1. Pētījuma teritorijas

Monitoringa parauglaukumi ierīkoti trijos purvos:

- Dabas liegums „Rožu purvs" (Natura 2000 kods LV0506500) atrodas Salas novada Salas un Sēlpils pagastos, platība 991 ha, dibināts 1987. gadā (www.daba.gov.lv).
- Dabas liegums „Aklais purvs" (Natura 2000 kods LV0519000) atrodas Jaunjelgavas novada Daudzeses pagastā, platība 2003 ha, dibināts 1999. gadā (www.daba.gov.lv).
- Dabas liegums „Aizkraukles purvi un meži" (Natura 2000 kods LV0522600) atrodas Aizkraukles novada Aizkraukles pagastā, platība 1532 ha, dibināts 1999. gadā (www.daba.gov.lv).

Atbilstoši biotopu klasifikācijai (Auniņš 2010) visos dabas liegumos dominē neskarti vai maz ietekmēti augstā purva biotopi (7110), sastopami arī pārejas (7140) un zāļu purvu biotopi, dažādi mežu biotopi (galvenokārt purvaini priežu meži 91D0) un distrofi ezeri (3160). Taču purva biotopu apsaimniekošanas efektivitātes monitoringa ietvaros uzmanība pievērsta tikai neskartu augsto purvu (Eiropas Savienības nozīmes aizsargājams biotops 7110), degradētu augsto purvu, kuros noris vai iespēja atjaunošanās (7120) un purvainu mežu (91D0) un pārejas stadiju starp augstā purva un purvaino mežu biotopiem.

Visos pētījuma objektos – augstajos purvos dažādās pakāpēs konstatētas biotopa degradācijas pazīmes agrāk veiktās hidromeliorācijas ietekmē. Veicot purva apsaimniekošanas un biotopu atjaunošanas pasākumus – dambju būvi uz meliorācijas grāvjiem ar nolūku kavēt ūdens aizplūšanu no purva – paredzamas biotopu izmaiņas veģetācijas struktūrā un sugu sastāvā un līdz ar to arī ekosistēmas funkcijās gan neskarto vai maz ietekmēto purvu biotopos, gan degradētajās purva daļās, gan daļēji arī purvainos mežos.

Visos trijos purvos raksturīgas vienas un tās pašas nosusināšanas pazīmes, kas raksturo augstā purva degradāciju jeb negatīvu antropogēnu ietekmi uz purva kā ekosistēmas funkcijām un augu sabiedrībām. Meliorācijas grāvju tuvumā dažādā attālumā (atkarībā no grāvju blīvuma un noteces apjoma) izteikti dominē sīkkrūmi, galvenokārt virši. Nosusināšanas ietekmētajās vietās agrāk atklātais augstais purvs daļēji aizaudzis ar strauji augošām priedēm, retāk purva bērziem, sūnu stāvā

vietām sfagni izzuduši pavisam un to vietā sastopamas sausiem skujkoku mežiem raksturīgas zaļsūnas vai sfagnu īpatsvars ir mazāks nekā parasti neskartos augstajos purvos.

Nosusināšanas ietekme dažādos apsekotajos purvos 2010. gadā pēc nosacītas gradācijas variēja no stipras līdz vidējai (Rožu purva periferiālās daļas dienvidu daļā, Aizkraukles purva austrumu, ziemeļaustrumu un rietumu daļas) līdz vājai un neizteiktai ar lokālu raksturu (Aklais purvā rietumos no purva ezeriņiem grāvja tuvumā Ģirupes iztekas apkārtnē). Ja Rožu purva un Aizkraukles purva periferiālajās daļās, īpaši grāvju tuvumā lielais viršu, retāk citu sīkkrūmu lielais īpatsvars, lielais priežu, retāk purva bērzu projektīvais segums un sfagnu samazināšanās sūnu stāvā saistāma ar purva ekosistēmai negatīvu antropogēnu ietekmi, tad Aklajā purvā augstā purva aizaugums ar priedēm, kā arī lielais sīkkrūmu (viršu, vaivariņu u.c.) segums, visticamāk, saistāms ar purva pašnosusināšanos, kā norādīts arī eksperta U.Suško atskaitē (Suško, 2010).

2. Veģetācijas monitoringa parauglaukumu vietas izvēle un parauglaukumu ierīkošana

Veģetācijas monitoringa vietas izvēlētas, ņemot vērā projektā paredzētās dambju vietas uz meliorācijas grāvjiem, kā arī plānotā hidroloģiskā monitoringa transektes. Monitoringa vietas izvēlētas tā, lai vismaz daļēji sakristu ar plānoto purva dambju uz meliorācijas grāvjiem vietām (pēc Pasūtītāja iesniegtā kartogrāfiskā materiāla), kur gaidāmas veģetācijas izmaiņas hidroloģiskā režīma izmaiņu ietekmē. Veģetācijas monitoringa un hidroloģiskā monitoringa vietas visos gadījumos pilnībā nesakrīt, jo izmaiņu novērtēšanai tiek izmantoti atšķirīgi kritēriji. Piemēram, hidroloģiskā monitoringa novērojumi tiks veikti arī meliorācijas neskartās vai mazskartās vietās, lai konstatētu hidroloģisko izmaiņu ietekmi uz purvu kopumā. Taču veģetācijas monitoringa vietas ierīkotas ar mērķi sekot līdzi redzamām izmaiņām purva veģetācijā, kas, visticamāk, notiks tiešā grāvju un dambju tuvumā. Veģetācijas monitoringa vietas nav ierīkotas visu plānoto dambju tuvumā, bet vietās, kas ir pietiekami reprezentatīvas, lai atspoguļotu izmaiņu raksturu kopumā.

Lai iegūtu pietiekami lielu atkārtojumu skaitu, katrā purvā ierīkotas četras līdz sešas transektes ar 5 līdz 6 parauglaukumiem katrā, visos trijos purvos kopā 81 pastāvīgais parauglaukums.

Rožu purvs

Pastāvīgā monitoringa parauglaukumi ierīkoti purva dienvidu daļā starp purva malu un centru. 2010. gadā ierīkots 21 parauglaukums 4 transektēs, kas izvietoti virzienā prom no meliorācijas grāvjiem, uz kuriem plānots veidot dambjus. Lai novērotu izmaiņas purva biotopos to references stāvoklī neskartā augstajā purvā, kur vērojama niecīga meliorācijas ietekme, 2011. gadā papildus ierīkoti 5 parauglaukumi transektē meliorācijas mazietekmētā daļā (biotops 7110). Kopā Rožu purvā ierīkoti 26 parauglaukumi 5 transektēs (1. att.).

1. transekte. Starp diviem grāvjiem, nosusināšanas ietekme no abām pusēm. Abos grāvjos (tajos plānots būvēt dambjus) redzama ūdens plūsma virzienā uz purva malu. Monitoringa vietā ir tipiskās augstā purva degradācijas pazīmes (virši, dominē sauso skujkoku mežu zaļsūnas sfagnu vietā).

2.transekte. Perpendikulāri grāvim, otrpus grāvim pretī 1. transektei, grāvja ietekme no vienas puses (grāvī redzama ūdens plūsma virzienā uz purva malu), virzienā uz purva centrālo daļu susināšanas ietekme mazinās. Tieši pie grāvja tipiskās augstā purva degradācijas pazīmes (virši, aizaugšana ar priedēm un bērziem), taču, attālinoties no grāvja, nosusināšanas ietekme uz purva augāju mazinās.

3. transekte. Perpendikulāri grāvim virzienā uz purva iekšieni. Grāvī (tajā plānots būvēt dambjus) redzama ūdens plūsma virzienā uz purva malu). Veģetācijā vērojamas tipiskās augstā purva degradācijas pazīmes (virši, sauso priežu mežu sūnas sfagnu vietā).

4. transekte. Perpendikulāri grāvim virzienā uz purva iekšieni. Grāvī (tajā plānots būvēt dambjus) redzama ūdens plūsma virzienā uz purva malu). Tipiskās augstā purva degradācijas pazīmes (virši, sauso skujkoku mežu zaļsūnas sfagnu vietā).

5. transekte. Purva vidusdaļā paralēli hidroloģiskā monitoringa transektei pietiekami lielā attālumā no grāvja, kur nav konstatētas purva degradācijas pazīmes. Raksturīgas seklas ieplakas, lēzeni ciņi un neliels aizaugums ar priedītēm.

1. att. Monitoringa transektes Rožu purvā. Transekšu vietas norādītas ar sarkaniem punktiem.

Aklais purvs

Pastāvīgā monitoringa parauglaukumi ierīkoti purva dienvidu daļā starp purva malu un centru (Jūgas upītes sākums) un purva ziemeļrietumu daļā pie no purva ezera iztekošas upītes – sen rakta meliorācijas grāvja (Ģirupes iztekas). Pavisam ierīkoti 30 parauglaukumi 6 transektēs, kas izvietoti virzienā prom no meliorācijas grāvjiem, uz kuriem plānots veidot dambjus, bet viena transekte – purva vidusdaļā starp akačiem apmēram 200 m attālumā no grāvja (2. att.).

1.-4. transektes. Perpedikulāri grāvim. Pie veca, ar sfagniem un spilvēm aizauguša sekla meliorācijas grāvja (Jūgas upītes sākums). Grāvī atklāta ūdens un ūdens plūsmas nav. Susināšanas ietekme pie grāvja vāja un neizteikta, purvs aizaudzis priedēm un dabiskās sukcesijas rezultātā atrodas pārejas stadijā uz purvainu priežu mežu. Viršu diezgan daudz (dominē sīkkrūmu un lakstaugu stāvā).

5. transekte. Perpendikulāri grāvim (no neliela purva ezera iztekošās Ģirupes sākums), grāvis raksts sen (iespējams, 19. gs. beigās, 20. gs. sākumā), tā vāji līdz vidēji izteiktā susinošā ietekme purva veģetācijā redzama lokāli samērā šaurā, pārdesmit metrus platā joslā abpus grāvim. Tālāk no grāvja vairāki akači (nelieli ezeriņi), kas dabiski drenē purvu, tādējādi to apkārtnē ir relatīvi sauss un atklāta purva vietā dominē pārejas stadija starp purvainu priežu mežu un purvu. Veģetācijā dominē sīkkrūmi (virši, vaivariņi), sūnu stāvā liels sfagnu projektīvais segums, sausiem skujkoku mežiem raksturīgo zaļsūnu, kas parasti norāda uz susināšanas negatīvo ietekmi, maz.

6. transekte. Purvā apmēram 200 m no Ģirupes (grāvja) starp diviem purva ezeriņiem ar priedēm aizaugušā augstajā purvā – pārejas stadijā uz purvainu mežu. Veģetācijā dominē sīkkrūmi (galvenokārt virši), sūnu stāvā – sfagni. Krūmu stāvā daudz priežu.

2. att. Monitoringa transektes Aklajā purvā. Transekšu vietas norādītas ar sarkaniem punktiem.

Aizkraukles purvi un meži

Pastāvīgā monitoringa parauglaukumi ierīkoti purva rietumu daļā purva malā, kas robežojas ar kūdras laukiem un kūdras lauku nosusinošo meliorācijas grāvi. 2010. gadā ierīkoti 20 parauglaukumi 4 transektēs, bet 2011. gadā papildus ierīkoti 5 parauglaukumi 1 transektē, kopā 25 parauglaukumi 5 transektēs (3. att.). Visi parauglaukumi izvietoti virzienā prom no meliorācijas grāvjiem, uz kuriem plānots veidot dambjus.

1.transekte. Perpendikulāri grāvim starp nosusināšanas stipri ietekmētu augsto purvu un kūdras laukiem. Veģetācijā tipiskās augstā purva degradācijas pazīmes (virši, sauso priežu mežu sūnas sfagnu vietā).

2.-4. transektes. Perpendikulāri nelieliem grāvīšiem purva periferiālajā daļā purva ziemeļrietumu daļā purva malā. Mazie grāvīši ik pa apmēram 30 metriem paralēli – šauri, ap 30 cm plati, bet ar redzamu ūdens plūsmu virzienā prom no purva. Apkārtnē purva malā slapjš pārejas purvs, domājams, arī nosusinātā daļa ar grāvīšiem bijusi līdzīga – pārejas purvs. Nosusinātā daļa daļēji aizaugusi ar mežu (priedes, bērzi), daļēji ar viršiem, pie grāvjiem izteikti dominē virši un sauso mežu sūnas (3. att.).

5. transekte. Purva rietumu daļā paralēli hidroloģiskā monitoringa transektei pietiekami virzienā prom no grāvja, kas šajā purva daļā rada nelielas degradācijas pazīmes (aizaugums ar priedēm un sīkkrūmiem grāvja tuvumā, „iekritušas" purva ieplakas), taču kopumā raksturīgs neskartiem augstajiem purviem tipisks augājs ar seklām ieplakām un lēzeniem ciņiem.

3. att. Monitoringa transektes Aizkraukles purvā un mežos. Transekšu vietas norādītas ar sarkaniem punktiem.

3. Parauglaukumu aprakstīšanas metode

Veģetācijas aprakstīšanas metode izstrādāta, balstoties uz Latvijas Dabas fonda 2003. gadā izstrādāto Purvu biotopu un sugu monitoringa rokasgrāmatu (Purva biotopu un sugu…. 2003), kas izstrādāta Nacionālās vides monitoringa programmas īstenošanai. Monitoringa lauka datu forma modificēta un precizēta atbilstoši konkrētajam mērķim (1. pielikums).

Kā purva biotopu un veģetācijas pārmaiņu indikatori izvēlēti sekojoši: augu sugu sastāva un projektīvā seguma izmaiņas; veģetācijas struktūras izmaiņas un izmaiņas koku un sīkkrūmu sugu vitalitātē (1. pielikums).

Veģetāciju novērtē apļa formas laukumos ar 4 m diametru. Tie izvietoti transektēs pa 5 vai 6 līnijā virzienā prom no meliorācijas grāvja, attālums starp parauglaukumu centriem – 6 m, kas atvieglo arī to atrašanu turpmākajos gados, ja mietiņš pazudis. Parauglaukuma centrs fiksēts ar mietu vai kā centrs iezīmēts kāds tur jau augošs koks, to iezīmējot ar lenti vai krāsu. Ar GPS uztvērēju fiksētas parauglaukuma centra ģeogrāfiskās koordinātas LKS-92 sistēmā.

Parauglaukumā, izmantojot procentuālo segumu, aprakstīta veģetācijas struktūra (augstie ciņi, lēzenie ciņi, līdzens reljefs, ieplakas, atklāts ūdens, atklāta kūdra). Veģetācija aprakstīta, izmantojot Brauna-Blankē metodi. Novērtēts projektīvais segums (%) pa veģetācijas stāviem (koku, krūmu, lakstaugu un sīkkrūmu, sūnu un ķērpju stāvos). Parauglaukumos fiksētas visas konstatētās augu sugas un to projektīvais segums procentos. Parauglaukumos novērtēts priežu, bērzu (atsevišķi pēc augstumiem (koku un krūmu stāvs) - augstums >7, augstums <7) skaits un vitalitāte pēc četru ballu sistēmas (1 - vitalitāte laba, 2 – vitalitāte vidēja, 3 - vitalitāte slikta, 4 - nokaltis koks). Norādīts koku vai krūmu skaits katrā vitalitātes klasē. Sīkkrūmiem (divas grupas: virši un citi) novērtēta tikai vitalitāte pēc četru ballu sistēmas.

Katru gadu veic parauglaukumu fotofikāciju. Parauglaukumus fotografē vienmēr grāvja (tātad arī transektes 1. parauglaukuma) virzienā neatkarīgi no transekta virziena (perpendikulāri grāvim). Parauglaukumus katru gadu fotografē no viena un tā paša rakursa, to pierakstot. Visus fotoattēlus sistematizē un failus nosauc pēc vienotas sistēmas, norādot parauglaukuma identifikācijas kodu (ID), gadu, mēnesi un datumu, kad veikts monitorings, kā arī fotografēšanas virzienu vai citu būtisku informāciju (piemēram, *AK01_2010-10-20_D virzienaa.jpg*, kas nozīmē - 1. parauglaukums Aklajā purvā, aprakstīts/fotografēts 2010. gada 20. oktobrī, D virzienā). Parauglaukumiem pēc purva nosaukuma piešķirti sekojoši ID: Aizkraukles purvs un meži – AIZ, Aklais purvs – AK, Rožu

purvs – RO. Tie paši ID izmantoti gan parauglaukumu veģetācijas aprakstos, gan fotoattēlu nosaukumos.

4. Rezultāti un diskusija

4.1. Vizuāli novērotās izmaiņas apsekotajos purvos

2013. gadā parauglaukumi apsekoti 17. maijā Rožu purvā, 18. maijā Aklajā purvā un 19. maijā Aizkraukles purvā un mežos (saistībā ar projekta termiņiem agrāk nekā iepriekšējos gados).

Augstā purva atjaunošanas darbi apsekošanas laikā bija pabeigti visos trīs purvos, kur 2012. gada vasaras beigās un rudenī uz grāvjiem uzbūvēti kūdras un/vai koka dambji.

Rožu purvā apsekošanas brīdī gan 2012. gadā, gan 2013. gadā grāvjos bija par apmēram 10-30 cm paaugstinājies ūdens līmenis, taču parauglaukumu apkārtnē lielākas ārpus grāvjiem applūdušas platības purvā netika konstatētas. Tā kā darbi bija īstenoti nepilnu gadu pirms pēdējā apsekojuma 2013. gada maijā, būtiska ietekme uz veģetāciju nevarēja būt notikusi. Novērotas tikai nelielas izmaiņas kūdras mitrumā grāvju tuvumā, vietām nelielas platības grāvju tuvumā bija dažu centimetru dziļumā applūdušas, kā arī vienā parauglaukumā tieši pie grāvja ūdens līmeņa pacelšanās rezultātā bija sākusies viršu kalšana. Dažos parauglaukumos novērota viršu vitalitātes pasliktināšanās, taču to, visticamāk, nevar saistīt ar ūdenslīmeņa pacelšanu, bet drīzāk ar iepriekšējās ziemas ietekmi un viršu dabisku novecošanos.

Aklajā purvā dambji uz purva grāvjiem uzbūvēti 2012. gada rudenī. Tieša ūdenslīmeņa pacelšanas ietekme (parauglaukumu applūšana vai būtiska kūdras samitrināšanās parauglaukumos) netika novērota. Līdz ar to arī netika novērotas ar ūdenslīmeņa pacelšanu saistītas izmaiņas veģetācijā. Izmaiņas veģetācijā, visticamāk, sagaidāmas tikai vairākus gadus pēc ūdenslīmeņa nostabilizēšanās.

Aizkraukles purvā dambji uz grāvjiem uzbūvēti 2012. gada rudenī. Tiešā parauglaukumu tuvumā dambju nav, būtiskas vizuāli novērtējamas izmaiņas parauglaukumos 2013. gada apsekojuma laikā netika konstatētas.

Kopumā visos trijos purvos 2013. gadā, salīdzinot ar iepriekšējiem trīs gadiem, būtiskas izmaiņas sugu sastāvā un augāja struktūrā nav notikušas. Vietām nedaudz izmainījusies lakstaugu, sīkkrūmu vai sūnu un ķērpju projektīvais segums (nebūtiski palielinājies vai samazinājies), dažos parauglaukumos atrasti atsevišķi iepriekšējos gados nekonstatētu sugu eksemplāri vai izzuduši. Nedaudz izmainījies koku sējeņu skaits, kas dinamiski mainās pa gadiem. Nav konstatēta strauja viršu vai koku kalšana, izņemot divus parauglaukumus. Tāpat būtiski nav mainījies arī sfagnu un zaļsūnu projektīvais segums.

Parauglaukumos nav konstatēti arī nekādi mehāniski bojājumi (piemēram, dzīvnieku rakumi), kas lokāli var radīt būtiskas pārmaiņas sugu sastāvā un struktūrā, nav notikuši citi traucējumi (applūšana, degšana utml.), kas varētu radīt krasas izmaiņas veģetācijā.

4.2. Izmaiņu indikatoru analīze

Lai analizētu izmaiņas purvos četru gadu laikā, analizētas izmaiņas parauglaukumu veģetācijā. Kā indikatori izmantoti:

- Sfagnu *Sphagnum spp*. projektīvā seguma izmaiņas un attāluma līdz grāvim ietekme,
- Zaļsūnu (*Pleurozium schreberi*, *Dicranum spp.*, *Polytrichum spp*.) projektīvā seguma izmaiņas,
- Sila virša *Calluna vulgaris* projektīvā seguma un vitalitātes izmaiņas,
- Parastā baltmeldra *Rhynchospora alba* klātbūtnes un projektīvā seguma izmaiņas.

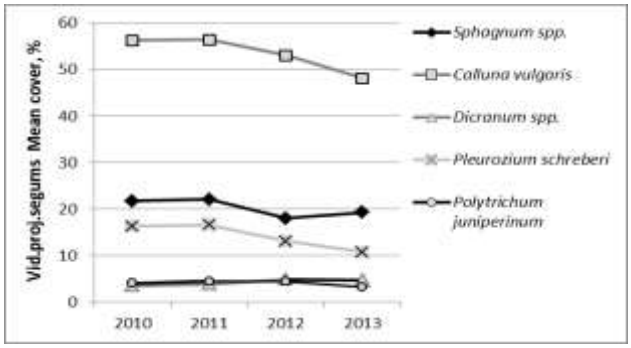
Balstoties uz līdzšinējo pieredzi augsto purvu atjaunošanas monitoringā, kā indikatori sekmīgi izmantojami arī tādi rādītāji kā priežu vitalitāte, bērzu vitalitāte (kalšana), raseņu *Drosera spp.* un dzērveņu *Oxycoccus spp*.ieviešanās –

indikatori, kas sekmīgi izmantoti purva atjaunošanās monitoringā Lielajā Ķemeru tīrelī (Priede, 2013; A. Priede, nepubl. dati), taču šajā gadījumā pārāk īsas datu rindas un vietu specifikas dēļ šie indikatori nav analizēti. Dzērvenes un rasenes konstatētas arī pārāk mazā skaitā parauglaukumu, lai tie būtu reprezentatīvi un parādītu kopējās izmaiņas katrā no purviem. Ilgākā laikā posmā izmaiņas purvam optimāla mitruma režīma veidošanās virzienā parādītu arī maksainās spilves *Eriophorum vaginatum* projektīvā seguma izmaiņas. Taču, ņemot vērā līdzīšinējos novērojumus citos purvos (piemēram, Priede (2013)), makstainā spilve ir samērā toleranta pret mitruma režīmu un spēj ilgstošo saglabāties arī nosusinātos purvos. Savukārt tās projektīvā seguma palielināšanās notiek lēni (raksturīgi, ka suga aug ciņos un ieviešas lēni), tādēļ šajā gadījumā īsā novērojumu perioda (četri gadi) dēļ nav izmantota kā indikators. Iespējams, šie indikatori būs izmantojami kopsakarību analīzei, uzkrājoties garākai datu rindai, ja monitorings tiks turpināts.

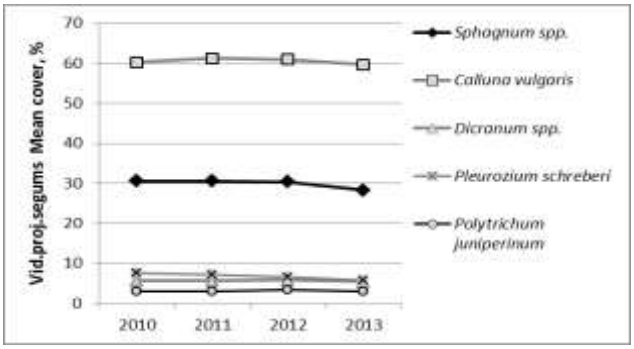
4.2.1. Sfagnu projektīvā seguma izmaiņas

Sfagnu segums ir proporcionāli mazāks nosusināšanas būtiski ietekmētās vietās (susināšanas būtiski ietekmētos purvos sfagnu var nebūt vispār), savukārt vāji ietekmētās vai neietekmētās vietās segums ir proporcionāli lielāks, un tie joprojām dominē sūnu stāvā. Apsekotajos purvos atsevišķā parauglaukumā visbiežāk sastopamas vismaz vairākas sfagnu sugas, taču šajā gadījumā kā rādītājs izmantots kopējais sfagnu segums.

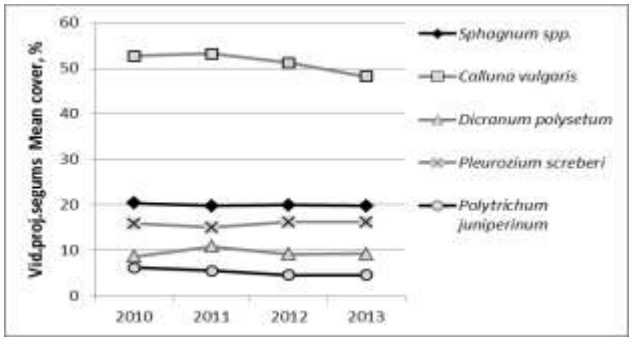
A



B



C



4. att. Sfagnu *Sphagnum spp*., sila virša *Calluna vulgaris*, divzobju *Dicranum spp*., Šrēbera rūsaines *Pleurozium schreberi* un kadiķu dzegužlina *Polytrichum juniperinum* vidējā projektīvā seguma izmaiņas (2010-2013) Rožu purvā (A), Aklajā purvā (B), Aizkrukles purvā (C).

Sfagnu projektīvā seguma izmaiņas visos trīs purvos bijušas niecīgas, gan analizējot pa parauglaukumiem, gan vidējo sfagnu segumu parauglaukumos katrā purvā. Rožu purvā vidējais sfagnu segums parauglaukumos ir nedaudz samazinājies par apmēram 2,5 % (4. att., A), Aklajā purvā (4. att., B) vidējā sfagnu seguma izmaiņas ir niecīgas (samazinājies par apmēram 2 %), bet Aizkraukles purvā (4. att., C) izmaiņu vidējā sfagnu segumā tikpat kā nav (vidēji samazinājies par 0,5 %). Visos gadījumos izmaiņas ir nenozīmīgas un saistītas ar dabiskām fluktuācijām, kā arī, tā kā projektīvie segumi tiek novēroti vizuāli, tad iespējamas vērtētāja acumēra nelielas atšķirības pa gadiem, kas šādā apmērā ir pieļaujamas un faktiski neizbēgamas.

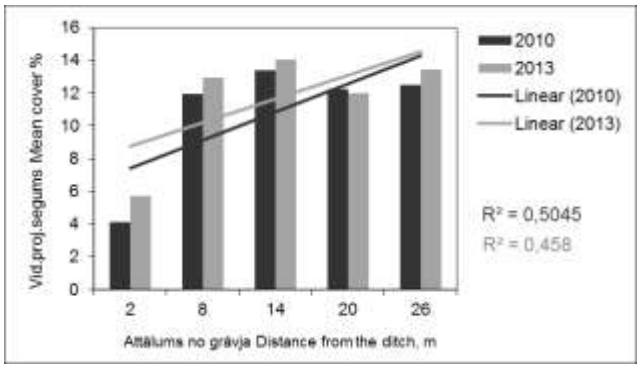
Lai izprastu grāvju nosusinošo ietekmi dažādās purvu daļās, t.i., grāvju nosusināšanas efektivitāti, aprēķināti vidējie sfagnu segumi atkarībā no attāluma līdz tuvākajam grāvim pirms

(2010. gadā) un pēc (2013. gadā) dambju uzbūvēšanas. Izteikta lineāra sakarība nav konstatēta nevienā no purviem (5. att.). Vismazākais sfagnu segums visos trīs purvos konstatēts tiešā grāvju tuvumā (2-6 m attālumā no grāvja), bet tālāk izteiktas sakarības ar grāvja tuvumu nav.

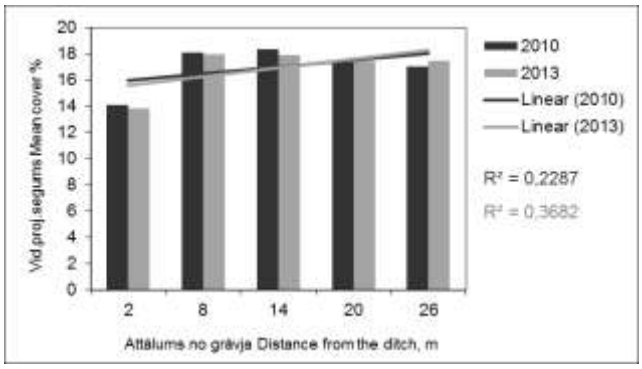
Dažādos attālumos no grāvjiem konstatēta gan vidējā sfagnu seguma (visos parauglaukumos kopā noteiktajā attālumā līdz grāvim) neliela palielināšanās, gan neliela samazināšanās, salīdzinot laiku pirms un pēc dambju uzbūvēšanas. Visos purvos 2-26 m attālumā no tuvākā grāvja sfagnu seguma palielināšanās vai samazināšanās ir neliela. Aizkraukles purvā samazināšanās apmēram 4 % robežās grāvja tuvumā, visticamāk, liecina par grāvja degradējošo ietekmi uz sfagnu segumu, kas turpinājusies visu laiku kopš 2010. gada (novērojumu pirmais gads).

Aklajā purvā konstatēta niecīga sfagnu seguma (arī citu augu sugu) mainība, kas varētu būt saistīts ar to, ka Aklais purvs ir salīdzinoši grāvju maz ietekmēts, līdz ar to degradācijas pazīmes veģetācijā ir relatīvi maz izteiktas un fluktuācijas augājā arī maz izteiktas (augstā purva veģetācija dabiskos apstākļos ir maz mainīga, un augu sabiedrības ir stabilas).

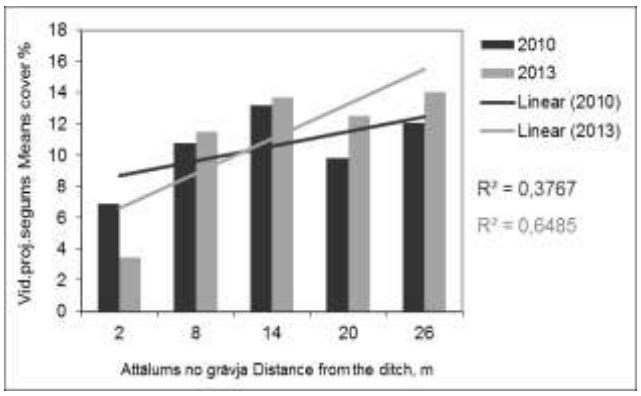
A



B



C



5. att. Sfagnu projektīvā seguma un attāluma līdz grāvim sakarība. Norādīts trends un determinācijas koeficients 2010. un 2013. gadam. Rožu purvs (A), Aklais purvs (B), Aizkraukels purvs (C).

Kopumā tas norāda, ka grāvjiem visos trijos purvos ir nosusinoša loma, taču lokālā mērogā tie ne vienmēr atstājuši izteikti negatīvu ietekmi uz purva veģetāciju. Izteikta nosusinoša loma ir tikai grāvjiem, kuros ir izteikta ūdens plūsma un ūdens līmenis ir vērā ņemami zem kūdras virsmas. Nozīmīga loma ir arī grāvju funkcionēšanai – ne visos gadījumos monitoringa vietās grāvji darbojas, vietām tie ir daļēji aizauguši. Izteikta nosusinoša ietekme uz veģetāciju, šajā gadījumā uz sfagnu segumu, novērojama tikai attiecībā pret kopējo purva platību relatīvi nelielās platībās.

4.2.2. Zaļsūnu projektīvā seguma proporcija atkarībā no attāluma līdz grāvjiem

Kā indikatori izvēlētas sūnu sugas, kas visos trīs purvos sastopamas visbiežāk un konstatētas lielākajā daļā parauglaukumu – viļņainā divzobe *Dicranum polysetum* (ievērojami retāk slotiņu divzobe *Dicranum scoparium* – Rožu un Aklajā purvā abas sugas analizētas kopā kā *Dicranum* spp.), Šrēbera rūsaine *Pleurozium schreberi* un kadiķu dzegužlins *Polytrichum juniperinum*. Analizētas šo triju sūnu sugu (*Dicranum* gadījumā ģints) vidējā projektīvā seguma izmaiņas pa

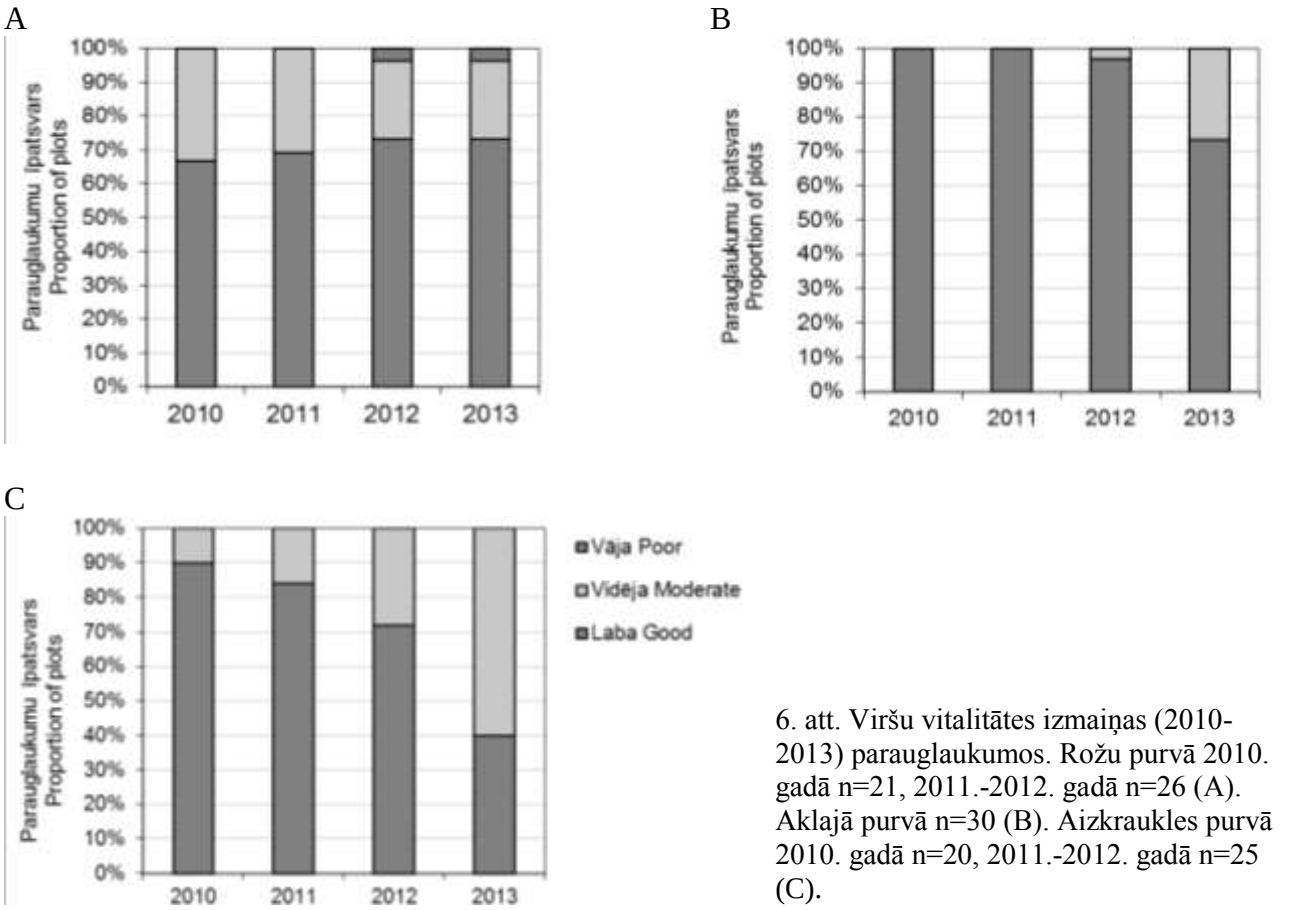
gadiem. Šīs sugas liecina par sausākiem augšanas apstākļiem purvā, izņemot *Polytrichum juniperinum*, kas sastopams arī tipiskos augstā purva biotopos. Lielākoties liels šo sugu segums saistīts ar grāvju nosusinošo ietekmi, taču šīs sugas var būt sastopamas arī lielākā attālumā no grāvja uz mikroreljefa pacēlumiem, piemēram, lielāko priežu tuvumā.

Vidējā projektīvā seguma izmaiņas pa gadiem nevienā no purviem neuzrāda būtiskas izmaiņas (5. att.), drīzāk tās uzskatāmas par dabiskām fluktuācijām, kā arī 1-3 % robežās varētu būt saistītas ar vizuāla novērtējuma atšķirībām. Lielākā *Pleurozium schreberi* vidējā projektīvā seguma samazināšanās konstatēta Rožu purvā (5. att., A), kas varētu būt saistīta ar ūdenslīmeņa pacelšanas ietekmi grāvju tuvumā.

Nevienā no purviem ne zaļsūnu, ne sfagnu kopējais projektīvais segums triju gadu laikā nav būtiski mainījies (5. att.), lai arī novērotas nelielas svārstības, segumam nedaudz palielinoties vai samazinoties. Atsevišķos gadījumos zaļsūnu īpatsvara palielināšanās varētu liecināt par to, ka grāvju nosusinošās ietekmes rezultātā turpinās purva degradācija (dambji uz grāvjiem uzbūvēti tikai nedaudz vairāk kā pusgadu pirms pēdējā apsekojuma, tādēļ ūdenslīmeņa paaugstināšanas ietekme uz veģetāciju vēl nebija novērojama).

4.2.3. Viršu projektīvā seguma un vitalitātes izmaiņas

Viršu vitalitāte kalpo kā purva mitruma pakāpes indikators. Viršu kalšana liecina par viršiem nelabvēlīgas vides veidošanos, parasti viršu kalšana notiek purvos, kur strauji palielinās mitrums. Kā liecina novērojumi Lielajā Ķemeru tīrelī (Priede, 2013; A.Priede, nepubl. dati), pēc straujas viršu kalšanas vairāku gadu laikā iespējama viršu seguma atjaunošanās, taču pēc kūdras samitrināšanās veģetācijā būtisku lomu sāk ieņemt sfagni un grīšļu dzimtas augi.



6. att. Viršu vitalitātes izmaiņas (2010-2013) parauglaukumos. Rožu purvā 2010. gadā n=21, 2011.-2012. gadā n=26 (A). Aklajā purvā n=30 (B). Aizkraukles purvā 2010. gadā n=20, 2011.-2012. gadā n=25 (C).

Četros monitoringa gados nevienā purvā parauglaukumā nav konstatētas būtiskas izmaiņas viršu projektīvajā segumā (5. att.). Lielākās svārstības seguma samazināšanās virzienā notikušas Rožu

purvā, kur vidējais viršu projektīvais segums samazinājies par apmēram 10 % (5. att., A), Aizkraukles purvā – vidējais seguma samazinājies par apmēram 5 % (5. att., C), bet Aklajā purvā tas svārstījies apmēram 2-3 % robežas (5. att., B) bez noteiktas tendences. Salīdzinot ar iepriekšējiem trim gadiem, 2013. gadā konstatēta viršu seguma samazināšanās parauglaukumos drīzāk saistāma ar iepriekšējās ziemas ietekmi (apsekots vasaras sākumā) un dabiskām fluktuācijām, nevis ūdenslīmeņa pacelšanas ietekmi, jo nelielas izmaiņas novērotas arī kontroles parauglaukumos neskartā purvā un vietās, kur nav būvēti dambji, tātad izmaiņas nevar tikt saistītas ar ūdenslīmeņa pacelšanu iepriekšējā gada rudenī (piemēram, Aizkraukles purvā pie kūdras frēzlauku kontūrgrāvja).

Kopumā viršu vitalitātes izmaiņas četros gados ir niecīgas un tikai vienā parauglaukumā 2012. gadā bija acīmredzami saistītas ar purva atjaunošanas pasākumiem (Rožu purvā, kur grāvju dambēšana īstenota 2012. gada vasaras beigās). Pārējos purvos izmaiņas viršu vitalitātē saistītas ar dabiskiem faktoriem (novecošanos un dabiskām fluktuācijām). Tikai vienā parauglaukumā (Rožu purvā, RO01) viršu vitalitāte triju gadu laikā no labas kļuvusi par vāju (sliktu), kas ir ūdenslīmeņa pacelšanas rezultāts (6. att., A). Parauglaukums atrodas tieši pie grāvja, tāpēc ūdenslīmeņa pacelšanas ietekme uz viršiem bijusi tieša un drīza.

Aklajā (6. att., B) un Aizkraukles purvā (6. att., C) notikušas tikai nelielas svārstības viršu vitalitātē no labas uz vidēju, dažkārt otrādi, kas neparāda skaidru tendenci un, visticamāk, saistītas ar dabiskām fluktuācijām kūdras mitrumā un viršu dabisku novecošanos un atjaunošanos. Vienā parauglaukumā Aklajā purvā (AK21) viršu vitalitāti būtiski ietekmējusi nomīdīšana dambju būvēšanas laikā (virši mehāniski bojāti, daļēji nolauzti). Nelielu ietekmi radījusi arī parauglaukumu izmīdīšana monitoringa laikā, kas ir neizbēgama, lai uzskaitītu visas parauglaukumā sastopamās sugas.

4.2.4. Parastā baltmeldra klātbūtnes un projektīvā seguma izmaiņas pa gadiem.

Parastais baltmeldrs *Rhynchospora alba* ir augstajos purvos mitrām ieplakām un lāmām raksturīga suga, kuras ieviešanās liecina par kūdras pamitrināšanos. Degradētos augstajos purvos sugas ieviešanās liecina par augstajam purva raksturīgu mitruma apstākļu atjaunošanos.

Rožu purvā parastais balmeldrs parauglaukumos dominē vai kondominē (projektīvais segums 25-50 %) tikai piecos references parauglaukumos nosusināšanas neietekmētajā/mazietekmētajā purva daļā. Nosusināšanas ietekmētajā daļā parauglaukumos grāvju tuvumā 2010.-2011. gadā suga nav konstatēta nevienā parauglaukumā. 2012. un 2013. gadā niecīgā īpatsvarā (1 % vai mazāk) konstatēta trijos parauglaukumos, taču dažādos attālumos no grāvjiem. Šīs izmaiņas nav uzskatāmas par būtiskām. Tikai turpmāki novērojumi vismaz divu gadu laikā varētu parādīt, vai sugas parādīšanās liecina par vērā ņemamām izmaiņām purvā ūdens līmeņa pacelšanas rezultātā.

Aklajā purvā parastais baltmeldrs nav konstatēts nevienā parauglaukumā nevienā no apsekojumiem.

Aizkraukles purvā parastais baltmeldrs nelielā īpatsvarā (projektīvais segums 1-30 %) 2011.-2013. gadā konstatēts septiņos parauglaukumos. Tā kā vērā ņemamas izmaiņas netika konstatētas un dambji uz grāvjiem bija uzbūvēti tikai nedaudz vairāk kā pusgadu pirms pēdējā apsekojuma, sugas klātbūtne vai projektīvā seguma izmaiņas vismaz 2012. gadā un 2013. gadā nav saistāmas ar hidroloģiskā režīma izmaiņām purva atjaunošanas ietvaros.

Lai gan parastais baltmeldrs sekmīgi izmantojams kā augstā un pārejas purva veģetācijas atjaunošanās indikators (piemēram, Priede (2013)), šajā gadījumā, tā kā suga konstatēta ļoti reti (parauglaukumos grāvju tuvumā tikpat kā nav sastopama nosusināšanas radītās ietekmes dēļ), tad īsā novērojumu perioda dēļ nekādas vērā ņemamas izmaiņas šīs sugas projektīvajā segumā nav notikušas.

4.3. Rezultātu apkopojums raksta formā

Monitoringa rezultāti sagatavoti arī populārzinātniska raksta formā un iesniegti publicēšanai projekta ietvaros sagatavojamā izdevumā: Priede A. 2013. Apsaimniekošanas pasākumu ietekme uz augstā purva biotopiem Rožu, Aklajā un Aizkraukles purvā. Grām.: Pakalne M., Strazdiņa L. (red.) Augsto purvu apsaimniekošana bioloģiskās daudzveidības saglabāšanai Latvijā (latviešu un angļu valodā).

Secinājumi

- Dambju uzbūvēšanas un ūdenslīmeņa paaugstināšanas rezultātā Rožu, Aklajā un Aizkraukles purvā ir radīti labvēlīgi apstākļi augstā purva veģetācijas atjaunošanai. Sagaidāms, ka degradētiem augstajiem purviem raksturīgās augu sugas nomainīs tipiskās augsto purvu sugas un atjaunosies dabiskiem augstajiem purviem raksturīgā augāja struktūra.
- 2013. gada apsekojuma laikā hidroloģiskā režīma atjaunošanas darbu ietekme uz degradēta augstā purva veģetāciju bija vāji izteikta un lokāla vai vēl nebija konstatējama, izņemot pirmās ūdens līmeņa pacelšanas ietekmes uz purva veģetāciju pazīmes Rožu purvā, kur dambji uz grāvjiem izveidoti visagrāk (2012. gada vasaras beigās). Rožu purvā atsevišķās vietās tiešā aizdambēto grāvju tuvumā sākusies viršu kalšana (konstatēta tikai vienā parauglaukumā, bet citur arī ārpus parauglaukumiem).
- 2013. gadā nevienā no apsekotajiem purviem vēl nebija notikušas ar ūdenslīmeņa paaugstināšanas ietekmi skaidri saistāmas izmaiņas purva veģetācijā (piemēram, sfagnu projektīvā seguma palielināšanās, sausieņu mežu zaļsūnu projektīvā seguma samazināšanās, parastā baltmeldra ieviešanās u.c.). Izmaiņas sugu projektīvajos segumos visus četrus gadus bijušas nelielas un saistāmas ar dabiskām fluktuācijām. Augstā purva veģetācija ir maz mainīga, izmaiņas bez straujām dabisku vai antropogēnu faktoru izraisītām vides pārmaiņām notiek ļoti lēni. Ūdenslīmeņa paaugstināšanas rezultāti sagaidāmi nākamajos gados un, tā kā ūdenslīmeņa izmaiņas nav krases, sagaidāms, ka izmaiņas purva veģetācijā būs pakāpeniskas.
- Lai mazinātu izmīdīšanas radīto ietekmi parauglaukumu apsekošanas laikā, kas nedaudz, tomēr ietekmē viršu un sūnu segumu, ieteicams parauglaukumus augstā purva biotopos apsekot reizi 2-3 gados, nevis katru gadu. Kā liecina četru gadu novērojumi šī monitoringa ietvaros un citviet, augstā purva veģetācijas mainība bez krasām izmaiņām ir lēna, tāpēc veģetācijas izmaiņu monitoringu var veikt retāk kā reizi gadā.
- Lai novērtētu purva atjaunošanas pasākumu ietekmi uz Rožu, Aklā un Aizkraukles purva biotopiem un veģetāciju, nepieciešams monitoringu turpināt, apsekojot parauglaukumus vismaz reizi piecos gados. Pašreizējie rezultāti vēl nesniedz ieskatu īstenoto pasākumu efektivitātē, jo augstā purva veģetācija, ja nenotiek būtiska ūdenslīmeņa pacelšanās, nemainās strauji.

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Dabas liegums „Aklais purvs". Dabas aizsardzības pārvalde, www.daba.gov.lv

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Priede A. 2013. Veģetācijas izmaiņas Lielā Ķemeru tīreļa bijušajā kūdras karjerā pēc hidroloģiskā režīma atjaunošanas. Grām.: Pakalne M. (red.) Augsto purvu apsaimniekošana bioloģiskās daudzveidības saglabāšanai Latvijā, *iespiešanā*.

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Monitoring of mire management success in Melnais Lake Mire

Report summary 2013

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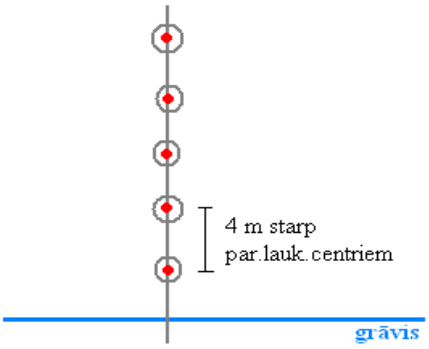
Kopsavilkums

Latvijā lielāko daļu purvu ietekmē agrāk veiktā susināšana un tās ietekme turpinās arī šobrīd. Līdz ar to Latvijā, tāpat kā citviet Eiropā, ir aktuāli veikt pasākumus, kas samazina tālāku purvu ekosistēmu degradāciju. LIFE projekta „Augstā purva biotopu atjaunošana īpaši aizsargājamās dabas teritorijās Latvijā" ietvaros tika ierīkoti kūdras dambji susināšanas un kūdras ieguves ietekmētajā augstajā purvā, lai stabilizētu gruntsūdens līmeni dabas liegumā „Melnā ezera purvs". Pētījuma mērķis bija novērtēt augāja izmaiņas pēc kūdras dambju ierīkošanas un gruntsūdens līmeņa stabilizēšanas dabas liegumā. Lai novērtētu pasākuma ietekmi uz purva augāju, tika veikta ikgadēja veģetācijas uzskaite pastāvīgos parauglaukumos un to fotografēšana pirms un pēc dambju ierīkošanas, attiecīgi 2010., 2011., 2012. un 2013. gadā. Augāja pētījumi veikti susināšanas ietekmētā augstā purvā (21 parauglaukums), frēzlauku neapplūdušajā daļā (15) un grāvjos, kuros ierīkoti dambji (7). Jau pusgadu pēc dambju ierīkošanas susināšanas ietekmētā augstajā purvā vērojamas augāja izmaiņas. 16 mēnešus pēc dambju ierīkošanas augāja izmaiņas turpinās un tās notiek augstā purva augāja atjaunošanai labvēlīgā virzienā. Turpinās sfagnu un makstainās spilves seguma palielināšanās, bet viršu segums samazinās. Tomēr priedes un purva bērzi turpina augt un to segums vietām palielinās. 2012. gadā augāja izmaiņu amplitūda nekorelē ar attālumu no grāvja, uz kura ierīkoti dambji, jo to būtiski ietekmē purva augāja sākotnējais stāvoklis. Susināšanas stipri ietekmētā augstā purvā ar izteiktu koku un krūmu stāvu augāja izmaiņas ir mazākas nekā vietās ar mazāku susināšanas ietekmi. 2013. gadā augāja izmaiņām ir tendence būt izteiktākām aizdambēto grāvju tuvumā nekā 2012. gadā, taču joprojām augāja stāvoklis pirms dambju ierīkošanas ietekmē izmaiņu amplitūdu. Frēzlauku neapplūdušajā daļā notiek slēgta augāja veidošanās, mežainajā daļā uz dienvidiem no tā vietām kalst virši. Iespējams, ka pat neliela gruntsūdens līmeņa paaugstināšanās ir sekmējusi augāja sukcesiju.

Materiāls un metodes

LIFE projekta **„**Augstā purva biotopu atjaunošana īpaši aizsargājamās dabas teritorijās Latvijā" ietvaros 2012. gada janvārī-februārī dabas lieguma „Melnā ezera purvs" grāvjos ierīkoti 54 kūdras dambji. Lai novērtētu pasākuma ietekmi uz purva augāju, veikta ikgadēja veģetācijas uzskaite pastāvīgos parauglaukumos un parauglaukumu fotografēšana pirms un pēc dambju ierīkošanas.

Lai objektīvi varētu sekot līdzi veģetācijas izmaiņām, parauglaukumi ierīkoti jau 2010. gada oktobrī. Veģetācija analizēta 2011., 2012. gada jūlijā un oktobrī un 2013. gada augustā.



1.attēls. Parauglaukumu ierīkošanas shēma dabas lieguma „Melnā ezera purvs" ziemeļaustrumu un centrālajā daļā.

Parauglaukumu izvēle

Melnā ezera purvā parauglaukumi ierīkoti:

1) divos grāvjos, kuros plānota dambju veidošana;
2) susināšanas ietekmētajā purva daļā blakus plānotajiem dambjiem, kur visticamāk veģetācijas izmaiņas notiks visstraujāk;
3) neapplūdušajā frēzlauka daļā.

Parauglaukumi, cik iespējams, ierīkoti blakus hidroloģisko mērījumu vietām, lai varētu salīdzināt veģetācijas izmaiņas ar ūdens līmeņa izmaiņām pēc dambju ierīkošanas. Parauglaukumu ierīkošana veikta pēc tam, kad noteiktas plānotās dambju vietas un ūdens līmeņa mērījumu vietas. Ietekmētajā un mazskartajā purva daļā veģetācija aprakstīta 4 m^2 lielos apļveida parauglaukumos. Ietekmētajā purva daļā parauglaukumi ierīkoti perpendikulāri susināšanas grāvim un attālums starp parauglaukuma centriem ir 6 m (1. attēls). Divos grāvjos tika ierīkoti parauglaukumi ar mērķi noskaidrot grāvju aizaugšanas tendences pēc dambju ierīkošanas Parauglaukumu izmērs uz grāvjiem bija atkarīgs no grāvju platuma un dziļuma, visbiežāk tas bija 2x2 m. Visi parauglaukumi nofotografēti. Parauglaukumu centrs vai kreisā mala (grāvjos) dabā atzīmēts ar krāsainu lentu, kas apsieta ap koku vai krūmu.

Veģetācijas uzskaite

Parauglaukumos uzskaitītas visas tur sastopamās augu sugas un tām vizuāli novērtēts projektīvais segums, atzīmēts koku skaits krūmu un koku stāvā, kā arī sīkkrūmu un koku vitalitāte. Novērtēts atklātas kūdras, nobiru un ūdens segums procentos.

Nomenklatūra: vaskulārie augi (Gavrilova & Šulcs 1999), sūnas – (Āboliņa 2001), ķērpji – (Piterāns 2001). Sfagni Sphagnum flexuosum, S. fallax un S. angustifolium, kurus grūti noteikt lauka apstākļos, apvienoti Sphagnum recurvum kompleksā.

Datu analīze

Datu analīze veikta ar programmu R(R Development Core Team, 2009). Analizēti 2011., 2012. un 2013. gada dati – savstarpēji salīdzinātas transektes un parauglaukumi.

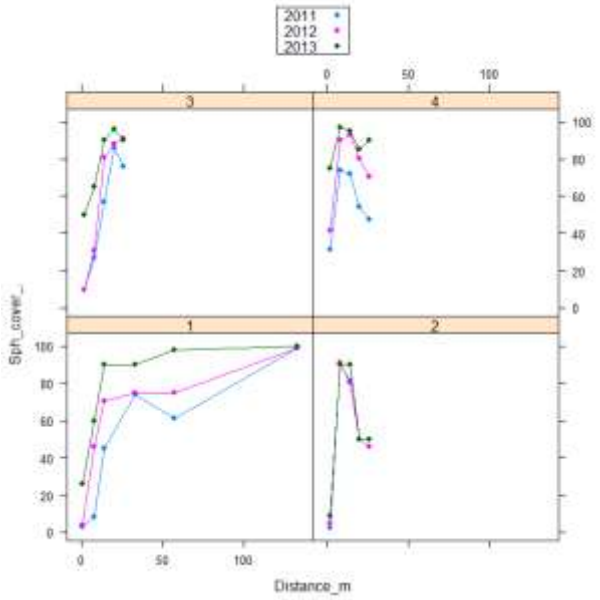
Rezultāti un diskusija

Augāja izmaiņas pēc dambju ierīkošanas

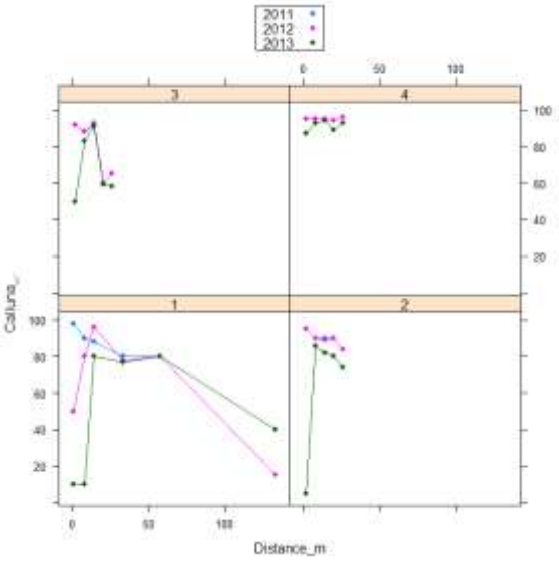
Augstais purvs

Dambji tika ierīkoti 2012. gada janvārī-februārī. Ierīkoti 54 dambji. Pēc dambju ierīkošanas Melnā ezera purva dienvidu daļā (profils M2) gruntsūdens līmenis paaugstinājies vidēji par 20cm, veidojot pat virsūdeņus grāvja tiešā tuvumā. Gruntsūdens līmeņa svārstības ir būtiski samazinājušās šajā purva daļā – no 20-65 cm līdz 10-25 cm. Visizteiktākās izmaiņas ir līdz 10 m attālumam no grāvja. Gruntsūdens līmeņa svārstību izmaiņas ir saistītas ar nokrišņu daudzumu un purva uzbūvi (Dēliņa 2013). 2013. gadā turpinās Melnā ezera purva augāja izmaiņas pēc dambju ierīkošanas. Sfagnu segums turpina palielināties visos augstā purva transektos. Visizteiktākās sfagnu seguma izmaiņas bija 1., 3. un 4. transektā, tātad tur, kur susināšanas ietekme bija mazāk izteikta. Otrajā transektā, susināšanas stipri ietekmētā purva daļā, sfagnu segums tikai nedaudz palielinājies. Sfagnu seguma palielināšanās vērojama līdz 50 m attālumam no grāvja visos transektos. Transektos 1., 3. un 4. konstatēta korelācija starp sfagnu seguma palielināšanos un attālumu līdz grāvim, bet 2. transektā, susināšanas stipri ietekmētajā daļā, tā ir nebūtiska. Parastā virša seguma izmaiņas korelē ar attālumu līdz grāvim visos transektos 2013. gadā. Sila virša segums samazinās visos transektos, jo tie nokalst pārmērīga mitruma apstākļos. Salīdzinot ar 2011. gadu, parauglaukumos, kas atrodas tuvāk grāvim, viršu segums 2013. gadā samazinājies no 90% līdz 50% vai pat 10%. Turklāt tas samazinās arī tajās purva daļās, kurās 2012. gadā netika novērota sila virša seguma samazināšanās (2., 3., 4. transekts, 2. attēls). Koku un krūmu stāva segums vietām nedaudz palielinās (2., 4., 6. attēls, 1. tabula).

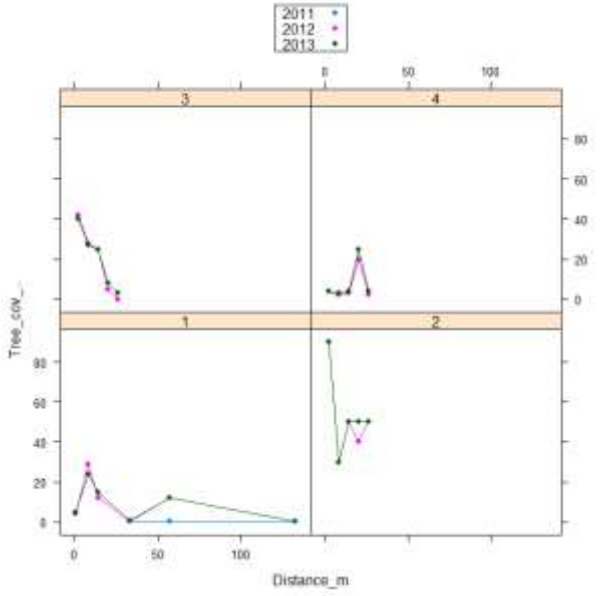
A



B

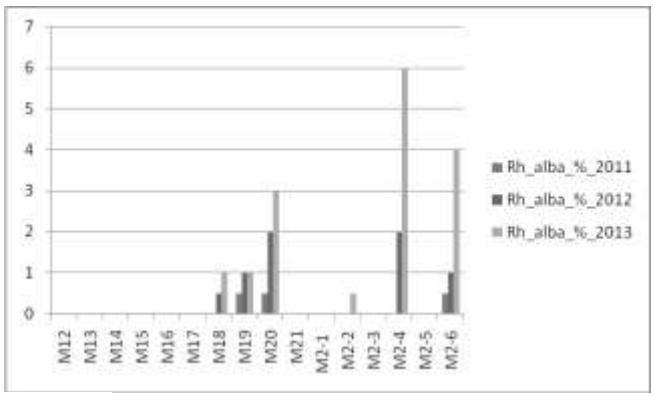


C

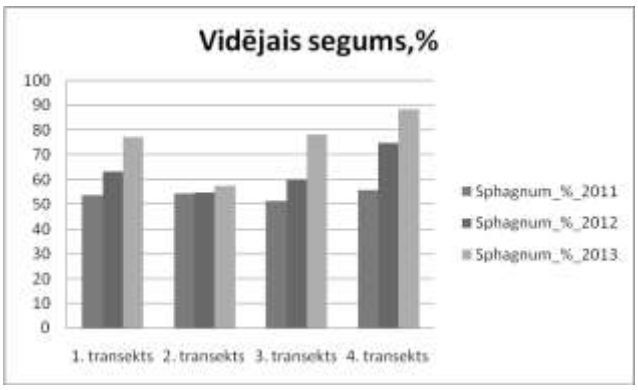


2.attēls.
Sfagnu (A), parastā virša (B) un koku & krūmu (C) seguma procentuļās izmaiņas parauglaukumos Melnā ezera purvā atkarībā no attāluma līdz grāvim, m. Attēlā: 1,2,3,4 – 1. ,2., 3., 4. transekts.

Pirmajā un trešajā transektē turpina palielināties parastā baltmeldra *Rhynchospora alba* segums. 2013. gadā *Rhynchospora alba* segums turpina palielināties četros no pieciem parauglaukumiem. Suga no jauna konstatēta vēl vienā parauglaukumā (3. attēls).

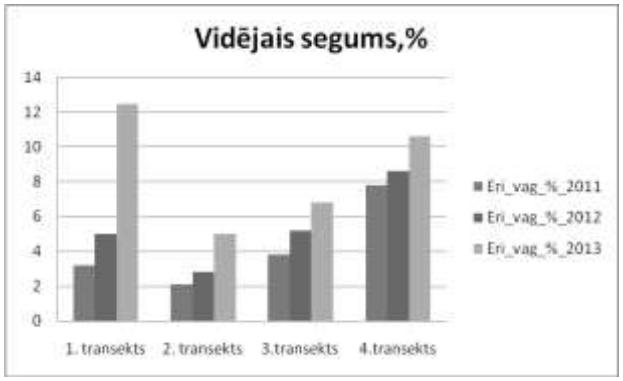


3. attēls.
Parastā baltmeldra *Rhynchospora alba* seguma, %, izmaiņas 2011.-2013. gadā 1.un 2. Transekta parauglaukumos Melnā ezera purvā

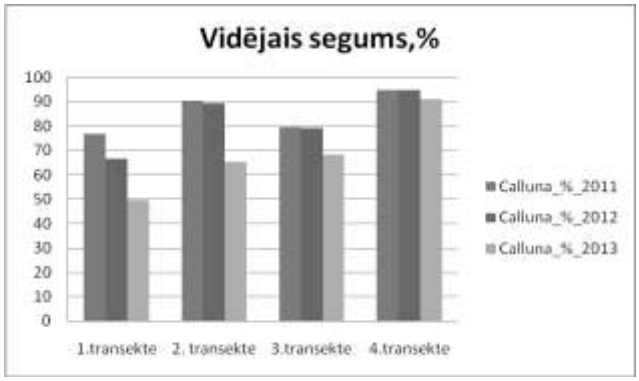


4. attēls.
Sfagnu seguma, %, izmaiņas 1.-4. transektos Melnā ezera purvā 2011.-2013. gadā

Visās četrās purva transektēs turpina pieaugt makstainās spilves *Eriophorum vaginatum* projektīvais segums, galvenokārt palielinoties esošo spilvju ciņu izmēriem. Visizteiktākās izmaiņas notikušas 1. un 2. transektā, kur spilves segums vietām pat desmitkāršojies (5. attēls.). Pirmajā un otrajā transektā palielinājies lācenes *Rubus chamaemorus* un polijlapu andromedas *Andromeda polifolia* segums. Palielinājusies sugu daudzveidība. Ieviesušās gan neskartiem augstiem purviem raksturīgas augu sugas, piemēram, peldošā zemzarīte *Cladopodiella fluitans,* smalkais sfagns *Sphagnum tenellum,* zvīņlapu kurcija *Kurzia pauciflora,* gludlapu mīlija *Mylia anomala,* gan susinātiem augstiem purviem raksturīgas augu sugas Šrēbera rūsaine *Pleurozium schreberii.*



5. attēls.
Makstainās spilves *Eriophorum vaginatum* seguma, %, izmaiņas 1.-4. transektos Melnā ezera purvā 2011.-2013. gadā



6. attēls.
Sila virša seguma, %, izmaiņas 1. - 4.transektos Melnā ezera purvā 2011.-2013. gadā

Susināšanas grāvji purvā

Abos grāvjos turpinās augāja izmaiņas. 1. grāvī būtiski palielinājies mazās pūslenes segums, vietām arī sfagnu segums, bet 2. grāvī sfagnu segums ūdenī jau daudzviet sasniedz 100% (7. attēls). Dambēto grāvju aizaugšana dokumentēta arī citviet Latvijā un pasaulē (Ķuze & Priede 2008, Salmiņa & Bambe 2008, Lanti et al. 2006) un tā tiek uzskatīta par vēlamu rezultātu purvu atjaunošanā (Lanti et al. 2006).

A

B

C

7. attēls.
Augāja izmaiņas 2. grāvī pēc dambju ierīkošanas Melnā ezera purvā 2012. gadā (A – skats uz parauglaukumu MG6 2010. gadā, B – 2012. gadā, C – 2013. gadā)

Frēzlauku neapplūdusī daļa

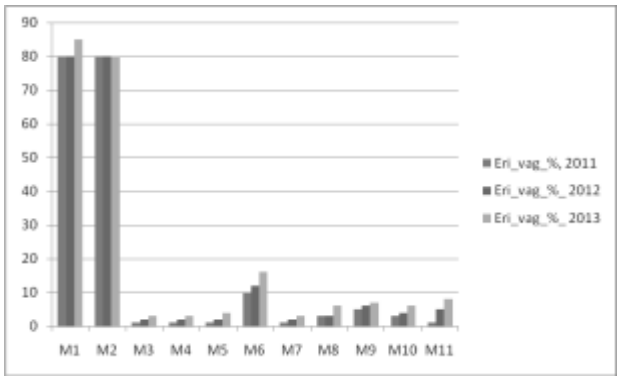
Ierīkoti četri kūdras dambji, lai samazinātu gruntsūdens līmeņa svārstības augstā purva un purvaino mežu biotopos, vienlaikus cenšoties nepaaugstināt līmeni frēzlaukos.

1. tabula
Veģetācijas struktūra Melnā ezera purva parauglaukumos pirms dambju ierīkošanas 2011. gadā un pusotru gadu pēc to ierīkošanas 2013. gadā

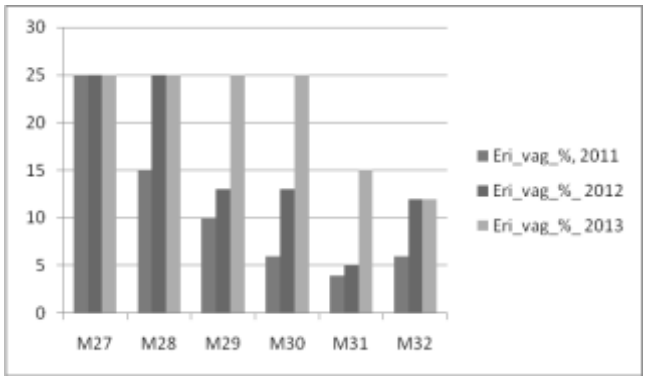
	Vidējais koku&krūmu segums,%		Vidējais Calluna vulgaris segums,%		Vidējais lakstaugu segums,%		Vidējais sfagnu segums,%		Vidējais zaļsūnu segums,%	
	2011	2013	2011	2013	2011	2013	2011	2013	2011	2013
1. transekts	9.3	11.4	76.8	49.5	4.3	16.8	53.6	77.3	0.25	0
2. transekts	52	54	90.4	65.4	6.8	13.8	54.3	57.6	0.6	1.3
3. transekts	20	20.6	79.6	68.2	10.4	17.7	51.2	78.2	1.3	1.2
4. transekts	7.4	8	95	91.2	6.2	18	55.7	88.6	1.2	1.2
5. transekts	10.6	20.8	0.5	0	34.3	36.7	0	0.4	0.3	0.8
6. transekts	13.2	20.6	19.8	19.6	25	34	0	0	2.7	4.5
Mežainā daļa_D	47.5	55	38	26	25	26	0	0	0.8	3.5
Mežainā daļa_Z	56.5	79.5	4	9	12.5	31	0	0	0.8	1
Periodiski applūstošā daļa	2.5	7.3	0.2	0.8	10.7	21.2	0	0	0.1	0.8

Vērojama aizaugšanas tendence frēzlauku neapplūdušajās daļās – palielinājies krūmu, lakstaugu stāva un zaļsūnu segums (1.tabula). 2013. gadā turpinās makstainās spilves seguma palielināšanās, kas visizteiktākā ir frēzlauku zemākajās vietās (8., 9. attēls). Dažviet nokalst virši. Ieviešas kadiķu dzegužlins *Polytrichum juniperinum,* nokarvācelīšu polija *Pohlia nutans* vai to

segums nedaudz palielinās. Frēzlauku mežainajā daļā turpinās aizaugšana ar kokiem un krūmiem. Dienvidu daļā acīmredzot paliek mitrāks, jo sila virsis sāk kalst (1. tabula). Gruntsūdens līmenis ir nedaudz paaugstinājies šajā lieguma daļā (profils M1), taču gruntsūdens līmeņa svārstību amplitūda nav būtiski mainījusies (Dēliņa 2013).

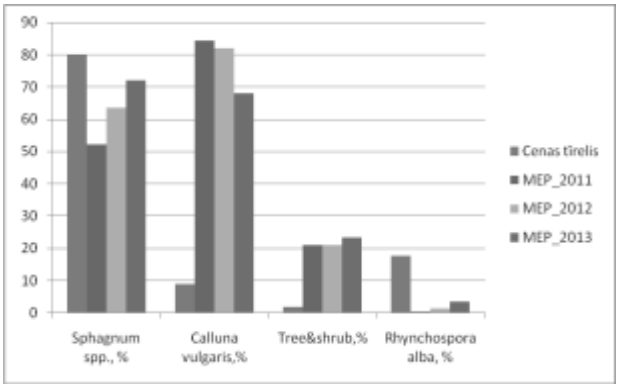


8. attēls.
Eriophorum vaginatum seguma, %, izmaiņas dabas lieguma „Melnā ezera purvs" frēzlauku augstākajās vietās (transekti 5. un 6.) 2011.-2013.



9. attēls.
Eriophorum vaginatum seguma, %, izmaiņas dabas lieguma „Melnā ezera purvs" frēzlauku zemākajās vietās 2011.-2013.

Pētījums parāda, ka Melnā ezera purvā sfagni strauji reaģē uz gruntsūdens līmeņa paaugstināšanos un stabilizēšanos susināšanas ietekmētā augstā purvā. Tas netika novērots Vasenieku un Klāņu purvos un Cenas tīrelī, kur veikti līdzīgi pētījumi (Salmiņa & Bambe 2008). Pēc dambju ierīkošanas Melnā ezera purvā, tāpat kā Vasenieku purvā un Cenas tīrelī, palielinājās makstainās spilves *Eriophorum vaginatum* segums. Visos līdz šim pētītajos augstajos purvos 1-2 m joslā gar grāvi vērojama sila virša *Calluna vulgaris* nokalšana (Salmiņa & Bambe 2008, Ķuze & Priede 2008). Salīdzinot ar neskartu augstā purva augāju Cenas tīrelī, Melnā ezera purva parauglaukumos joprojām ir vidēji lielāks priežu un viršu segums, bet mazāks sfagnu segums nekā Cenas tīreļa neskartajā daļā, kas uzskatāma par neskarta augstā purva augāja references vietu (10. attēls). Tomēr kopumā augāju izmaiņu tendences Melnā ezera purvā pēc dambju ierīkošanas ir neskarta augstā purva augāja virzienā. Tik strauju liekņu sugu, parastā baltmeldra *Rhynchospora alba*, garsmailes sfagna *Sphagnum cuspidatum,* parādīšanos pēc dambju ierīkošanas sekmē šo sugu klātbūtne blakus esošajā purva mazskartajā daļā. Sugu diasporu nozīmi purva augāja atjaunošanā ir uzsvēruši vairāki autori (Poschold 1995, Money & Wheeler 1999). Jāņem vērā, ka gruntsūdens stabilizēšanās notiek vairāku gadu laikā pēc dambju ierīkošanas (Ruseckas & Grigaliūnas 2008). Tādējādi, mēs varam sagaidīt augāja izmaiņas arī turpmākajos gados.



10. attēls.
Neskarta augstā purva un susināšanas ietekmēta augstā purva augāja svarīgāko augāja parametru salīdzinājums Melnā ezera purvā un Cenas tīreļa neskartajā daļā (references vieta). Abās teritorijās augu sugu vidējais projektīvais segums vērtēts procentos.

Secinājumi

Kūdras dambju izveides rezultātā susināšanas ietekmētā augstā purva augājā notikušas būtiskas izmaiņas. Augāju izmaiņu tendences notiek neskarta augstā purva augāja virzienā. Par to liecina pieaugošais sfagnu kopējais segums un tādu pārmitru augteņu augu sugu, kā parastā baltmeldra *Rhynchospora alba*, garsmailes sfagna *Sphagnum cuspidatum* parādīšanās un makstainās spilves *Eriophorum vaginatum* seguma palielināšanās. Vērojama sila virša *Calluna vulgaris* seguma būtiska samazināšanās, jo tie nokalst pārmērīga mitruma apstākļos. 2013. gadā, 18 mēnešus pēc dambju ierīkošanas, augāja izmaiņām ir tendence būt izteiktākām aizdambēto grāvju tuvumā nekā 2012. gadā, taču joprojām augāja stāvoklis pirms dambju ierīkošanas ietekmē izmaiņu amplitūdu. Frēzlauku neapplūdušajā daļā notiek slēgta augāja veidošanās, mežainajā daļā uz dienvidiem no tā vietām kalst virši. Iespējams, ka pat neliela gruntsūdens līmeņa paaugstināšanās ir sekmējusi augāja sukcesiju. Jāņem vērā, ka augāja atbildes reakcija jāvērtē vismaz 6–10 gadu periodā pēc pasākuma veikšanas un tāpēc esošie secinājumi uzskatāmi tikai par indikatīviem.

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Monitoring of mire hydrology regime

Report summary 2013

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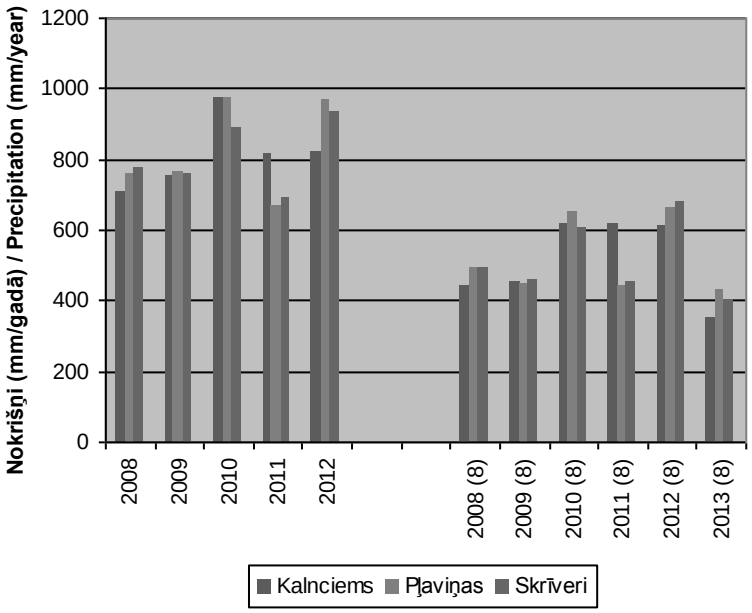
Purva hidroloģiskā režīma novērošanai ierīkoti novērošanas urbumu profili katrā purvā. Urbumu dziļums 1,5-3 m, atkarībā , no kūdras slāņa biezuma. Kopā ierīkoti deviņi profili un 26 + 16 + 13 + 8 = 63 urbumi. Ūdens līmeņa novērojumi tiek veikti divas reizes mēnesī, mērījumiem tiek izmantota mērlente ūdens līmeņa mērīšanai. Mērījumi uzsākti 2010. gada decembrī un turpināti līdz 2013. gada augustam. Iegūtie dati par gruntsūdens līmeņa izmaiņām tiek uzkrāti un analizēti.
Novērojumi liecina, ka aizsprostu izbūve uz visiem grāvjiem ir sniegusi gaidīto rezultātu – gruntsūdens līmenis grāvju tuvumā ir paaugstinājies un stabilizējies. Līmeņa kāpums profilos atšķiras, atkarībā no grāvja morfoloģijas un piegulošās purva teritorijas morfoloģijas. Izteikti drenējošos grāvjos ar zemu ūdens līmeni līmeņa kāpums ir ļoti izteikts grāvja tuvumā, bet grāvjos, kas jau sākotnēji ir bijuši gandrīz pilni ar ūdeni šis kāpums ir niecīgāks. Attālums, kādā izpaužas apsaimniekošanas pasākumi purvā, lielā mērā atkarīgs no lāmu un akaču klātbūtnes konkrētajā purva daļā – tur, kur purvā ir šādi veidojumi, grāvja aizdambēšanas efekts novērojams daudz tālāk no grāvja.

Profiles of groundwater observation wells are installed at the Project sites in order to monitor the hydrological regime of the mires. The well depth is 1,5-3 m, depending on the thickness of peat layer. Totally there are nine profiles with 26 + 16 + 13 + 8 = 63 wells. Groundwater level is measured twice per month manually, using water level meter, starting from December 2010 until August 2013. The data obtained are aggregated in the data base and analysed.
Observations show that dams' construction have brought the planned results – groundwater table has rised and stabilised near the ditches. Groundwater table rise differs throughout the profiles depending on morphology of the dithc and surrounding mire area. There is significant water table rise near the draining ditches with low water level, but the groundwater table rise is smaller near the ditches initially almost completely filled with water. The distance, where effect of management measures is observed depends on presence of bog pools in the particular mire area – the effect is observed furtjer from the ditch in the mire parts, where bog pools are present.

Ievads

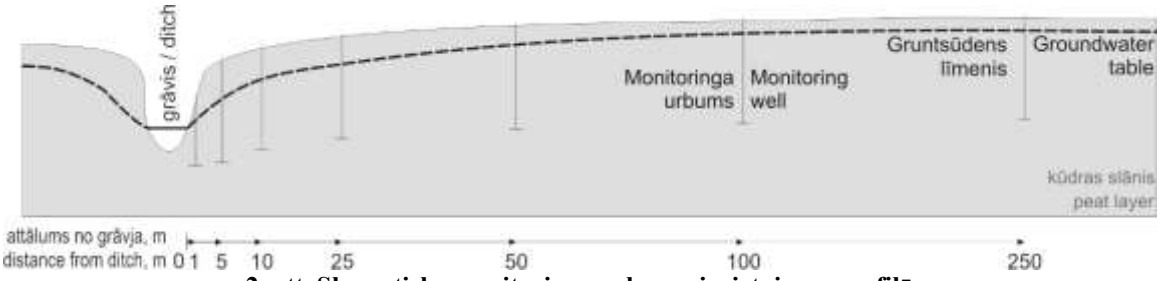
Dabas liegumos izveidotajos monitoringa urbumu profilos gruntsūdens līmeņa novērojumi turpinājās līdz 2013. gada augustam ieskaitot. Novērojumi tiek veikti divas reizes mēnesī. Iegūtie dati tiek apkopoti tabulās (skat. pielikumu) un analizētas gruntsūdens līmeņa svārstības purvos. Melnā ezera purvā 2012. gada janvārī – februārī uz grāvjiem plānotajās vietās izbūvēti aizsprosti. Pārējos DL aizsprosti izbūvēti 2012. gada augustā – septembrī.
Līdztekus gruntsūdens līmeņa izmaiņām, kas saistās ar aizsprotu izbūvi, visiem purviem ir raksturīgas līmeņa svārstības, ko nosaka klimatiskie apstākļi. Analizējot nokrišņu daudzumu tuvākajās meteoroloģiskajās stacijās par pēdējiem gadiem kopš 2008. gada (1. attēls), redzams, ka 2008., 2009. un 2011. gads ir bijis sausāks nekā 2010. un 2012. gads. Salīdzinot nokrišņu daudzumu par 8 mēnešiem, var secināt, ka arī 2013. gads pieder sausajiem gadiem. Šajā gadā nokrišņu daudzums 8 mēnešos ir vismazākais visā salīdzinājumu periodā visās stacijās, tādejādi nosakot kopējo gruntsūdens līmeņa izmaiņu tendenci.



1. att. Nokrišņu daudzums pētījumu teritorijām tuvākajās meteoroloģiskajās stacijās
(dati no LVĢMC – Meteoroloģija 2013). Grafikā atainots kopējais nokrišņu daudzums mm/gadā – 2008, nokrišņu daudzums pirmajos astoņos gada mēnešos – 2008 (8).

Gruntsūdens līmeņa novērojumi

Gruntsūdens līmeņa novērojumi katrā purvā veikti vienā vai vairākos reprezentatīvos profilos, kas stiepjas perpendikulāri grāvim. Profila izvietojums purvā izvēlēts, balstoties uz sekojošiem apsvērumiem: (1) grāvis atrodas konkrētajam purvam raksturīgā vietā un (2) uz grāvja paredzēts izveidot dambjus. Urbumi katrā profilā izvietoti tā, lai grāvja tuvumā tie būtu ciešāk viens pie otra, bet, attālinoties no grāvja, attālums starp urbumiem pieaugtu (skat. 2. attēlu). Profila garums parasti bija 500 m, izņemot dažus profilus, kur tie ir 250 m gari. Pēdējais urbums profilā raksturo purva hidroloģisko režīmu netraucētos apstākļos.



2. att. Shematisks monitoringa urbumu izvietojums profilā

Kopumā projekta vietās izveidoti deviņi profili, kas ietver 63 urbumus:

- Četri profili izveidoti DL "Aizkraukles purvs un meži":
  - (A1) perpendikulāri platam grāvim, kurš projekta laikā tika aizdambēts, 7 urbumi;
  - (A2) pie maziem grāvīšiem, uz kuriem izbūvēti dambji, 7 urbumi;
  - (A3) pie esoša grāvja gar kūdras laukiem, lai noteiktu nedambēta grāvja ietekmi uz purvu, 7 urbumi;
  - (A4) purvainā un mitrā mežā, lai noteiktu apsaimniekošanas pasākumu ietekmi uz piegulošajiem mežiem, 5 urbumi.
- DL "Aklais purvs" izveidoti divi profili:
  - (Ak1) netālu no Ģirupes iztekas, kur izveidoti dambji, 8 urbumi;
  - (Ak2) pie daļēji aizauguša grāvja, kur izveidoti dambji, 8 urbumi.

- DL "Melnā ezera purvs" izveidots viens profiles un viena urbumu grupa:
  - (M1) urbumu grupa bijušo kūdras lauku teritorijā, kur tagad ir daļēji applūstoši dīķi, 6 urbumi;
  - (M2) pie grāvja, kur izveidoti dambji, 7 urbumi.
- DL "Rožu purvs" izveidots viens profils (R) pie grāvja, kas atrodas visdziļāk purvā plašā grāvju sistēmā, uz kuras izveidoti dambji, 8 urbumi.

2012. gada oktobrī tika iznīcināts urbums M1-6, tāpēc tas tika divu nedēļu laikā atjaunots, jaunajam urbumam piešķirts numurs M1-6a.

Urbumu dziļums atkarībā no kūdras slāņa biezuma ir līdz 3 m. Urbumu veido perforēta polietilēna filtra caurule, kas noslēgta ar vāku. Katra urbuma koordinātas un absolūtā augstuma atzīme tika noteiktas, izmantojot augstas precizitātes GPS uztvērēju *Leica GPS 900cCS*.

Pazemes ūdeņu līmeņa novērojumi uzsākti 1–1,5 gadu pirms dambju izbūves, lai iegūtu informāciju par hidroloģisko režīmu pirms dambju izbūves. Mērījumi tiek veikti divas reizes mēnesī (ziemā, kad purva virskārta sasalusi, 1–2 reizes mēnesī) manuāli, izmantojot ūdens līmeņa mērītāju.

Gruntsūdens līmeņa analīzei tika sastādīti grafiki, kas atspoguļo gan gruntsūdens līmeņa dziļuma izmaiņas, gan gruntsūdens līmeni katrā profila urbumā aboslūtajās atzīmēs. Papildus, izmantojot Latvijas Vides, ģeoloģijas un meteoroloģijas centra mājas lapā pieejamo informāciju par nokrišņu daudzumu atsevišķās stacijās, atlasīti dati par periodu no 2010. gada sākuma līdz 2013. gada septembrim (LVĢMC – Meteoroloģija 2013). Arī šie dati atspoguļoti gruntsūdens līmeņa izmaiņu grafikos. Tā kā meteoroloģisko staciju skaits, kurās regulāri un nepieciešamajā periodā tiek veikti nokrišņu daudzuma mērījumi, ir ierobežots, kā atbilstošākās, ņemot vērā attālumu un fizioģeogrāfisko izvietojumu, izvēlētas Kalnciema stacija Melnā ezera purva datu analīzei, Skrīveru stacija Aizkraukles purva un mežu un Aklā purva datu analīzei un Pļaviņu stacija Rožu purva datu analīzei.

Hidroloģiskā režīma atjaunošanas pasākumi un to efektivitāte

Purvu hidroloģiskā režīma atjaunošanai uz grāvjiem, kuri ierīkoti purvā un būtiski maina dabisko ūdens noteci no purva, tika ierīkoti aizsprosti. Šādi apsaimniekošanas pasākumi tradicionāli tiek izmantoti cilvēka saimnieciskās darbības ietekmētos purvos (Price 1997). Aizsprostu izbūve uz grāvjiem palēnina ūdens noplūdi no purva, tādejādi padarot mitrāku grāvim piegulošo teritoriju un nodrošinot labvēlīgākus augšanas apstākļus mitrumu mīlošiem purva augiem.

1. tabula. Projekta vietās ierīkotie aizsprosti

Projekta vieta	Aizsprostu novietojums purvā	Aizsprostu skaits	Ierīkošanas laiks
Aizkraukles purvs un meži	ZR daļa	18	08-09/2012
	ZA daļa	8	
	D daļa	3	
Aklais purvs	Ģirupe (centrālā un R daļa)	4	08-09/2012
	Jūgupe un grāvis (DA daļa)	8	
	Znotiņu ezera grāvis (ZA daļa)	2	
Melnā ezera purvs	Galvenie grāvji pa visu lieguma teritoriju	54	01-02/2012
Rožu purvs	D daļa	51	08-09/2012
	A mala	8	

Aizsprosti tiek būvēti gan ar rokām, gan ar speciālu tehniku. Ar tehniku būvētie dambji ir stipri sablīvēti kūdras vaļņi ar noteiktu augstumu, kas palēnina ūdens plūsmu grāvī, kā arī rada nelielu uzstādinājumu virs dambja. Savukārt ar roku veidotos aizsprostus nav iespējams tik stipri sablīvēt, tādēļ kūdras vaļņi tiek papildināti ar horizontāliem un vertikāliem baļķiem, kas palielina dambja stiprību. Aizsprosta izmērs ir atkarīgs no grāvja izmēra. Ar tehniku būvēto aizsprostu platums parasti ir nedaudz lielāks par grāvja platumu, bet garums ir apmēram 2 reizes lielāks nekā grāvja platums, t.i. aizsprosts turpinās abpus grāvim līdz pusei no grāvja platuma. Ar roku veidotie aizsprosti parasti ir šaurāki, to platums ir 1–1,5 m, atkarībā no grāvja izmēra un pastiprinošo

konstrukcijas elementu daudzuma. Arī šie aizsprosti ir garāki par grāvja platumu un turpinās uz abām pusēm no grāvja malas vismaz 0,5 m. Sākumā kūdras aizsprosti tiek būvēti augstāki par projektētajām atzīmēm, jo kūdra ar laiku vēl sasēžas, sasniedzot projektēto augstumu. Ūdens līmeņa starpība starp dambju virsmu tiek plānota 10–35 cm, lai nebūtu pārāk plaši uzstādinājumi grāvī un lai ūdens līmenis grāvī pēc tā izveides nesniegtos pāri grāvja krantij.
Projekta vietās purvos kopumā uzbūvēti 156 aizsprosti, no kuriem 29 Aizkraukles purvā, 14 Aklajā purvā, 54 Melnā ezera purvā un 59 Rožu purvā (1. tabula).
Pēc aizsprostu ierīkošanas novērota ūdens līmeņa celšanās un paaugstināta līmeņa saglabāšanās gan ziemā, gan 2013. gada vasaras sākumā ar sekojošu nelielu līmeņa pazemināšanos 2013. gada vasaras beigās. Gruntsūdens līmeņa (GŪL) svārstību amplitūda pēc dambju ierīkošanas ir samazinājusies, kas pierāda apsaimniekošanas pasākumu efektivitāti (2. tabula).

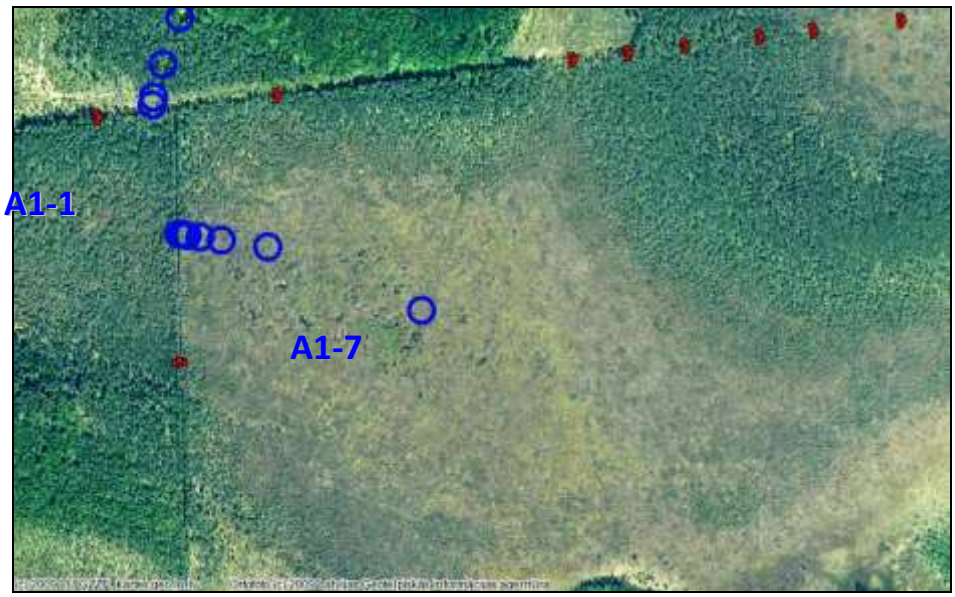
2. tabula. Kopsavilkums par gruntsūdens līmeņa (GŪL) izmaiņām urbumos pirms un pēc aizsprostu izveides

Profils	GŪL profilā, m no z.v. (no - līdz)		GŪL svārstību amplitūda urbumos, m (min - max)	
	Pirms	Pēc	Pirms	Pēc
A1	+0,1-0,4	+0,2-0,25	0,3-0,35	0,1-0,25
A2	0,0-0,55	+0,1-0,2	0,3-0,5	0,15-0,25
A3	0,0-1,9	-	0,15-0,65	-
A4	0,0-0,6	+0,05-0,4	0,25-0,35	0,15-0,25
Ak1	+0,1-0,4	+0,45-0,1	0,3-0,5	0,1-0,2
Ak2	+0,05-0,4	+0,05-0,25	0,25	0,1-0,15
M1	0,0-1,0	+0,1-0,8	0,25-0,4	0,25-0,6
M2	0,05-0,45	+0,25-0,2	0,2-0,25	0,1-0,25
R	0,0-0,9	+0,05-0,2	0,3-0,8	0,15

Aplūkojot gruntsūdens līmeņa svārstību datus, redzams, ka atsevišķos profilos pēc aizsprostu ierīkošanas uz grāvjiem ir notikušas būtiskas izmaiņas un gruntsūdens līmeņa svārstības ir krasi samazinājušās (piemēram, A2, R), bet citos profilos šis samazinājums ir mazāk būtiskāks (piemēram, A1, M2).
Plašāka aizsprostu ietekme uz purva hidroloģisko režīmu analizēta turpmākajās sadaļās, apskatot datus par gruntsūdens līmeņa mērījumiem purvos katrā profilā.

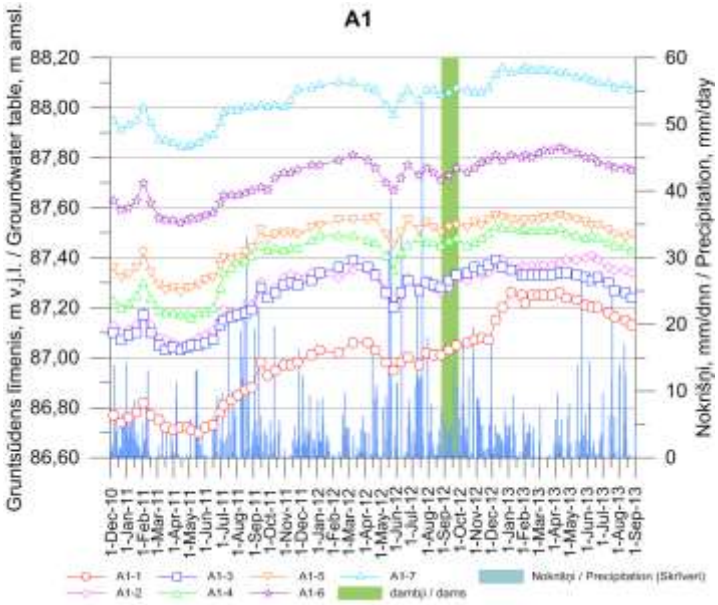
DL „Aizkraukles purvs un meži"

A1 profils – purva ZR daļā ūdens līmeņa novērojumiem pie lieliem, ar ūdeni pildītiem grāvjiem, uz kuriem 2012. gada augustā – septembrī uzbūvēti aizsprosti. Urbumi izvietoti purva atklātajā daļā, kur sastopamas purva lāmas (3. att.).
Visā novērojumu periodā ir redzams, ka gruntsūdens līmenis (GŪL) kopumā ir pastāvīgi paaugstinājies (4. att.), ko var skaidrot kā ar klimatisko apstākļu ietekmi, tā arī ar veiktajiem purva hidroloģiskā režīma atjaunošanas pasākumiem. Gruntsūdens līmenis pie grāvja (A1-1 urbums) ir 1-1,2 m zemāks nekā ūdens līmenis dziļāk purvā (A1-7 urbums).
Pirms aizsprostu izbūves 2010. gada nogalē un 2011. gada sākumā gruntsūdens līmenis ir zems ar izteiktu kāpumu 2011. gada februārī, ko var saistīt ar lielāku nokrišņu daudzumu 2010. gada nogalē. 2011. gada pavasarī un vasaras sākumā ūdens līmenis ir zems visos urbumos profilā, un līmeņa celšanās novērota kopš 2011. gada jūlija, kas sakrīt ar nokrišņu daudzuma pieaugumu 2011. gada jūlijā – oktobrī. Laika posmā no 06/2011, kad ir zemākie līmeņi, līdz 04/2012, kad ir augstākais līmenis pirms aizsprostu izbūves, līmeņu kāpums urbumos nav vienmērīgs. Visstraujākais kāpums par 10-15 cm ir 2011. gada jūnijā – jūlijā, turpmāk, līdz 11/2011 līmenis pieaug vēl par 15-20 cm, un pēc tam iestājas zināma stablizācija un GŪL līdz 04/2012 pieaug vairs tikai par 5-10 cm. 2012. gada maijs – augusts ir raksturīgs ar lielu nokrišņu daudzumu, turklāt nokrišņu intensitāte ir krasi mainīga. Tas arī izsauc straujas GŪL svārstības par 5-10 cm visos urbumos.



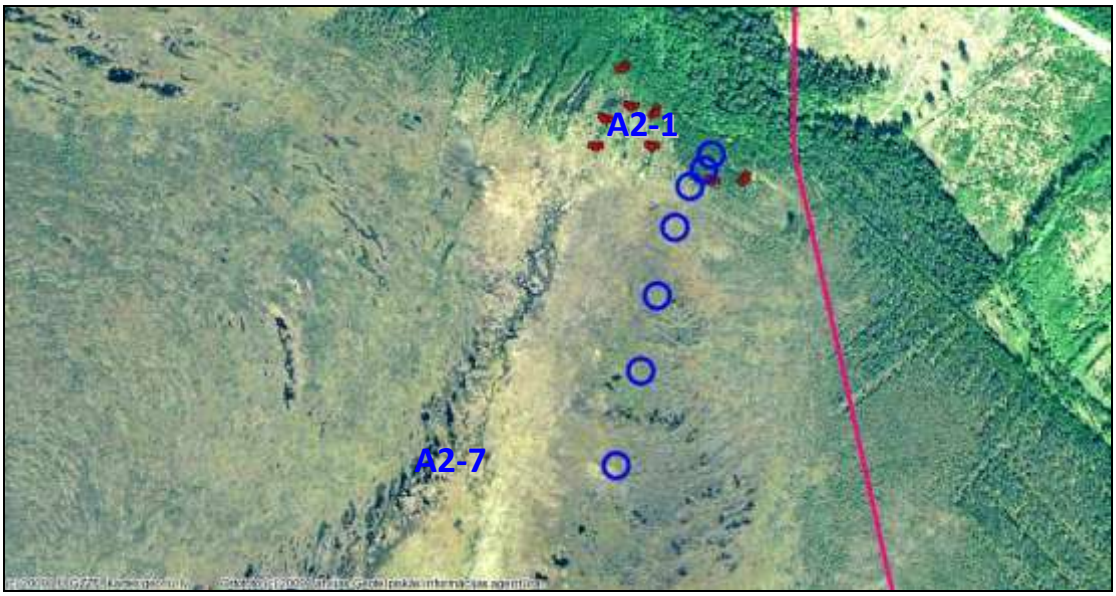
3. att. A1 profila monitoringa urbumu un aizsprostu izvietojums Aizkraukles purva ZR daļā
(Zilie aplīši – monitoringa urbumi, sarkanie punkti – aizsprosti uz grāvjiem)

Aizsprosti tika uzbūvēti 2012. gada augustā – septembrī, kam seko neliels lēzens GŪL kāpums visos urbumos par 5-10 cm. Savukārt izteikta GŪL paaugstināšanās novērojama tikai 2012. gada beigās – decembrī, pēc lietaina rudens A1-1 un A1-7 urbumos. GŪL grāvim tuvākajā urbumā līmenis pieaug par 20-25 cm, bet tālākajā par 10-15 cm. Īpatnēji, ka urbumos 5-100 m attālumā no grāvja (A1-2 līdz A1-6) krass līmeņa kāpums nav novērojams, bet kopumā no 08/2012 līdz 12/2012 GŪL šajos urbumos ir paaugstinājies par 10-15 cm.
2013. gads ir sausāks nekā iepriekšējie, ar izteikti sausu ziemu un pavasari, bet GŪL urbumos saglabājas stabils visu ziemu un pavasari. Neliels, lēzens līmeņa kritums vērojams kopš vasaras sākuma, kad visos urbumos līmenis pazeminās par 5-10 cm, kas, visticamāk saistīts ar sauso pavasari.
Kopumā var secināt, ka aizsprostu izbūve uz lielajiem, ar ūdeni pildītajiem grāvjiem šajā purva daļā ir sniegusi gaidīto rezultātu – ūdens līmenis purvā ir paaugstinājies un stabilizējies.



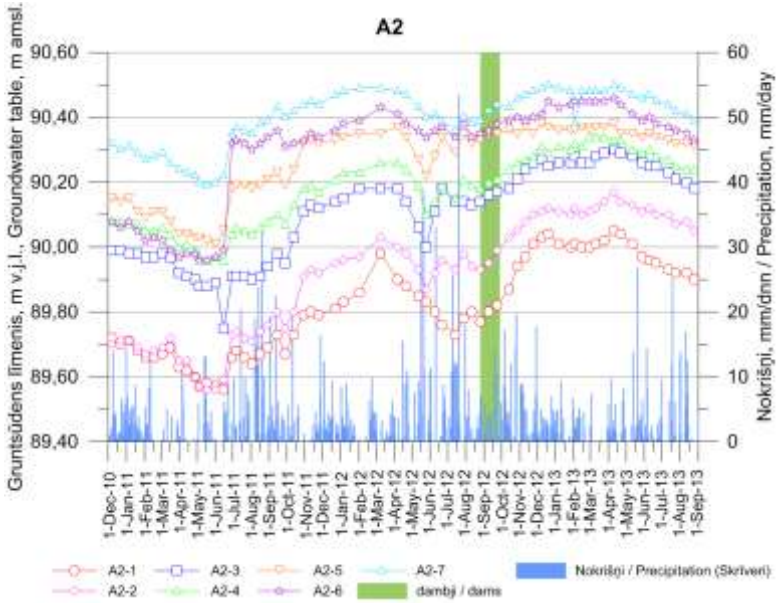
4. att. GŪL izmaiņas DL „Aizkraukles purvs un meži" A1 profilā

A2 profils izveidots ūdens līmeņa novērojumiem pie maziem, sekliem grāvīšiem, uz kuriem projekta laikā 2012. gada augustā – septembrī tika izbūvēti aizsprosti. Urbumi izvietoti pārejas purva daļā, kur sastopamas purva lāmas un netālu uz rietumiem atrodas arī dabiska ūdens noteces vieta no purva (5. att.).



5. att. A2 profila monitoringa urbumu un aizsprostu izvietojums Aizkraukles purva ZA daļā
(Zilie aplīši – monitoringa urbumi, sarkanie punkti – aizsprosti uz grāvjiem, lillā līnija – DL robeža)

Šajā profilā kopumā gruntsūdens līmenis ir bijis relatīvi stabils ar atsevišķiem lielākiem vai mazākiem kāpumiem un kritumiem pirms aizsprostu izbūves, un maz mainīgs pēc aizsprostu izbūves. Izņēmums ir būtiski zemāks ūdens līmenis visos urbumus novērojumu perioda pašā sākumā līdz 2011 gada jūnija vidum (6. att.). Gruntsūdens līmenis pie grāvjiem (A2-1, A2-2 urbumi) ir 0,5-0,6 m zemāks nekā dziļāk purvā (A2-7 urbums).

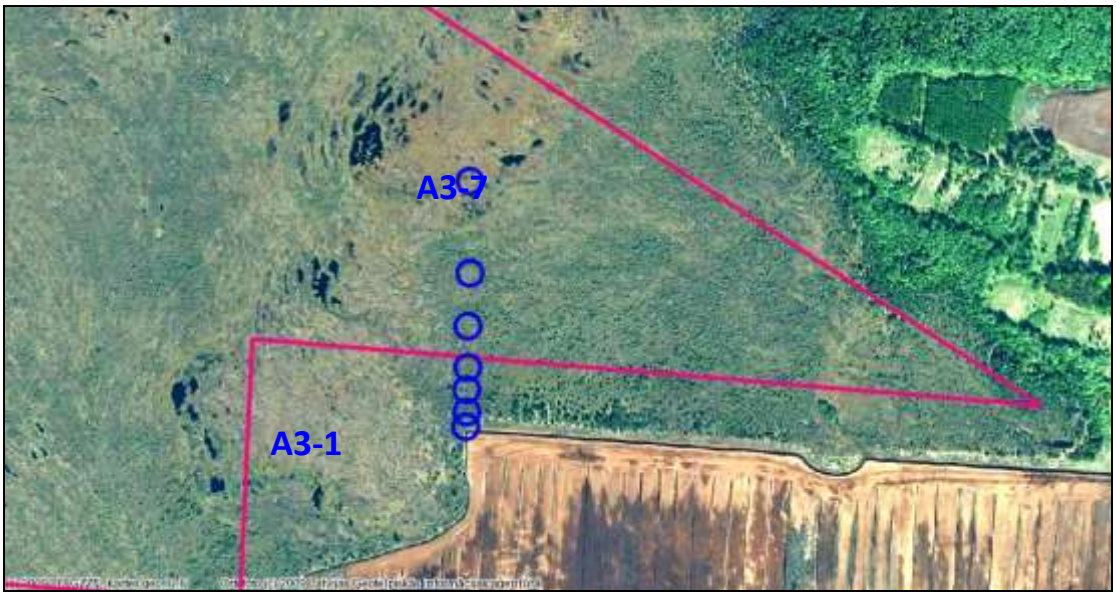


6. att. GŪL izmaiņas DL „Aizkraukles purvs un meži" A2 profilā

Pirms aizsprostu izbūves kopš 2011. gada jūlija GŪL ir pakāpeniski paaugstinājies visos urbumos līdz pat 2012. gada martam, kopējais GŪL kāpums ir no 10-15 cm urbumos dziļāk purvā līdz 25-35 cm urbumos grāvju tuvumā. Šajā profilā izteikti redzama grāvju ietekme uz ūdens līmeņa

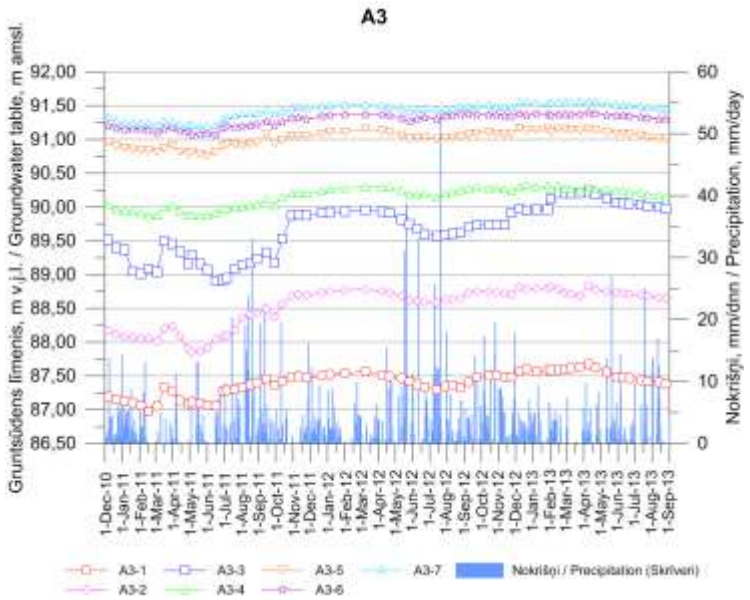
svārstībām purvā – grāvju tuvumā, kur to ietekme ir izteiktākā, raksturīgas krasas, lielākas amplitūdas GŪL svārstības. Savukārt attālinoties no grāvjiem par 100-250 m grāvju tiešā ietekme faktiski vairs nav jūtama un GŪL svārstības vairāk saistāmas ar nokrišņu daudzuma izmaiņām un dabisko noteci nopurva.
Aizsprosti tika uzbūvēti 2012. gada augustā – septembrī, kam seko pastāvīgs lēzens GŪL kāpums visos urbumos līdz pat 2013. gada janvārim. Grāvjiem tuvākajos urbumos GŪL paaugstinās par 20-30 cm, bet tālākajos urbumos tikai par 5-10 cm. Turklāt, tālākajos urbumos, kas atrodas 50-250 m attālumā no grāvja maksimālais novērotais GŪL pirms un pēc aizsprostu izbūves ir līdzīgs.
2013. gads ir sausāks nekā iepriekšējie, ar izteikti sausu ziemu un pavasari, bet GŪL urbumos saglabājas stabils visu ziemu un pavasari līdz 04/2013, kad sākas intensīva sniega kušana. Kopš 2013. gada aprīļa līdz augsutam GŪL krītas visos urbumos par 10-15 cm, lielākais kritums ir grāvjiem tuvākajos urbumos. Izteiktākais līmeņa kritums šajā profilā visos urbumos, salīdzinājumā ar A1 profilu, var būt skaidrojams ar to, ka blakus atrodas purva dabiskās noteces zona, tādejādi dabiski pazeminot ūdens līmeni šajā purva daļā.
Kopumā var secināt, ka aizsprostu izbūve uz maziem, sekliem grāvīšiem ir lietderīga, jo būtiski samazināja gruntsūdens līmeņa svārstības un paaugstināja GŪL grāvīšu tuvumā. Apsaimniekošanas pasākumu ietekme uz purva daļu 100m un vairāk attālumā no grāvjiem ir mazāka, ko var skaidrot ar šīs purva daļas specifisko uzbūvi (dabiskās noteces zonas esamību).

A3 profils izveidots ūdens līmeņa novērojumiem pie dziļa drenējoša grāvja kūdras lauku malā, lai novērotu visu laiku funkcionējoša grāvja ietekmi uz purva hidroloģisko režīmu (7. att.).



7. att. A3 profila monitoringa urbumu un aizsprostu izvietojums Aizkraukles purva A daļā
(Zilie aplīši – monitoringa urbumi, lillā līnija – DL robeža)

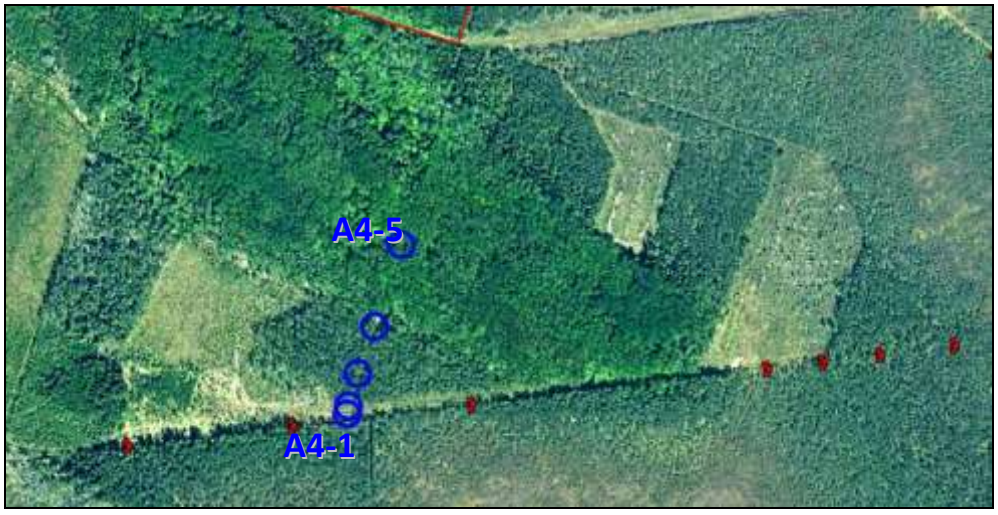
Šajā profilā kopumā gruntsūdens līmeņa režīms atšķiras atkarībā no urbumu izvietojuma. Urbumos līdz 10 m attālumā no grāvja (A3-1, A3-2, A3-3) ir novērojamas izteiktas GŪL svārstības, bet urbumos 25-250 m attālumā no grāvja (A3-4 ÷ A3-7) gruntsūdens līmenis ir stabilāks (8. att.). Šajā profilā ir raksturīgas lielas atšķirības GŪL aboslūtajās atzīmēs – pie grāvja GŪL ir par 4-4,25 m zemāks nekā tālākajos profila urbumos. Jau 5 m attālumā no grāvja GŪL ir par 1 m augstāks, un 10 m attālumā tas ir pieaudzis vēl par 1 m.



8. att. GŪL izmaiņas DL „Aizkraukles purvs un meži" A3 profilā

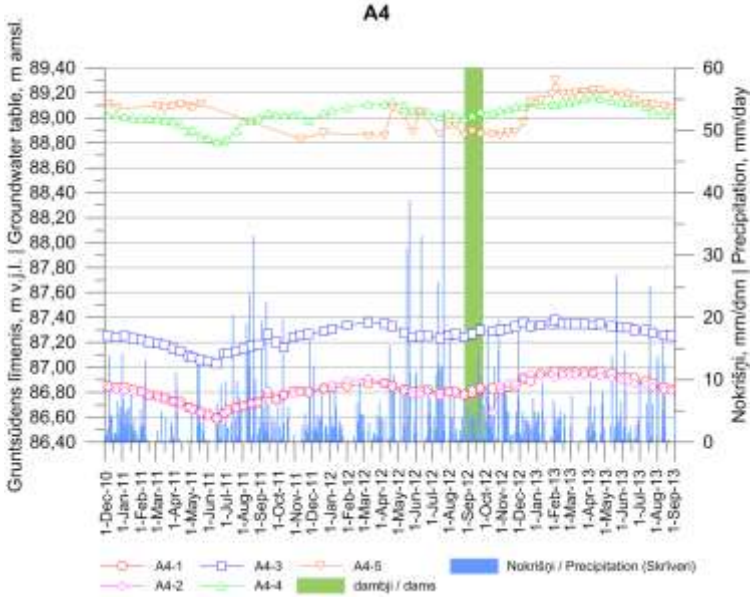
Izteiktākās GŪL svārstības raksturīgas 5-10 m platā joslā no grāvja, kur tieši ir straujākais līmeņa kritums par 2 m. Tā ir josla, kur vistiešāk izpaužas grāvja drenējošā darbība. Ja grāvim tuvākajā urbumā A3-1 kopējās GŪL izmaiņas novērojumu periodā ir 50-60 cm, tad A3-2 un A3-3 urbumos kopējā GŪL svārstību amplitūda sasniedz attiecīgi 1,0-1,1 m un 1,2-1,5 m. Jau nākamajā urbumā A3-4 25 m attālumā no grāvja redzams, ka GŪL ir daudz stabilāks, to grāvja tiešā drenējošā ietekme skar mazāk. Vienlaikus, ir redzams, ka kopumā grāvja drenējošā ietekme izpaužas arī vismaz 25 m attālumā no grāvja, jo te GŪL ir apmēram par 1 m zemāks nekā nākamajos urbumos. Citos profilos, kur grāvjos pastāvīgi netika uzturēts zems līmenis, kā te, šādā attālumā no grāvja GŪL starpības starp blakus esošiem urbumiem nepārsniedza 20-30 cm, ko vairāk nosaka purva kupola stāvums.
Šajā profilā, līdzīgi kā citos, izteiktākās GŪL svārstības raksturīgas 2011. gadā, bet 2012. un 2013. gadā raksturīga ūdens līmeņa pazemināšanās vasaras beigās un kāpums rudenī – ziemas sākumā.

A4 profils izveidots ūdens līmeņa novērojumiem purvainā mežā un mežā, lai novērotu apsaimniekošanas pasākumu ietekmi uz piegulošajiem mežiem. Profils izvietots pie liela, ar ūdeni pildīta grāvja, uz kura projekta laikā 2012. gada augustā – septembrī izbūvēti aizsprosti (9. att.).



9. att. A4 profila monitoringa urbumu un aizsprostu izvietojums Aizkraukles purva A daļā
(Zilie aplīši – monitoringa urbumi, sarkanie punkti – aizsprosti uz grāvjiem, sarkanā līnija – DL robeža)

Šajā profilā gruntsūdens līmeņa režīms ir stabils visā novērojumu periodā (10. att.), ko var skaidrot ar urbumu izvietojumu zonā starp grāvi, kas pastāvīgi pildīts ar ūdeni un purva malu gar minerālgrunts salu, kur dabiski veidojas paaugstināta mitruma zona. Vienlaikus, jāatzīmē, ka A4-4 urbumā, kas atrodas tieši pirms minerālgrunts salas ūdens līmenis ir apmērma par 2 m augstāks, nekā urbumos 1-10 m attālumā no grāvja, bet kopējā GŪL izmaiņu tendence arī šajā urbumā ir tāda pati, kā tuvākajos.



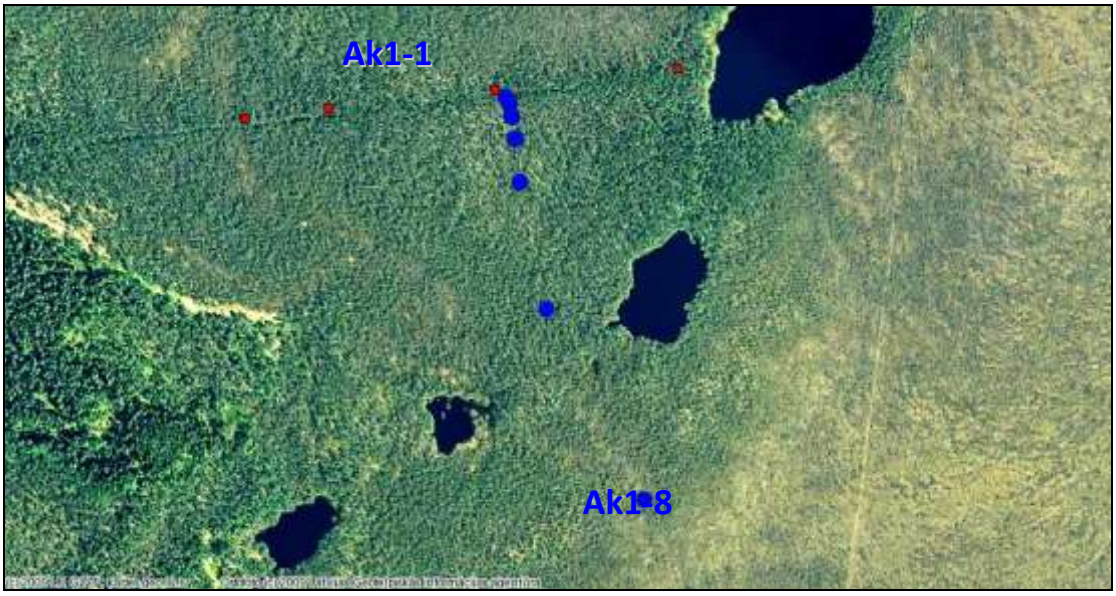
10. att. GŪL izmaiņas DL „Aizkraukles purvs un meži" A4 profilā

Novērojumu periodā urbumos A4-1 ÷ A4-3 raksturīgs neliels, pakāpenisks GŪL kritums 2011. gada jūnijā – jūlijā, līmenim nokrītoties par apmērma 20 cm no 12/2010. Tam seko tikpat lēzens kāpums 2011. gada rudenī un ziemā, kas turpinās arī 2012. gadā līdz aprīlim. Šajā laikā GŪL paaugstinās par 35 cm. GŪL salīdzinoši straujāk nokrītas par 15-20 cm 2012. gada aprīlī un maijā, un tad saglabājas relatīvi stabils līdz pat 2012. gada septembrim, kad tiek izbūvēti aizsprosti uz grāvjiem. Tad sākas ļoti pakāpeniska GŪL celšanās, sākumā par apmēram 10 cm, bet līdz 2013. gada sākumam GŪL ir paaugstinājies par 20 cm, salīdzinot ar iepiekšējā gada vasaru. Tas noturas stabils līdz pat 2013. gada aprīļa beigām, un lēna līmeņa krišanās, līdzīgi, kā citos profilos sākas 05/2013. Līdz novērojumu perioda beigām GŪL ir pazeminājies par 20 cm.
Aizsprostu izbūves pozitīvā ietekme ir novērojama abos grāvim tuvākajos urbumos, kur pēc aizsprostu ierīkošanas GŪL sasniedza maksimālās novērotās atzīmes, kas bija par apmēram 10 cm augstāk, nekā iepriekš. Tāpat, lai gan 2013. gada sākums bija pat sausāks nekā 2011. gads, GŪL nenokritās tik zemu kā 2011. gada vasarā, kad tika sasniegtas minimālās GŪL atzīmes.
Attiecībā uz GŪL svārstībām mežā minerālgrunts salā (A4-5 urbums), redzams, ka te GŪL grafikam ir atšķirīgs raksturs, kas liecina, ka gruntsūdens līmenis piegulošajās teritorijās, kur nav vairs izplatīti purvu nogulumi nav tieši atkarīgs no ūdens līmeņa izmaiņām grāvjos. Tomēr arī šajā urbumā vairākus mēnešus pēc aizsprostu izbūves ir novērojama GŪL celšanās par 20-25 cm, stabils un pastāvīgs GŪL 2013. gada ziemā, un līmeņa krišanās 2013. gada pavasarī – vasarā par 20 cm.

DL „Aklais purvs"

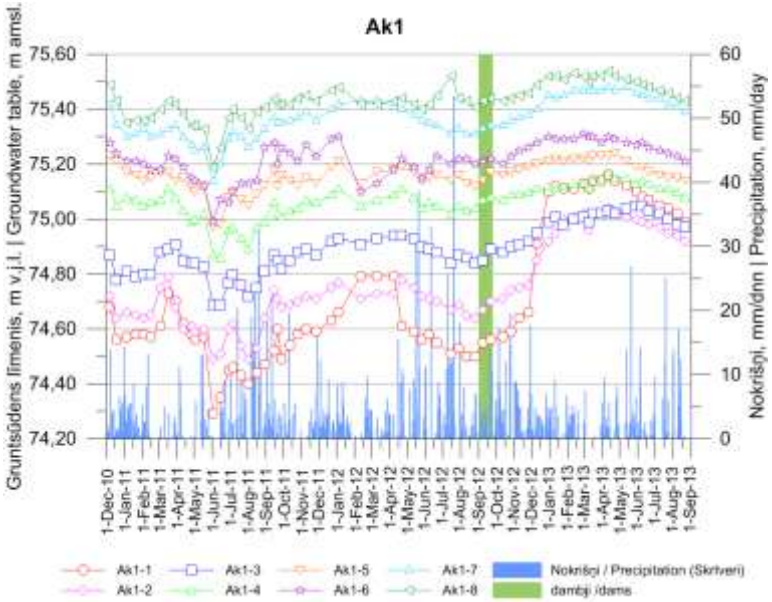
Ak1 profils izveidots ūdens līmeņa novērojumiem pie Ģirupes augšteces (grāvja), kur 2012. gada septembrī – oktobrī tika uzbūvēti aizsprosti. Grāvis te ir 1-1,5 m dziļš, labi drenējošs. Urbumi izvietoti perpendikulāri grāvim un šķērso purva ezeriņu virkni (11. att.).

Šajā profilā redzams, ka GŪL režīms atšķiras pirms un pēc aizsprostu izbūves uz grāvja (12. att.). Atšķirība starp GŪL urbumos pie grāvja un tālākajos urbumos ir apmēram 1 m, kas liecina par lēzenu līmeņa kritumu grāvja virzienā. Novērojumu perioda sākumā GŪL ir ļoti mainīgs, tam raksturīgas krasas svārstības ar amplitūdu no 10-20 cm tālāk no grāvja līdz 20-30 cm grāvim tuvākajos urbumos.



11. att. Ak1 profila monitoringa urbumu un aizsprostu izvietojums Aklā purva R daļā
(Zilie punkti – monitoringa urbumi, sarkanie punkti – aizsprosti uz grāvjiem)

Zemākais GŪL novērots 2011. gada vasaras sākumā, kam seko līmeņa kāpums līdz pat 2012. gada pavasarim. Sākotnēji līmenis strauji pieaug par 25-30 cm divu mēnešu laikā, bet vēlāk pakāpeniski pieaug vēl par 10 cm. 2012. gada pavasarī GŪL atkal pazeminās par 20-25 cm, un tāds saglabājas visu vasaru līdz aizsprostu izbūvei.

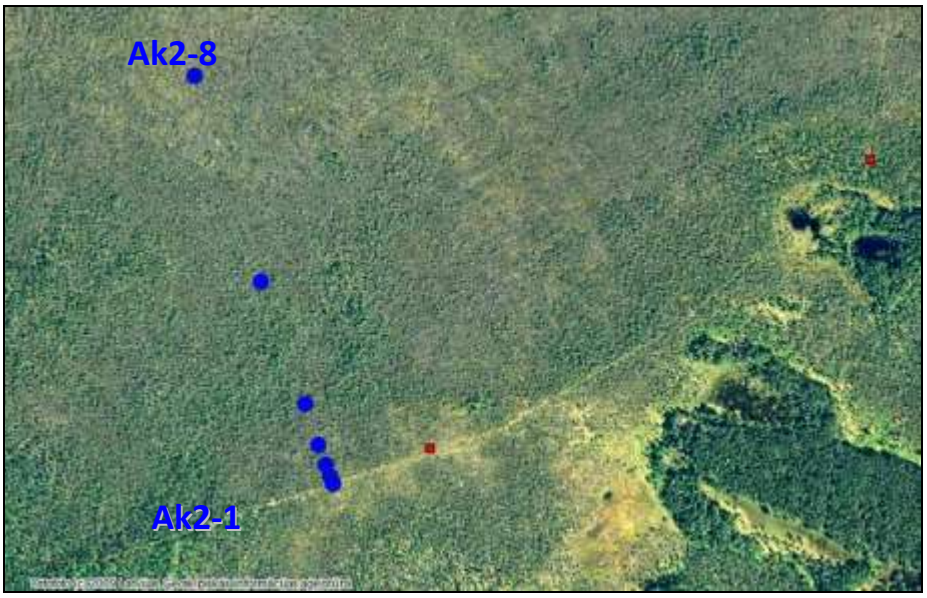


12. att. GŪL izmaiņas DL „Aklais purvs" Ak1 profilā

Pēc aizsprostu izbūves līdz 12/2012 gruntsūdens līmenis pakāpeniski paaugstinās visos profila urbumos par 10-15 cm. Savukārt decembrī, kad grāvis acīmredzot ir piepildījies ar ūdeni pēc rudens lietavām grāvim tuvākajos urbumos Ak1-1 un Ak1-2 novērots straujšs GŪL kāpums attiecīgi par 50

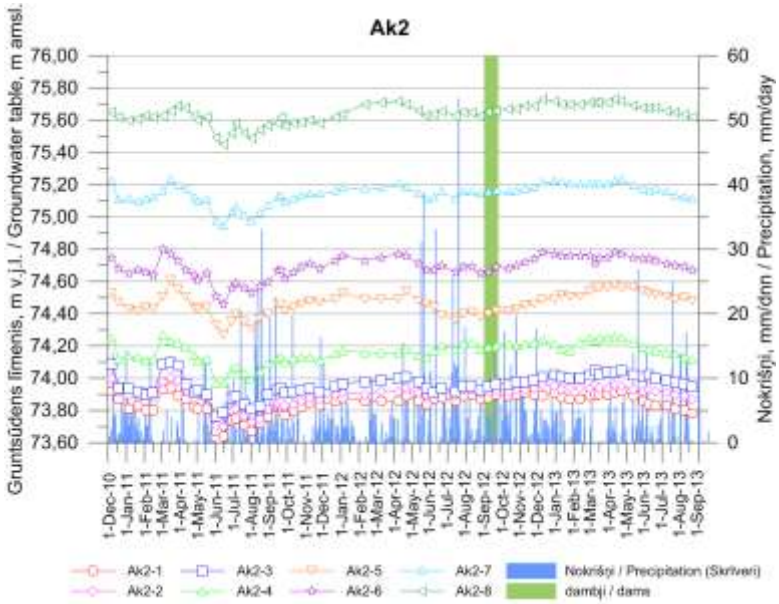
cm un 25 cm līdz 01/2013. Tālākajos urbumos šāds krass kāpums nenotiek, tur līdz janvārim turpinās lēzenā pakāpeniskā GŪL paaugstināšanās. 2013. gada ziemā tiek sasniegts maksimālais GŪL visos urbumos novērojumu periodā. Savukārt, kopš 05/2013 ūdens līmenis purvā sāk pakāpeniski pazemināties, līdz 08/2013 nokrītoties par 15-20 cm visos urbumos. Šis kritums visticamāk ir saistīts ar 2013. gada sauso pavasari.
Novērojumi rāda, ka aizsprostu izbūve uz izteikti drenējošā grāvja, kas veido Ģirupes augšteci ir sniegusi gaidīto rezultātu – ūdens līmenis purvā ir paaugstinājies (īpaši grāvja tuvumā) un stabilizējies. Tieši gruntsūdens līmeņa stabilizācija ir faktors, kas apliecina apsaimniekošanas pasākumu efektivitāti plašākā joslā gar grāvi, tā novērojama pat 500 m attālumā no grāvja.

Ak2 profils izveidots ūdens līmeņa novērojumiem pie daļēji aizauguša grāvja, kur 2012. gada septembrī – oktobrī tika uzbūvēti aizsprosti. Grāvis te ir ap 1,5 m plats, to sedz sfagnu kārta, zem kuras turpinās ūdens plūsma. Urbumi izvietoti daļēji atklātā purva daļā ar diezgan izteiktu kupolu (13. att.).



13. att. Ak2 profila monitoringa urbumu un aizsprostu izvietojums Aklā purva D daļā
(Zilie punkti – monitoringa urbumi, sarkanie punkti – aizsprosti uz grāvjiem)

Šajā profilā GŪL ir salīdzinoši stabils, lielākas GŪL izmaiņas tika novērotas 2011. gada pirmajā pusē (14. att.). Atšķirība starp GŪL urbumos pie grāvja un tālākajos urbumos ir apmēram 2 m, kas liecina par diezgan izteiktu līmeņa kritumu grāvja virzienā, kas šai gadījumā saistīts ar tālāko urbumu izvietojumu purva kupola daļā. Šim profilam raksturīgs, ka GŪL izmaiņu tendence visos urbumos ir līdzīga, tikai grāvim tuvākajos urbumos līmeņa izmaiņām ir lielāka amplitūda, nekā tālākajos urbumos.
Šajā profilā GŪL pazeminās no novērojumu perioda sākuma līdz 2011. gada jūnija vidum, un izteiktais līmeņa kritums 2011. gada pavasarī saistīts ar samazināto nokrišņu daudzumu 2011. gada pirmajā pusē. 2011. gada vasarā raksturīgas GŪL svārstības 20-30 cm amplitūdā, atkarībā no urbumu attāluma līdz grāvim. Stabils GŪL kāpums novērots visos urbumos kopš 08/2011, sākotnēji augustā un septembrī GŪL kāpums ir salīdzinoši straujš, līmenis paaugstinās par 20-30 cm, kas saistīts ar intensīvajiem nokrišņiem šajā peridoā. Pēc tam, laikā no 10/2011 līdz 05/2012, kāpums ir lēzens un ļoti pakāpenisks, GŪL šajā periodā pieaug par apmēram 10 cm. 2012. gada vasaras sākumā atkal novērota neliela GŪL pazemināšanās par 10-20 cm, ar sekojošu salīdzinoši stabilu zemu līmeni visu vasaru. Acīmredzot, sausais 2011. gads noteica to, ka 2012. gada vasaras intensīvie nokrišņi neradīja tik būtiskas GŪL svārstības, kā tas bija 2011. gada vasarā.

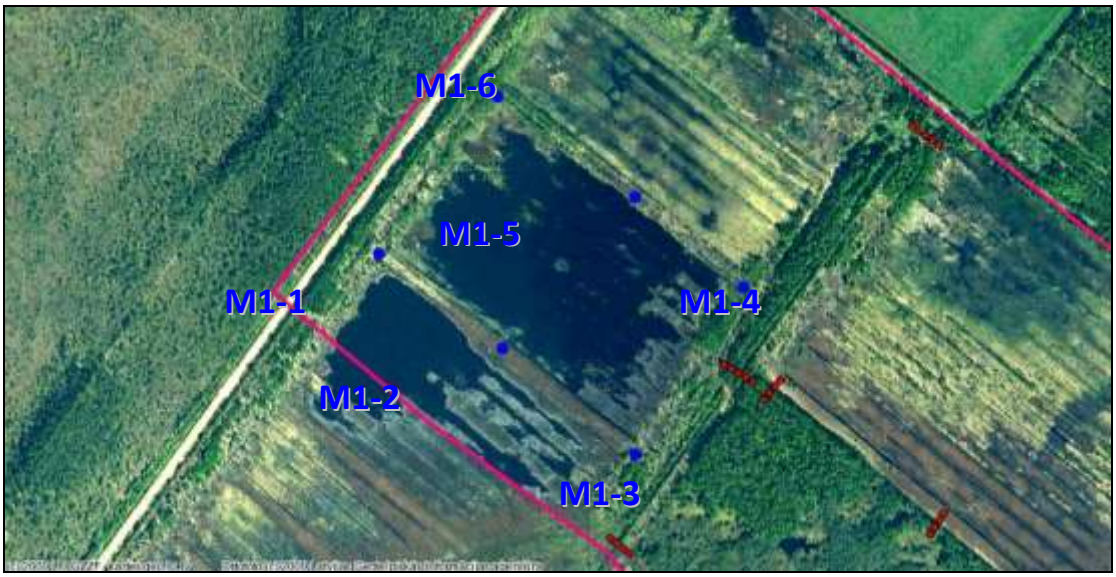


14. att. GŪL izmaiņas DL „Aklais purvs" Ak2 profilā

Pēc aizsprostu izbūves urbumos novērota GŪL celšanās līdz 12/2012 par 10-15 cm. 2013. gada ziemā GŪL saglabājas stabils un augsts, kopš 2013. gada maija vidus, līdzīgi kā citos profilos, sākas GŪL pazemināšanās par 5-10 cm nelielā nokrišņu daudzumu dēļ 2013. gada sākumā.
Šajā profilā pie no virspuses aizauguša grāvja tāpat novērojams, ka apsaimniekošanas pasākumi ir uzlabojuši purva hidroloģisko režīmu to vēl vairāk stabilizējot, kā arī nodrošinot nedaudz augstāku GŪL nekā iepriekš un minimizējot GŪL pazemināšanos ilgstoša sausuma periodos. Turklāt, šajā profilā raksturīgi, ka ietekme ir līdzīga gan grāvim tuvākajos urbumos, gan tajos, kas atrodas 10-25 un pat 100-250 m attālumā no grāvja. Tas ir saistīts ar to, ka grāvja virskārtā ir sfagnu slānis, kas izlīdzina ūdens līmeni grāvī un piegulošajā teritorijā.

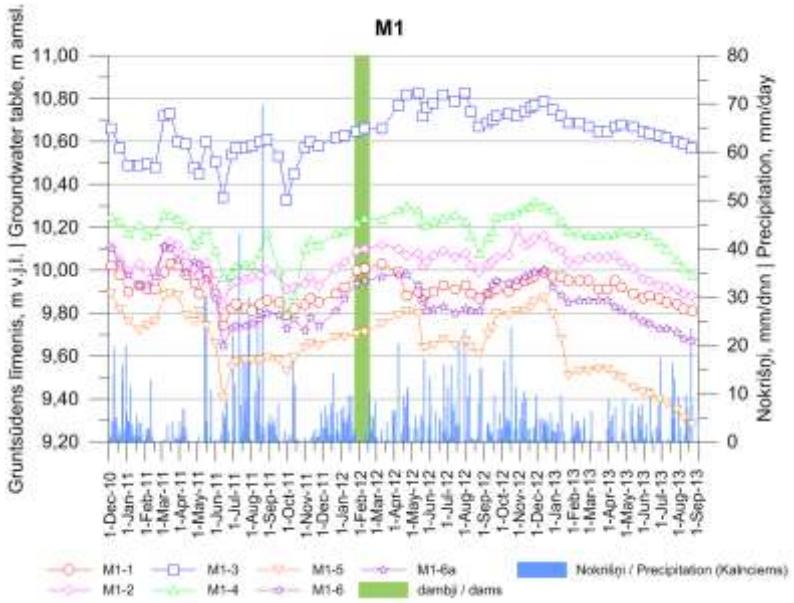
DL „Melnā ezera purvs"

M1 urbumu kopa izveidota ūdens līmeņa novērojumiem ap applūdušajiem bijušajiem kūdras laukiem. Aizsprosti izbūvēti 2012. gada februārī uz lielajiem drenējošiem grāvjiem, kas stiepjas gar bijušajiem kūdras laukiem uz A-DA no tiem, netālu no M1-3 un M1-4 urbumiem (15. att.).



15. att. M1 monitoringa urbumu kopas un aizsprostu izvietojums Melnā ezera purva ZR daļā
(Zilie punkti – monitoringa urbumi, sarkanie punkti – aizsprosti uz grāvjiem, lillā līnija – DL robeža)

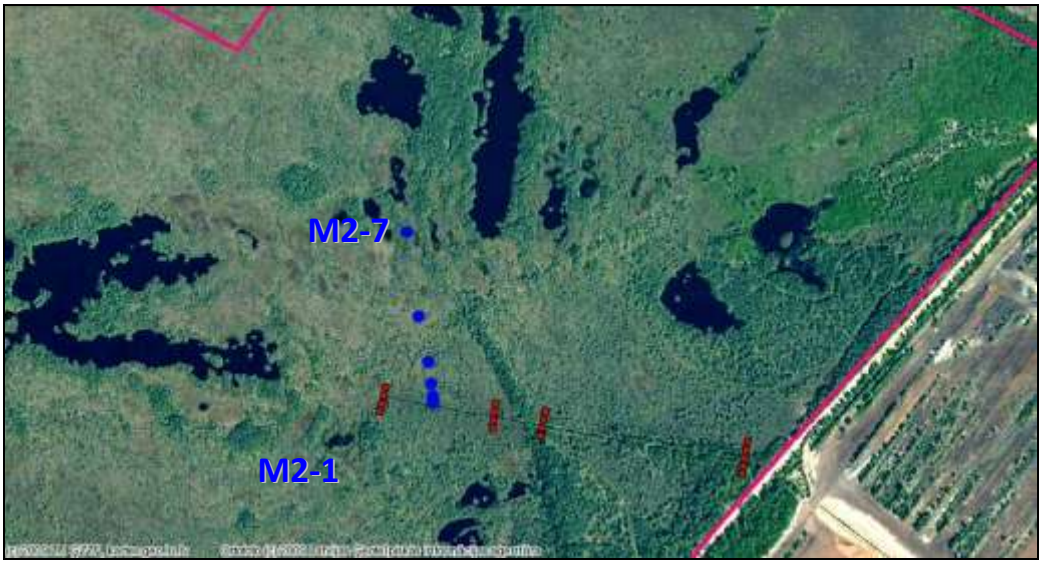
Gruntsūdens līmenis šajā urbumu kopā ir izteikti mainīgs, ko nosaka to izvietojums bijušajos kūdras laukos, kas ir daļēji applūduši un kuros ūdens līmeni nosaka kā klimatiskie apstākļi (nokrišņi un iztvaikošana), tā arī ierobežotā notece uz ietverošajiem maģistrālajiem grāvjiem. GŪL visaugstākais ir M1-4 urbumā, kur tas ir par 0,4-0,8 m augstāks nekā pārējos urbumos. Gruntsūdens līmenim šajā teritorijā ir raksturīgas krasas svārstības 20-40 cm amplitūdā ar īsiem (tikai dažus mēnešus ilgiem) stabilizācijas periodiem. Līmeņa paaugstināšanās ir saistīta kā ar sniega kušanas ūdeņu pieplūdi pavasarī, tā arī ar intensīviem nokrišņiem vasarā un rudenī.
Aizsprostu izbūve uz netālajiem grāvjiem ietekmējusi arī šo bijušo kūdras lauku teritoriju, un visbūtiskākās izmaiņas novērojamas M1-3 un M1-4 urbumos. Pavasarī pēc aizsprostu izbūves M1-4 urbumā GŪL paaugstinājies par 20 cm un stabilizējies – GŪL svārstību amplitūda samazinājusies līdz 20 cm, nav novērojamas krasas īslaicīgas līmeņa izmaiņas. Urbumā M1-3 vērojams mazāks GŪL kāpums – tikai par 10 cm, bet tāpat ir notikusi GŪL stabilizēšanās, kad līmeņa svārstību amplitūda nepārsniedz 20 cm, kā arī nav novērojamas krasas īslaicīgas līmeņa izmaiņas.



16. att. GŪL izmaiņas DL „Melnā ezera purvs" M1 urbumu grupā

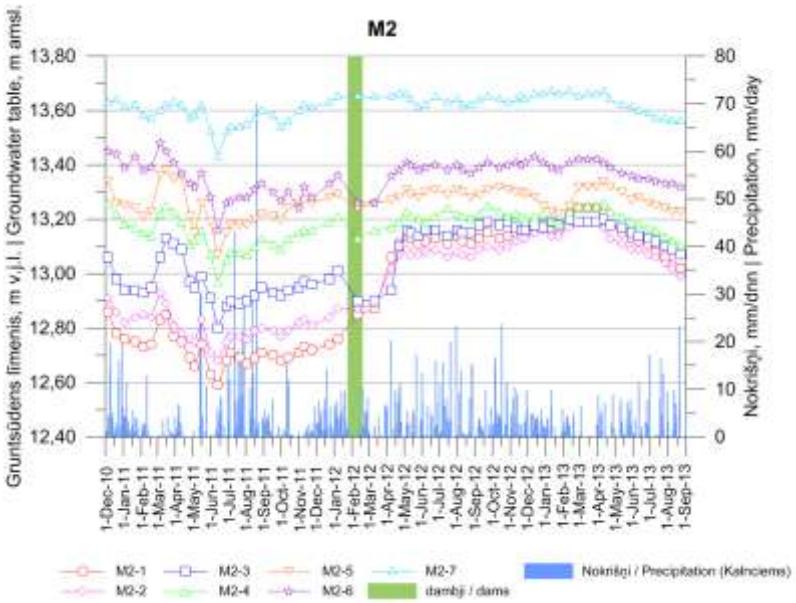
Šajā gadījumā grāvju aizsprostošana un ūdens līmeņa paaugstināšana tajosn ne tikai ir stabilizējusi GŪL apkārtējā teritorijā, bet tagad grāvis kalpo par pastāvīgu gruntsūdens papildināšanās avotu periodos, kad GŪL sāk būtiski pazemināties. Tādejādi teritorijai uz rietumiem no aizsprostotā grāvja tiek pievadīts papildus ūdens, nodrošinot vienmērīgākus mitruma apstākļus bijušajos kūdras laukos, bet tos tieši neappludinot.

M2 profils izveidots ūdens līmeņa novērojumiem pie grāvja, uz kura aizsprosti izbūvēti 2012. gada februārī. Grāvis izteikti drenē purva austrumu daļu, aizvadot ūdeni uz liegumu ietverošajiem maģistrālajiem meliorācijas grāvjiem. Urbumi izvietoti perpendikulāri grāvim, sasniedzot purva lāmu un akaču izplatības reģionu pie tālākā urbuma (17. att.).
Šajā profilā GŪL režīmā redzamas izteiktas atšķirības pirms un pēc aizsprotu izbūves (18. att.). Atšķirība starp GŪL urbumos pie grāvja un tālākajos urbumos ir apmēram 0,7 m pirms un 0,6 m pēc aizsprostu izveides uz grāvja. Pirms aizsprostu izbūves šajā teritorijā ir raksturīgs ļoti mainīgs GŪL režīms, ko ietekmē nokrišņu daudzuma izmaiņas un ūdens notece pa grāvi. GŪL svārstību amplitūda 2011. gadā sasniedz 20-30 cm, un šīs svārstības ir izteiktākas tieši grāvja tuvumā. Tomēr atbilstoši GŪL kritumi ir novērojami visos urbumos – arī tālākajā, kas atrodas 250 m no grāvja. Te visticamāk savu lomu spēlē profila izvietojums pie akaču un lāmu sistēmas. Te, līdzīgi kā Aizkraukles purva A1 profilā, lāmu sistēma ūdens līmeņa izmaiņām ļauj izpausties tālāk no grāvja, nekā gadījumā, ja lāmu un akaču nebūtu.



17. att. M2 profila monitoringa urbumu un aizsprostu izvietojums Melnā ezera purva A daļā
(Zilie punkti – monitoringa urbumi, sarkanie punkti – aizsprosti uz grāvjiem, lillā līnija – DL robeža)

Kopumā 2011. gadā raksturīga GŪL pazemināšanās kopš marta grāvim tuvākajos urbumos līdz jūnija vidum par 20-35 cm. Urbumos tālāk no grāvja līmeņa krišanās sākas vēlāk, to mazāk ietekmē tieši sniega kušanas ūdeņu aizplūšanas radītais efekts grāvja tuvumā.



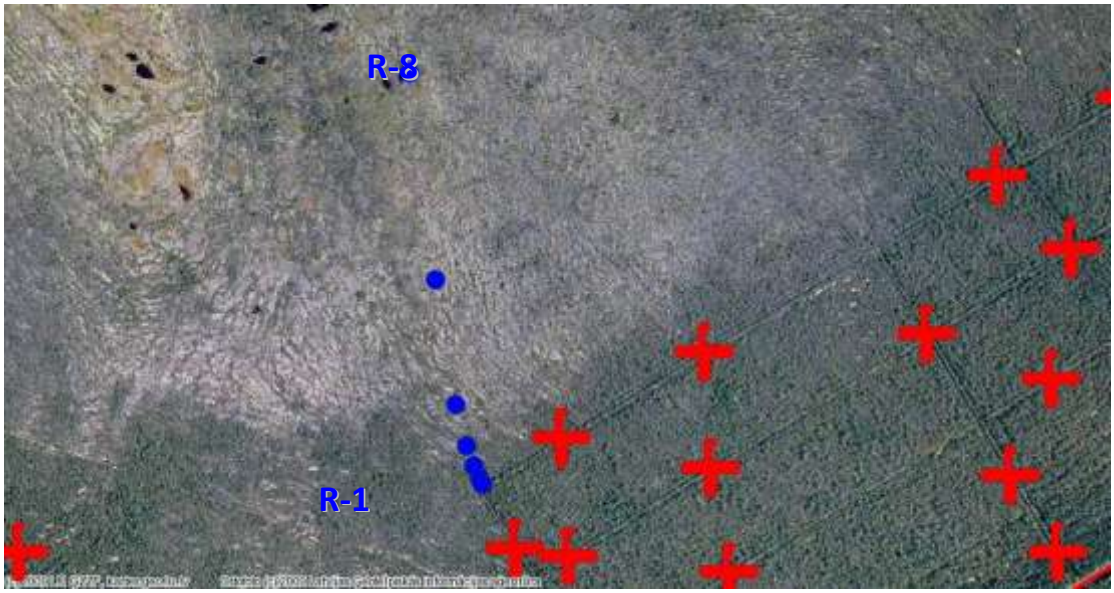
18. att. GŪL izmaiņas DL „Melnā ezera purvs" M2 profilā

Nokrišņu daudzuma pieaugums 2011. gada otrajā pusē attiecīgi izsauca arī pakāpenisku GŪL kāpumu visos M2 profila urbumos par 15-20 cm līdz 01/2012. Uzsākot aizsprostu izbūvi grāvī īslaicīgi pazeminājies ūdens līmenis, kas novērojams visos urbumos līdz 100 m attālumā no grāvja. Pēc aizsprostu izbūves ūdens līmenis krasi paaugstinājās no 04/2012, kad sniega kušanas ūdeņi piepildīja grāvi. Tuvākajos urbumos GŪL pacēlās par 30-35 cm, bet urbumā M2-6 par 15 cm. Tālākajā urbumā M2-7 gruntsūdens līmeņa celšanās netika novērota. Visos urbumos novērota GŪL stabilizēšanās pēc aizsprostu izbūves, līmeņa svārstību amplitūda tagad pārsvarā ir 10-15 cm. Līdzīgi kā citos purvos un profilos, kopš 2013. gada pavasara vērojams GŪL kritums visā profilā, ko var skaidrot ar nelielo nokrišņu daudzumu 2013. gadā.

Aizsprotu izbūve uz dziļa drenējoša grāvja, kā pie M2 profila, būtiski uzlabo hidroloģisko režīmu purvā, un pozitīvā efekta ietekme novērojama plašākā teritorijā ap grāvi, ja tur ir atrodas akaču un lāmu sistēmas.

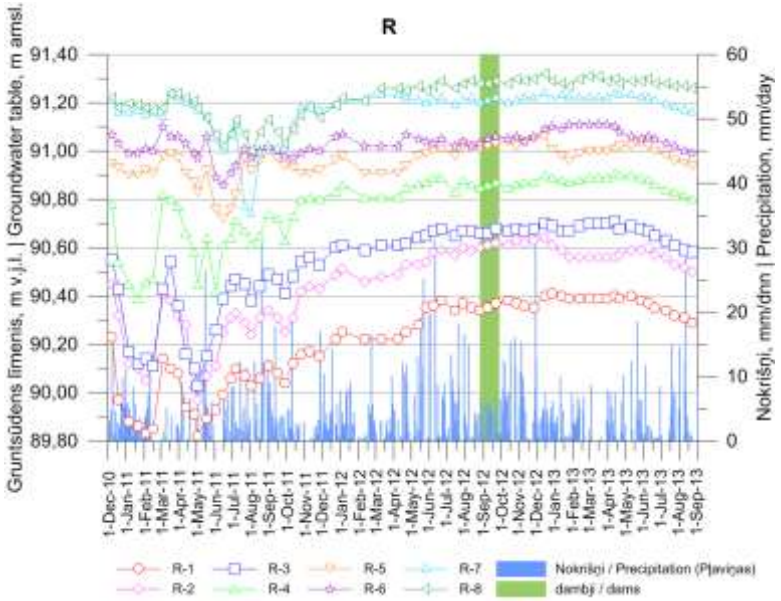
DL „Rožu purvs"

R profils izveidots ūdens līmeņa novērojumiem pie grāvju sistēmas pēdējā grāvja (19. att.), un aizsprosti šajā grāvju sistēmā izbūvēti 2012. gada augustā – septembrī. Grāvju sistēma būtiski drenē purva D daļu, lai gan pēdējie grāvji purvā ir pastāvīgi pildīti ar ūdeni un to drenējošā ietekme nav tik acīmredzama, kā pie purva robežas esošajos grāvjos.



19. att. R profila monitoringa urbumu un aizsprostu izvietojums Rožu purva D daļā
(Zilie punkti – monitoringa urbumi, sarkanie krusti – aizsprosti uz grāvjiem)

Visā novērojumu periodā šajā profilā raksturīgs GŪL kāpums. Vienlaikus, būtiskas atšķirības GŪL režīmā novērotas pirms un pēc aizsprostu izbūves (18. att.). Gruntsūdens līmeņa kritums profilā nav liels, atšķirība starp GŪL urbumos pie grāvja un tālākajā urbumā (500 m no grāvja) ir ~1 m.



20. att. GŪL izmaiņas DL „Rožu purvs" R profilā

Novērojumu perioda sākumā raksturīgas krasas GŪL svārstības, kas īpaši izteiktas ir 1-10 m attālumā no grāvja. Te līmeņa izmaiņu amplitūda sasniedz 40-50 cm, bet tālākajos urbumos 20-40 cm. Kopumā 2011. gada sākumā GŪL pazeminās par 40-55 cm līdz 05/2011, bet martā aprīlī, kūstot sniegam ir novērots īslaicīgs līmeņa kāpums. Kopš 2011. gada maija GŪL purvā pakāpeniski paaugstinās par 30-60 cm līdz pat dambju izbūvei 09/2012. Gruntsūdens līmeņa straujš kāpums sākas kopš 05/2011 grāvim tuvākajos urbumos, bet pamazām attālinoties no grāvja arī GŪL kāpums sākas vēlāk, un pēdējos urbumos tas jau ir 1-2 mēnešus vēlāk un ir ievērojami mazāk izteikts.
Pēc aizsprostu izbūves turpinās pakāpeniska GŪL paaugstināšanās, bet līmeņa pieaugums ir salīdzinoši neliels – tikai ap 5 cm. Toties novērota GŪL stabilizācija – novērojumi vairs neuzrāda krasas līmeņa svārstības. Līdzīgi, kā pārējos purvos, arī šajā kopš 05/2013 vērojama GŪL pazemināšanās, kas saistīta ar nelielo nokrišņu daudzumu 2013. gadā.
Aizsprotu izbūve Rožu purva grāvju sistēmā ir stabilizējusi un nedaudz paaugstinājusi gruntsūdens līmeni purvā, pozitīvi ietekmējot purva hidroloģisko režīmu.

Secinājumi

Projektā veiktie apsaimniekošanas pasākumi ir uzlabojuši hidroloģiskos apstākļus, atjaunojot dabiskam purvam tuvāku situāciju. Ar aizsprostu uz grāvjiem ir panākts, ka gruntsūdens līmenis paaugstinās un, galvenais, stabilizējas, nodrošinot pastāvīgi vienmērīgākus mitruma apstākļus purvā.
Profilu izveide pie dažādajiem grāvjiem un iegūto datu analīze parādīja, ka vienlīdz nozīmīgi šādus apsaimniekošanas pasākumus ir veikt gan lieliem grāvjiem, gan nelieliem, gan tādiem, kas pilnībā ir pildīti ar ūdeni, gan tādiem, kuri ir ar acīmredzamu drenējošu ietekmi. Grāvju tiešās ietekmes attālums ir lielā mērā atkarīgs no grāvju veida un dziļuma, kas aprakstīts daudzviet literatūrā (Romanov 1968). Novērojumi rāda, ka papildus šai tiešajai ietekmei ir arī pastarpināta, pašlaik vēl līdz galam neizpētīta ietekme, kas saistīta ar purva uzbūvi grāvja apkārtnē, t.i. lāmu un akaču klātbūtni un izvietojumu. Šis aspekts būtu papildus pētāms nākotnē.

Izmantotā literatūra

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7.15 List of the Study tours (E3)

No.	Data	Country	Places visited / Seminars participated
1	March 2-3, 2010	Estonia	Kick-off meeting for LIFE08 projects in Tallinn
2	June 6-18, 2010	Germany	Stapeler Moor in Wiefelstede, Leegmoor in Aurich, Moorerlebnispfad Esterwegen near Osterbrook, Diepholzer Moorschnucke bog near Rehden, Großen Torfmoores near Lübbecke, Rosenheimer Stammbeckenmoore, Kollerfilze near to Nicklheim, Burghamer Filz Nature Reserve
3	July 5-18, 2010	Slovakia, Poland	Mociar Nature Reserve in Slovakia, Belianski meadows, Pos Nature Reserve, Rospuda River valley / Field Symposium of the International Mire Conservation Group
4	September 7-9, 2010	United Kingdom, Wales	Anglesey and Lleyn Fens, Berwyn and Migneint Special Area / Aberystwyth and Corsa Fochno seminar
5	April 4-10, 2011	Italy	20th Annual Meeting of the European Vegetation Survey
6	May 2011	East Latvia	Daugavpils University, Dviete River floodplain
7	August 2011	Estonia	Tolkuse Mire, Nigula Nature Reserve, Viduae Nature Reserve
8	February 25-27, 2012	Germany	International Conference “Mire Conservation in Germany”.
9	September 30-October 7, 2012	Lithuania	Amalvas and Zuvintas wetlands, Aukstumala raised bog
10	April 8-13, 2013	Italy	22nd Annual Meeting of European Vegetation Survey
11	April 20-26, 2013	Poland	International Workshop “Approaches in Wetland Restoration”
12	June 25-30, 2013	Estonia	56th International Association of Vegetation Science Symposium

7.17 Photos of the project actions

A1 Elaboration of management plans

Informative meeting for "Aizkraukle Mires and Forest" management plan - 26.05.2010.
Photo: Aivars Slisans

Informative meeting for "Aizkraukle Mires and Forest" management plan - 26.05.2010.
Photo: Aivars Slisans

Informative meeting of "Aizkraukle Mires and Forest" managent plan - 26.05.2010.
Photo: Aivars Slisans

Informative meeting "Aizkraukle Mires and Forest" - 26.05.2010.
Photo: Aivars Slisans

Informative meeting for "Melnais Lake Mire" managent plan - 03.06.2010.
Photo: Aivars Slisans

Informative meeting for "Melnais Lake Mire" managent plan - 03.06.2010.
Photo: Aivars Slisans

Informative meeting for "Melnais Lake Mire" managent plan - 03.06.2010.
Photo: Aivars Slisans

Informative meeting for "Melnais Lake Mire" managent plan - 03.06.2010.
Photo: Aivars Slisans

Informative meeting for Rozu Mire management plan - 21.06.2010.
Photo: Aivars Slisans

Informative meeting for Rozu Mire managent plan - 21.06.2010.
Photo: Aivars Slisans

Gundega Freimane – coordinator of Rozu Mire management plan.
Photo: Aivars Slisans

Informative meeting for Rozu Mire management plan - 21.06.2010.
Photo: Aivars Slisans

Informative meeting for Aklais Mire management plan - 21.06.2010.
Photo: Aivars Slisans

Informative meeting for Aklais Mire management plan - 21.06.2010.
Photo: Aivars Slisans

Informative meeting for Aklais Mire management plan - 21.06.2010.
Photo: Aivars Slisans

Informative meeting for Aklais Mire management plan - 21.06.2010.
Photo: Aivars Slisans

First Management Plan Steering Group meeting "Rozu Mire" - 17.09.2010.
Photo: Mara Pakalne

First Management Plan Steering Group meeting "Rozu Mire" - 17.09.2010.
Photo: Mara Pakalne

First Steering Group meeting "Rozu Mire" - 17.09.2010.
Photo: Mara Pakalne

Steering Group meeting in "Rozu Mire" - 17.09.2010.
Photo: Mara Pakalne

Raised bog habitats in Aizkraukle Mire and Forests.
Photo: Valda Baronina

Raised bog island in Aizkraukle Mire and Forests.
Photo: Mara Pakalne

Raised bog pool in Aizkraukle Mire and Forests.
Photo: Mara Pakalne

Raised bog pools in Aizkraukle Mire and Forests.
Photo: Mara Pakalne

Raised bog pools in Aklais Mire.
Photo: Mara Pakalne

Sphagnum cuspidatum in a bog hollow of Aklais Mire.
Photo: Mara Pakalne

Schistostega pennata in Aklais Mire – rare bryophyte.
Photo: Aivars Slisans

Aklais Mire Nature Reserve, experts in the site.
Photo: Mara Pakalne

Melnais Lake Mire Nature Reserve.
Photo: Mara Pakalne

Melnais Lake Mire Nature Reserve.
Photo: Mara Pakalne

Melnais Lake Mire Nature Reserve.
Photo: Mara Pakalne

Melnais Lake Mire Nature Reserve.
Photo: Mara Pakalne

Raised bog habitats in Rozu Mire.
Photo: Mara Pakalne

Raised bog habitats in Rozu Mire.
Photo: Mara Pakalne

Raised bog pools in Rozu Mire.
Photo: Mara Pakalne

Raised bog habitats in Rozu Mire.
Photo: Mara Pakalne

Gundega Freimane, Coordinator of Rozu Mire Management Plan.
Photo: Mara Pakalne

Valda Baronina Coordinator of Melnais Lake Mire and Aizkraukle Mires Management Plans.
Photo: Aivars Slisans

Janis Reihmanis, Coordinator of Aklais Mire Management Plans.
Photo: Aivars Slisans

Ruta Sniedze-Kretalova, species and habitat expert
Photo: Aivars Slisans

Edmunds Racinskis, ornithologist.
Photo: Aivars Slisans

Aivars Petrins, ornithologist.
Photo: Aivars Slisans

Dr.biol. Voldemars Spungis, invertebrate specialist.
Photo: Valda Baronina

Uvis Susko, species and habitat expert.
Photo: Mara Pakalne

Dr.geogr. Laimdota Kalnina, geologist.
Photo: Mara Pakalne

Dr.geol. Aija Delina, hydrologist.
Photo: Mara Pakalne

Field work in Aklais Mire.
Photo: Mara Pakalne

Field work in Aklais Mire.
Photo: Aivars Slisans

A2 Hydro-geological studies for the elaboration of technical designs for building dams

Hydrological and geological studies in Melnais Lake Mire.
Photo: Aivars Slisans

Hydrological and geological studies in Melnais Lake Mire.
Photo: Aivars Slisans

Geological studies in Rozu Mire Nature Reserve.
Photo: Laimdota Kalnina

Laboratory studies to determine pollen.
Photo: Laimdota Kalnina

Geological studies in Aizkraukle Mire.
Photo: Laimdota Kalnina

Geological studies in Aizkraukle Mire.
Photo: Laimdota Kalnina

Inventory of dam building areas in in Aizkraukle Mire.
Photo: Valda Baronina

Drainage ditch with beaver dam in Aizkraukle Mire.
Photo: Valda Baronina

Drainage ditch in Aizkraukle Mire.
Photo: Mara Pakalne

Drainage ditch and peat fields in Aizkraukle Mire and Forests Nature Reserve.
Photo: Mara Pakalne

Drainage ditches in Melnais Lake Mire.
Photo: Valda Baronina

Peat fields in Melnais Lake Mire Nature Reserve.
Photo: Valda Baronina

Drainage ditches where dams have to be built in Aklais Mire Nature Reserve.
Photo: Maris Ostelis

Equipment used for surface measurement in Aklais Mire.
Photo: Maris Ostelis

Drainage ditch in Rozu Mire.
Photo: Aivars Slisans

Drainage ditch where dams have to be built in Rozu Mire.
Photo: Mara Pakalne

Drainage ditches where dams have to be built in Rozu Mire Nature Reserve.
Photo: Mara Pakalne

Drainage ditch where dams have to be built in Rozu Mire Nature Reserve.
Photo: Mara Pakalne

Drainage ditch where dams have to be built in Aklais Mire.
Photo: Aivars Slisans

Drainage ditch where dams have to be built in Aklais Mire.
Photo: Mara Pakalne

Drainage ditch where dams have to be built in Aklais Mire.
Photo: Mara Pakalne

Drainage ditch where dams have to be built in Aklais Mire.
Photo: Mara Pakalne

Discussions about the location of dams.
Photo: Aivars Slisans

Discussions about the planned location of dams in Melnais Lake Mire.
Photo: Mara Pakalne

C1 Re-establishing the active raised bog habitats and natural raised bog hydrology

Meeting with the sub-contractor about dam building in the project sites.
Photo: Mara Pakalne

Meeting with the sub-contractor about dam building in the project sites.
Photo: Mara Pakalne

Discussion with sub-contractor about dam building in Melnais Lake Mire.
Photo: Mara Pakalne

Discussion with sub-contractor about dam building in Melnais Lake Mire.
Photo: Mara Pakalne

Discussion with sub-contractor about dam building in Melnais Lake Mire.
Photo: Mara Pakalne

Discussion with sub-contractor about dam building in Melnais Lake Mire.
Photo: Mara Pakalne

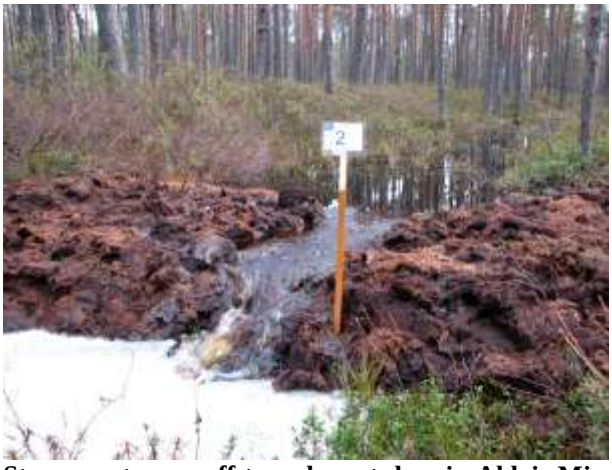
Building of peat/wood dam by hand in Aizkraukle Mire on 03.09.2012.
Photo: Arnis Staris

Building of peat/wood dam by hand in Aizkraukle Mire on 03.09.2012.
Photo: Arnis Staris

Peat/wood dam in Aizkraukle Mire on 16.10.2012.
Photo: Gunars Balodis

Checking of dams building progress in Aklais Mire.
Photo: Aivars Slisans

Peat dam on the drainage ditch in Aklais Mire Nature Reserve on 14.10.2012.
Photo: Gunars Balodis



Strong water runoff trough peat dam in Aklais Mire on 24.10.2012.
Photo: Gunars Balodis

Building of peat dam in Rozu Mire.
Photo: Mara Pakalne

Peat dam on drainage ditch in Rozu Mire.
Photo: Aivars Slisans

Checking the dams in Rozu Mire.
Photo: Aivars Slisans

Building of dams in Melnais Lake Mire.
Photo: Mara Pakalne

Peat dam on drainage ditch in Melnais Lake Mire.
Photo: Arnis Staris

Building of dams in Melnais Lake Mire.
Photo: Mara Pakalne

D1 Organisation of seminars

Participants of the First project seminar in Viesite Municipality on 29.03.2010.
Photo: Aivars Slisans

First seminar in Viesite Municipality on 29.03.2010. – project manager Mara Pakalne tells about the project.
Photo: Aivars Slisans

First seminar in Viesite Municipality on 29.03.2010. – Vija Busa from the Ministry of Enviroment.
Photo: Aivars Slisans

First seminar in Viesite Municipality on 29.03.2010. – Viesite Town local representative Inese Vitola.
Photo: Aivars Slisans

First seminar in Viesite Municipality on 29.03.2010. – Nature Protection Board, Juris Jatnieks.
Photo: Aivars Slisans

First seminar in Viesite Municipality on 29.03.2010. – Discussion after the formal part.
Photo: Aivars Slisans

Participants of the seminar "Value of Raised Bog Conservation" in Viesite Municipality on 17.12.2010.
Photo: Aivars Slisans

Seminar "The Value of Raised Bog Conservation" in Viesite Municipality on 17.12.2010 – project manager Mara Pakalne tells about the project.
Photo: Aivars Slisans

Seminar "The Value of Raised Bog Conservation" in Viesite Municipality on 17.12.2010 – project ornitologist Aivars Petrins tells about the bog birds.
Photo: Aivars Slisans

Seminar "The Value of Raised Bog Conservation" in Viesite Municipality on 17.12.2010. – winners of bog quiz.
Photo: Aivars Slisans

Opening of the Photo exhibition "Secrets of Mires" in Viesite Culture House on 17.12.2010.
Photo: Aivars Slisans

Opening of the Photo exhibition "Secrets of Mires" in Viesite Culture House on 17.12.2010.
Photo: Aivars Slisans

Participants of the Teachers' Seminar in Olaine Museum of Art and History on 17.05.2011.
Photo: Aivars Slisans

Participants of the Teachers' Seminar in Melnais Lake Mire on 17.05.2011.
Photo: Aivars Slisans

Iluta Dauskane telling about trees growing in the bog in Teachers' Seminar on 17.05.2011.
Photo: Aivars Slisans

Participants of the Teachers' Seminar on 17.05.2011 could see tree samples.
Photo: Aivars Slisans

During the seminar the teachers visited Melnais Lake Mire.
Photo: Mara Pakalne

Participants of the Teachers' Seminar on 17.05.2011.
Photo: Aivars Slisans

Seminar in Daudzese on 23.09.2011. Microscoping tree rings.
Photo: Aivars Slisans

Participants of Teachers Seminar in Daudzese on 23.09.2011.
Photo: Aivars Slisans

Participants in excursion of Teachers Seminar in Daudzese on 23.09.2011.
Photo: Aivars Slisans

Participants of Teachers Seminar taking peat sample in Daudzese on 23.09.2011.
Photo: Aivars Slisans

Participants in excursion of Teachers Seminar in Daudzese on 23.09.2011.
Photo: Daiga Brakmane

Participants of Teachers Seminar taking tree sample in Daudzese on 23.09.2011.
Photo: Aivars Slisans

Participants of the Seminar for Pupils in Daudzese Elementary School on 23.09.2011.
Photo: Aivars Slisans

Participants of the Pupils Seminar on 23.09.2011.
Photo: Aivars Slisans

Participants of the Seminar for Pupils on 23.09.2011.
Photo: Aivars Slisans

Participants of the Seminar for Pupils on 23.09.2011.
Photo: Aivars Slisans

Participants of the Seminar for Pupils on 23.09.2011.
Photo: Aivars Slisans

Participants of the Seminar for Pupils on 23.09.2011.
Photo: Aivars Slisans

Project manager Mara Pakalne giving talk during International Seminar „Sharing experience on Raised Bog Restoration" in Riga on 23.07.2012.
Photo: Aivars Slisans

Project hydrologist Dr. geol. Aija Delina explaining principle of groundwater monitoring wells during excursion to Melnais Lake Mire to seminar participants.
Photo: Aivars Slisans

Dr. geogr. Laimdota Kalnina explaining raised bog development during excursion to Melnais Lake Mire to International seminar participants.
Photo: Aivars Slisans

Excursion of seminar participants to Melnais Lake Mire.
Photo: Aivars Slisans

Excursion of seminar participants to Melnais Lake Mire.
Photo: Aivars Slisans

Group picture of seminar participants and organizers in Melnais Lake Mire.
Photo: Aivars Slisans

Excursion of seminar participants to Rozu Mire.
Photo: Aivars Slisans

Seminar participants exploring *Sphagnum* mosses during excursion to Rozu Mire.
Photo: Aivars Slisans

Dr. biol. Mara Pakalne explaining project results to seminar participants during excursion to Rozu Mire.
Photo: Aivars Slisans

Excursion of seminar participants to Melnais Lake Mire.
Photo: Aivars Slisans

Dr. biol. Mara Pakalne explaining LIFE project "Implementation of Mire Habitat Management Plan for Latvia" results to seminar participants during excursion to Vasenieku Mire.
Photo: Aivars Slisans

Group picture of seminar participants and organizers in Vasenieku Mire.
Photo: Aivars Slisans

Particiants of the official part of the Final seminar on 13.08.2013.
Photo: Aivars Slisans

Introduction of Final seminar given by Project manager Mara Pakalne on 13.08.2013.
Photo: Aivars Slisans

Particiants of the official part of the Final seminar on 13.08.2013.
Photo: Aivars Slisans

Film director Kaspars Goba presenting the Project documentary „Mires Uncovered" during Final seminar.
Photo: Aivars Slisans

Participants visiting Melnais Lake Mire during the Final seminar on 13.08.2013.
Photo: Aivars Slisans

Dr.geol. Laimdota Kalnina explaining raised bog development in Melnais Lake Mire during the Final seminar.
Photo: Aivars Slisans

Participants of Final seminar visiting restored area of Melnais Lake Mire on 13.08.2013.
Photo: Aivars Slisans

Project manager Mara Pakalne and enthomology expert Voldemars Spungis in Melnais Lake Mire during the Final seminar.
Photo: Aivars Slisans

Dr.biol. Iluta Dauskane - dendrochronology expert.
Photo: Aivars Slisans

Dr.biol. Iluta Dauskane explaining pine growth patterns in mires during Final seminar on 13.08.2013.
Photo: Aivars Slisans

Project finance assistant Aivars Slisans giving tips of macrophotography in mires during Final seminar on 13.08.2013.
Photo: Ilze Priedniece

Project finance assistant Aivars Slisans giving tips of macrophotography in mires during Final seminar.
Photo: Ilze Priedniece

D3 Elaboration and publishing of information booklets and boards

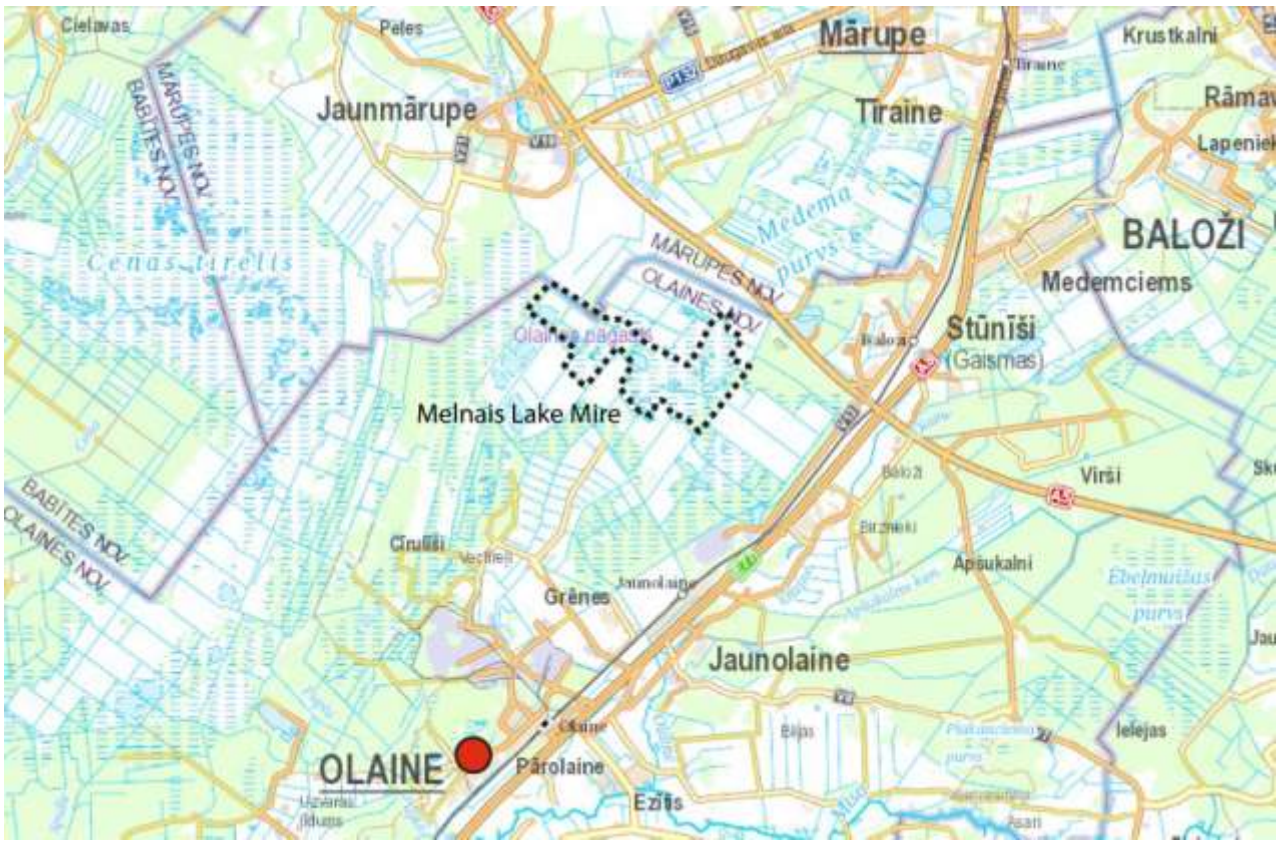
Project information booklets.
Photo: Aivars Slisans

Project information booklets.
Photo: Aivars Slisans

Project manager Mara Pakalne with information booklets.
Photo: Aivars Slisans

Information coordinator Daiga Brakmane and the project booklets.
Photo: Aivars Slisans

Location of informative boards in Central Latvia (1—Melnais Lake Mire, 2—Aizkraukle Mire and Forests, 3—Aklais Mire, 4—Rozu Mire).
Map: http://www.balticmaps.eu



Road map to Melnais Lake Mire information board in Olaine City (red circle).
Map: http://www.balticmaps.eu

Information board about Melnais Lake Mire in Olaine City.
Photo: Gunars Balodis

Information board about Melnais Lake Mire in Olaine City.
Photo: Gunars Balodis

Road map to Aizkraukle Mire and Forests information board in Aizkraukle City (red circle).
Map: http://www.balticmaps.eu

Information board about Aizkraukle Mire and Forests in Aizkraukle City.
Photo: Aivars Slisans

Information board about Aizkraukle Mire and Forests in Aizkraukle City.
Photo: Aivars Slisans

Road map to Aklais Mire information board in Daudzese Town (red circle).
Map: http://www.balticmaps.eu

Information board about Aklais Mire in Daudzese Town.
Photo: Aivars Slisans

Information board about Aklais Mire in Daudzese Town.
Photo: Aivars Slisans

Road map to Rozu Mire information board in Sala Town (red circle).
Map: http://www.balticmaps.eu

Information board about Rozu Mire in Sala Town.
Photo: Aivars Slisans

Information board about Rozu Mire in Sala Town.
Photo: Aivars Slisans

D5 Production of a documentary

Operator Davis Drazdovskis filming in Aizkraukle Mire and Forests.
Photo: Ieva Goba

Filming German visit in Latvia in Aizkraukle Mire.
Photo: Ieva Goba

Operator Lelde Goba.
Photo: Ieva Goba

Filming in Aklais Mire.
Photo: Aivars Slisans

Operator Davis Drazdovskis filming Teachers' Seminar.
Photo: Aivars Slisans

Ieva Goba from Elm Media telling about film.
Photo: Aivars Slisans

Making of film in Rozu Mire.
Photo: Gunars Balodis

Making of film in Aklais Mire.
Photo: Gunars Balodis

Making of film in Melnais Lake Mire.
Photo: Mara Pakalne

Making of film in Melnais Lake Mire.
Photo: Mara Pakalne

Film director Kaspars Goba presenting project documentary "Mires Uncovered" in the Botanical Garden of the University of Latvia on 17.05.2013.
Photo: Aivars Slisans

Film director Kaspars Goba presenting project documentary in the Botanical Garden of the University of Latvia on 17.05.2013.
Photo: Aivars Slisans

D6 Establishment of the Raised Bog Exhibition „Secrets of Mires”

Opening of the Photo exhibition “Secrets of Mires” in Viesite Culture House on 17.12.2010.
Photo: Aivars Slisans

Opening of the Photo exhibition “Secrets of Mires” in Viesite Culture House on 17.12.2010. Project Team at the opening.
Photo: Uldis Saulitis

Opening of Exhibition in Ogre Culture Centre on 13.01.2011.
Photo: Aivars Slisans

Opening of Exhibition in Ogre Culture Centre on 13.01.2011.
Photo: Mara Pakalne

Opening of Exhibition in Ogre Culture Centre on 13.01.2011.
Photo: Aivars Slisans

Opening of Exhibition in Ogre Culture Centre on 13.01.2011.

Opening of Exhibition in Aizkraukle Municipality on 08.02.2011.
Photo: Aivars Slisans

Opening of Exhibition in Aizkraukle Municipality on 08.02.2011.
Photo: Aivars Slisans

Opening of Exhibition in Sala Secondary School on 09.03.2011.
Photo: Aivars Slisans

Opening of Exhibition in Sala Secondary School on 09.03.2011.
Photo: Aivars Slisans

Opening of Exhibition in Sala Secondary School on 09.03.2011.
Photo: Aivars Slisans

Opening of Exhibition in Sala Secondary School on 09.03.2011.
Photo: Aivars Slisans

Exhibition in Ministry of the Environment and Regional Development of Latvia on 21.03.2011.
Photo: Aivars Slisans

Exhibition in The Cabinet of Ministers of the Republic of Latvia on 26.03.2011.
Photo: Aivars Slisans

Exhibition in The Cabinet of Ministers of the Republic of Latvia. Prime Minister of Latvia Valdis Dombrovskis.
Photo: Aivars Slisans

Exhibition in The Cabinet of Ministers of the Republic of Latvia on 26.03.2011.
Photo: Aivars Slisans

Opening of Exhibition in Ministry of Defence of Latvia on 11.04.2011.
Photo: Aivars Slisans

Opening of Exhibition in Ministry of Defence of Latvia on 11.04.2011.
Photo: Aivars Slisans

Opening of Project Photo Exhibition in Daugavpils University on 27.04.2011.
Photo: Mara Pakalne

Opening of Project Photo Exhibition in Daugavpils University on 27.04.2011.
Photo: Mara Pakalne

Project Photo Exhibition in Olaine Museum of History and Art on 12.05.2011.
Photo: Daiga Brakmane

Project Photo Exhibition in Olaine Museum of History and Art on 12.05.2011.
Photo: Mara Pakalne

Opening of Exhibition in the Parliament of Latvia on 23.05.2011.
Photo: Saeima

Opening of Exhibition in the Parliament of Latvia on 23.05.2011.
Photo: Saeima

Opening of Project Photo Exhibition in Ventspils Library on 06.07.2011.
Photo: Aivars Slisans

Opening of Project Photo Exhibition in Ventspils Library on 06.07.2011.
Photo: Aivars Slisans

Opening of Project Photo Exhibition in Ventspils Library on 06.07.2011.
Photo: Aivars Slisans

Opening of Project Photo Exhibition in Ventspils Library on 06.07.2011.
Photo: Mara Pakalne

Opening of Project Photo Exhibition in Ventspils Library on 06.07.2011.
Photo: Mara Pakalne

Photo Exhibition in Jelgava Scientific Library on 02.08.2011.
Photo: Jelgava Scientific Library

Photo Exhibition in the Botanical Garden of the University of Latvia on 06.09.2011.
Photo: Mara Pakalne

Photo Exhibition in the Botanical Garden of the University of Latvia on 06.09.2011.
Photo: Mara Pakalne

Exhibition in Botanical Garden during the Researchers Night 2011.
Photo: Aivars Slisans

Photo Exhibition in Botanical Garden during the Researchers Night 2011.
Photo: Mara Pakalne

Raised Bog Exhibition in Akniste Library (12.01.-15.02.2012).
Photo: Aivars Slisans

Raised Bog Exhibition in Akniste Library (12.01.-15.02.2012).
Photo: Mara Pakalne

Project manager Mara Pakalne showing mire plants and animals to pupils in Raised Bog Exhibition in Akniste Library.
Photo: Aivars Slisans

Pupils in Raised Bog Exhibition in Akniste Library.
Photo: Aivars Slisans

Pupils in Raised Bog Exhibition in Akniste Library.
Photo: Aivars Slisans

Opening of project photo exhibition "Secrets of Mires" in EU House in Riga on 01.04.2012.
Photo: Mara Pakalne

Raised Bog Exhibition in Bulduri Library (04.04.-05.05.2012).
Photo: Mara Pakalne

Raised Bog Exhibition in Bulduri Library (04.04.-05.05.2012).
Photo: Mara Pakalne

Raised Bog Exhibition in Bulduri Library (04.04.-05.05.2012).
Photo: Mara Pakalne

Raised Bog Exhibition in Vaivari Rehabilitation Centre (08.05.-08.06.2012).
Photo: Gunars Balodis

Raised Bog Exhibition in Vaivari Rehabilitation Centre (08.05.-08.06.2012).
Photo: Gunars Balodis

Raised Bog Exhibition in Vaivari Rehabilitation Centre (08.05.-08.06.2012).
Photo: Gunars Balodis

Raised Bog Exhibition in Stockholm Economic School in Riga (15.06.-15.07.2012).
Photo: Mara Pakalne

Raised Bog Exhibition in Stockholm Economic School in Riga (15.06.-15.07.2012).
Photo: Mara Pakalne

Raised Bog Exhibition in Riga City Central Library (17.09.-19.10.2012).
Photo: Aivars Slisans

Raised Bog Exhibition in Riga City Central Library (17.09.-19.10.2012).
Photo: Mara Pakalne

Raised Bog Exhibition in Riga City Central Library (17.09.-19.10.2012).
Photo: Mara Pakalne

Raised Bog Exhibition in Riga City Central Library (17.09.-19.10.2012).
Photo: Mara Pakalne

Opening of the project photo exhibition "Secrets of Mires" in Riga City Council on 22.10.2012.
Photo: Vitauts Mihalovskis

Welcome from the Deputy Head of the Riga City Council Andris Ameriks (right) and the Head of the Council of "Riga Forests" Aivars Taurins (left) in the opening of the project photo exhibition "Secrets of Mires" in Riga City Council.
Photo: Aivars Slisans

Welcome from the head of the Ogre photo Club Vitauts Mihalovskis in the opening of the project photo exhibition "Secrets of Mires" in Riga City Council.
Photo: Aivars Slisans

Opening of the project photo exhibition "Secrets of Mires" in Riga City Council. From left to right – member of the board of "Riga Forests" Juris Buskevics, M. Pakalne, A. Ameriks, A. Taurins.
Photo: Aivars Slisans

Opening of the Raised Bog Exhibition „Secrets of Mires" in Dundaga Library on 14.01.2013.
Photo: Aivars Slisans

The Raised Bog Exhibition „Secrets of Mires" in Dundaga Library on (14.01.-31.01.2013).
Photo: Mara Pakalne

The Raised Bog Exhibition „Secrets of Mires" in Dundaga Library on (14.01.-31.01.2013).
Photo: Mara Pakalne

Poject Manager Mara Pakalne giving presentation about mires to schoolchildren during Opening of the Raised Bog Exhibition in Dundaga Library on 14.01.2013.
Photo: Aivars Slisans

Raised Bog Exhibition in Tīnūži Elementary School Library (04.02.-28.02.2013).
Photo: Aivars Slisans

Raised Bog Exhibition in Tīnūži Elementary School Library (04.02.-28.02.2013).
Photo: Aivars Slisans

Raised Bog Exhibition in Tīnūži Elementary School Library (04.02.-28.02.2013).
Photo: Mara Pakalne

Raised Bog Exhibition in Tīnūži Elementary School Library (04.02.-28.02.2013).
Photo: Aivars Slisans

Raised Bog Exhibition in Laubere Library (01.03.-03.04.2013).
Photo: Mara Pakalne

Raised Bog Exhibition in Laubere Library (01.03.-03.04.2013).
Photo: Mara Pakalne

Raised Bog Exhibition in Slate Library (03.04.-03.05.2013).
Photo: Mara Pakalne

Raised Bog Exhibition in Slate Library (03.04.-03.05.2013).
Photo: Aivars Slisans

Raised Bog Exhibition in Sala Library (07.05.-10.06.2013).
Photo: Mara Pakalne

Raised Bog Exhibition in Sala Library (07.05.-10.06.2013).
Photo: Mara Pakalne

Raised Bog Exhibition in the Botanical Garden of the University of Latvia (11.06.-02.07.2013).
Photo: Mara Pakalne

Raised Bog Exhibition in the Botanical Garden of the University of Latvia (11.06.-02.07.2013).
Photo: Mara Pakalne

E1 Steering Group Meetings

1st Project Steering Group Meeting on 19.08.2010. – participants and project manager Mara Pakalne speaking.
Photo: Aivars Slisans

1st Project Steering Group Meeting on 19.08.2010. – chair of the meeting Vija Busa.
Photo: Aivars Slisans

1st Project Steering Group Meeting on 19.08.2010. – Dr.geol. Aija Delina explaining raised bog hydrology.
Photo: Aivars Slisans

1st Project Steering Group Meeting on 19.08.2010. – Valda Baronina telling about nature management plans.
Photo: Aivars Slisans

Participants of the 1st Project Steering Group Meeting on 19.08.2010.
Photo: Aivars Slisans

1st Project Steering Group Meeting on 19.08.2010. – Aivars Slisans presenting overview about the finances of the project.
Photo: Mara Pakalne

Participants of the 2nd Project Steering Group Meeting on 01.03.2011.
Photo: Aivars Slisans

Participants of the 2nd Project Steering Group Meeting on 01.03.2011.
Photo: Aivars Slisans

2nd Project Steering Group Meeting on 01.03.2011. – Project Manager Mara Pakalne.
Photo: Aivars Slisans

2nd Project Steering Group Meeting on 01.03.2011. – chair of the meeting Vija Busa.
Photo: Aivars Slisans

2nd Project Steering Group Meeting on 01.03.2011. – Valda Baronina tells about management plans.
Photo: Aivars Slisans

2nd Project Steering Group Meeting on 01.03.2011. – Janis Reihmanis tells about management plans.
Photo: Aivars Slisans

Participants of the 3rd Project Steering Group Meeting on 06.09.2011 – Mara Pakalne and participants.
Photo: Aivars Slisans

Participants 3rd Project Steering Group Meeting on 06.09.2011.
Photo: Aivars Slisans

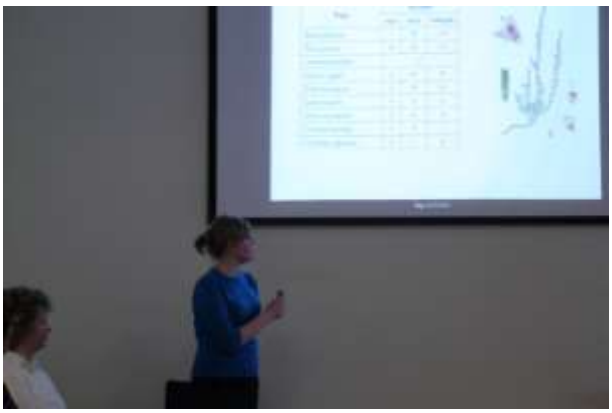
3rd Project Steering Group Meeting on 06.09.2011. – Dr.geol. Laimdota Kalnina tells about paleovegetation studies.
Photo: Aivars Slisans

3rd Project Steering Group Meeting on 06.09.2011. – Dr.geogr. Agnese Priede tells about the results of habitat monitoring.
Photo: Aivars Slisans

Project manager Dr. biol. Mara Pakalne informs about the progress of the project actions in 4th Project Steering Group Meeting.
Photo: Aivars Slisans

4th Project Steering Group Meeting on 01.04.2012. Daiga Brakmane informs about the project public awareness actions.
Photo: Aivars Slisans

Ieva Goba from " Elm Media" tells about progress of the documentary about project activities in 4th Project Steering Group Meeting.
Photo: Aivars Slisans

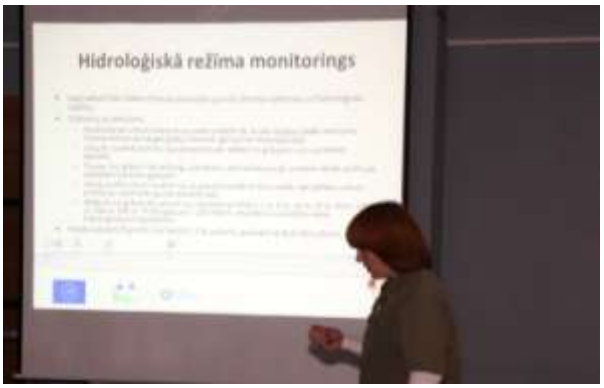


Dr. biol. Iluta Dauskane informs about the results of dendrochronological studies in Melnais Lake Mire Nature Reserve in 4th Project Steering Group Meeting.
Photo: Aivars Slisans

Arnis Staris from E-Buvvadiba informs about building of dams in Melnais Lake Mire in 4th Project Steering Group Meeting
Photo: Aivars Slisans

5th Project Steering Group Meeting on 22.10.2012. Project manager Dr. biol. Mara Pakalne informs about the progress of the project actions.
Photo: Aivars Slisans

Ieva Goba from "Elm Media" informs about the progress of the project documentary in the 5th Project Steering Group Meeting.
Photo: Mara Pakalne



Dr. geol. Aija Delina explaining raised bog hydrology in the 5th Project Steering Group Meeting.
Photo: Aivars Slisans

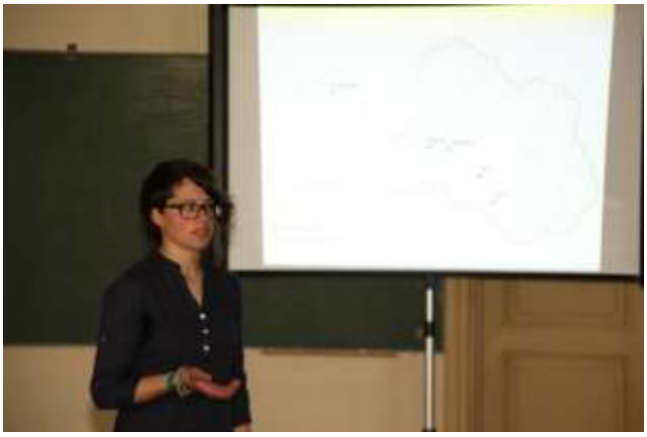
Project assistant Aivars Slisans gives overview about project finances in the 5th Project Steering Group Meeting.
Photo: Mara Pakalne

Project experts, botanist Dr.biol. Liene Aunina (left) and ornithologist Janis Kuze (right), in the 5th Project Steering Group Meeting.
Photo: Mara Pakalne

6th Project Steering Group Meeting on 17.05.2013. Project manager Dr. biol. Mara Pakalne informs about achieved project results.
Photo: Aivars Slisans

Participants of the 6th Project Steering Group Meeting on 17.05.2013.
Photo: Aivars Slisans

Participants of the 6th Project Steering Group Meeting on 17.05.2013.
Photo: Aivars Slisans



Project information coordinator Liga Strazdina giving overview of public awareness activities in the 6th Project Steering Group Meeting on 17.05.2013.
Photo: Aivars Slisans

E1 Project administration by the University of Latvia

Dr.biol. Mara Pakalne, project manager.
Photo: Aivars Slisans

Aivars Slisans, project assistant.
Photo: Mara Pakalne

Gunars Balodis, field manager.
Photo: Aivars Slisans

Msc.biol. Daiga Brakmane, information coordinator (in time period from 2010-2012).
Photo: Aivars Slisans

Edite Plokste, information coordinator (working in the project in year 2012).
Photo: Mara Pakalne

Dr.biol. Liga Strazdina, information coordinator (in time period from 2012-2013).
Photo: Aivars Slisans

Rolands Ratfelders visits the project team in 2010.
Photo: Aivars Slisans

Project team together in Germany.

EC Monitoring expert Rolands Ratfelders visiting the project team on June 20, 2011.
Photo: Aivars Slisans

EC Monitoring expert Rolands Ratfelders visiting the project team on June 20, 2011.
Photo: Aivars Slisans

Project team discussing the actions during the project management meeting.
Photo: Aivars Slisans

Project team discussing the actions during the project management meeting.
Photo: Aivars Slisans

Discussion with the experts about the project informations booklets.
Photo: Aivars Slisans

Discussion with the experts about the project booklets.
Photo: Aivars Slisans

Project team in the field work in Rozu Mire.
Photo: Mara Pakalne

Project manager Mara Pakalne doing field work in Rozu Mire.
Photo: Aivars Slisans

Field work carried out by project experts in Rozu Mire.
Photo: Aivars Slisans

Shooting film in Rozu Mire Nature Reserve.
Photo: Aivars Slisans

Shooting film in Rozu Mire Nature Reserve.
Photo: Aivars Slisans

Project information coordinator in Rozu Mire.
Photo: Aivars Slisans

Field work in drained area of Rozu Mire. Monitoring dam building area.
Photo: Aivars Slisans

Field work in Aizkraukle Mire Nature Reserve.
Photo: Aivars Slisans

Meeting with the stakeholder – Latvian State Forests, discussion about management actions.
Photo: Aivars Slisans

Meeting with the stakeholder – Latvian State Forests.
Photo: Aivars Slisans

Meeting with the representatives from Jaunjelgava Municipality, discussion about management actions.
Photo: Aivars Slisans

Meeting with the representatives from Jaunjelgava Municipality, discussion about management actions.
Photo: Aivars Slisans

EC Monitoring expert Rolands Ratfelders visits the project team in 2012.
Photo: Aivars Slisans

EC Monitoring expert Rolands Ratfelders visits the project team in 2012.
Photo: Mara Pakalne

Children exploring mire plants in the project stand during Plant Conservation Day in the Botanical Garden of the University of Latvia on May 18th.
Photo: Aivars Slisans

Children exploring mire plants in the project stand during Plant Conservation Day in the Botanical Garden of the University of Latvia on May 18th.
Photo: Mara Pakalne

Children exploring mire plants in the project stand during Plant Conservation Day in the Botanical Garden of the University of Latvia on May 18th.
Photo: Mara Pakalne

Children exploring mire plants in the project stand during Plant Conservation Day in the Botanical Garden of the University of Latvia on May 18th.
Photo: Mara Pakalne

Children exploring mire plants in the project stand during Plant Conservation Day in the Botanical Garden of the University of Latvia on May 18th.
Photo: Mara Pakalne

Project assistant Aivars Slisans explaining pine root system development in mires during Plant Conservation Day in the Botanical Garden of the University of Latvia on May 18th.
Photo: Mara Pakalne

Visitors of the project stand during European Researchers Night 2012 in the Botanical Garden of the University of Latvia on 28.09.2012.
Photo: Mara Pakalne

Visitors of the project stand during European Researchers Night 2012 in the Botanical Garden of the University of Latvia on 28.09.2012.
Photo: Mara Pakalne

Visitors of the project stand during European Researchers Night 2012 in the Botanical Garden of the University of Latvia on 28.09.2012.
Photo: Mara Pakalne

Visitors of the project stand during European Researchers Night 2012 in the Botanical Garden of the University of Latvia on 28.09.2012.
Photo: Mara Pakalne

Visitors of the project stand during European Researchers Night 2012 in the Botanical Garden of the University of Latvia on 28.09.2012.
Photo: Mara Pakalne

Project stand in European Researchers Night 2012 in the Botanical Garden of the University of Latvia on 28.09.2012.
Photo: Mara Pakalne

Project information coordinator Liga Stradina in the poject stand during Plant Conservation Day in the Botanical Garden of the University of Latvia on May 17th.
Photo: Aivars Slisans

Children exploring mire plants in the project stand during Plant Conservation Day in the Botanical Garden of the University of Latvia on May 17th.
Photo: Lauma Strazdina

Children exploring mire plants in the project stand during Plant Conservation Day in the Botanical Garden of the University of Latvia on May 17th.
Photo: Lauma Strazdina

Children exploring mire plants in the project stand during Plant Conservation Day in the Botanical Garden of the University of Latvia on May 17th.
Photo: Lauma Strazdina

EC Monitoring expert Rolands Ratfelders and technical expert of EC visiting the project team in June 2013.
Photo: Aivars Slisans

EC Monitoring expert Rolands Ratfelders, technical expert of EC and the project team visiting Rožu Mire in June 2013.
Photo: Aivars Slisans

EC Monitoring expert Rolands Ratfelders, financial expert, technical expert of EC and the project team visiting Rožu Mire in June 2013.
Photo: Aivars Slisans

EC Monitoring expert Rolands Ratfelders, financial expert, technical expert of EC and the project team visiting Rožu Mire in June 2013.
Photo: Aivars Slisans

E2 Monitoring the effects of management actions on raised bog habitats, bird species and site hydrology

Monitoring area including peat field and intact bog in Melnais Lake Mire NR.
Photo: Mara Pakalne

Monitoring area in Melnais Lake Mire NR.
Photo: Mara Pakalne

Groundwater monitoring in the project sites.
Photo: Aivars Slisans

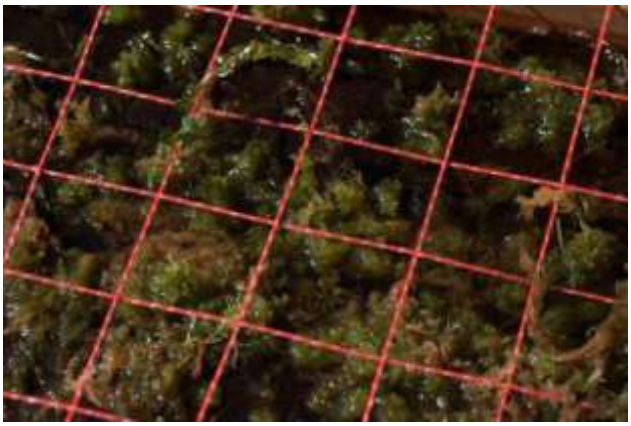
Hydrologiacal monitoring well in the project sites.
Photo: Gunars Balodis

Bryophyte *Sphagnum magellanicum* in the monitoring plot.
Photo: Mara Pakalne

Establishing monitoring plots in Melnais Lake Mire in 2010.
Photo: Mara Pakalne

Monitoring habitats in Melnais Lake Mire in summer 2010.
Photo: Mara Pakalne

Sundew *Drosera rotundifolia* in the monitoring plot.
Photo: Mara Pakalne

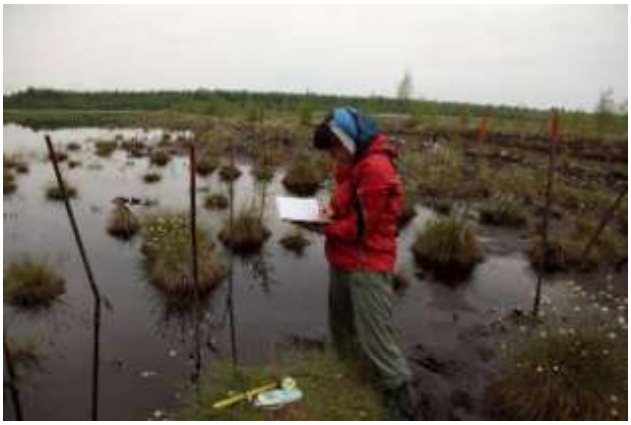


Sphagnum species in the monitoring plot in 2010.
Photo: Mara Pakalne

The monitored habitats in Melnais Lake Mire.
Photo: Mara Pakalne

Habitat monitoring in spring 2011 in Melnais Lake Mire.
Photo: Mara Pakalne

Habitat monitoring peatland area in Melnais Lake Mire.
Photo: Mara Pakalne



Habitat monitoring in Melnais Lake Mire.
Photo: Mara Pakalne

Habitat monitoring in Melnais Lake Mire.
Photo: Mara Pakalne

Peatland restoration area in Melnais Lake Mire.
Photo: Mara Pakalne

Peatland restoration area in Melnais Lake Mire.
Photo: Mara Pakalne

Habitat monitoring plots in summer 2011 in Melnais Lake Mire.
Photo: Mara Pakalne

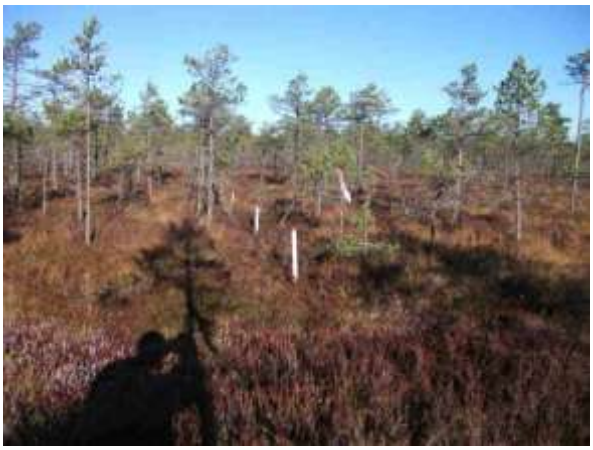
***Sphagnum magellanicum* in the monitoring plots in summer 2011.**
Photo: Mara Pakalne

Hydrological monitoring in Melnais Lake Mire.
Photo: Persijs Gederts

Groundwater monitoring well in Melnais Lake Mire.
Photo: Persijs Gederts

Hydrological monitoring in Aizkraukle Mire.
Photo: Persijs Gederts

Hydrological monitoring in Aklais Mire.
Photo: Persijs Gederts



Hydrological monitoring in Aklais Mire.
Photo: Persijs Gederts

Hydrological monitoring in Rozu Mire in December 2011.
Photo: Persijs Gederts

Establishing of groundwater monitoring well.
Photo: Persijs Gederts

Establishing of groundwater monitoring well.
Photo: Persijs Gederts

Groundwater monitoring well in Rozu Mire.
Photo: Persijs Gederts

Groundwater monitoring well in Rozu Mire.
Photo: Persijs Gederts

Groundwater monitoring well in Melnais Lake Mire.
Photo: Persijs Gederts

Groundwater monitoring well in Melnais Lake Mire.
Photo: Persijs Gederts

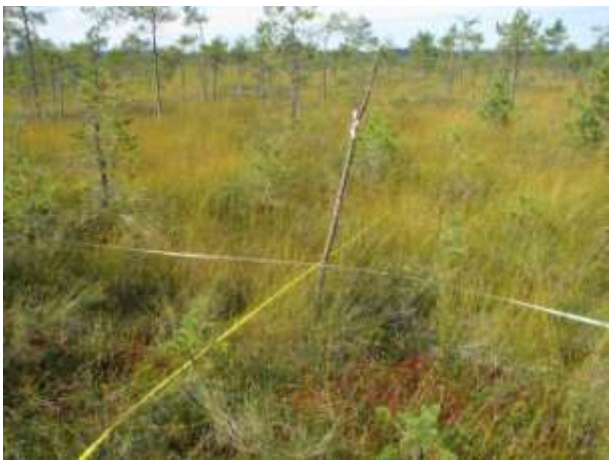
Monitoring of mire management success in Melnais Lake Mire in vegetation plot in 2011.
Photo: Liene Aunina

Monitoring of mire management success in Melnais Lake Mire in the same vegetation plot in 2012.
Photo: Liene Aunina

Monitoring of mire management success in Melnais Lake Mire in vegetation plot on drainage ditch in 2011.
Photo: Liene Aunina

Monitoring of mire management success in Melnais Lake Mire in vegetation plot on the same drainage ditch in 2012.
Photo: Liene Aunina

Vegetation monitoring plot in Rozu Mire in 2012. Significant changes in elevation of water table were observed over the monitoring period 2010-2012.
Photo: Agnese Priede



Vegetation monitoring plot in Rozu Mire in 2012. Dying out of heather was observed over the monitoring period 2010-2012.
Photo: Agnese Priede

Vegetation monitoring plot in Aklais Mire in 2012.
Photo: Agnese Priede

Vegetation monitoring plot in Aklais Mire in 2012.
Photo: Agnese Priede

Vegetation monitoring plot in Aklais Mire in 2012.
Photo: Agnese Priede

Vegetation monitoring plot in Aizkraukle Mire in 2012.
Photo: Agnese Priede

Vegetation monitoring plot in Aizkraukle Mire in 2012.
Photo: Agnese Priede

Vegetation monitoring plot in Aizkraukle Mire in 2012.
Photo: Agnese Priede

Vegetation monitoring plot in Rozu Mire in 2013.
Photo: Agnese Priede

Vegetation monitoring plot in Rozu Mire in 2013.
Photo: Agnese Priede

Vegetation monitoring plot in Aklais Mire in 2013
Photo: Agnese Priede

Vegetation monitoring plot in Aklais Mire in 2013
Photo: Agnese Priede

Vegetation monitoring plot in Aizkraukle Mire in 2013.
Photo: Agnese Priede

Vegetation monitoring plot in Aizkraukle Mire in 2013.
Photo: Agnese Priede

E3 Cooperation with LIFE+ projects, participation in study tours, seminars and conferences

Study tour trip to Germany 06.06.-18.06.2010.
Photo: Aivars Slisans

Experience exchange trip to Germany 06.06.-18.06.2010. *Photo: Aivars Slisans*

Study tour trip to Germany 06.-18.06.2010.

Building dams in the Bavarian LIFE project.
Photo: Aivars Slisans

The restored bog area in Bavarian Raised bog.
Photo: Mara Pakalne

The restored bog area in Bavarian LIFE project.
Photo: Mara Pakalne

Field Symposium of the International Mire Conservation Group in Slovakia and Poland 05.-17.07.2010.
Photo: Izolda Matchutadze

Field Symposium of the International Mire Conservation Group in Slovakia and Poland 05.-17.07.2010.
Photo: Mara Pakalne

Field Symposium of the International Mire Conservation Group in Slovakia and Poland 05.-17.07.2010.
Photo: Mara Pakalne

Field Symposium of the International Mire Conservation Group in Slovakia and Poland 05.-17.07.2010.
Photo: Mara Pakalne

***Utricularia vulgaris* - Field Symposium of the International Mire Conservation Group in Slovakia and Poland 05.-17.07.2010.**
Photo: Mara Pakalne

***Gladiolus palustre* in Slovakian mires - Field Symposium of the International Mire Conservation Group 05.-17.07.2010.**
Photo: Mara Pakalne

Experience exchange trip to Wales on 01.09.-07.09.2010.
Photo: Mara Pakalne

Restored bog in Wales on 01.09.-07.09.2010.
Photo: Mara Pakalne

Blanket bogs in Wales.
Photo: Mara Pakalne

***Erica tetralix* in the bogs in Wales.**
Photo: Mara Pakalne

Discussions about site hydrological monitoring equipment – loggers in Wales on 01.09.-07.09.2010.
Photo: Mara Pakalne

Building of dams in LIFE project site - the blanket bogs in Wales on 01.09.-07.09.2010.
Photo: Mara Pakalne

LIFE project team in the blanket bogs in Wales 01.-07.09.2010.
Photo: Mara Pakalne

Project team and Welsh LIFE project team.
Photo: Mara Pakalne

LIFE project from Wales visiting Latvia, Kemeri National Park.
Photo: Mara Pakalne

LIFE project from Wales visiting Latvia visiting Cena Mire.
Photo: Mara Pakalne

LIFE project from Wales in Latvia 21.-22.09.2010. – visiting Cena Mire.
Photo: Mara Pakalne

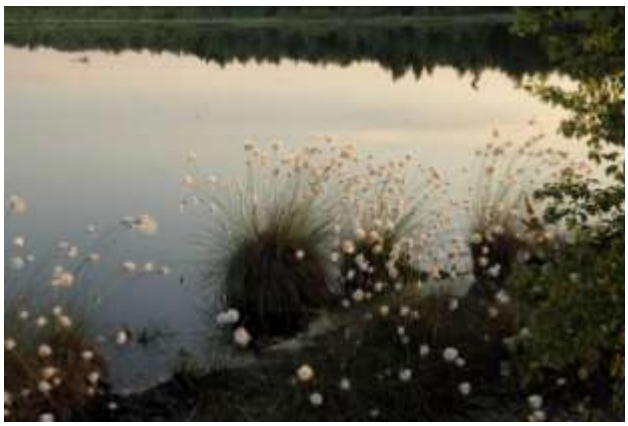
LIFE project from Wales in Latvia 21.-22.09.2010. – visiting Engure Lake Nature Park.
Photo: Mara Pakalne

LIFE project from Wales in Latvia 21.-22.09.2010. – visiting Raganu Mire.
Photo: Mara Pakalne

LIFE project from Wales in Latvia 21.-22.09.2010. - visiting Engure Lake Nature Park.
Photo: Mara Pakalne

Peatland experts from Germany in Melnais Lake Mire.
Photo: Aivars Slisans

Peatland experts from Germany in Melnais Lake Mire.
Photo: Aivars Slisans



Peatland resoration area in Melnais Lake Mire NR.
Photo: Mara Pakalne

Peatland experts from Germany in Melnais Lake Mire.
Photo: Aivars Slisans

Peatland experts from Germany in Aizkraukle Mire and Forests. Discussion about raised habitats.
Photo: Mara Pakalne

Peatland experts from Germany in Aizkraukle Mire and Forests.
Photo: Mara Pakalne

Peatland experts from Germany in Aklais Mire.
Photo: Mara Pakalne

Peatland experts from Germany in Aklais Mire.
Photo: Mara Pakalne

Peatland experts from Germany in Aklais Mire. Discussion about site hydrology and geology with the project hydrologist Aija Delina.
Photo: Aivars Slisans

Peatland experts from Germany in Aklais Mire. Discussion about management plan and management actions.
Photo: Aivars Slisans

Peatland experts from Germany in Aklais Mire. Discussion about site hydrology.
Photo: Aivars Slisans

Crossing the bog pool in Aklais Mire.
Photo: Aivars Slisans

German experts in Aizkraukle Mire, discussion about management actions.
Photo: Aivars Slisans

German experts studying Sphagnum moss.
Photo: Mara Pakalne

German experts in Aklais Mire, shooting film.
Photo: Mara Pakalne

German experts in Aklais Mire Nature Reserve.
Photo: Mara Pakalne

Study tour to LIFE project in Daugavpils in May 2011.
Photo: Aivars Slisans

Study tour to LIFE project in Daugavpils in May 2011, field discussion.
Photo: Aivars Slisans

Meeting with LIFE project in Daugavpils University in May 2011.
Photo: Aivars Slisans

Study tour to LIFE project in Daugavpils in May 2011.
Photo: Aivars Slisans

Study tour to LIFE project in Dviete Floodplain in May 2011.
Photo: Aivars Slisans

Management area in Dviete Floodplain LIFE Project in May 2011.
Photo: Aivars Slisans

Study tour to LIFE projects in Estonia in August 2011, discussion about raised bog management and monitoring in Tolkuse Bog, LIFE project site.

Study tour to LIFE projects in Estonia in August 2011, discussion about raised bog management and monitoring in Tolkuse Bog, LIFE project site.

Life project team and experts from the Estonian Ministry of Environment in Nigula Bog in Estonia.
Photo: Aivars Slisans

Agu Levits from Nigula Nature Reserve tells about building of dams in Nigula Bog in Estonia.
Photo: Aivars Slisans

Agu Levits from Nigula Nature Reserve tells about building of dams in Nigula Bog in Estonia.
Photo: Mara Pakalne

Discussion about dam building experience in Estonia with the experts from the Estonia.
Photo: Mara Pakalne

Discussion about mire management in Vidumae Nature Reserve in Estonia.
Photo: Aivars Slisans

Vidumae Nature Reserve in Estonia.
Photo: Aivars Slisans

Project manager Mara Pakalne (middle) and the project assistant Aivars Slisans (left) discussing with Friedhelm Niemayer in the conference in Germany "Mire Conservation in Germany" on 27.02.-28.02.2012.
Photo: Aivars Slisans

Project manager Mara Pakalne introducing conference participants with bog restoration project results during poster session in Germany on 27.02.-28.02.2012.
Photo: Aivars Slisans

Conference participants obtaining information from project poster presenting results in the conference in Germany on 27.02.-28.02.2012.
Photo: Aivars Slisans

Conference participants obtaining information from project poster presenting results in the conference in Germany on 27.02.-28.02.2012.
Photo: Mara Pakalne

Poster session during the conference "Mire Conservation in Germany" on 27.02.-28.02.2012.
Photo: Aivars Slisans

Oral session during the conference "Mire Conservation in Germany" on 27.02.-28.02.2012.
Photo: Aivars Slisans

Experience Exchange with Estonian colleagues in Melnais Lake Mire on 17.04.2012.
Photo: Aivars Slisans

Experience Exchange with Estonian colleagues in Melnais Lake Mire on 17.04.2012.
Photo: Aivars Slisans

Experience Exchange with Estonian colleagues in Melnais Lake Mire on 17.04.2012.
Photo: Mara Pakalne

Experience Exchange with Estonian colleagues in Melnais Lake Mire on 17.04.2012.
Photo: Mara Pakalne

Experience Exchange with Estonian colleagues in Melnais Lake Mire on 17.04.2012.
Photo: Aivars Slisans

Experience Exchange with Estonian colleagues in Melnais Lake Mire on 17.04.2012.
Photo: Mara Pakalne

Study tour to the LIFE project "WETLIFE – Restoring Hydrology in Amalvas and Zuvintas wetlands" and Aukstumala raised bog in Lithuania on 08.10.-15.10.2012.
Photo: Aivars Slisans

High groundwater level in Aukstumala Bog.
Photo: Mara Pakalne

Dead shoots of *Calluna vulgaris* after restoration.
Photo: Mara Pakalne

Mosses re-appear in moist areas after bog restoration.
Photo: Mara Pakalne

Dead standing birches in Aukstumala Bog.
Photo: Mara Pakalne

***Sphagnum angustifolium* re-appear in Aukstumala Bog after restoration.**
Photo: Mara Pakalne

Lithuanian colleagues pointing to managed Aukstumala bog area.
Photo: Mara Pakalne

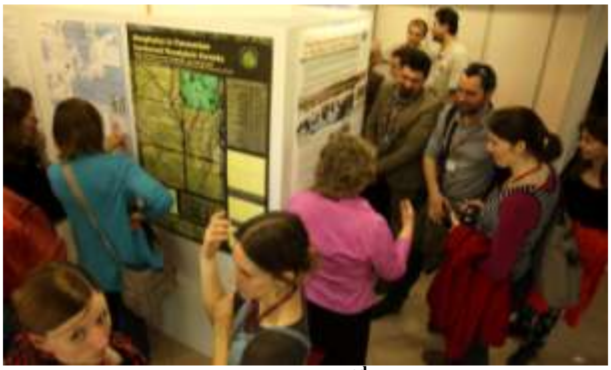
Lithuanian colleagues showing nature values in Aukstumala Bog.
Photo: Mara Pakalne

High groundwater level in contour-ditch after building of plastic dams.
Photo: Mara Pakalne

Dry peat after peat extraction in Aukstumala Bog.
Photo: Mara Pakalne

Peat extraction in Aukstumala Bog.
Photo: Mara Pakalne

Peat extraction in Aukstumala Bog.
Photo: Mara Pakalne



Poster session during the 22^{nd} Annual Meeting of European Vegetation Survey in Italy, Rome (April 7-12, 2013).
Photo: Aivars Slisans

Poster session during the 22^{nd} Annual Meeting of European Vegetation Survey in Italy, Rome (April 7-12, 2013).
Photo: Aivars Slisans

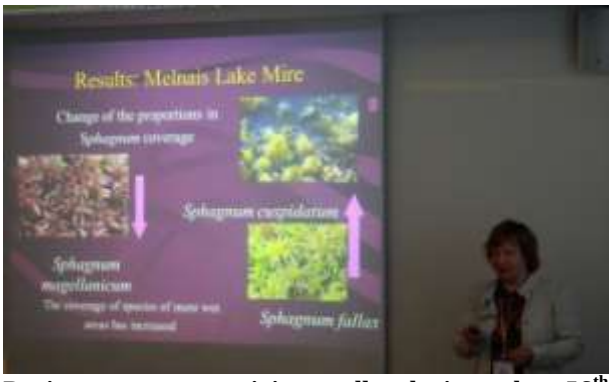
Poster session during the 22^{nd} Annual Meeting of European Vegetation Survey in Italy, Rome (April 7-12, 2013).
Photo: Aivars Slisans

Poster session during the 22^{nd} Annual Meeting of European Vegetation Survey in Italy, Rome (April 7-12, 2013).
Photo: Aivars Slisans

Poster session during the International Workshop "Approaches in Wetland Restoration" in Poland (April 21-26, 2013).
Photo: Aivars Slisans

Visiting mire during the International Workshop "Approaches in Wetland Restoration" in Poland (April 21-26, 2013).
Photo: Aivars Slisans

Visiting mire during the International Workshop "Approaches in Wetland Restoration" in Poland (April 21-26, 2013).
Photo: Aivars Slisans



Project manager giving talk during the 56th International Association of Vegetation Science Symposium in Estonia, Tartu (June 25-30, 2013).
Photo: Liga Strazdina

Visiting mire during the 56th International Association of Vegetation Science Symposium in Estonia, Tartu (June 25-30, 2013).
Photo: Mara Pakalne

Visiting mire during the 56th International Association of Vegetation Science Symposium in Estonia, Tartu (June 25-30, 2013).
Photo: Mara Pakalne

7.18 Publicity of the project

Newspapers and other printed materials

No.	Date	Title of the edition	Title	Photos	Summary
	Year 2010				
1	May	Olaines Domes Vestis	Uzsak izstradat dabas aizsardzības planu	0*	Invitation to Melnais Lake Mire Management plan informative meeting (i)**
2	May 11	Latvijas Vestnesis	Pazinojums	0	Invitation to Aizkraukle Mire and Forests Management plan informative meeting (i)
3	May 14	Latvijas Vestnesis	Pazinojums	0	Invitation to Aklais Mire Management plan informative meeting (i)
4	May 14	Latvijas Vestnesis	Pazinojums	0	Invitation to Melnais Lake Mire Management plan informative meeting (i)
5	May 19	Latvijas Vestnesis	Pazinojums	0	Invitation to Rozu Mire Management plan informative meeting (i)
6	July	Jaunjelgavas novada vestis	Plans dabas liegumam	0	Invitation to Aklais Mire Management plan informative meeting (i)
7	July 1	Chemjaur Zeitung	Lettische Biologen bei Hochmoor-renaturierung	1	Latvians visiting LIFE project “Rosenheimer Stammbeckenmoore” in Germany (i)
8	August 7	Staburags	Plano paaugstinat purvu udenslimeni (Indulis Burka)	1	After discussions with the plant and habitat expert Uvis Susko journalist Indulis Burka writes an article about the project in the newspaper “Staburags” - about nature management plan and planned actions in Aizkraukle Mire and Forests and in Aklais Mire (v)
9	October 26	Staburags	Purva ir dabas vertibas (Indulis Burka)	1	After first Steering Group meeting for Aklais Mire Nature Management Plan I.Burka writes about nature values found in the site during experts' expeditions and planned management actions in the mire (v)
10	December	Olaines Domes Vestis	Par dabas lieguma "Melna ezera purvs" dabas aizsardzibas planu	0	Invitation to Melnais Lake Mire Management plan public discussions (i)
11	December 14	Latvijas Vestnesis	Sabiedriskas apspriesanas sanaksme par dabas lieguma "Melna ezera purvs" dabas aizsardzibas planu	0	Invitation to Melnais Lake Mire Management plan public discussions (i)

No.	Date	Title of the edition	Title	Photos	Summary
12	December 14	Latvijas Vestnesis	Sabiedriskas apspriesanas sanaksme par dabas lieguma "Rozu purvs" dabas aizsardzibas planu	0	Invitation to Rozu Mire Management plan public discussions (i)
	Year 2011				
13	January 4	Rigas Aprinka Avize	Aicina debatet par Melna ezera purva dabas aizsardzības planu	0	Invitation to Melnais Lake Mire Management plan public discussions (i)
14	January 10	Novada Vestis (Salas novada izdevums)	Sabiedriskas apspriesanas sanaksme par dabas lieguma “Rozu purvs” dabas aizsardzibas planu	0	Invitation to Rozu Mire Management plan public discussions (i)
15	January 18	Ogres vestis	Ogreniesu vertejumam nodotas divas fotoizstades (A. Zeilina)	2	Information about exhibition in Ogre (v)
16	January 18	Staburags	Dabas lieguma neiklaus	0	Information that Koknese Municipality doesn’t want to make Nature Reserve larger (i)
17	January 25	Latvijas Vestnesis	Par dabas lieguma "Aizkraukles purvs un mezi" dabas aizsardzibas plana apspriesanu	0	Invitation to Aizkraukle Mire and Forests Management plan public discussions (i)
18	January 29	Staburags	Purva dabas aizsardzības planu nodod sabiedriskajai apspriešanai (Indulis Burka)	0	Information about Aizkraukle Mire and Forests Management plan (g)
19	February 5	Aizkraukles Domes Vestis	Informācija par Aizkraukles purva un mežu dabas aizsardzības plānu sabiedrisko apspriešanu (V.Baronina)	1	Information about Aizkraukle Mire and Forests Management plan and exhibition Secrets of Mires
20	February 9	Latvijas Vestnesis	Pazinojums	0	Invitation to Aklais Mire Management plan public discussions (i)
21	10/02/11	Novada vestis	Informacija par Rozu purva dabas aizsardzības plana sabiedrisko apspriešanu (G. Freimane)	0	Invitation to Rozu Mire Management plan public discussions (i)
22	February 15	Jaunjelgavas novada vestis	Par dabas lieguma "Aklais purvs" dabas aizsardzibas plana apspriesanu	0	Invitation to Aklais Mire Management plan public discussions (i)
23	March 5	Aizkraukles Domes Vestis	Plans purva aizsardzībai	1	Information about Aizkraukle Mire and Forests Management plan and exhibition Secrets of Mires
24	March 5	Staburags	Plano veidot 29 dambjus (Guna Mikasenoka)	0	Information about Aizkraukle Mire and Forests Management plan (v)

No.	Date	Title of the edition	Title	Photos	Summary
25	March 26	Staburags	Iedzivotaji grib ogu vietas (Guna Mikasenoka)	0	Information about Aizkraukle Mire and Forests Management plan (v)
26	March 29	Staburags	Savu purvu neatdod (Janis Ozolins)	0	Discussions about Aklais Mire Management plan (v)
27	April 21	Staburags	Negativas ietekmes projekta nav izskatitas (Guntis Jankovskis)	0	Discussions about Aklais Mire Management plan (v)
28	August 9	Zemgales Zinas	Purvi fotografijas (Uldis Veilants)	0	Information about exhibition “Secrets of Mires” in Jelgava (v)
29	September	Zinatnieku nakts	Botaniskais darzs	0	Information about Science Night 2011 – “Secrets of Mires” in the Botanical Garden of the University of Latvia
30	November 3	Briva Daugava	Aicina izstade “Purvu noslepumi”	0	Information about exhibition “Secrets of Mires” in Jekabpils (v)
31	December 5	Staburags	“Purvu noslepumi” Jaunjelgavas bibliotekā	1	Information about exhibition “Secrets of Mires” in Jaunjelgava (v)
32	December 16	Jaunjelgavas novada vestis	Purvu noslepumi	0	Information about exhibition “Secrets of Mires” in Jaunjelgava (v)
	Year 2012				
33	April 1	e-Newsletter Peatland Research Special Interest Group	Dates for the Diary	0	Announcement of International Seminar “Sharing experience on Raised Bog Restoration” (i).
	Year 2013				
34***	January 16	Talsu Vēstis	Dundagas novada bibliotēka iepazīst dabas bagātības un vēsturiskās vērtības	4	Photo Exhibition „Secrets of Mires” in the Dundaga Library (v)

4* - number of photos
**(i) – short paper or news
(v) – medium long paper
(g) – long paper
*** – only from this newspaper the scanned copy is included in the Final Report while for others it was added to Mid-term Report or Progress Report

Newspaper
34. Talsu Vēstis, 16.01.2013., Photo Exhibition „Secrets of Mires" in the Dundaga Library

Dundagas novada bibliotēkā iepazīst dabas bagātības un vēsturiskas vērtības

Krista Topiņa

Dundagas novada centrālā bibliotēka par dažādu notikumu un aktivitāšu trūkumu sūdzēties nevar. Šeit pavisam nesen uzlabojumus piedzīvojušas vairākas telpas, ieradušās divas ceļojošās izstādes, un netrūkst ideju arī tālākam darbam.

«Mežā nevar tā — atnācu, ieraudzīju, uzvarēju,» klausītājiem uzsver fotogrāfs Aivars Slišāns. Daiņa Kārkluvalka foto

Ikviens interesents var ielūkoties pagātnē, iepazīstot izstādi «Sibīrijā rakstītās vēstules uz bērza tāss».

Lai gan bibliotēkā esam ieradušies darba dienas rītā, šeit sastopam daudz jauniešu. Izrādās, tā vietā, lai sēdētu skolas solā, viņi ieradušies gūt zinības citādā gaisotnē, proti — apmeklējot izstādi. 14. janvārī šeit atklāšanu piedzīvoja ceļojošā fotoizstāde «Purvu noslēpumi», kas interesentus turpinās priecēt līdz 31. janvārim. Tā ir daļa no projekta «Augstā purva biotopu atjaunošana īpaši aizsargājamās dabas teritorijās Latvijā», kura mērķis ir pievērst sabiedrības uzmanību apkārtējai videi draudīgajai tendencei — purvu nosusināšanai. Ekspozīcijā, kas tapusi ar Eiropas Komisijas «Life+» programmas atbalstu, atrodamas 119 fotogrāfijas. Tās sadarbībā ar purvu pētniekiem radījuši Ogres fotokluba mākslinieki.

Lai iepazīstinātu klātesošos ar tās būtību un ļautu uzzināt ko jaunu par dabas bagātībām mūsu tuvākajā apkārtnē, izstādes atklāšanā viesojās arī projekta vadītāja botāniķe Māra Pakalne. Viņas stāstījumā skolēni un citi klātesošie varēja uzzināt gan interesantus faktus par purvu rašanos, to veidiem un retajiem iemītniekiem, gan iepazīt dažādus pētījumus un pat ievērības cienīgas apskates vietas. Lai gan fotogrāfijas uzņemtas purvos, kas atrodami Latvijas centrālajā un austrumu daļā (Aklais purvs, Rožu purvs, Melnā ezera purvs, Aizkraukles purvs un mežī), atklāšanas stāstījumā bija sagatavots materiāls par dabas vērtībām arī mūsu pusē — Slīteres nacionālajā parkā un Engures ezera dabas parkā. Pasākuma apmeklētāji varēja ieskatīties to floras un faunas dažādībā, izprast to aizsargāšanas nepieciešamību (piemēram, Īrijā vietējo purvu īpašnieki kūdru rok savu māju apsildei; nereti nodarot postījumus dabai), kā arī uzzināt pa interesantām stāstām no pētnieku pieredzes. Tā, piemēram, Slīteres pusē pie kāda soliņa ceļiniekus regulāri sagaida tās iemītniece — odze, savukārt tepat Engurē varam aplūkot veselu savvaļas orhideju taku.

Tāpat skolēni kopā ar M. Pakalni meklēja atbildes uz jautājumiem par to, cik dziļi un bīstami purvos mēdz būt akači un kā no tiem izvairīties, ko to veidošanai sniedz bebri, kādi augi atvēsina gada karstākajā laikā un pat minēja, kā Dienvidāfrikas purvu ūdenstilpē jūtas nīlzirgs. Skolēni ar fotoattēlu palīdzību iepazina šos dabas veidojumus arī citās zemēs.

Pēcāk ar interesentiem savā pieredzē par projekta laikā piedzīvoto dalījās viens no tā dalībniekiem — fotogrāfs Aivars Slišāns. Arī viņš uzsvēra lielo purvu floras un faunas bagātību, kā arī nepieciešamību būt ar to īpaši uzmanīgiem. Fotogrāfa stāstījumā iepazinām arī interesantas dabas veltes. Piemēram, izrādās — teiksmās izslavētais rūķīšu zelts meklējams arī tepat mūsu purvos — tiesa, vien kā sūnas, kas noteiktā apgaismojumā spīd.

(Turpinājums 4. lappusē.)

Dundagas novada bibliotēkā iepazīst dabas bagātības un vēsturiskas vērtības

(Sākums 3. lappusē.)

Pie jauniegvumiem ieit tikuši ne tikai apmeklētāji,

bet arī bibliotēka. Kopš 1997. gada tā par savām mājām dēvē Dundagas pirmskolas izglītības iestādes «Kurzemīte» ēku. Kā pastāstīja tās vadītāja Ruta Emerberga — tai gan šeit jaunuzbūvējamie laika sprīdī, pārlūkos remontdarbus ir piedzīvojusi vien nesen. Tā 2011. gadā pieņēmusi dāņu ārsti un krāsām tīkami vārtā, katrā apvienotu datormācību un vadītāju kabinetu, tāpat tur veikli vēl dažādojumi. Savukārt pērnruden šeit uzsāka remontu divām telpām un sešstūrajam muzejam pieaugušo abonementā. Šobrīd tas jau pavērts, vien atlicis palaist pilnīgu iekārtošanas darbus. Kopumā pēro izremontētās telpas aizņem aptuveni 100 kvadrātmetru lielu platību. Vairāk nekā 6000 latu remontam piešķīrā no novada pašvaldības līdzekļiem, bet darbus veica SIA «Frombetons».

Tiesa, bibliotēkā nepietiekami arī citi uzlabojumi, norāda R. Emerberga atšķirīga, ka tos vislabāk bija redzēt, kad bērnudārzs ēkai bija nomainīts jau savu laika nokalpojušais jumts.

Tostarp bibliotēkas apmeklētāju skaits šeit aizvien ir augsts. Kā pastāstīja vadītāja — 2012. gadā reģistrēti 625 bibliotēkas lietotāji, apmeklējumu skaits tuvējos pāri 12 000 un izsniegtas ap 25 000 grāmatu. Palielīgi reiz lasāmvielas papildināšanā šeit mīnēt gan dāvinājumi, gan fondi. Protams, novada bibliotēkām palīdz arī pašvaldība.

Šo iestādi citīgi apmeklē arī pamāksās pusdienot ļaužķi, kas to dara ne tikai bērnajā laikā, bet arī skolas audzinātā. «Protams, viss laika domājam, ko piedāvāt, savaram tikai sēdēt un gaidīt, kad jūs mums nāksi, jo skolas programma jau tā ir pietiekami noslogota, un daudz bērnu pašlaik apmeklē arī sporta nodarbības, mākslas un mūzikas skolu, tāpat tetīck dažādi kultūras pasākumi. Tādēļ centāmies arī rīkot izstādes, kas būtu pakārtotas dotajām mācību prasībām. Izdarbojas tā, lai mēs cits citu papildinātu. Bez šaubām — ja bērns no mazām dienām būs pazīstams ar zīmēm, kur ir mūsdienu bibliotēka, tad vēlāk no tās apmēs nebūs, arī pieaudzis būdams,» pauda vadītāja.

Ikviens interesents līdz 25. janvārim šeit var aplūkot arī Talsīnas muzeja izlojoto izstādi «Sēbrejs rakstīšu vēstules uz bērza tāss». Tā veidota, izmantojot desmit cīņēkas iestrijumā Sebreja uz bērza tāss rakstītas vēstules un likteņstāstus. Ieinteresēta šo cilvēku centienos uzturēt saiknī ar dzimteni var būt noderīga pieturas punkta mūsu vēstures apgūšanā. Līdzīgi vēstulēm tajā iespējams iepazīt arī tā laika vēsturiskos un politiko kontekstu.

Šīs izstādēm drīz nebūs arī nākamās, kur visu pasaulīs iniciatīvai varēs iedarbīties gan atvadītā gadsimta mākslā un literatūrā, gan citās aizraujošās sfērās.■

Dundagas novada centrālās bibliotēkas vadītāja Ruta Emerberga.

Projekta vadītāja Māra Pakalne pievērš skolēnu uzmanību apkārtējās vides apdraudētībai. Daina Kārkluvalka foto

TV, Radio

Date	Radio/TV channel	Broadcast	Summary	Length
Year 2010				
June 29	Radio LR1	Zinamais nezinamaja	Live interview with project manager Mara Pakalne and invertebrate expert Voldemars Spungis about Management plans, nature values in the Project sites, bogs in other counties. Project is presented to the public.	10'
Year 2011				
July	Kurzemes TV	Zinas Ventspilij	Information about the Project. Information about exhibition Secrets of Mires in Ventspils Library.	5’
July	Talsu TV	Zinas	Information about Bryology seminar in Latvia and raised bogs. Interview with Project Manager Mara Pakalne.	3’
July	LTV1	Zinas	Information about Bryology seminar in Latvia and raised bogs. Interview with Project Manager Mara Pakalne.	2’
October 3	Naba	Izglitibas, zinatnes un kulturas zinas pirmdiena	Photo exhibition “Secrets of Mires” opened in Riga – Botanical Garden of University of Latvia.	1’
October 20	LTV1	Rita zinas	Information about exhibition Secrets of Mires in Botanical garden. Interview with Project Manager Mara Pakalne.	2’
Year 2012				
April 25	Venstpils TV	Ziņas	Information of project results after restoration in Vasenieku Mire.	3’
April 27	LTV1	Novadu ziņas	Information of project results after restoration in Vasenieku Mire.	3’
Year 2013*				
February 9	LTV1	Vides fakti	Wetland Days in Natural History Museum of Latvia	7’
June 24	WDR	Markencheck	Interview with project manager Mara Pakalne about peat extraction in Latvia carried out by German companies to compare two German supermarkets Bauhaus and OBI.	44’
October 14	Radio LR1	Zinamais nezinamaja	Live interview with project manager Mara Pakalne	53’

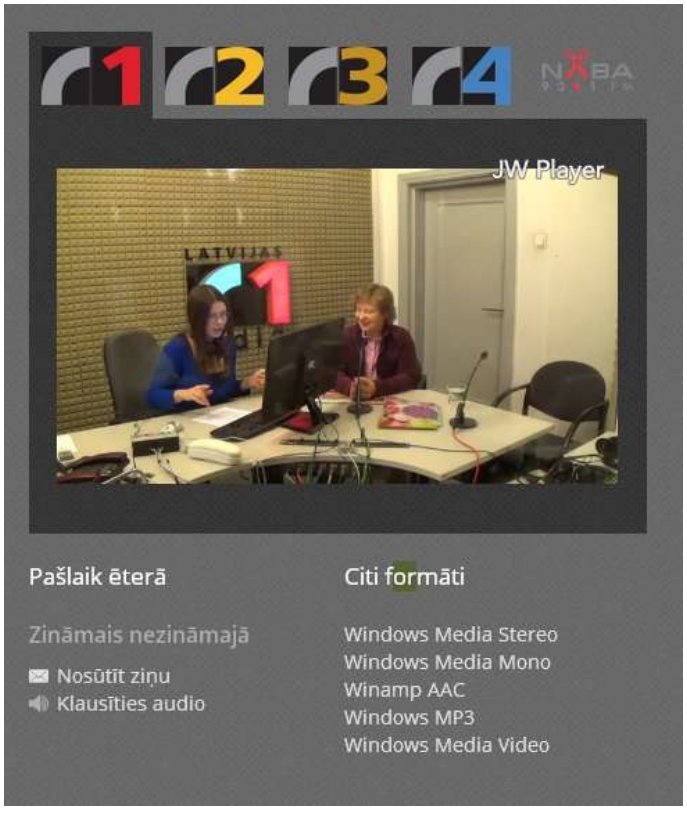
* – only from year 2013 the snapshots of interviews are included in the Final Report while for others it was added to Mid-term Report or Progress Report

TV, Radio

LTV1, Vides fakti, 09.02.2013., Wetland Days in Natural History Museum of Latvia

WDR, Markencheck, 24.06.2013.

Radio LR1, Zināmais Nezināmajā, 14.10.2013.



Internet portals and news agencies

No.	Date	Internet portal or news agency	Title	Summary	Photos
	Year 2010				
1	May 1	www.ldf.lv	Augstie purvi	Summary about the Project and Management Plans	0
2	May 1	www.ldf.lv	Aklais purvs	Summary about Nature management plan for Aklais Mire	0
3	May 1	www.ldf.lv	Rozu purvs	Summary about Nature management plan for Rozu Mire	0
4	May 1	www.ldf.lv	Melna ezera purvs	Summary about Nature management plan for Melnais Lake Mire	0
5	May 1	www.ldf.lv	Aizkraukles purvs un mezi	Summary about Nature management plan for Aizkraukle Mire and Forests	0
6	May 11	www.lv.lv	Pazinojums	Invitation to Aizkrauke Mire and Forests Management plan informative meeting	0
7	May 11	www.salasnovads.lv	Dabas lieguma Rozu purvaizstrades uzsaksana	Invitation to Rozu Mire Management plan informative meeting	0
8	May 14	www.lv.lv	Pazinojums	Invitation to Aklais Mire Management plan informative meeting	0
9	May 14	www.lv.lv	Pazinojums	Invitation to Rozu Mire Management plan informative meeting	0
10	May 19	www.lv.lv	Pazinojums	Invitation to Melnais Lake Mire Management plan informative meeting	0
11	May	www.elmmedia.lv	Purva noslepumi	Summary about project and the film what will be made during it.	4
12	May 20	www.ldf.lv	Uzsakts darbs pie cetriem dabas aizsardzibas planiem purvu teritorijas	Information about four Nature Management plans what will be carried out by Latvian Fund for Nature and informative meetings for them.	1
13	June 17	www.daudzese.lv	Sanaksme par dabas lieguma Aklais purvs plana izstradi	Invitation to Aklais Mire Management plan informative meeting	0
14	July 30	www.staburags.lv	Plano paaugstinat purvu udenslimeni (Indulis Burka)	After discussions with the plant and habitat expert Uvis Susko journalist Indulis Burka writes an article about the project in the newspaper “Staburags” - about nature management plan and planned actions in Aizkraukle Mire and Forests and in Aklais Mire	1
15	July 31	www.delfi.lv	Daudzeses pagasta plano paaugstinat purvu udenslimeni (Indulis Burka)	After discussions with the plant and habitat expert Uvis Susko journalist Indulis Burka writes an article about the project in the newspaper “Staburags” - about nature management plan and planned actions in Aizkraukle Mire and Forests and in Aklais Mire	1

No.	Date	Internet portal or news agency	Title	Summary	Photos
16	August 18	www.elmmedia.lv	Purva ekspedicija (Davis)	After an expedition with bog experts Elm Media who is preparing film for the project writes an article about people living next to the mires and experts studying bog nature values.	3
17	September 14	www.blanketbogswales.org	Latvian LIFE visit	At the beginning of September, the LIFE project hosted a visit from a Latvian LIFE project team who are working on the project, Restoration of Raised Bog Habitats in the Especially Protected Areas of Latvia.	0
18	September 15	www.ldf.lv	Pabeigta teritoriju izpete cetros dabas liegumos (Valda Baronina)	Summary about animal, plant and habitat inventory in the project sites.	3
19	September 15	www.ldf.lv	Dabas lieguma “Rozu purvs” dabas aizsardzibas plana izstrades I uzraudzibas grupas sanaksme (G.Freimane)	Invitation to attend First Steering Group Meeting for Rozu Mire Nature Reserve Nature Management Plan.	1
20	October 2	www.ldf.lv	Dabas liegumos notiks pirmas uzraudzibas grupas sanaksmes	Invitation to attend First Steering Group Meeting for Aizkraukle Mire and Forests, Melnais Lake Mire and Aklais Mire Nature Management Plan.	1
21	October 18	www.staburags.lv	Purva pasleptas dabas vertibas	After first Steering Group meeting for Aklais Mire Nature Management Plan I.Burka writes about nature values found in the site during experts' expeditions and planned management actions in the mire.	*2*
22	October 22	www.blanketbogswales.org	LIFE in Latvia	The „Blanket Bogs Wales” LIFE team has recently returned from a visit to see the work carried out by two LIFE-Nature projects in Latvia.	9
23	December 1	www.ldf.lv	Purvu dabas aizsardzibas planiem - otras uzraudzības grupas sanaksmes	Invitation to attend Second Project Steering Group Meeting for Aizkraukle Mire and Forests, Melnais Lake Mire and Aklais Mire Nature Management Plan	1
24	December 14	www.lv.lv	Sabiedriskas apspriesanas sanaksme par dabas lieguma "Melna ezera purvs" dabas aizsardzibas planu	Invitation to Melnais Lake Mire Management plan public discussions	*0*
25	December 14	www.lv.lv	Sabiedriskas apspriesanas sanaksme par dabas lieguma "Rozu purvs" dabas aizsardzibas planu	Invitation to Rozu Mire Management plan public discussions	*0*

No.	Date	Internet portal or news agency	Title	Summary	Photos
26	December	www.olaine.lv	Sabiedriskas apspriesanas sanaksme par dabas lieguma "Melna ezera purvs" dabas aizsardzibas planu	Invitation to Melnais Lake Mire Management plan public discussions	0
27	December 23	www.olaine.lv	Sabiedriskas apspriesanas sanaksme par dabas lieguma "Melna ezera purvs" dabas aizsardzibas planu	Invitation to Melnais Lake Mire Management plan public discussions	0
28	December 27	www.salasnovads.lv	Dabas liegums Rozu purvs	Invitation to Rozu Mire Management plan public discussions	*0*
29	December 29	www.ldf.lv	Dabas lieguma "Melna ezera purvs" dabas aizsardzības plana sabiedriska apspriesana	Invitation to Melnais Lake Mire Management plan public discussions.	1
	Year 2011				
30		Daba.gov.lv	Publiski apspriezamie dokumenti	Invitation to Management Plans public discussions.	0
31	January 4	www.ldf.lv	Dabas lieguma "Rozu purvs" dabas aizsardzības plana sabiedriska apspriešana	Invitation to Rozu Mire Management plan public discussions.	1
32	January 5	LETA	Nakamnedel Ogre atklas fotografiju izstadi par purviem	Photo exhibition “Secrets of Mires” will be opened in Ogre.	0
33	January 6	www.eogre.lv	Purvu noslepumi	Photo exhibition “Secrets of Mires” will be opened in Ogre.	1
34	January	www.ogrenet.lv	Ceturtdien foto klubs “Ogre” atklas divas izstades	Photo exhibition “Secrets of Mires” will be opened in Ogre.	0
35	January	www.ogresnovads.lv	Fotoizstades atklasana	Photo exhibition “Secrets of Mires” will be opened in Ogre.	1
36	January 11	www.ogresnovads.lv	Foto klubs “Ogre” atver divas izstades	Photo exhibition “Secrets of Mires” will be opened in Ogre.	1
37	January 13	LETA	Ogre atklas fotografiju izstadi par purviem	Photo exhibition “Secrets of Mires” will be opened in Ogre.	0
38	January 13	www.eogre.lv	Izstade “Purvu noslepumi”	Photo exhibition “Secrets of Mires” was opened in Ogre.	Video

No.	Date	Internet portal or news agency	Title	Summary	Photos
39	January 17	www.latvijascentrs.lv	Foto klubs “Ogre” atver divas izstades	Photo exhibition “Secrets of Mires” was opened in Ogre.	1
40	January 19	www.staburags.lv	Dabas lieguma “Aizkraukles purvs un mezi”dabas aizsardzibas planu nolemj nodot sabiedriskajai apspriesanai	Aizkraukle Mire and Forests Nature Management Plan will be discussed in public.	1
41	January 24	www.ldf.lv	Dabas lieguma "Aizkraukles purvs un mezi" dabas aizsardzības plana sabiedriska apspriesana	Invitation to Aizkraukle Mire and Forests Management plan public discussions	1
42	January 25	www.lv.lv	Par dabas lieguma "Aizkraukles purvs un mezi" dabas aizsardzibas plana apspriesanu	Invitation to Aizkraukle Mire and Forests Management plan public discussions	0
43	January 28	www.fotoamatnieki.lv	Foto kluba Ogre “Purvu noslepumi”	Information about photo exhibition by Arno Marnics.	5
44	January 29	www.staburags.lv	Purva dabas aizsardzibas planu nodod sabiedriskajai apspriesanai	Aizkraukle Mire and Forests Nature Management Plan will be discussed in public.	1
45	February 9	www.lv.lv	Pazinojums par sabiedriskas apspriesanas sanaksmi par dabas liegumu "Aklais purvs"	Invitation to Aklais Mire and Forests Management plan public discussions.	0
46	February 11	www.ldf.lv	Rozu purva dabas liegumam nosleguma sanaksme	Information about the last Steering group meeting of Rozu Mire Management plan.	1
47	February 11	www.ldf.lv	Dabas lieguma "Aklais purvs" dabas aizsardzības plana sabiedriska apspriešana	Information about the Public hearing of Aklais Mire Management plan.	1
48	February 24	www.liaa.lv	Informativais seminars Riga par ES programmu LIFE+	Invitation to informative seminar about LIFE+ programme; one of speakers – M. Pakalne.	0

No.	Date	Internet portal or news agency	Title	Summary	Photos
49	February, March	www.lu.lv	LU 69. konference	Information of the project staff and experts presentation at the 69th Scientific Conference of the University of Latvia: 1. M. Pakalne, A. Slisans. Raised bog habitat studies within the LIFE project "Raised Bogs". 2. U. Susko. Rare and protected lichen, bryophyte species in Aklais Mire Nature Reserve. 3. E. Kuske, L. Kalnina, N. Stivrins, A. Dinkite, M. Reca, R. Bigacs. Paleovegetation studies in Rozu Mire.	0
50	March 27	Aizkrauklesbibl.blogspot.com	Dabas liegums "Aizkraukles purvs un mezi"	Nature values in Aizkraukle Mire and Forests (information from Nature Management Plan).	3
51	March 28	www.lvafa.gov.lv	Informacija par ikgadeja LIFE+ informative seminara norisi un seminara materiali	Informative seminar about LIFE+ programme; one of speakers was M. Pakalne.	0
52	March 29	LETA	Ministru kabineta skatama fotografiju izstade "Purvu noslepumi"	Raised Bog Photo exhibition "Secrets of Mires" in the Cabinet of Ministers.	0
53	April 11	www.ldf.lv	Apstiprinati pieci Latvijas Dabas fonda izstradatie dabas aizsardzibas plani	Information about the approval at the Ministry of Environment and Regional Planning of the project management plans.	1
54	April 19	www.ldf.lv	Apstiprinats dabas aizsardzibas plans dabas liegumam "Aizkraukles purvs un mezi"	Information about the approval at the Ministry of Environment and Regional Planning of Management plan for Aizkraukle Mire and Forests.	1
55	April	Du.lv	Fotoizstade "Purvu noslepumi"	Photo exhibition "Secrets of Mires" will be in Daugavpils University.	1
56	April	www.latgale.lv	Fotoizstade "Purvu noslepumi"	Photo exhibition "Secrets of Mires" will be in Daugavpils University.	1
57	April	www.riga24.lv	Fotoizstade "Purvu noslepumi"	Photo exhibition "Secrets of Mires" will be in Daugavpils University.	1
58	May	www.olainesmuzejs.lv		On May 14th seminar for teachers about raised bog values will be hold.	0
59	May 23	http://www.flickr.com/photos/saeima/	Izstade "Purvu noslepumi"	Saeima Flickr set about "Secrets of Mires".	4

No.	Date	Internet portal or news agency	Title	Summary	Photos
60	July 1	www.ventspils.lv	Ventspils biblioteka atklas izstadi “Purvu noslepumi”	Photo exhibition “Secrets of Mires” will be opened in Ventspils.	1
61	July 4	LETA	Ventspils biblioteka atklas izstadi “Purvu noslepumi”	Photo exhibition “Secrets of Mires” will be opened in Ventspils.	0
62	July 5	Jaunais.kis.gov.lv	Ventspils biblioteka atklas izstadi “Purvu noslpumi”	Photo exhibition “Secrets of Mires” will be opened in Ventspils.	0
63	July 5	BNS	Ventspils biblioteka atklas izstadi “Purvu noslepumi”	Photo exhibition “Secrets of Mires” will be opened in Ventspils.	0
64	July 5	Easyget.lv	Ventspils biblioteka atklas izstadi “Purvu noslepumi”	Photo exhibition “Secrets of Mires” will be opened in Ventspils.	0
65	July	www.biblioteka.lv	Izstades “Purvu noslepumi” atklašana	Photo exhibition “Secrets of Mires” will be opened in Ventspils.	0
66	July 6	www.ventspils24.lv	Sodien Ventspils biblioteka atklas izstadi “Purvu noslepumi”	Photo exhibition “Secrets of Mires” will be opened in Ventspils today.	1
67	July 6	Latfoto.lv	Ventspils biblioteka atklas izstadi “Purvu noslepumi”	Photo exhibition “Secrets of Mires” will be opened in Ventspils.	0
68	July 6	www.biblioteka.ventspils.lv	Ventspils biblioteka atklas izstadi “Purvu noslepumi”	Photo exhibition “Secrets of Mires” will be opened in Ventspils.	0
69	July 7	www.biblioteka.lv	Izstade “Purvu noslepumi” uzsakusi ceļojumu pa bibliotekam	Photo exhibition “Secrets of Mires” opened in Ventspils.	1
70	July 8	www.latforin.lv	Augsta purva biotope atjaunosana ipasi aizsargajamas dabas teritorijas Latvija	Project “Restoration of Raised Bog Habitats in Especially Protected Sites in Latvia”.	1
71		www.daba.gov.lv	Aizkraukles purvs un mezi	Nature Management Plan and its attachements.	0
72		www.daba.gov.lv	Aklais purvs	Nature Management Plan and its attachements.	0
73		www.daba.gov.lv	Rozu purvs	Nature Management Plan and its attachements.	1
74		www.daba.gov.lv	Melna ezera purvs	Nature Management Plan and its attachements.	1

No.	Date	Internet portal or news agency	Title	Summary	Photos
75	August 4	www.jelgava.lv	Zinatniskaja biblioteka jauna fotoizstade “Purvu noslepumi”	Photo exhibition “Secrets of Mires” opened in Jelgava.	1
76	August 4	www.zz.lv	Zinatniskaja biblioteka skatami “Purvu noslepumi”	Photo exhibition “Secrets of Mires” opened in Jelgava.	0
77	August 4	www.e-novads.lv	Zinatniskaja biblioteka jauna fotoizstade “Purvu noslepumi”	Photo exhibition “Secrets of Mires” opened in Jelgava.	0
78	August 4	www.jelgavasvestnesis.lv	Zinatniskaja biblioteka jauna fotoizstade “Purvu noslepumi”	Photo exhibition “Secrets of Mires” opened in Jelgava.	1
79	August 5	www.oyo.lv	Zinatniskaja biblioteka skatami “Purvu noslepumi”	Photo exhibition “Secrets of Mires” opened in Jelgava.	0
80	August 18	www.delfi.lv	LU botaniskaja darza ‘piestas’ celojosa fotoizstade “Purvu noslepumi”	Photo exhibition “Secrets of Mires” will be opened in Riga – Botanical Garden of University of Latvia.	1
81	September 15	www.delfi.lv	LU Botaniskaja darza bus ‘Zinatnieku nakts’	Science Night 2011 actions will be in Botanical Garden of University of Latvia, also Photo exhibition “Secrets of Mires” will be there.	1
82	September 23	www.staburags.lv	Rukisu zelts jamekle zem egles saknem	About Teachers’ seminar in Daudzese School on September 22nd.	1
83	September 29	www.botanika.lu.lv	Celojosa fotoizstade “Purvu noslepumi”	Photo exhibition “Secrets of Mires” opened in Riga – Botanical Garden of University of Latvia.	2
84	October 3	www.diena.lv	Botaniskaja darza aplukojama fotoizstade Purvu noslepumi	Photo exhibition “Secrets of Mires” opened in Riga – Botanical Garden of University of Latvia.	1
85	October 3	www.radionaba.lv	Izglitibas, zinatnes un kulturas zinas pirmdiena	Photo exhibition “Secrets of Mires” opened in Riga – Botanical Garden of University of Latvia.	0
86	October 3	www.easyget.lv	LU Botaniskaja darza aplukojama celojosa fotoizstade “Purvu noslepumi”	Photo exhibition “Secrets of Mires” opened in Riga – Botanical Garden of University of Latvia.	0
87	October 3	www.unity.lv	LU Botaniskaja darza aplukojama celojosa fotoizstade “Purvu noslepumi”	Photo exhibition “Secrets of Mires” opened in Riga – Botanical Garden of University of Latvia.	1

No.	Date	Internet portal or news agency	Title	Summary	Photos
88	October 3	www.reitingi.lv	LU Botaniskaja darza aplukojama celojosa fotoizstade “Purvu noslepumi”	Photo exhibition “Secrets of Mires” opened in Riga – Botanical Garden of University of Latvia.	1
89	October 3	www.unity.lv	Latvijas sunu purvu noslepumi	Photo exhibition “Secrets of Mires” opened in Riga – Botanical Garden of University of Latvia.	1
90	October	www.1188.lv	Celojosa fotoizstade - Purvu noslepumi	Photo exhibition “Secrets of Mires” opened in Riga – Botanical Garden of University of Latvia.	1
91	October 28	www.jekabpilszinas.lv	Jekabpils Galvenaja biblioteka celojosa izstade “Purvu noslepumi”	Photo exhibition “Secrets of Mires” opened in Jekabpils.	1
92	October 28	www.jekabpils24.lv	Jekabpils Galvenaja biblioteka celojosa izstade “Purvu noslepumi”	Photo exhibition “Secrets of Mires” opened in Jekabpils.	1
93	October 28	www.jgb.lv	Izstade: Purvu noslepumi	Photo exhibition “Secrets of Mires” opened in Jekabpils.	0
94	November 1	www.jvestnesis.lv	Jekabpils Galvenaja biblioteka celojosa izstade “Purvu noslepumi”	Photo exhibition “Secrets of Mires” opened in Jekabpils.	1
95	December 2	http://www.jaunjelgava.lv/	Fotoizstade “Purvu noslēpumi”	Announcement about project photo exhibition “Secret of Mires” in Jaunjelgava Library.	2
96	December 5	www.staburags.lv	“Purvu noslepumi” Jaunjelgavas biblioteka	Photo exhibition “Secrets of Mires” opened in Jaunjelgava.	1
97	December 5	www.e-novads.lv	Celojosa fotoizstade Purvu noslepumi Jaunjelgavas biblioteka	Photo exhibition “Secrets of Mires” opened in Jaunjelgava.	1
98	December 5	www.jaunjelgava.lv	Celojosa fotoizstade “Purvu noslepumi” Jaunjelgavas biblioteka	Photo exhibition “Secrets of Mires” opened in Jaunjelgava.	1
	Year 2012				
99	January 13	http://www.akniste.lv/	Aknistes biblioteka izstade “Purvu noslepumi”	Information about project photo exhibition “Secret of Mires” in Akniste Library and their authors. Short overview about mires as important habitats for rare and protected plant and animal species.	1

No.	Date	Internet portal or news agency	Title	Summary	Photos
100	January 15	http://www.enovads.lv/	Aknistes biblioteka izstade Purvu noslepumi	Information about project photo exhibition “Secret of Mires” in Akniste Library and their authors. Short overview about mires as important habitats for rare and protected plant and animal species.	1
101	January 18	http://www.jekabpilszinas.lv/	Aknistes biblioteka fotoizstade “Purvu noslepuumi”	Information about project photo exhibition “Secret of Mires” in Akniste Library and their authors. Short overview about mires as important habitats for rare and protected plant and animal species.	1
102	February 9	http://latvijas.daba.lv/	Pieredzes apmaina augsto purvu atjaunosana	Information about International Seminar “„Sharing experience on Raised Bog Restoration” – program, dates, excursion guides, registration form. Short overview about project sites is given.	1
103	February 9	http://gliemji.daba.lv/	Foto izstade “Purvu noslepumi” celo pa visu Latviju	Information about project photo exhibition “Secret of Mires”.	1
104	February 15	http://www.staburags.lv/	Skola skan purva putnu balsis	Information about project photo exhibition “Secret of Mires” in Daudzese Primary School and introducing authors of used photos. Explaining about rare moss species that grows in mires.	1
105	February 16	http://mezi.lv/	Seminars “Pieredzes apmaina augsto purvu atjaunosana”	Information about International Seminar “„Sharing experience on Raised Bog Restoration” – aims and topics of the seminar.	1
106	March 1	http://www.esmaja.lv/	Notikumu kalendars	Notification about opening of project photo exhibition “Secrets of Mires” and 4th Project Steering Group Meeting in EU House in Riga.	0
107	March 23	http://dabasdati.lv/lv/	Foto izstade “Purvu noslepumi” apskatama ES maja Riga	Information about project photo exhibition “Secret of Mires” in EU House in Riga.	2
108	July 22	http://www.peatsociety.org/	Conferences, Workshops and Symposia. Past Events	Information about International Seminar “„Sharing experience on Raised Bog Restoration”.	0
109	July 22	http://www.peat.lv/	Jaunumi. Seminars “Pieredzes apmaina augsto purvu atjaunosana”	Information about International Seminar “„Sharing experience on Raised Bog Restoration”.	0
110	September 16	http://www.rcb.lv/	Izstades oktobri	Announcement about project photo exhibition “Secret of Mires” in Riga City Central Library.	0
111	October 22	http://www.lu.lv/	Rigas dome var apskatit LU projekta fotoizstadi par purviem	Information about project photo exhibition “Secret of Mires” in Riga City Council. Project manager Mara Pakalne briefly explains aims and sponsors of the project.	1

No.	Date	Internet portal or news agency	Title	Summary	Photos
112	October 22	http://mezi.lv/	Iespeja atklat purvu noslepumus	Information about project photo exhibition “Secret of Mires” in Riga City Council. Project manager Mara Pakalne briefly explains aims of the project and critical situation with mires in other European countries.	1
113	October 22	http://www.delfi.lv/	Rigas dome atklas izstadi ‘Purvu noslepumi’	Information about project photo exhibition “Secret of Mires” in Riga City Council. Explaining meaning of mire restoration.	1
114	October 22	http://www.rigasmezi.lv/	Rigas dome atklata celojosa fotoizstade “Purvu noslepumi”	Information about project photo exhibition “Secret of Mires” in Riga City Council. Short information about mire restoration and sponsors of the project.	16
115	October 23	http://www.atkritumi.lv/	Ratsnama atklas fotografiju izstadi “Purvu noslepumi”	Information about project photo exhibition “Secret of Mires” in Riga City Council. Short information about mire restoration.	0
116	October 26	http://mezi.lv/	Mezi.lv Brivdienu celvedis	Announcement about project photo exhibition “Secret of Mires” in Riga City Council.	0
	Year 2013*				
117	January 11	http://www.dundaga.lv/	Fotoizstade „Purvu noslepumi”	Photo Exhibition in Dundaga Library	**0**
118	January 14	http://www.daba.gov.lv/	Celojosa fotoizstade „Purvu noslepumi” Dundaga	Photo Exhibition in Dundaga Library	**1**
119	January 11	http://www.enovads.lv/	Fotoizstade „Purvu noslepumi”	Photo Exhibition in Dundaga Library	**1**
120	January 11	http://www.mediji.lv/	Fotoizstade „Purvu noslepumi”	Photo Exhibition in Dundaga Library	**0**
121	January 16	http://www.tirailatvijai.lv/	Celojosa fotoizstade „Purvu noslepumi” Dundaga	Photo Exhibition in Dundaga Library	**2**
122	March 6	http://www.ogresnovads.lv/	„Purvu noslepumi” Lauberes pagasta biblioteka	Photo Exhibition in Laubere Library	**1**
123	March 6	http://citalaubere.lv/	„Purvu noslepumi” Lauberes pagasta biblioteka	Photo Exhibition in Laubere Library	**1**
124	March 6	http://www.fakti.lv/	„Purvu noslepumi” Lauberes pagasta biblioteka	Photo Exhibition in Laubere Library	**0**
125	March 6	http://www.draugiem.lv/	„Purvu noslepumi” Lauberes pagasta biblioteka	Photo Exhibition in Laubere Library	**1**

No.	Date	Internet portal or news agency	Title	Summary	Photos
126	March 6	http://www.latvijascentrs.lv/lv/	„Purvu noslepumi" Lauberes pagasta biblioteka	Photo Exhibition in Laubere Library	**0**
127	March 6	http://www.ogre24.lv/	„Purvu noslepumi" Lauberes pagasta biblioteka	Photo Exhibition in Laubere Library	**1**
128	April 4	http://www.radio1.lv/	Slates biblioteka var ielukoties Latvijas purvu noslepumos	Photo Exhibition in Slate Library	**1**
129	April 9	http://www.jvestnesis.lv/	Sabiedriba: „Purvu noslepumi" biblioteka	Photo Exhibition in Slate Library	**1**
130	May 13	http://www.salasnovads.lv/	Salas biblioteka izstade „Purvu noslepumi"	Photo Exhibition in Sala Library	**2**
131	May 17	http://www.lu.lv/	Prezentes filmu par purviem Latvija	Presentation of the Project documentary	**1**
132	May 16	http://www.botanika.lu.lv/	Filmas „Purvu noslepumi" pirmizrade	Presentation of the Project documentary	**1**
133	May 23	http://news.lv/	Salas biblioteka apskatama izstade „Purvu noslepumi"	Photo Exhibition in Sala Library	**0**
134	June 11	http://www.botanika.lu.lv/	Fotoizstade „Purvu noslepumi"	Photo Exhibition in Botanical Garden of the University of Latvia	**5**
135	June 13	http://www.draugiem.lv/	Fotoizstade „Purvu noslepumi"	Photo Exhibition in Botanical Garden of the University of Latvia	**0**
136	June 25	http://horti.lv/	Fotoizstade „Purvu noslepumi"	Photo Exhibition in Botanical Garden of the University of Latvia	**1**
137	June 26	http://www.cesis.lv/lv/	Cesu svetku 2013 programma	Presentation of the Project documentary in Rucka Estate during Cesis City Festival	**0**
138	September 18-22	http://www.matsalufilm.ee/	Awards of the Matsalu Film Festival 2013	Participation of the Project documentary „Mires Uncovered" in nature film festival in Matsalu, Estonia	**0**
139	October 19-26	http://www.cineecoseia.org/	Competição International Curtas-Metragens	Participation of the Project documentary „Mires Uncovered" in nature film festival in Portugal	**0**

* – only from year 2013 the print screens of internet portal home pages are included in the Final Report while for others it was added to Mid-term Report or Progress Report

Internet portals

117. Dundagas novads, 11.01.2013., Photo Exhibition in Dundaga Library

118. Dabas aizsardzības pārvalde, 14.01.2013., Photo Exhibition in Dundaga Library

119. e-novads, 11.01.2013., Photo Exhibition in Dundaga Library

120. mediji.lv, 11.01.2013., Photo Exhibition in Dundaga Library

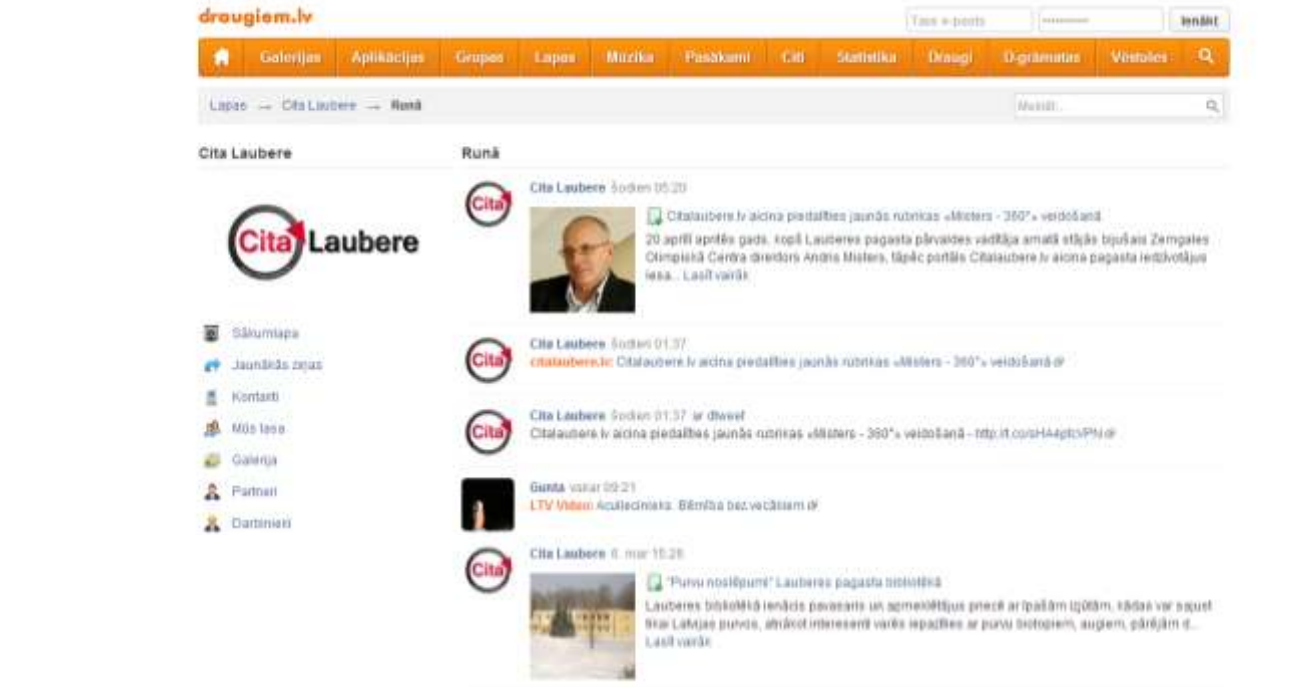
121. Tirai Latvijai, 16.01.2013., Photo Exhibition in Dundaga Library

122. Ogres novads, 06.03.2013., Photo Exhibition in Laubere Library

123. Cita Laubere, 06.03.2013., Photo Exhibition in Laubere Library

124. Ogres Fakti, 06.03.2013., Photo Exhibition in Laubere Library

125. draugiem.lv, 06.03.2013., Photo Exhibition in Laubere Library



126. Latvijas Centrs, 06.03.2013., Photo Exhibition in Laubere Library

127. Ogre24.lv, 06.03.2013., Photo Exhibition in Laubere Library

128. radio1.lv, 04.04.2013., Photo Exhibition in Slate Library

radio1.lv
Jēkabpils ziņu portāls

Šodien vārda dienu svin: Dana, Dans, Danute, Edgars

2013. gada 8. aprīlis

Tiešraide

Slates bibliotēkā var ielūkoties Latvijas purvu noslēpumos

Informācijas avots: Māra Grīnberga

Aiz loga vēl jūtama ziemas klātbūtne, bet Slates bibliotēkā ir ienācis pavasaris un apmeklētājus priecē ar īpašām izjūtām, kādas var sajust tikai Latvijas purvos, jo no 3.aprīļa līdz 3.maijam bibliotēkā ir skatāma foto izstāde „Purvu noslēpumi", kuru sagatavoja Ogres foto klubs. Pavasarīgo noskaņu vēl papildina izstādē skanošās dzidrās putnu balsis.

Izstāde ir viens no Latvijas Universitātes īstenotā projekta "Augstā purva biotopu atjaunošana īpaši aizsargājamās dabas teritorijās Latvijā" pasākumiem, kura mērķis ir vērst sabiedrības uzmanību bīstamajai tendencei - purvu nosusināšanai.

Tā, piemēram, Rīgas teritorijā esošais Cenas tīrelis un Melnā ezera purva dabas liegums, kurš pēc būtības ir Cenas tīreļa sastāvdaļa, kurš bija viens no lielākajiem purviem Latvijā, bet tagad saglabājusies tikai nelela daļa (no agrākajiem 10 000 ha, tagad tikai nedaudz vairāk par 2000 ha). Purvs reiz aizņēmis vairāk nekā četras reizes lielāku teritoriju kā šobrīd. Tagad nosusinātā purva vietā slejas privātmāju rajoni.

"Mums jābūt lepniem par šo īpašo dabas bagātību, jo citviet Eiropā purvi jau pilnībā izzuduši, bet par Latvijas purviem atskanējis trauksmes zvans, tādēļ jādara viss, lai tos saglabātu", situāciju skaidro projekta vadītāja Dr.biol. Māra Pakalne.

Pats svarīgākais panākt, lai purvu gruntsūdeņu līmenis nesamazinātos, lai purvi neizžūtu un tiktu saglabāta flora un fauna, kas raksturīga purviem.

Projekta īstenošanai atbalstu sniegusi Eiropas Komisijas LIFE+ programma, sedzot 75% no projekta izdevumiem, bez SIA "Rīgas meži" atbalsta projekts nebūtu ticis īstenots, par to sakām milzīgu paldies uzņēmuma vadībai, saka Dr.biol.Māra Pakalne.

Jēkabpils apkaimē lielākie purvi ir Gargrodes purvs, kā arī Teiču rezervāts ar tajā ietērpstošo Siksalu, kas uzskatāma par unikālu dabas teritoriju.

Informāciju sagatavoja Māra Grīnberga

JAUNĀKĀS ZIŅAS

BK "Jēkabpils" piekāpjas līderiem - "VEF Rīga" komandai

Sikarbā un patiesā vēsture jāraksta mums visiem kopā!

Visas biļetes uz Dziesmu svētku noslēguma koncertu jau pārdotas, turpina tirgot citas biļetes

LASĪTĀKĀS ZIŅAS

Smago autovadītāju izrraisījis "Scania" vadītājs, kurš pats gājis bojā

Apkopotas kružu kuģu pasažieru smiekligākās sūdzības

Jēkabpiliete Aija Rogāle gūst panākumus Eiropas čempionātā Spānijā!

AUDIO ZIŅAS

Valsts prezidents - jautājumu krustugunīs

Krustpils novada skolu direktori: "Kam atkal vajadzīga šī biezputra?"

Kā norītēja Jēkabpils reģionālās partijas dibināšanas pasākums?

Rīga aptur darbību Latvijas Pašvaldību savienībā (AUDIO)

Iedzīvotājiem jāizlemj, kā kursēs maršruts uz Radžu ūdensiekārtuves peldvietu un slēpošanas kalnu?

JAUNĀKIE KOMENTĀRI

Pasveicini savējos!
Sveiciens Edgaram Grauzam no Jēkabpils Varda dienā! Novēlam stipru veselību un vēl visu to labāko.

Ierēķumi nedaudz pieauguši, parādi - mazliet samazinājušies
Nesaprotu,kā viens cilvēks var apvienot darbu tik daudzās darba vietās,kā vēļ tiek galā?

Autovadītāji visvairāk grēko, pārsniedzot ātrumu
Neko sev.. Manti lepni palikuši, 400 ls ??? Tur jau kādi zemūdens akmeņi noteikti arī bija..

Var nozagt ordeni, bet nav iespējams nozagt godu
traki... cerams policija nokļers un vēl...raikstā jāizlabo pareizrakstības kļūdas

Sanda Mālniece: Reklāmas baneris šķēršām ceļam – īpašs bonuss Jēkabpils sportistiem
Sports ir svarīga sabiedrības veselības sastāvdaļa, un par basketbolu nav nemaz tik daudz ...

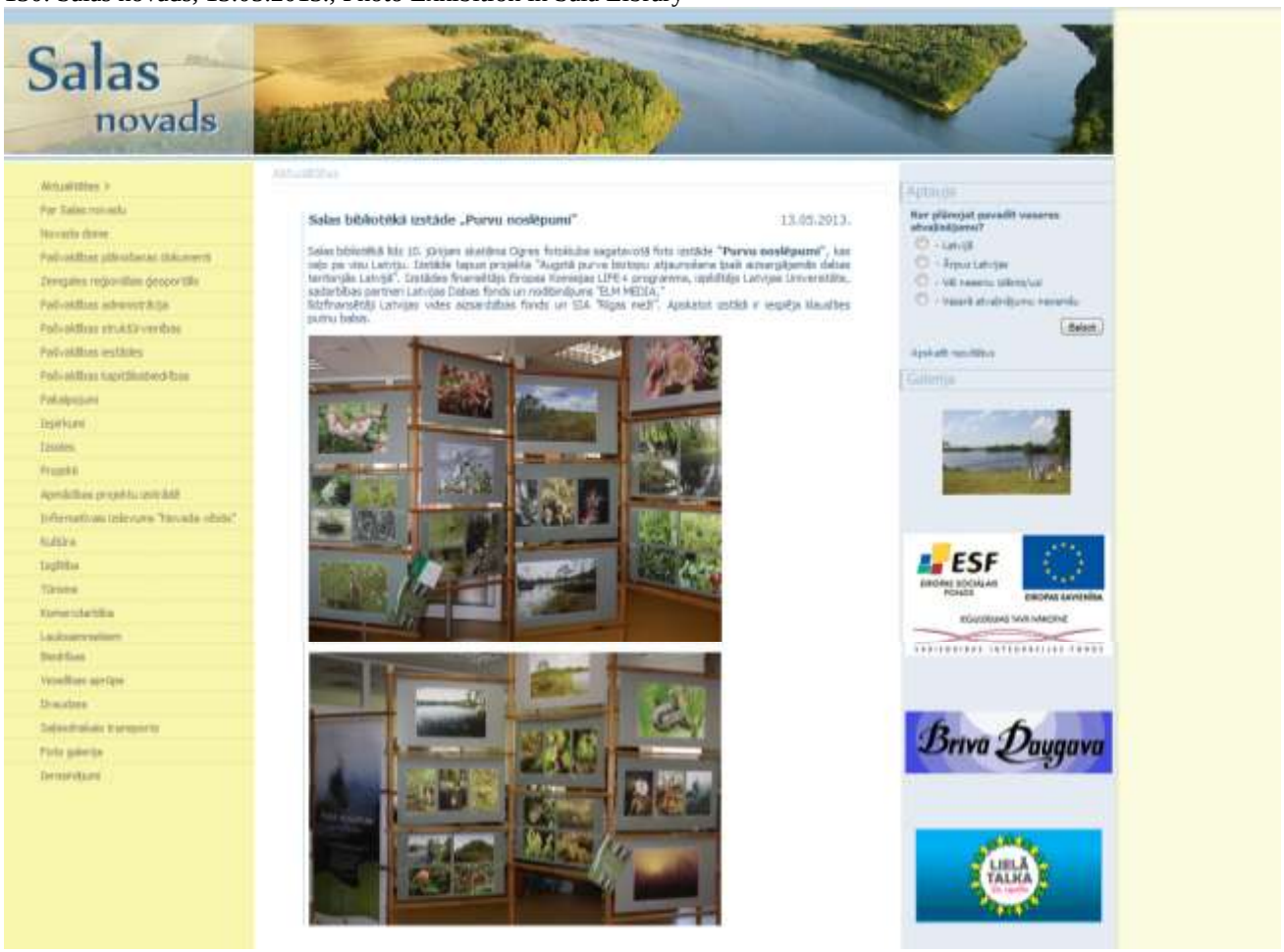
NOSKATIES

TIEŠRAIDE

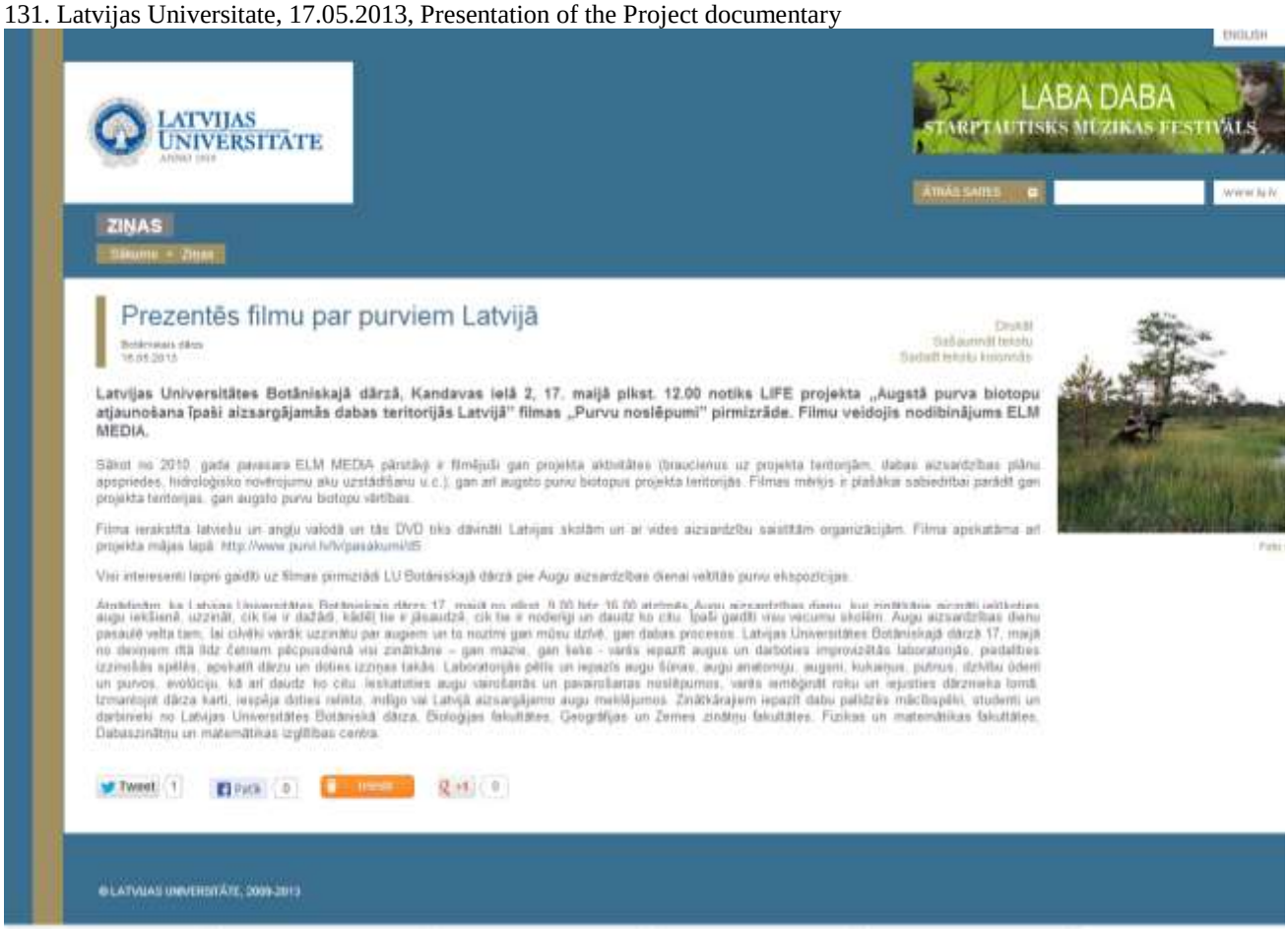
radio1 on

129. Jaunais Vestnesis, 09.04.2013., Photo Exhibition in Slate Library

130. Salas novads, 13.05.2013., Photo Exhibition in Sala Library



131. Latvijas Universitate, 17.05.2013, Presentation of the Project documentary



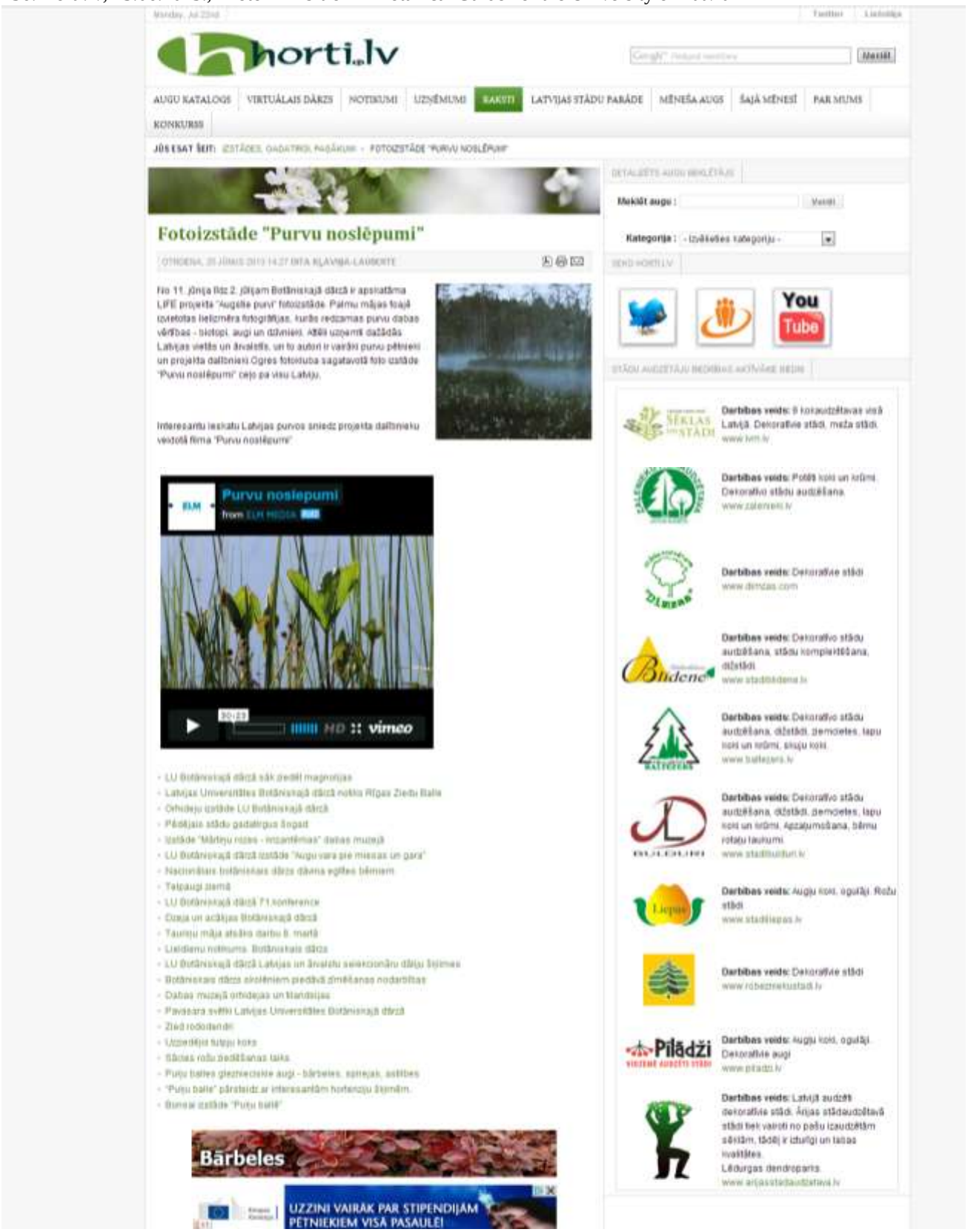
132. LU Botaniskais darzs, 16.05.2013., Presentation of the Project documentary

133. news.lv, 23.05.2013., Photo Exhibition in Sala Library

134. LU Botaniskais darzs, 11.06.2013., Photo Exhibition in Botanical Garden of the University of Latvia

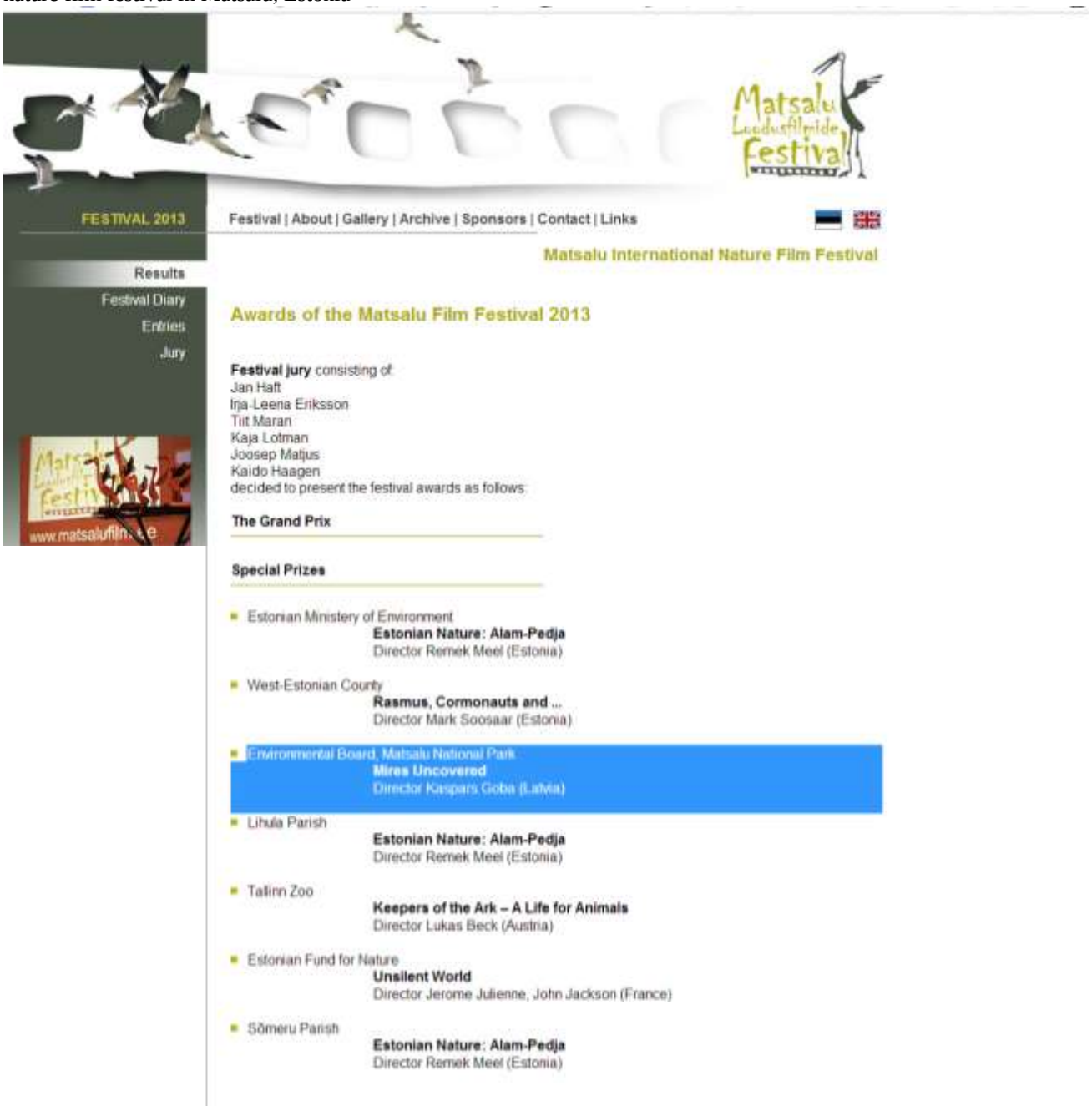
135. draugiem.lv, 13.06.2013., Photo Exhibition in Botanical Garden of the University of Latvia

136. Horti.lv, 25.06.2013., Photo Exhibition in Botanical Garden of the University of Latvia



137. Cesis, 26.06.2013., Presentation of the Project documentary in Rucka Estate during Cesis City Festival

138. Matsalu loodusfilmide festivali 18.-22.09.2013., Participation of the Project documentary „Mires Uncovered" in nature film festival in Matsalu, Estonia



139. Cine Eco, 19.-26.10.2013., Participation of the Project documentary „Mires Uncovered" in nature film festival in Portugal