



LIFE Project Number

LIFE12 NAT/LT/001186

FINAL Report

Covering the project activities from 31/07/2013 to 30/11/2017

Reporting Date

<08/10/2018>

LIFE+ PROJECT NAME or Acronym

Demonstrative restoration of the Tyruliai bog as a part of the initiative of the re-wetting of Lithuanian peatlands (acronym: *Tyruliai – Life*)

Project Data

Project location	Lithuania, Siauliai county, Tyruliai
Project start date:	31/07/2013
Project end date:	31/08/2017 Extension date: 30/11/2017
Total Project duration (in months)	52 months (including Extension of 3 months)
Total budget	1,250,907 €
Total eligible budget	1,222,937 €
EU contribution:	733,762 €
(%) of total costs	58,66
(%) of eligible costs	60

Beneficiary Data

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1. List of key-words and abbreviations

AB – Associated beneficiary

BC – budget category

Commission – European Commission

CB – coordinating beneficiary

Didysis tyrulis – Joint stock company UAB “Didysis tyrulis”, associated beneficiary

GA – grant agreement

LOD – Lietuvos ornitologu draugija (Lithuanian Ornithological Society), coordinating beneficiary

MoE – Ministry of Environment of the Republic of Lithuania

Project – project “Demonstrative restoration of the Tyruliai bog as a part of the initiative of the re-wetting of Lithuanian peatlands”, LIFE12 NAT/LT/001186

PSC – Project Steering Committee

SPA – Special Protected Area

SSPA – State Service for Protected Areas

2. Executive Summary

The main project objective was to ensure the favourable conservation status of the priority bird species – Bittern* (*Botaurus stellaris*), which breed exceptionally in the dense reed stands flooding with water, as well as another breeding bird species – Spotted Crake (*Porzana porzana*), which prefer open fens with domination of sedge grasses, although could inhabit reed stands as well. The third trigger bird species of the project site was migratory Common Crane (*Grus grus*), which use open wet areas of the site for staging. Also, based on the final bird monitoring report data, the LOD proposed to the Ministry of Environment of the Republic of Lithuania (MoE) to add three new trigger bird species for the Tyruliai SPA – Whooper swan (*Cygnus cygnus*), Little crane (*Porzana parva*) and Grey-headed woodpecker (*Picus canus*). Adding of last three bird species as trigger species of the project was discussed in the request for the modification of the project (approved by the Commission on 19 July 2017). The proposal was approved by Project Steering Committee (PSC) during the last its meeting. The official proposal was sent by the coordinating beneficiary (CB) to the competent authority – State Service for Protected Areas (SSPA) – for the endorsement of the proposal.

The project actions were related to restoration of formerly open wet areas, which are important for waterbirds, focus re-wetting of still dry destroyed peatland areas and protection of peatbog ecosystem itself. The concrete conservation actions were related to the restoration of open sedge-grass communities and supporting their maintenance, improvement of the conditions for birds in different type of the reed stands as well as fire prevention in order to protect whole bog ecosystem from possible large-scale fire negative impact on whole Tyruliai ecosystem.

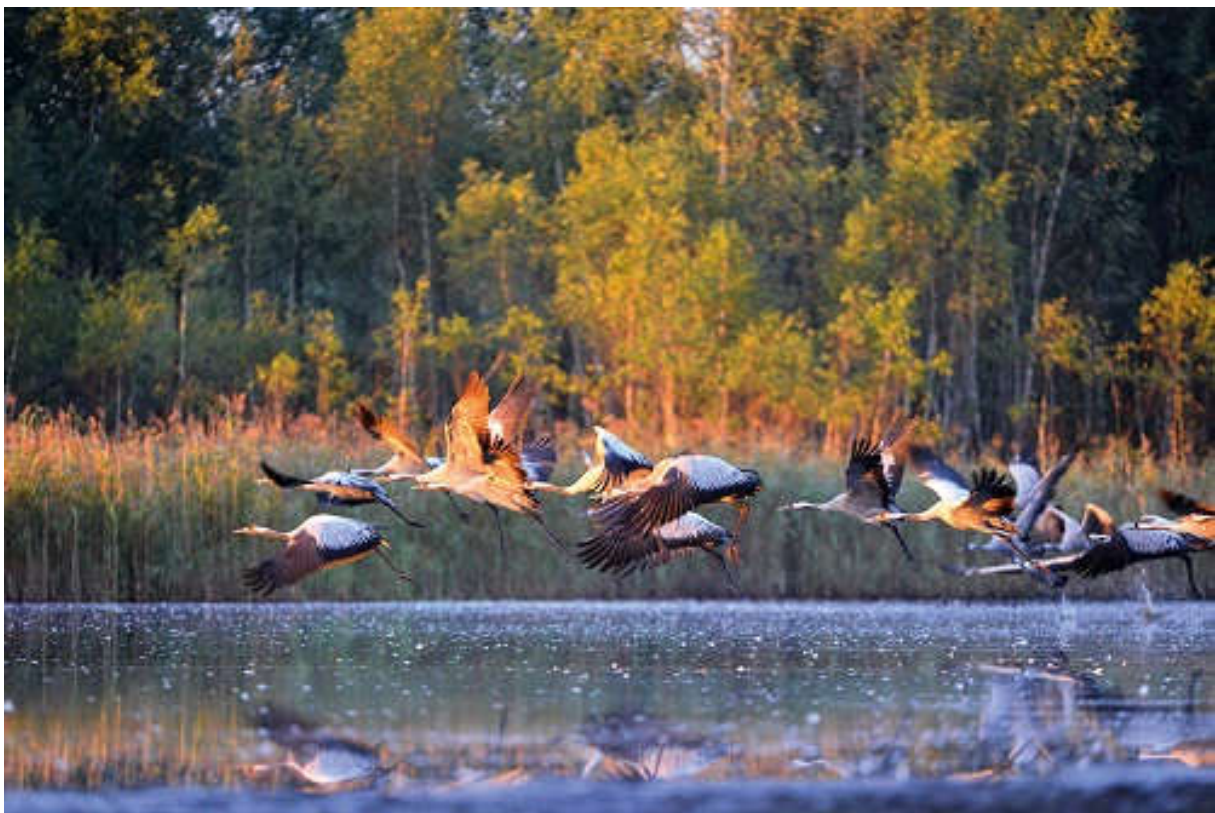


Photo: Flying cranes in the Tyruliai bog

The project was planning to re-wet more than 500 ha of dry peat basing on the prepared technical project. The only preparatory action of the project (A.1) aimed to develop technical project on the restoration of the hydrological regime of the Tyruliai bog (i.e. re-wetting of the rather dry peat areas). The technical project was prepared and approved on 23/10/2015 instead of planned 31/07/2014 due to contradictions between nature conservation and forestry management issues in the responsible institutions.

To rewet area of the Tyruliai wetland it was planned to construct 30 dams from local materials (Action C.1). While more dams were constructed by the end of the project: 37 dams were needed following initial technical project, and 16 additional dams were constructed to reach better effect of the activity after the modification of the project was approved by the Commission. In total 53 dams were constructed by the project. Also, in total 27 (22+9) out of constructed dams were reinforced by plastic sheets to prevent leaking of water through the dams.



Photo: A dam from local materials was reinforced with plastic sheets

To improve ecosystems, woody and other vegetation growing on the dry peat were cut in the area of 278 ha (250 ha planned in the application, 30 ha amended by project modification) during the activity C.2. Capacity of more than 200 ha reed stands growing in the flooded ponds was increased by the extermination of 4 metres width belts in at least 32 ha area (activity C.3): 20 ha were planned in the application, 25 ha of flooded reed stands were cut before the requested project modification, and additional 7 ha after approval of the modification.

Bushes and other vegetation growing on the over-flooded places cut in the area of 200 ha for two time in subsequent winter seasons (action C.4) as planned in the grant agreement (GA). The implementation of the activity was complicated by extremely mild winters, which were subsequent for several years, so the machinery could enter wet wetland areas only for the very short time of frost. Nevertheless, to overcome this problem a specialised machinery was hired,

and entire activity was fully completed, and by the spring of 2017 204 ha of flooded wetland areas was managed.

In the application it was planned, that the reed stands will be cut twice (in two subsequent vegetation seasons) in 100 ha of the former open wet areas of the bog. While in total 113 ha of the wetland area were managed. Also, aiming to achieve better nature conservation effect in the project modification it was decided that all 113 ha will be managed once more by the third time in the last year of the project (2017). The action was fully implemented by the end of the project (30/11/2017).

Blocking of the local roads aimed to reduce disturbance of birds (Action C.7), thus four road barriers were set-up the way as it was planned in the project application, already by 30/09/2014. To improve effectiveness of the fire prevention it was planned to improve quality of 8,5 km of local road, while taking into account poor condition of the road in total 9,6 km of the road were improved, and latter maintained during the entire project.

Monitoring actions (D.1 and D.2) are related to the Ex-ante and Ex-post monitoring scheme and evaluation of impact of socio-economic conditions and ecosystem changes. With an extension of the project duration both activities were extended until the end of the project (30/11/2017). The first activity was related to elaboration and implementation of the monitoring schemes for birds and habitats/vegetation. Both schemes were used for monitoring of targeted bird species and habitats on the designated management plots of the project area in 2013–2017. An interactive ArcGIS Online map on monitoring data is publicly available on website since summer of 2014. Reports on birds monitoring and habitat monitoring in 2014, 2015, 2016 and 2017 were prepared and latter approved by the PSC. These reports and monitoring schemes are available on the project website. The birds monitoring data showed that total Bittern* population significantly increased from 20 territory males in 2014 to 33 in 2017. The number of other trigger species of the Tyruliai bog SPA – Spotted Crake reached 13 territorial males in 2017 from 12 in 2014, thus slight increase is observed during project implementation period. The number of staging migratory cranes regularly exceeded 1000 individuals and fluctuated from 1400 to 2000 in different years (depending on the conditions in the neighbouring agricultural lands, which is used for feeding by the staging cranes) of the project implementation period in 2014-2017. Besides, quite numerous populations of the Little Crake, Whooper Swan and Grey-headed Woodpecker, which are species of the EU importance, were discovered and these species were proposed for responsible nature conservation authorities to be nominated as trigger species of the Tyruliai bog SPA. While breeding populations of 6 calling males of Little Crake and 3 pairs of Whooper Swan were identified in 2014, 14 calling males of Little Crake and 6-7 pairs of Whooper Swan were counted in 2017. This data showed significant increase of the breeding population of those species, which also significantly exceed the threshold of the SPA designation criteria (3 pairs for both species). The number of the species increased significantly during the project implementation period as a result of the implementation of the practical conservation measures. In additional, high number of the breeding Grey-headed Woodpecker (12 pairs) was detected during implementation of the action D.1 and also is significantly higher than the SPA designation threshold (8 pairs). Both those species also reach SPA designation threshold, thus, project proposed to include them into the list of the trigger species of the Tyruliai bog SPA.



Photo: Population of Little Crane increased significantly since the project start

The first ecosystem services report was prepared by 29/01/2015. From the general list of 30 ecosystem services, important for peatland ecosystems in Lithuania 18 priority ecosystem services of Tyruliai wetland were selected for further assessment. Set of 45 indicators was proposed for the monitoring of the ecosystem services' quality and use intensity in the project area. The benefit transfer method allowed to predict possible preliminary lower limit of economic value of the project areas' ecosystem services potential after the successful implementation of the project activities – it could start from at least 0.9–1.7 million Euros annually. The second and third reports (covering years 2016 and 2017) as well as final report on the ecosystem services were prepared, presented to the PSC and approved during its meetings.

A number of awareness raising activities were implemented to ensure wide dissemination of knowledge and experience on restoration of the boggy habitats and, at the same time, ensuring favourable conservation status of the protected bird species. The project maintained its website at <http://www.tyruliai-life.lt/>, published and distributed two leaflets (500 copies each, 1 000 in total), brochure about Tyruliai wetland (500 copies), and five wall calendars (350 copies each year, including additional for 2018 after the modification of the project). Also, the project had produced and distributed a Layman's report (400 copies). Production of the film about the natural values of the Tyruliai bog and project achievements started in 2014 and was completed by 11/01/2016. 500 copies of DVD were produced and were distributed. The film was also broadcasted for six times in national and regional TV channels. Also, announcement of the movie was created and broadcasted for six times on "Siauliu TV" channel. Five notice boards together with visitor infrastructure (two observation towers) were set up. This

infrastructure also supported achievement of the conservation objectives and had contributed to the rising of the public awareness on the project actions.

The project disseminated its achievements to the wider audience of stakeholders in its conference organised in May 2017 in Tyruliai. The project team also had actively communicated with the local community, and organised 10 events for it, so that the local people would get better acquainted with the project activities and nature conservation issues.

Environmental benefit is related with implementation of these measures improved capacity of the habitats, which are important for the protected bird species and expand the area of effective and targeted protection across large area/part of the Tyruliai bog SPA thus ensuring the wider distribution with favourable breeding conditions for the species and using whole habitat capacity of the site. Implementation of these conservation measures in Tyruliai bog was very timely, since wood vegetation and reed stands had occupied quite large areas of formerly open habitats already, which may have led to rapid deterioration of breeding conditions for targeted bird species of the SPA if no measures to prevent this were taken. Therefore, species-based conservation measures supported conservation status of the species through the restoration of their important habitats as well as the vanishing in the country open bog habitats including habitats of the EU Importance.

Implemented practical conservation measures ensured long-term benefits and sustainability of this Natura 2000 site. Regarding the long-term objectives for managing wet sedge habitat, woody vegetation in case of such habitat are growing very slowly. Current situation in the bog areas with low sedge vegetation is a result of the natural succession for at least 30 years. It means that single bushes and/or trees or scares stands started growing before the formation of the sedge layer or later. It means that after extermination of the growing woody vegetation, open boggy habitats with sedge communities should be formed for several decades. Regarding the reeds, their stands are quite scares at the moment in sedge bog areas, because of sedge predomination. However, because of accumulation of old dead reed, their stands are getting denser every year. Thus, we removed both growing and old reed stands (Action C.4, C.5) and repeated this action twice in right time (late summer for action C.5). This should determine the atrophy of reed stands. At the same time, sedge will be in better conditions (no competition and overshadow with reed) and will overrun reed during coming years. Now, our long-term objective is to manage properly former open bog areas in order to restore sedge habitat and leave it for natural regeneration. According to our evaluation, rather open area will exist for twenty upcoming years. However, supporting measures also must be implemented during mentioned period in order to support natural regeneration process of the open marsh habitats. The only manager of the state-owned forest land (Tyruliai bog area also belongs to this category of the land) – is the State Enterprise “Valstybinių miškų urėdija” – is obliged by the Lithuanian Government to ensure supportive management of the restored bog open habitats as well as for further maintenance of the reconstructed road in the future. While the Tytuvėnai Regional Park Directorate will be responsible for the monitoring of the protected birds’ species as well as maintenance of the installed infrastructure for visitors in the Tyruliai bog SPA. State Enterprise “Valstybinių miškų urėdija” has to organise proper management of the project site on the own budget, while the Tytuvėnai Regional Park Directorate, usually, getting funds from the state budget or the EU Cohesion Fund.

Long-term qualitative economic and social benefits were assessed during implementation of

the project Action D.2 by applying innovative approach to estimating and valuing ecosystem services, prepared for the European Commission (document “A synthesis of approaches that assess and value ecosystem services in the EU in the context of the TEEB”) and Mapping and Assessment of Ecosystems and Their Services (Technical Report - 2014 - 080) adapted to the scale of Tyruliai bog, time constraints and budget limitation. The conclusions and findings are presented in the Final report of the ecosystems’ services evaluation. The Final report of the ecosystems’ services evaluation is uploaded in the project website.

Proper management of the reed stands growing in the shallow water, i.e. underwater cutting of the belts in the reed stands, is a very **innovative** action for the areas, which are important for the conservation of breeding Bittern and various species of crakes (Spotted, Little crakes, Water Rail) as well as other waterbirds species. Although this conservation measure was based on proved data of special scientific research in some lakes of Lithuania, results of such research had never been applied in conservation practice in the country on wider extent, and only some limited practical attempts were done in a few aquaculture ponds for short-term period. Having in mind that the collected birds’ monitoring data (monitoring of the abundance of the trigger as well as potential trigger birds’ species in Tyruliai bog SPA) have proved the effectiveness of the application of such practical bird conservation measure, it might be replicated in other SPAs, at least the ones that are designated for protection of Whooper Swan, Bittern, Spotted and Little crakes. Another important point is that described measure (Action C.3) does not have negative impact on other sectors, such as fishery, recreation, hunting and others, and sometimes even makes it positive. Thus, cutting of belts in the reed stands might be implemented everywhere if it is important for bird protection avoiding potential conflicts with land managers and users. This is also rather cost-effective measure for protection of certain species, because it does not require preparation of special planning documents, large manpower resources and make rather low disturbance impact on birds, thus can be implemented immediately after bird breeding season, although the local birds are still in the managed area. This is why the implementation of Action C.3 on the Tyruliai bog has high **demonstration** value and will be available for replication in other sites of Lithuania or other countries that encounter similar problems.

As the project targeted conservation of three bird species – Bittern, Spotted Crake and Common Crane as well as newly proposed trigger species – Little Crake, Whooper Swan and Grey-headed Woodpecker, their abundance and distribution of local populations in Tyruliai bog are the main indicators, which clearly illustrate their conservation status in this SPA. This can be assessed during regular monitoring of the trigger bird species of Tyruliai bog SPA in the future as it is planned in the National Environmental Monitoring scheme. Bird monitoring data of the first project year (2014) will be baseline information for further evaluation of the species conservation status.

Evaluation of the effectiveness of the project actions compared to the initial situation on the ecosystem services, assessment of the socio-economic impact of the project actions, and in addition, project actions’ impact on the ecosystem functions restoration is also an **innovative** practice for Lithuania. The last issue is of high importance because Tyruliai bog restoration activities are implemented in the largest destroyed bog ecosystem in Lithuania, which was destroyed because of long lasting (almost for fifty years) peat excavation.

Both beneficiaries carried the project management and administration. In total during entire project 12 persons were hired by LOD, and 9 persons by Didysis tyrulis. In addition to the project staff responsible for the implementation of the project activities, the Project Steering Committee (PSC) was formed. It had general advisory role for the project, and also was approving annual and final reports of project activities monitoring, botanical and ornithological monitoring, and ecosystems services evaluation. In total there were five PSC meetings. The PSC members were representatives of both beneficiaries, State Services of Protected Areas, Tytuvėnai Regional Park, Šiauliai State Forest Enterprise, Tytuvėnai State Forest Enterprise, Tyruliai elderly under Municipality of Radviliskis, MoE.

There was one amendment of the project Grant Agreement (dated by 24/07/2017). The main changes of the project were related to 1) prolongation of the project implementation for three months, till 30/11/2017, and 2) modification of the project budget due to the increased level of co-financing of the MoE, and re-allocation of the expenditures among budget categories due to the redistribution of the responsibilities for the implementation of the activities among beneficiaries.

The communication with the Commission and the Monitoring Team was based on the e-mail correspondence, official letters, monitoring visits, visits of the representatives of the Commission, kick-off meeting as well as presentation and comments on the official reports by the monitoring team and the Commission. Since the beginning the project had submitted Inception report, dated 31/05/2014, Mid-term report, dated 15/12/2015, and Progress report, dated 13/02/2017.

The partnership agreement between coordinating beneficiary and associated beneficiary was signed on 26/08/2014, and its content followed all the components required in the “guidelines to partnership agreements”. Transactions of the project grant were done by LOD to Didysis tyrulis according to the partnership agreement.

Both project beneficiaries had established analytical accounting system and used accounting IT programmes for the registry and traceability of the expenditures and income. Both beneficiaries were not eligible to refund VAT from goods and services that were purchased for the needs of the project. Also both of organisations are non-contracting authorities according to the national law of the public procurement, and purchased goods and services for the project following requirements set up by the “Description of the order of implementation and supervision of the purchasing of the legal persons that are not public tendering bodies according to the public procurement Law of the Republic of Lithuania” that was approved by the order of the Minister of Environment of 14 September 2010, No. D1-762.

The project has reported 1 147 258,76 Eur of its total expenditures, which makes 91,71% of total costs planned in the project application. More expenditures than planned in the budget after project modification were used in the budget category of External assistance – 101,23%, while under other budget categories the project had savings. The final project audit report stated, that the project financial report is in compliance with the LIFE+ Programme Common Provisions, the national legislation and accounting rules.

3. Introduction

The main project objective was to ensure the favourable conservation status of three priority bird species: Bittern* (*Botaurus stellaris*), which breeds exceptionally in dense reed stands flooded by water, Spotted Crake (*Porzana porzana*), breeding species, which prefers open fens with domination of sedge grasses, although could inhabit in reed stands as well, and migratory Common Crane (*Grus grus*), which uses open wet areas of the site for staging.

Conservation of the mentioned species was achieved through the reached specific objectives:

- To improve the habitats condition and increase their capacity;
- To restore the hydrological regime on the open areas of the Natura 2000 site;
- To support the natural succession of the sedge-grass communities;
- To reduce the bird disturbance;
- To maintain the fire prevention scheme;
- To raise public awareness on possibilities to restore destroyed bogs.

The project area covers whole territory of the Tyruliai bog SPA designated in 2004. Its' surface area is 3,699 ha. SPA covers seriously damaged peat bog used for peat extraction, but currently being under re-naturalization process. Currently used peat extraction near-by Natura 2000 site does not prevent the conservation status and objectives of the SPA. The area, which was used for peat extraction twenty and more years ago, was completely destroyed: vegetation layer was removed by leaving pure peat soil surface, which, in its turn, had no natural value at all. All exploited parts of the bog, which are plan to restore by the project, been used for peat excavation in the Soviet times by Soviet State Company.

The area was selected as important breeding site of several bird species of the EU Importance as well as staging place of the migratory Common Crane, which also meet Ramsar site criteria. The main expectation is related with increasing of the breeding population of the Bittern* (at least 20 pairs) and Spotted Crake (up to 30 males) as well as staging cranes (exceeding 1000 birds). However, **habitats of the Tyruliai bog** still are in dynamic stage and their management is essential. Besides, only part of the bog is under the process of re-naturalization, while significant part of the area is still too dry and hydrological regime should be restored. Huge areas of the reed stands which have support an important part of the Bittern* population, currently became too dense and too dry, thus their restoration also was one of the priority works. Tyruliai bog currently is designated for the protection of three bird species.

The project was planning to manage the open (now or earlier) places, which are important for wetland birds. This is why project actions were related to restoration of formerly open wet areas or focused on re-wetting of still dry destroyed peatland areas or to protection of peatbog ecosystem itself. The concrete conservation actions were related to restoration of open sedge-grass communities, improvement of the conditions for birds in different type of the reed stands as well as fire prevention in order to protect whole bog ecosystem from possible large scale negative impact.

Thus, **project results are related to** implemented habitat management measures:

- re-wetted more than 500 ha of dry peat basing on the prepared technical project;
- improved capacity of at least 200 ha of former open sedge-grass areas and more than 100 ha dense reed stands overgrowing wet peatland areas;
- increased capacity of more than 200 ha reed stands growing in the flooded ponds by the fragmentary extermination of reed at least 20 ha area;
- closure of car traffic on the large area (some thousand ha) of the Reserve through the closer of the local roads;
- at the same time the quality of those roads in the length of at least 8,5 km is improved ensuring effective fire prevention means.

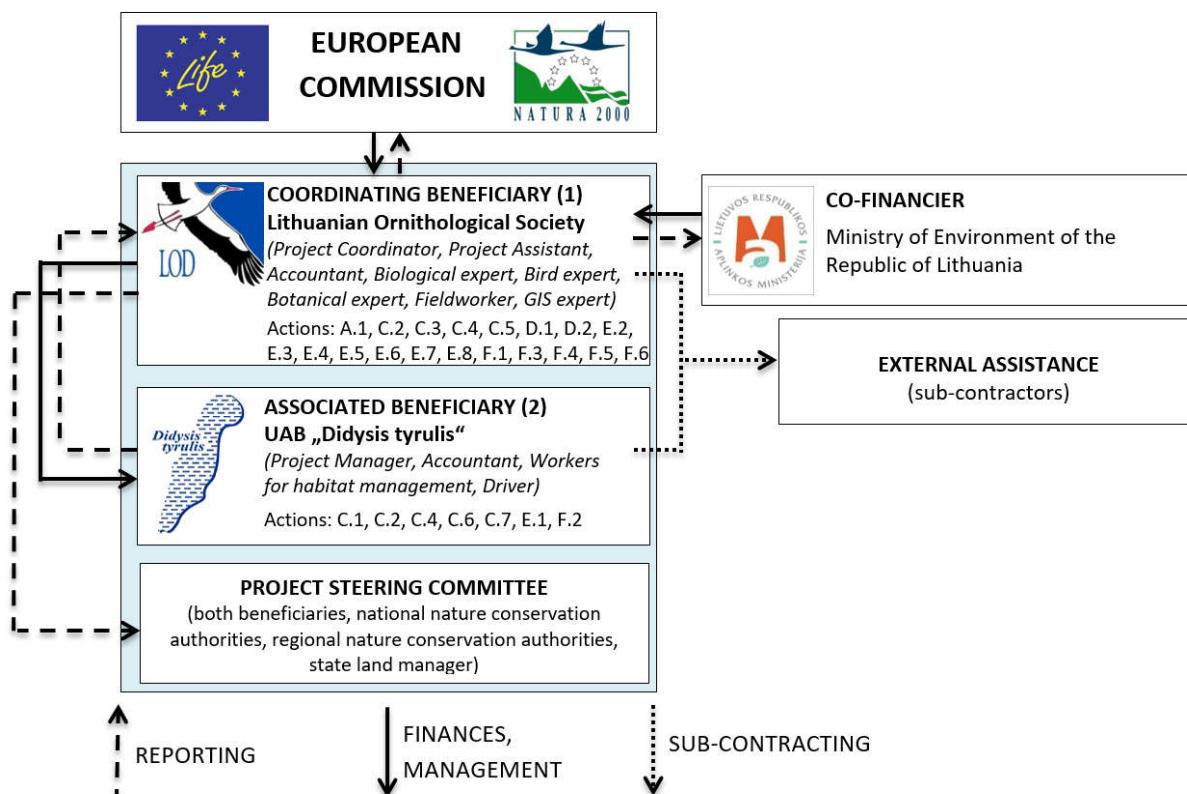
Awareness raising activities including maintenance of project website, printing of the publications, making of film about the natural values of the Tyruliai bog and project achievements, set-up of the notice boards, etc. were supporting achievement of the conservation objectives.

The important part of the project implementation actions was closely related to participation of local community of Tyruliai settlement and neighbouring villages. The project partner – associated beneficiary UAB “Didysis tyrulis” – is located in Tyruliai settlement and all employees of the company are local people. Because unemployment level is very high in Tyruliai settlement (because of outlying location), employment for several years period is very important from the economic and social point of view.

Regarding the **long-term objectives and expected results** of the project conservation actions on the Tyruliai bog, woody vegetation grows very slowly in peatland habitats. The situation before the project implementation in the bog areas with some areas with low sedge vegetation was a result of at least 30 years of natural succession. It means that single bushes and/or trees had started growing prior to the formation of the sedge layer or scapes and single ligneous plants are growing in pure peat layer only. It means that if we exterminate currently growing woody vegetation, we will get open sedge boggy habitats at least for several decades. Regarding the reeds, their stands were quite scarce at the project beginning in sedge bog areas, because of sedge predomination. However, reed stands were getting denser every year because of accumulation of old dead reed. Thus, our long-term objective was to manage properly former open bog areas in order to restore sedge habitat and leave it for natural regeneration. According to our evaluation, open area will exist at least for coming twenty years. However, substantive measures can be implemented also during mentioned period in order to support natural regeneration process. National financial mechanisms can be available for such rather small-scale management actions. Proper habitat conditions should determine the favourable conservation status of the trigger bird species of the project area. The main expectation is related to increasing of the breeding population of the Bittern* up to at least 20 pairs and Spotted Crake up to 30 males as well as staging cranes exceeding 1000 individuals in autumn.

4. Administrative part

The organigramme of the project team and the project management structure is presented below.



5. Technical part

5.1. Technical progress, per task

A. Preparatory actions

A.1 Preparation of the technical project for re-wetting of the dry peat areas of the Tyruliai bog

Action implementation dates:

Planned start date	Actual start date	Planned end date	Revised end date (Inception report)	Actual end date
30/09/2013	15/04/2014	31/07/2014	30/11/2014	23/10/2015 of the first approved draft and 28/11/2017

Current status of the action: completed.

Action completion was reported in Mid-term report. The technical project was updated and approved by the end of the project (28/11/2017) after the final implementation of the technical project.

Action related milestones and deliverables:

	Original deadline	Revised deadline	Implementation status
Deliverable			
Technical project for re-wetting of the dry peat areas of the Tyruliai bog approved by the nature conservation authorities	31/07/2014	30/11/2014	Technical project for re-wetting of the dry peat areas of the Tyruliai bog completed and officially approved by 23/10/2015. Later revised (updated) project was approved by 28/11/2017
Milestone			
The hydrological planning expert/company contracted	31/01/2014	31/07/2014	08/07/2014

According to the approved technical project, 32 dams could be constructed in Tyruliai wetland. Please note, that it was already more than planned at least 30 dams in the project application. Initially 30 dams were planned to be built within the project, however the hydrological situation in the project area had shown clear need on the construction of the additional dams in order to restore hydrological regime in at least 600 ha area. The obtained experience on the construction of the 32 dams was very important for the planning of the

location of the additional dams. The technical project was revised including technical supervision of its implementation and was finally approved on 28/11/2017. During the revision of the technical hydrological project, basing on the recommendations of the contracted hydrological expert, it was decided to increase the number of the installed dams from 9 to 20.

C. Concrete conservation actions

C.1 Re-wetting of the dry-peat areas of the Tyruliai bog

Action implementation dates:

Planned start date	Actual start date	Planned end date	Revised end date (Inception Report)	Revised end date (Progress Report)	Revised end date (Modification)	Actual end date
31/07/2014	30/09/2015	31/12/2015	30/06/2016	16/06/2017	30/11/2017	30/11/2017

Current status of the action: completed.

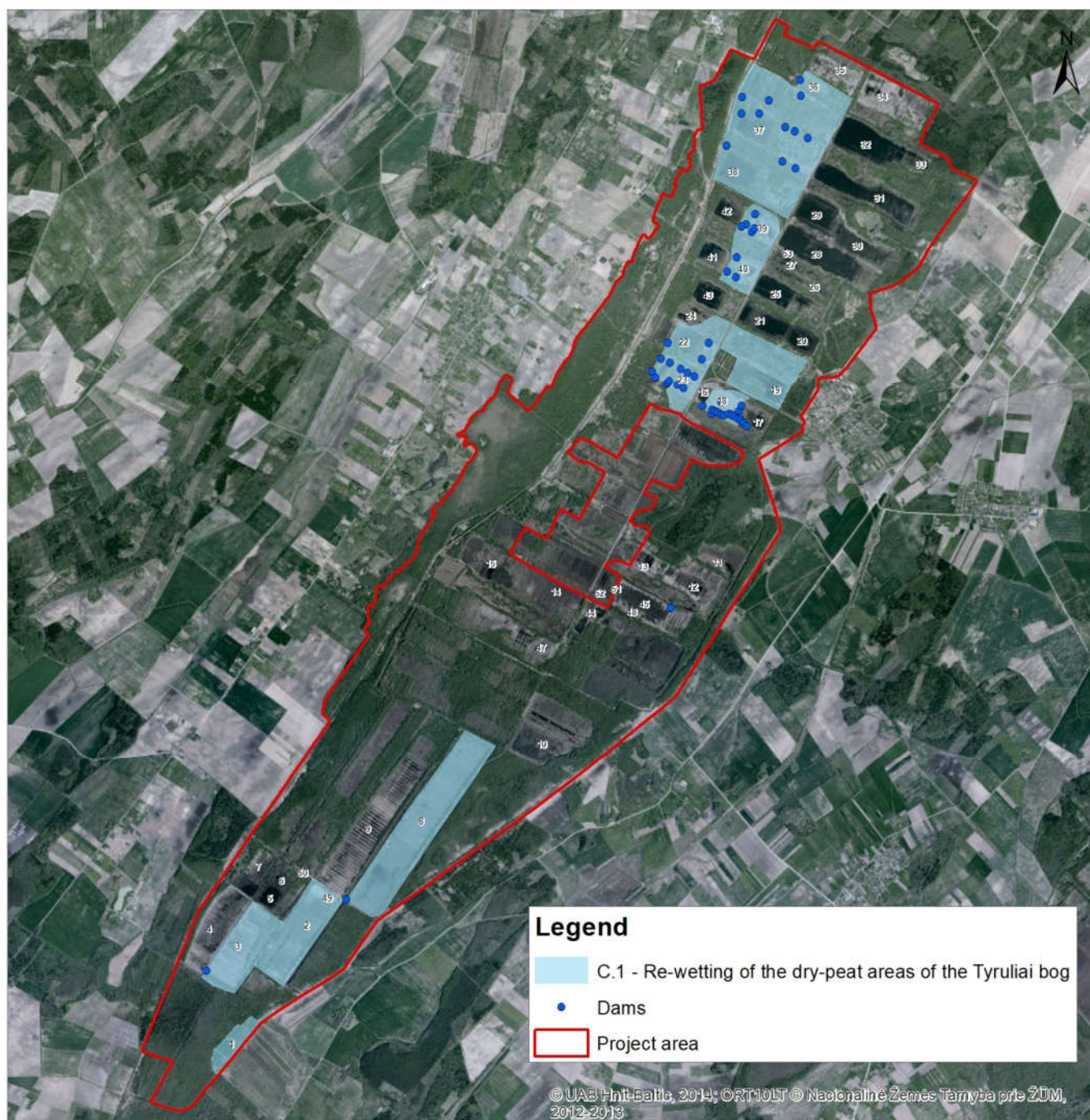
Action related milestones and deliverables:

Milestone	Original deadline	Revised deadline	Implementation status
30 woody dams with a peat layer between wood constructions built	31/12/2015	31/10/2017	30/11/2017 53 woody dams are built

Blocking of the drainage channels was planned to start after preparation and official approval of the technical project for re-wetting of the dry peat areas of the Tyruliai bog. In the project application it was planned, that not less than 30 dams will be installed. However, even having installed 32 dams by the spring 2017, in order to reach large-scale re-wetting effect of the formerly drained peatland area additional 9 dams were planned in the modification of the project. During the revision of the technical hydrological project, was decided to increase the number of the installed dams from 9 to 20. Finally, 21 dams were constructed until the end of the project prolongation period. Therefore, in total 53 dams were constructed during the project, which will allow to ensure more favourable hydrological regime in Tyruliai wetland. For the trial of the measure at first some amount of plastic pile sheets was purchased and tested for the enforcement of 6 dams. Following technical parameters of plastic pile sheets were selected: width – not more than 180 mm; thickness – at least 6 mm; height (profile) – not more than 70 mm; length – not less than 3 m. Thus, 57,12 m² of plastic pile sheets were purchased and applied. After the monitoring of water level of the constructed dams during spring–autumn 2016 period, project team decided to improve more 22 dams with plastic peeling sheets. Later, the most of the additional dams that were constructed already during the project extension, were enforced by plastic shields as well. In total 43 dams were enforced during the entire project period.



Photo: Drainage channels were blocked with artificial dam from local materials



C.2 Cutting of the wood and other vegetation in the dry peat areas

Action implementation dates:

Planned start date	Actual start date	Planned end date	Revised end date (Inception report)	Revised end date (Progress report)	Revised end date (modification)	Actual end date
30/09/2013	01/01/2014	31/03/2015	31/03/2016	31/03/2017	30/11/2017	30/11/2017

Current status of the action: completed.

Action related milestones and deliverables:

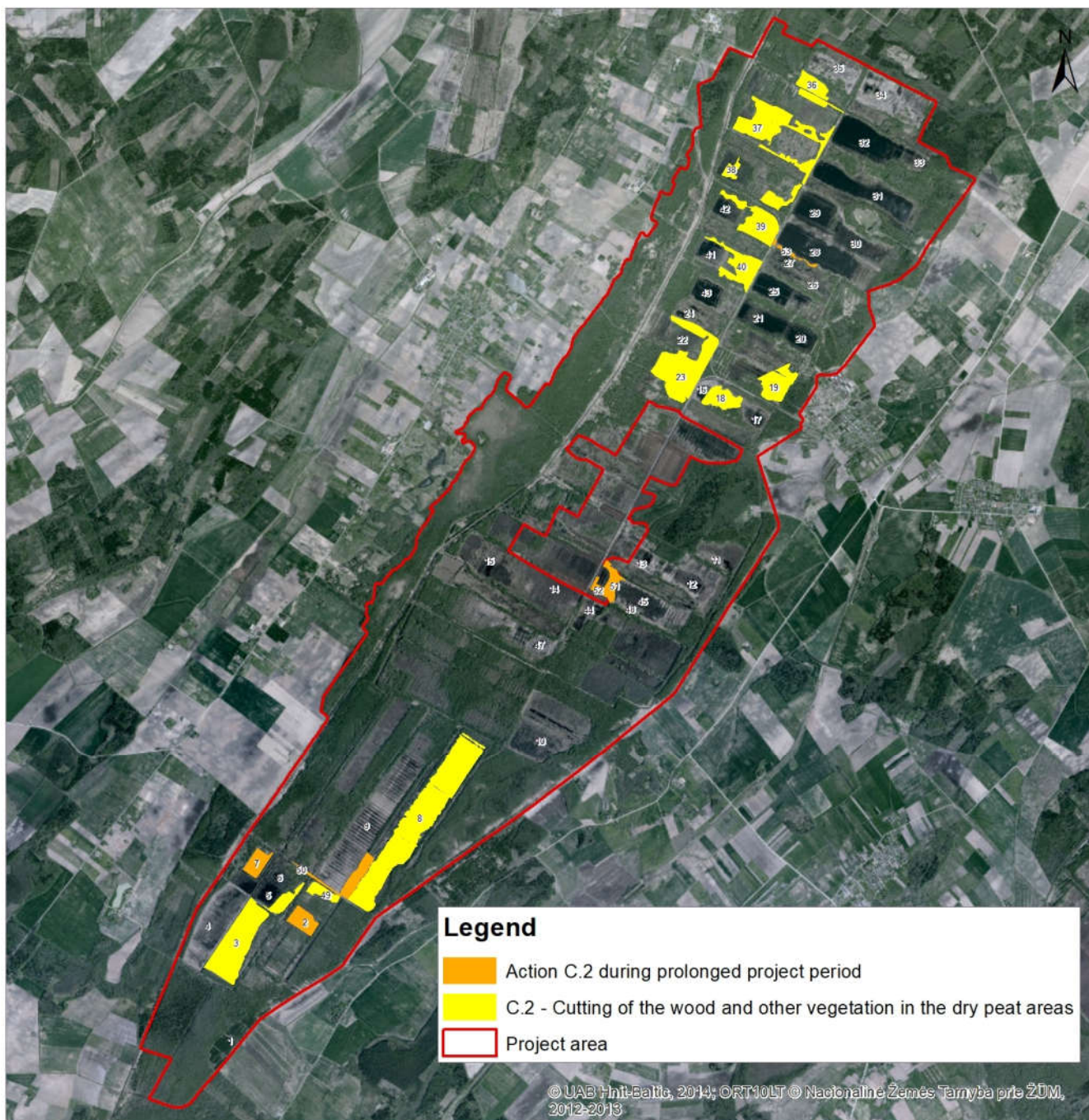
Milestone	Original deadline	Revised deadline (Inception report)	Revised deadline (Progress report)	Revised end date (modification)	Implementation status
Woody and other vegetation growing on the dry peat cut in the area of 250 ha once	31/03/2015	31/03/2016	31/03/2017	15/11/2017	13/11/2017 Completed, 278 ha managed

In the initial project application, it was planned, that bushes and other woody and grassy vegetation will be cut in 250 ha area of dry peat land, which also will be used for rewetting. While latter, in the project modification it was planned, that additional area of 30 ha will be managed, so that the total area managed under action C.2 will be 278 ha. The project fully implemented this action by its end on 13/11/2017.



Photo: Removal of woody vegetation from the dry peatland

The locations of the managed areas during implementation of the action C.2 are presented in the map below.



C.3 Cutting of the reed stands in the already flooded areas/ponds

Action implementation dates:

Planned start date	Actual start date	Planned end date	Revised end date (modification)	Actual end date
01/06/2014	01/06/2014	30/09/2015	30/09/2017	30/09/2017

Current status of the action: completed.

Action related milestones and deliverables:

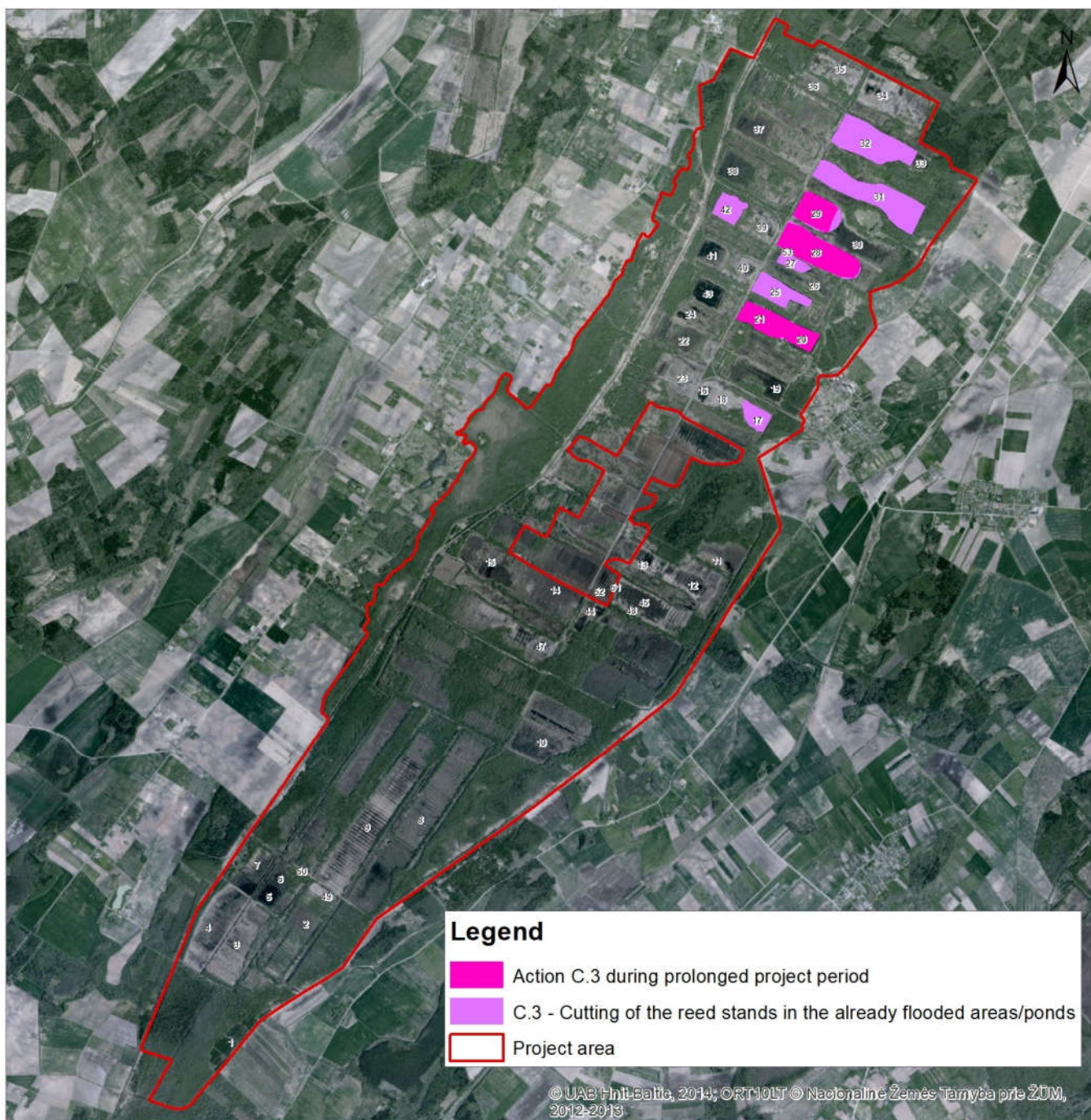
Milestone	Original deadline	Implementation status
Flooded reed stands cut in the area of 20 ha once	30/09/2015	32 ha completed by 02/10/2017

Initially in the project application it was planned, that 20 ha of reed stands will be cut in flooded areas. 25 ha were cut by the initially planned end of the activity on 02/09/2015. Nevertheless, seeing a positive effect of the measure to the ecosystems in the modification of the project it was planned, that the additional 7 ha will be clear cut by the prolonged end of the project (02/10/2017). The planned results were reached and 32 ha in total were clear cut by the end of the project.



Photo: Reed stands were cut under water with special machinery

The locations of the managed areas during implementation of the action C.3 are presented in the map.



C.4 Cutting of the wood and other vegetation in the former open wet areas of the bog

Action implementation dates:

Planned start date	Actual start date	Planned end date	Actual end date
01/12/2013	01/01/2014	31/03/2017	31/03/2017

Current status of the action: completed.

Action related milestones and deliverables:

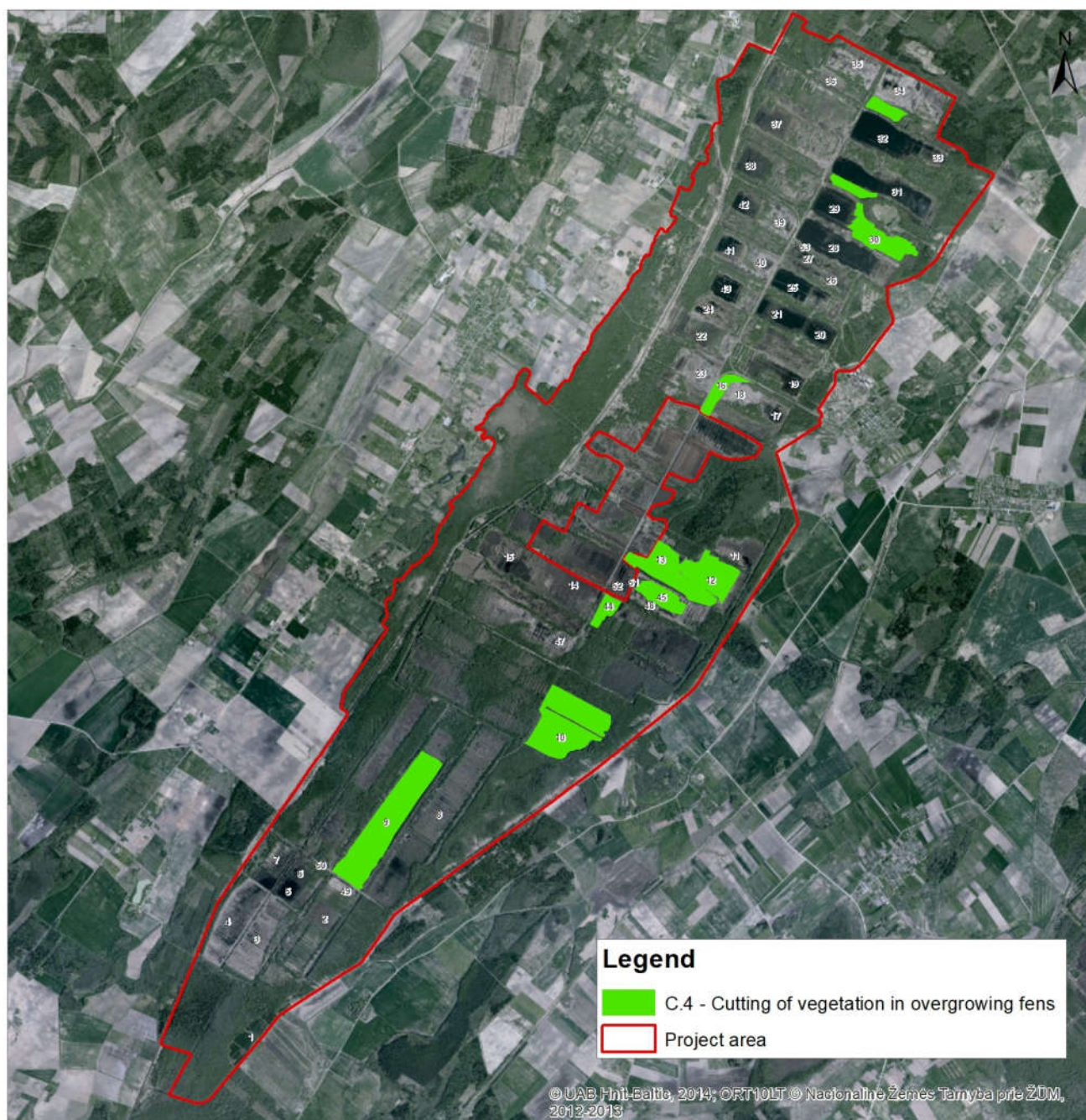
Milestone	Original deadline	Implementation status
Bushes and other vegetation growing on the over-flooded places cut in the area of 200 ha 2 times	31/03/2017	204 ha were managed for 2 times

The project fully achieved set-up milestones within time initially planned in the application. At the beginning of the Project the practical implementation of the Action C4 was delayed because of extremely mild winter with the first strong cold only in mid-January 2014, so the management works could start only at the very end of January 2014. Thus, in this season only 39 ha were managed once, by using capacities of associated beneficiary Didysis tyrulis.



Photo: Vegetation was removed during the cold season

The locations of the managed areas during implementation of the action C.4 are presented in the map below.



C.5 Cutting of the reed stands in the former open wet areas of the bog

Action implementation dates:

Planned start date	Actual start date	Planned end date	Revised end date	Actual end date
01/12/2013	01/06/2014	31/03/2017	30/09/2017	30/09/2017

Current status of the action: completed.

Action related milestones and deliverables:

Milestone	Original deadline	Revised deadline	Implementation status
Reed stands cut in wet places in the area of 100 ha 2 times	31/03/2017	30/09/2017	30/09/2017 Completed 113,00 ha managed three times

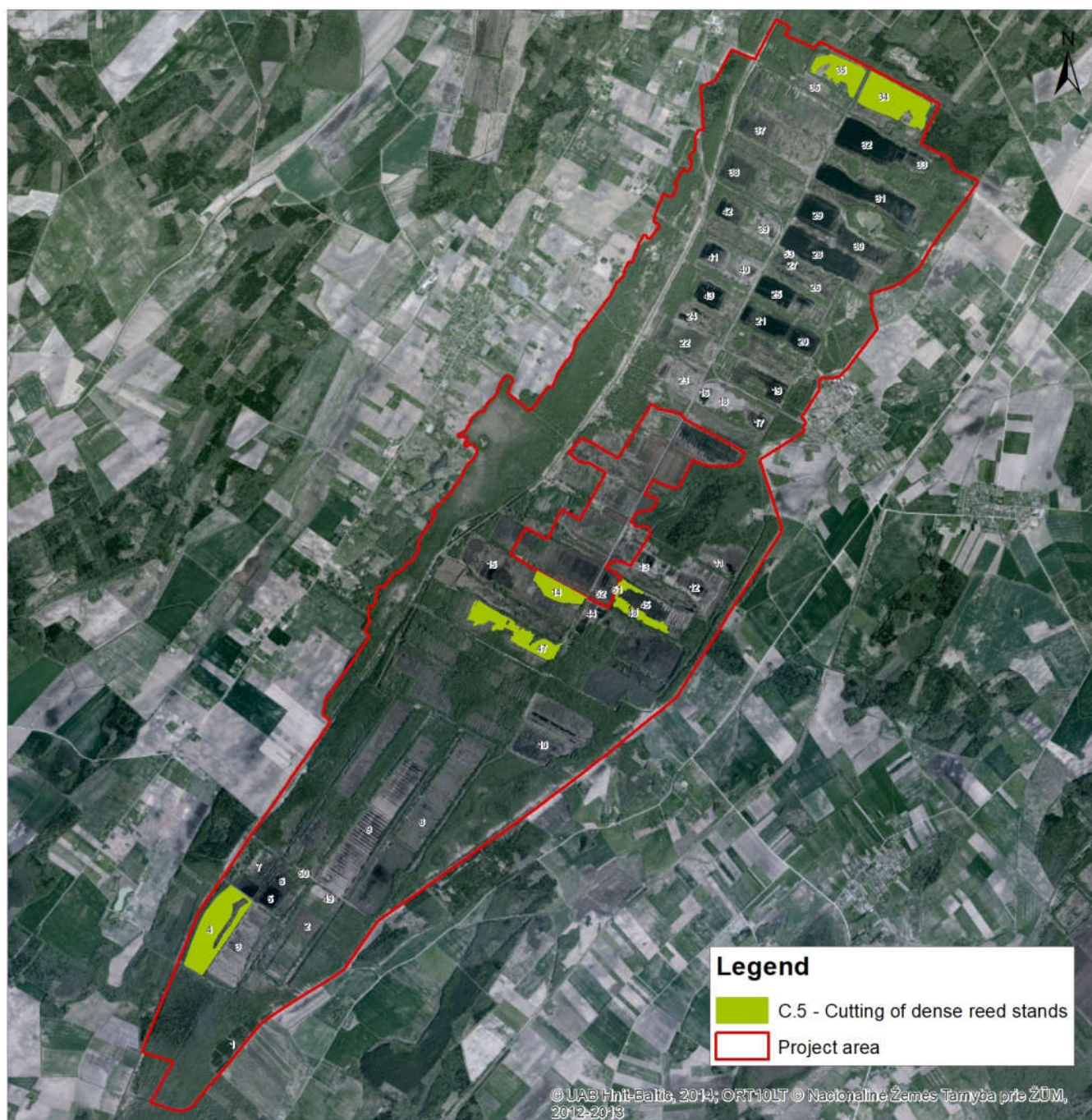
It was planned that associated beneficiary Didysis tyrulis will implement this Action. However, due to the lack of technical capacities of the associated beneficiary as well as need to have special machinery that would be suitable for working in wetland conditions coordinating beneficiary LOD requested the Commission to reallocate responsibilities between the beneficiaries and after Commission's approval became coordinator of the Action C.5.

First 26 ha were cut in 2014, and the same 26 ha were cut for the second time in vegetation season of 2015 (after bird raring period). The first cutting of vegetation was implemented in other area of 87 79,7 ha in 2015, and the second cutting of this area was repeated in July–September of 2016. Thus, an area of 113 ha was used for the implementation of the Action C.5 in total.



Photo: Reeds were removed from large areas of the bog

The locations of the managed areas during implementation of the action C.5 are presented in the map below.



C.6 Improvement of the local roads in the bog for fire prevention

Action implementation dates:

Planned start date	Actual start date	Planned end date (in the application)	Planned end date (in modification)	Actual end date
01/05/2014	01/05/2014	30/09/2016	30/11/2017	30/11/2017

Current status of the action: completed.

Action related milestones and deliverables:

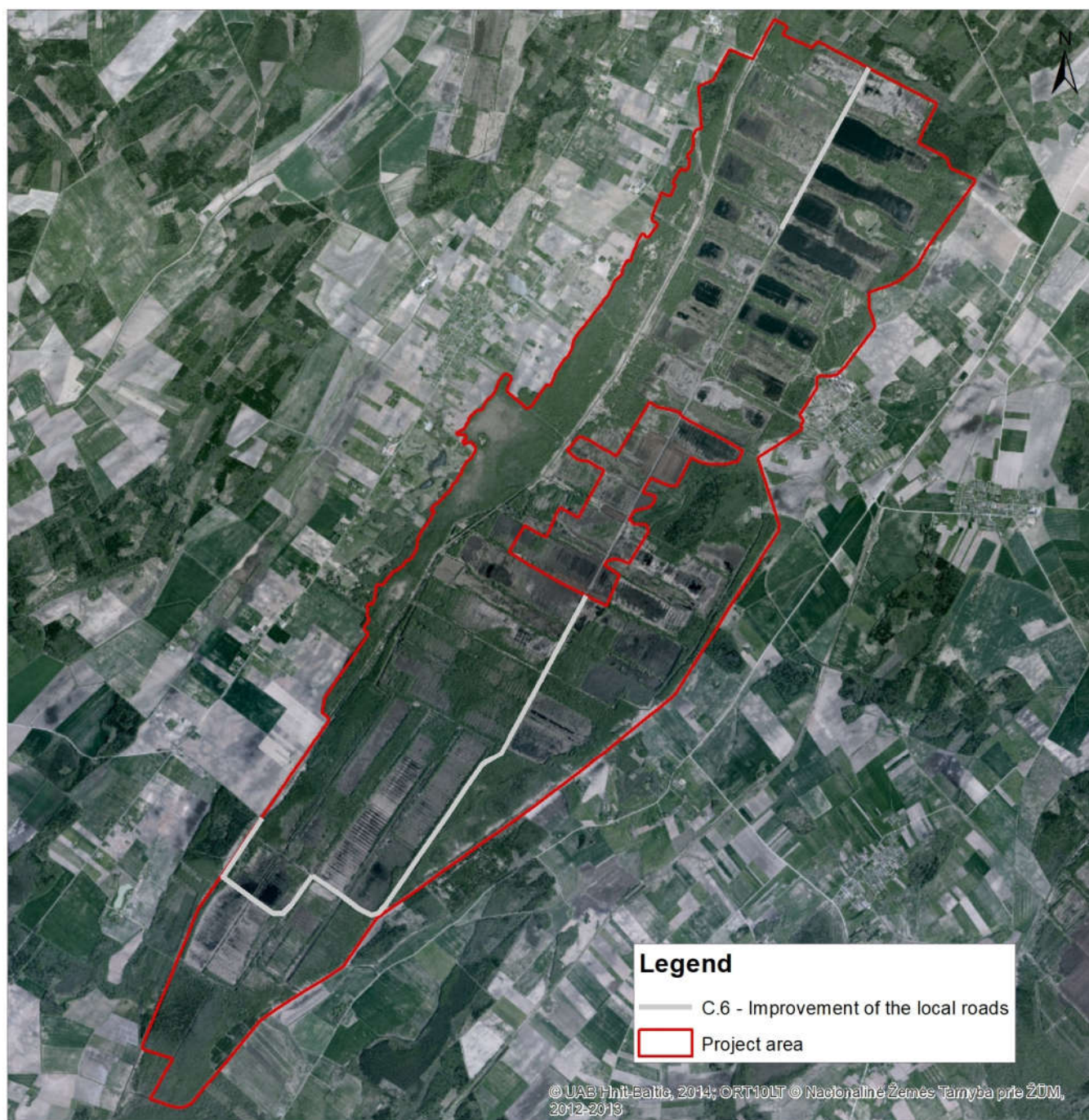
Milestone	Original deadline	Implementation status
8,5 km of the local roads improved and area available for driving on the fire-engine	30/09/2016	9,6 km improved and maintained until the end of the project on 30/11/2017

The Action was implemented by project associated beneficiary Didysis tyrulis. Practical implementation of the Action started from the procuration of the permits for the restoration and maintenance of the local roads. Both beneficiaries were involved in the process of getting permit. The technical project on the improvement of local roads for fire prevention was approved with condition that the implementer of the technical project (Didysis tyrulis) will ensure presence of external supervision of the improvement works.



Photo: Improved road is being used not only for fire prevention, but also by site visitors

9,6 km of the road were improved by 30/10/2015. The result was higher on more than 15 % compared to milestones of the Action C.6. The improved road was intensively used by foresters, fishermen, naturalists and other visitors (including nature cognitive visitors) as well as machinery of the AB and subcontractor during implementation of the Actions C.1 – C.4. The location of the improved roads during implementation of the action C.6 is presented in the map below.



C.7 Seasonal blocking of the local roads of the bog

Action implementation dates:

Planned start date	Actual start date	Planned end date	Actual end date
01/05/2014	01/05/2014	30/09/2014	30/09/2014

Current status of the action: completed according to time plan. Reported in the Mid-term report.

Action related milestones and deliverables:

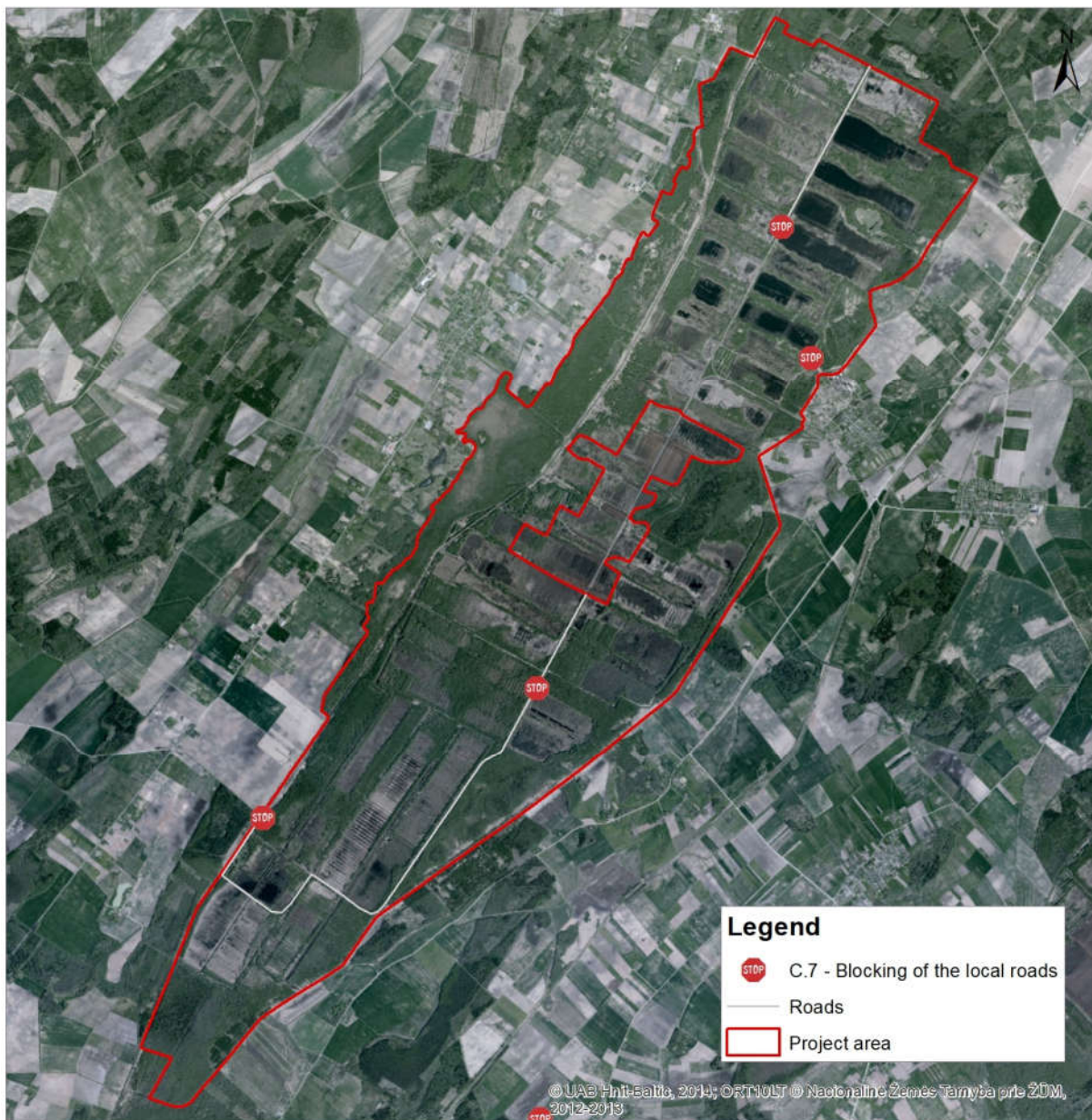
Milestone	Original deadline	Implementation status
Four roadblocks with locking facilities produced and set-up in place	30/09/2014	Completed by 30/09/2014

This Action was implemented by associated beneficiary Didysis tyrulis. Four road barriers were installed in the sites proposed in the project application by the 30/09/2014. Associated beneficiary managed road barriers regularly, and opened them in those periods of the season, which are not important for bird conservation and when birds are not so sensitive to disturbance, i.e. mainly during periods of bird spring arrival and autumn staging of the migratory cranes time. This allowed the local community and other visitors to use roads for the visiting of the project site, which, in its turn, is important for dissemination of information about the project and its actions.



Photo: Local roads were seasonally blocked

The associated beneficiary and land manager – State Forest Enterprise, as it is indicated in the Project After-LIFE Conservation Plan, is going to continue proper management and maintenance of the road barriers after the end of the project as well. The location of the constructed road barriers during implementation of the action C.5 are presented in the map below.



D. Monitoring of the impact of the project actions

D.1 Designing, elaboration and implementation of the Ex-ante and Ex-post monitoring scheme

Action implementation dates:

Planned start date	Actual start date	Planned end date	Actual end date
01/09/2013	01/09/2013	30/11/2017	30/11/2017

Current status of the action: completed.

Action related milestones and deliverables:

	Original deadline	Implementation status
Deliverable		
Final monitoring report attached to the Final Report	28/02/2018	Completed
Milestone	Original deadline	Implementation status
Monitoring scheme elaborated and presented on the project website	30/09/2013	Completed
All monitoring data entered and stored in the GIS database	31/10/2017	Completed

The implementation of the action started at the very beginning of the project implementation, i.e. in September 2013. The first activity was related to elaboration of the monitoring schemes for birds and habitats/vegetation. Both monitoring schemes were drafted and placed on the project website. Both schemes were used for monitoring of the migratory cranes and habitats on the designated management plots of the project area in autumn 2013 already.

Regarding the implementation of birds monitoring, as the project implementation started after the end of the breeding season, monitoring of the migratory cranes was conducted from the end of September 2013 until migratory cranes left the project area in the first days of October 2013. Birds' monitoring report was not produced for the year 2013 because very little data on staging of migratory cranes was collected until the migration ended. While monitoring of the project area habitats was conducted on more detailed scale. The first habitats report was produced and published on project website by the end of the year 2013.

Regarding the birds monitoring in 2014, the first surveys of the breeding birds started in March and were implemented by the project bird expert. Fieldworker supporting birds expert's work was employed from the beginning of April 2014. The draft report on the monitoring of the breeding birds was produced after the end of the breeding season, i.e. in late summer of 2014. During the monitoring of the targeted species – Bittern and Spotted crane – a numerous population of new bird species included in Annex I of the EU Bird Directive – Little crane – was discovered in the Tyruliai bog. The abundance of this species exceeded national SPA designation criteria, thus, it was selected as a new potential trigger bird species for the Tyruliai bog SPA. Because of this reason, the coordinating beneficiary included the

monitoring of the breeding population of this species into the fieldwork plan of Ex-ante and Ex-post monitoring.



Photo: Wild orchid in the Tyruliai bog - marsh helleborine

Bird monitoring was conducted on a regular basis since 2014, then 2015, 2016 and then in 2017. Because migratory cranes monitoring was conducted in August–October periods it includes also prolonged project period. Respectively, habitats monitoring data were collected in July–October 2014, 2015, 2016 and 2017 (also including prolonged project period). The birds and habitats monitoring data from 2015, 2016 and 2017 are entered into project database. All monitoring reports including Final monitoring report are available on the project website. An interactive ArcGIS Online map on monitoring data is publicly available on website since summer 2014. The interested persons can find out results of the monitoring research on this map.

The birds monitoring data showed that total Bittern* population significantly increased from 20 territory males in 2014 to 33 in 2017. The number of other trigger species of the Tyruliai bog SPA – Spotted Crake reached 13 territorial males in 2017 from 12 in 2014, thus slight increase is observed during project implementation period. Besides, quite numerous

populations of the Little Crane and Whooper Swan, which is species of EU importance, was discovered and this species will be proposed for nature conservation authorities to be nominated as trigger species of the Tyruliai bog SPA. If breeding populations of 6 calling males of Little Crane and 3 pairs of Whooper Swan were identified in 2014, 14 calling males of Little Crane and 6-7 pairs of Whooper Swan were counted in 2017. This data showed the significant increasing of the breeding population of those species, which also significantly exceed the threshold of the SPA designation criteria (3 pairs for both species). The number of the species increased significantly during project implementation period as a result of the implementation of the practical conservation measures. In addition, high number of the breeding Grey-headed Woodpecker (12 pairs) was detected during implementation of the action D.1 and also is significantly higher the SPA designation threshold (8 pairs). The abundance of three above mentioned bird species (Little Crane, Whooper Swan and Grey-headed Woodpecker) exceeded national SPA designation criteria, thus, the project proposed to the representatives of the responsible authorities to add them as a new trigger bird species for the Tyruliai bog SPA. This proposal was presented during the Final PSC ting and also included into After-Life Conservation Plan.

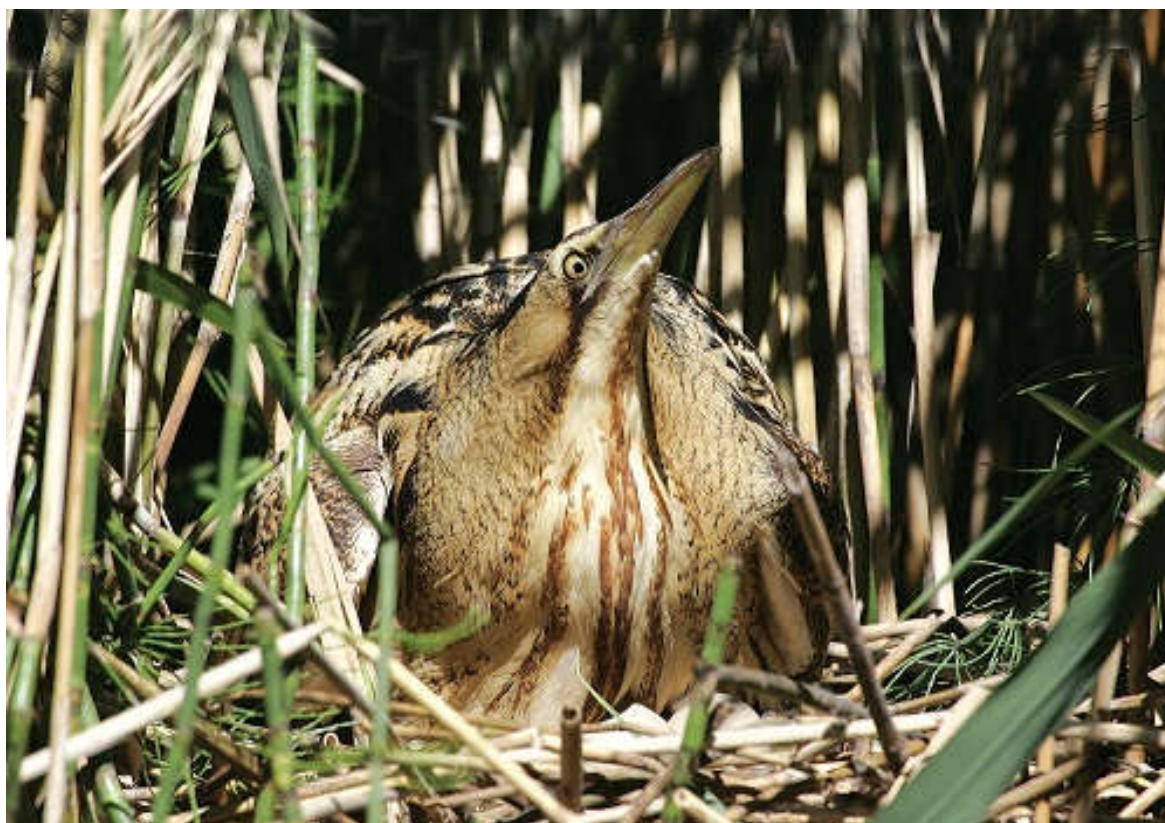


Photo: Eurasian Bittern – one of the trigger species in the site

D.2 Project impact on socio-economic conditions and ecosystem functions

Action implementation dates:

Planned start date	Actual start date	Planned end date (application)	Revised end date (modification)	Actual end date
30/10/2014	30/10/2014	31/08/2017	30/11/2017	30/11/2017

Current status of the action: completed.

Action related milestones and deliverables:

	Original deadline	Implementation status
Deliverable		
Final project monitoring report on the impact of the natural values and socio-economic conditions and ecosystems	30/11/2017	completed by the end of project on 29/11/2017
Milestone		
Three annual monitoring reports with recommendations for site management produced	31/10/2017	Three annual reports completed by the end of project on 29/11/2017

The project reached its milestone and deliverable – three annual and one final reports on the ecosystem services of Tyruliai wetland were completed by the end of the project on 30/11/2017. The first report covered period from project start to 31/12/2015, the second report to 31/12/2016, while the third – to 31/07/2017. It was planned, that the third and final report will cover period till project end on 31/07/2017, but as the project duration was extended, the report covered period till 30/11/2017, the Final report covered entire project duration, and it was approved in the PSC meeting on 29/11/2017. All reports are presented on the project website.

Already the first ecosystems' services report in details described the methodology based on which the ecosystem services will be evaluated. The ecosystem services are classified according to the Common international classification of ecosystem services (CICES, v4.3) framework and based on proposals developed by the Mapping and assessment of ecosystems and their services (MAES) project working group for the implementation of Action 5 of the European Biodiversity Strategy 2020. From the general list of 30 ecosystem services, important for peatland ecosystems in Lithuania 18 priority ecosystem services of Tyruliai wetland were selected for further assessment: from the provisioning services section – provision of wild plants (mushrooms, berries) and animals (game and fish); from the regulating and maintenance services section – filtration/decomposition/detoxification of waste and waste water, air quality regulation, erosion control, hydrological cycle and water flow maintenance, pollination and pest control, habitat and shelter provision for breeding and migrating species, climate regulation; from the cultural services section – potential for recreation, nature tourism, leisure fishing and hunting, science and education. Set of 45 indicators was proposed for the monitoring of the ecosystem services' quality and use intensity in the Project area. Initial spatial distribution and quality maps of the Project area were produced for the following ecosystem services: air quality regulation (based on the PM retention equivalent), erosion prevention potential (index); pollination potential (index); habitat provision potential (index, resolution 1 km), climate regulation (carbon sequestration and storage potential), nature tourism and education potential (index, resolution 1 km).

The following main methods for the monetary evaluation of ecosystem services were selected as optimal ones: Market prices based, Cost based, Travel cost and Benefit (value) transfer.

In the first ecosystems' services report it was stated, that the benefit transfer method allowed to predict possible preliminary lower limit of economic value of the Project areas' ecosystem services potential after the successful implementation of the Project activities – it could start from at least 0.9–1.7 million Euros annually.

In the second ecosystems services evaluation report it was stated, that after the preliminary assessment of the possible changes of quality and use of the selected ecosystem services after the implementation of the Project activities in 2016, the following tendencies were noticed: increase – in provision of habitat and shelter provision for breeding and migrating species and potential for nature tourism; positive tendency - hydrological cycle and water flow maintenance, filtration of waste and waste water, potential for science and education.

In the third and the final ecosystems services report indicated, that the following trends of the changes of the ecosystem services could be expected: significant increase – in provision of wild berries, hydrological cycle and water flow maintenance, habitat and shelter provision for breeding and migrating species, climate regulation, potential for recreation and nature tourism; increase – in provision of fish, filtration/decomposition/detoxification of waste and waste water, air quality regulation, erosion control, pollination and pest control, potential for science and education; stable – in provision of mushrooms and game species, potential for recreation, leisure fishing and hunting. The data received from the social survey, executed in six municipalities surrounding the Project area, reflects relatively high potential for use of some provisioning and, especially, cultural ecosystem services (e.g. recreation, nature tourism), and it presuppose increase in sustainable use of these services in the future, if effective infrastructure and publicity measures will be implemented.

The final report consolidated findings of all reports. It was stated, that the main user groups of ecosystem services in the Project area are local community (up to 400 persons, benefitting from the full spectrum of ecosystem services), inhabitants of Šiauliai city, the fourth largest city of Lithuania, municipality (hunters, nature tourism enthusiasts), inhabitants of surrounding municipalities (important ecosystem services from the Project area - climate regulation, air quality regulation, water quality regulation, erosion control) and users of the Project area on the national level – numerous visitors of recreational and ecotourism destinations, situated relatively close to the Project area.

Taking into account various aspects it was evaluated, that the preliminary economic value of the Project areas' ecosystem services potential is about 941 Eur per hectare per year, or from at least 3.26 million euros annually for the territory. The value of habitat and shelter provision for breeding and migrating species, hydrological cycle and water flow maintenance, erosion control, climate regulation, filtration of waste and waste water represents up to 86 % of above mentioned total value the ecosystem services.

The preliminary assessment indicated the following trends: increase – in provision of hydrological cycle and water flow maintenance, pest control, habitat and shelter provision for breeding and migrating species and potential for nature tourism; positive tendency – in filtration of waste and waste water, pollination, climate regulation services, potential for leisure fishing, potential for science and education; negative tendency – in air quality regulation.

After the assessment of existing and historical data, the aerial pictures from 2011-2013, and in situ observations (including UAV investigation) results, the positive changes in the Index of Performance (IP) of the Project area ecosystems (excluding from the assessment the peat extraction area) were noticed, calculating, that the value of IP increased from $0,6 < IP \leq 0,7$ in 2012-

2013 to the value of $0,76 < IP \leq 0,78$ in year 2017, reflecting the Project activities' positive impact to the quality of the ecosystem.

The set of 33 indicators was proposed for the afterwards monitoring of the ecosystem services' quality and use intensity in the Project area.

In addition, the results of the project ecosystem services analysis (Action D.2) were presented to the wide international range of stakeholders by the expert in two international conferences, one of which was of the global importance: 1) Presentation "Cultural ESS in wetlands: from national survey to local assessment" was presented in the 9th Ecosystem Services Partnership (ESP) world conference "Ecosystem Services for Eco-civilization: Restoring connections between people and landscapes through nature-based solutions" on 11-15/12/2017 in Shenzhen, China, and 2) Presentation "Cultural ESS in wetlands: from national survey to local assessment" was presented in the MAES meeting "Assessing and Mapping Ecosystem Condition" on 27-28/06/2017 in Brussels, Belgium. More details are provided in this Final report under action E.5 Work with media.

F. Overall project operation and monitoring of the project progress

Please note, that the implementation and achievements under project actions F.1 Project management by the Lithuanian Ornithological Society, F.2 Project management by the Joint stock company “Didysis tyrulis”. F.3 Monitoring of the project actions are in detail described in report section 4 Administrative part.

F.4 Elaboration of “After-LIFE Conservation Plan”

Action implementation dates:

Planned start date	Actual start date	Planned end date	Actual end date
01/07/2017	01/07/2017	30/11/2017	30/11/2017

Current status of the action: completed.

Action related milestones and deliverables:

	Original deadline	Implementation status
Deliverable		
After-LIFE conservation plan	30/11/2017	Completed on 20/04/2018
Milestone		
After-LIFE conservation plan drafted	01/10/2017	Completed 31/03/2018

The After-LIFE Conservation Plan was developed by project team upon completion of the project in English and Lithuanian. It was prepared in electronic format and submitted to the main national stakeholders (MoA, State Service for Protected Areas, Administration of the Tytuvėnai Regional Park, State Forest Enterprises (VĮ “Valstybinių miškų urėdija”), AB of the Project – UAB Didysis Tyrulis, green-route NGOs) as well as international organizations working with a topic on the restoration of the damaged peatlands (BirdLife International partners and other NGOs, universities, scientific centers). All further commitments of the key stakeholders – State Service for Protected Areas, Tytuvėnai Regional Park Directorate and State Forest Enterprises (VĮ “Valstybinių miškų urėdija”), are based on the legal obligations of these state institutions, which are delegated by the Government of the Republic of Lithuania. Besides, further continuation of the project actions was discussed and justified with these stakeholders during the individual meetings, which were initiated by the CB – Lithuanian Ornithological Society.

The After-LIFE Plan proposed the solutions how the actions initiated in the LIFE project will be continued and developed after the end of the project, and how management of the habitats will be ensured, indicates who will implement these actions, and what funding will be used.

The After-Life plan explained background of the project, and what was the habitat situation before the project was provided in the report. Also, the main achievements of the project were indicated. Like total Bittern* population increased from 20 territory males in 2014 to 33 in

2017. The number of other trigger species of the Tyruliai bog SPA – Spotted Crake reached 13 territorial males in 2017 from 12 in 2014, quite numerous populations of the Little Crake and Whooper Swan, were discovered and is proposed for nature conservation authorities to be nominated as trigger species of the Tyruliai bog SPA. Breeding populations of 6 calling males of Little Crake in 2014 increased to 14, and 3 pairs of Whooper Swan identified in 2014, increased to 6 in 2017, in addition a high number of the breeding Grey-headed Woodpecker (12 pairs) was detected.

SWOT analysis indicated strengths, weakness, opportunities and opportunities. The main strengths of the situation are Natura 2000 status of the project site (Lithuania's commitment to ensure favourable conservation status of natural values) and State land ownership, thus national authorities can ensure implementation of the proper management without additional negotiations with other institutions (including private owners). As the main weaknesses are that habitat maintenance should start in short period after the end of the project (implementation project management actions) and State forest management system, which institutions are responsible for the management of the Tyruliai SPA, is under reformation now and there no clarity who will be responsible of this area in nearest future. The main opportunities are to apply for the payments from the national Rural Development Programme and the presence of the institutions/persons, which have interest in further management of the site and its habitats. The main treats are that restored habitats will lose their favourable features and conditions for the protected species until the responsible managers of this site will be approved and will be able initiate proper habitat management of the Tyruliai SPA. Another threat is if Rural Development Programme will not support measures of proper wetlands management during next EU Programming period.

The main conservation objective and the main methods were presented in the report. The main conservation objectives of Tyruliai wetland habitats after the project are to continue maintenance restored habitats and continuation of the restoration of the bog habitats, which still are in the unfavourable condition.

The monitoring of the status of habitats ant targeted species is also indicated as an activity, which will have to be continued beyond the end of the project and will be the main basis for well-timed valid conservation decisions.

The project After-LIFE Conservation Plan also clearly identified institutions/bodies, which are responsible of the further continuation of the concrete conservation and monitoring project actions as well as some dissemination actions, namely, maintenance of the installed infrastructure for visitors in the project area.

The After-Life plan also gave a financial outlook for the implementation of proposed activities in 2018 – 2025.

F.5 Communication with other projects

Action implementation dates:

Planned start date	Actual start date	Planned end date	Actual end date
01/09/2013	01/05/2014	30/06/2017	30/11/2017

Current status of the action: completed.

Action related milestones and deliverables:

Milestone	Original deadline	Revised (Progress report)	Implementation status
2 meetings with other similar project in Lithuania organized	30/06/2017	-	1. Meetings and communication with LIFE Aukstumala, 2. Meetings and communication with WetLIFE 2 3. Visit to ad(d)mire, Sweden in November 2015.
One joint event with similar LIFE+ projects organized	30/10/2016	30/08/2017	Joint event with Life-Aukstumala was organised on 01/06/2017

The Tyruliai-Life project had a meeting with project LIFE Aukstumala LIFE12 NAT/LT/000965 in June 2014. Moreover, both projects keep regular contact not only due to the day-to-day communication of both project teams, but also, because internationally recognized expert of wetlands restoration prof. R. Pakalnis who is involved in LIFE Aukstumala project is also a member of Tyruliai-Life PSC. Also, the project had joint event (described below).

Also the Tyruliai-Life project had increased its communication with project LIFE13 NAT/LT/84 “Restoration of proper hydrological conditions in Amalva and Kamanos bogs” WETLIFE 2 and communicated and exchanged experiences with each other on a daily basis on issues related to the implementation of practical nature conservation measures.

Project biodiversity specialists participated in the seminar organized by Life project Life to ad(d)mire (LIFE08 NAT/S/000268) in November 2015 in Sweden. An experience from Sweden, Germany, Finland, Estonia, France, Great Britain and other countries on the restoration of the damaged bogs was obtained during the seminar, and it was extremely important for the planning of the habitat management techniques and methodology, including restoration of the hydrological regime of the Tyruliai bog. The seminar focused on such main topics as restoration of hydrological regime in damaged peat lands, sustainable solutions in restoration and importance of rewetting of drained peat lands on reduction of climate gas emissions. These topics also were covered in communication materials of Tyruliai-Life project, which were produced after the seminar (e.g. second project leaflet, brochure, articles in press and a website). Some experience from other projects was used as examples in discussions with the members of the Project steering committee and participants of the Project events. Some practical aspects, learned and discussed with the managers of the other projects (including funded by LIFE), were implemented in rewetting activity of Tyruliai-Life project. For example, decision on improvement of some channel blocking dams with the plastic piling sheets (was also proposed by the Project Steering Committee), implementation of which started in 2016 and will be completed in 2017.

On 20–22 September 2016 international workshop “Harvested and damaged peatlands: prospects of restoration and conservation” was organized by the LIFE project LIFE

Aukstumala LIFE12NAT/LT/000965 in Vente village. Tyruliai-Life project was represented there as well. About 60 participants from Lithuania, Latvia, Estonia, UK, Germany and Belarus representing scientific and official institutions, peat producers and naturalists took part in this event. The workshop focused on benefits provided by restoration of peatlands and shaping of Lithuanian policies towards better conservation of wetlands. The participants agree that restoration of damaged mires in Lithuania currently reached some progress. However, management of extracted peatlands still lacks attention. Thus, the discussion on the strategy and national policy of extracted peatland restoration was initiated during this workshop with active participation of the Tyruliai-LIFE project team – project coordinator and biological expert. The decision on its continuation with responsible authorities was reached as a result of this discussion.

In April 2017 Project assistant presented project in Birdlife network meeting of the representatives of national European organisations in Brussels, Belgium. The experiences and achievements of the project were shared with a wide audience.

On 28-29/09/2017 the project was presented by Project assistant in LIFE partnership meeting “Baltic networking meeting 2017”, which was organized by LIFE project “Coastal Habitat Conservation in Nature Park ‘Piejūra’, Natura 2000 site“, LIFE CoHaBit, LIFE15 NAT/LV/000900 in Pärnu. The project presentation is provided in the overview of the event on the website: <http://dabasparkspiejura.lv/index.php/lv/110-noritejis-seminars-baltic-networking-meeting-2017>. Representatives of these LIFE projects took part in the meeting, and shared their experience on the implementation of the different projects:

- Awareness raising and application quality improvement of the LIFE program in Estonia, AwaRaEst LIFE, No. LIFE 14 CAP/EE/000009;
- Building LIFE capacities in Lithuania, LIFE LT, No. LIFE14 CAP/LT/000008;
- Capacity Building For LIFE Programme Implementation in Latvia, CAP LIFE LAT, No. LIFE 14 CAP/LV/000002;
- Coastal Habitat Conservation in Nature Park ‘Piejūra’, Natura 2000 site, LIFE CoHaBit, LIFE 15NAT/LV/000900;
- Assessment of ecosystems and their services for nature biodiversity conservation and management, LIFE EcosystemServices, LIFE13ENV/LV/000839;
- Baltic pilot cases on reduction of emissions by substitution of hazardous chemicals and resource efficiency, No. LIFE14ENV/LV000174;
- Alternative use of biomass for maintenance of grassland biodiversity and ecosystem services, LIFE GRASSSERVICE, No. LIFE12 BIO/LV/001130;
- LIFE to alvars - Restoration of Estonian alvar grasslands, LIFE to alvars, No. LIFE13 NAT/EE/000082;
- Sustainable and responsible management and re-use of degraded peatlands in Latvia, LIFE REstore, No. LIFE14 CCM/LV/001103;
- LIFE+ URBANCOWS - Restoration of urban coastal meadow complex in Pärnu town, Estonia, No. LIFE10 NAT/EE/000107;
- Integrated planning tool to ensure viability of grasslands, LIFE Viva Grass, No. LIFE13 ENV/LT/000189;

- Conservation and Management of priority Wetland habitats in Latvia, LIFE «Wetlands», No. LIFE13 NAT/LV/000578.

On 01-02/06/2017 the project was presented by Biological expert in the final seminar of the LIFE AUKSTUMALA project in Vente, Silute district. The project was attended by the practitioners involved in the restoration of exploited peatlands and conservation of wetlands. The project was briefly presented to the participants of the seminar. During the last day of the seminar a joint event with Tyruliai_life project was organised: the participants of the conference went to the field-trip to the site of Tyruliai-Life project. During the trip the participants were in detail presented with the experiences and achievement of Tyruliai-Life project, could see practical examples of the nature management activities.

F.6 Project auditing

Action implementation dates:

Planned start date	Actual start date	Planned end date	Actual end date
30/03/2014	30/09/2014	30/11/2017	30/11/2017

Current status of the action: completed.

Action related milestones and deliverables:

	Original deadline	Implementation status
Deliverable		
A copy of the auditing report attached to the Final Project Report	30/11/2017	Action completed
Milestone		
The audit report produced	30/10/2017	Action completed

The final auditors report clearly states, that that the project financial report gives a true and fair view of the expenses, income and investments incurred/made by Lithuanian Ornithological Society and UAB “Didysis Tyrulis” in connection with the abovementioned project within the time limit laid down by the Commission and in accordance with the LIFE+ Programme Common Provisions, the national legislation and accounting rules.is in compliance with the LIFE+ Programme Common Provisions, the national legislation and accounting rules.

5.2 Dissemination actions

5.2.1 Objectives

The main objective of the dissemination actions was to increase public awareness on the need of wetlands conservation and nature values of Tyruliai wetland in particular. The project communication objectives were:

- To increase awareness and knowledge about importance of wetland ecosystems.
- To increase awareness and knowledge on the natural values of Tyruliai wetland, and need to restore and conserve the area.
- To present the project targeted species conservation status and its protection needs.
- To introduce public with threats to the wetlands ecosystems.
- To introduce public with Project conservation actions, which were implemented.
- To disseminate experiences of the project on the restoration of the exploited peat-bog ecosystems.

5.2.2 Dissemination: overview per activity

E.1 Set up of visual infrastructure/info stands in the project site

Action implementation dates:

Planned start date	Actual start date	Planned end date	Actual end date
01/05/2014	01/05/2014	30/06/2015	30/06/2015

Current status of the action: completed. Action reported in Mid-term report.

Action related milestones and deliverables:

	Deadline	Implementation status
Deliverable		
Photos of the set-up notice boards and observation towers	30/06/2015	Completed
Maps of the set-up notice boards and observation towers	30/06/2015	Completed
Milestone		
Notice boards set-up	30/06/2015	Completed
Observation towers set-up	30/06/2015	Completed

All information on the completion of the activity was provided in the Progress report and is still valid. All planned infrastructure was constructed, and at the moment of preparation of the Final report was of the good condition. The Action was implemented by Didysis tyrulis with assistance of LOD. The associated beneficiary had received permissions to construct all infrastructure (observation towers and information stands).



Photo: Information stand in Tyruliai bog

Both planned observation towers were completed by November 2014. The observation towers are suitable for bird-watching, and have wide platform in order to ensure better visibility and attractive viewpoint to see managed area. There are project information stands in each observation tower as well. The observation towers are constructed in central and southern part of Tyruliai wetland. The information stands targeted mainly the general public visiting Tyruliai bog SPA. All five information boards have clear reference to project, Life and Natura 2000 logos. All five planned notice boards were prepared and installed in the project territory in places where they are visible for the people and visitors: two of them near-by public road, two on observation towers, and one on the road entering southern part of Tyruliai wetland. All of them are large sized: 1000 mm x 1700 mm.

The construction of the information stands was completed by 31 May 2015. Information boards at observation towers and on the road entering southern part of Tyruliai wetland contain pictures and interesting information about species and ecosystems, as well as description of project objectives and main actions, map of project site, and contacts of LOD and Didysis tyrulis. The other two info stands are installed near-by public road. These information boards aim to attract public attention that Tyruliai wetland is Natura 2000 area, and to encourage searching for information about the project. The info stands have large and attractive photos of birds, a slogan “Tyruliai wetland is a home for protected bird species, Natura 2000 area”, project website (www.tyruliai-life.lt), and contact information of LOD and Didysis tyrulis. completion of the action, the information stands are maintained by the associated beneficiary. No need for the repair or vandalism was observed so far.

E.2 Production of a film on the Tyruliai bog and project activities

Action implementation dates:

Planned start	Actual start	Planned end date	Revised end date	Actual end date
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date	date	(application)	(Mid-term report)	
01/07/2014	01/07/2014	30/11/2015	31/08/2017	30/11/2017

Current status of the action: completed.

Action related milestones and deliverables:

Deliverable	Deadline	Revised deadline (Mid-term report)	Implementation status
Project film	30/11/2015	31/01/2016	Completed

The Action was implemented by coordinating beneficiary LOD.

1000 copies of DVDs of the film (Lithuanian version and version with English subtitles) was released on 23/02/2016. 500 copies of the DVD were distributed to such stakeholders as Tyruliai community, associated beneficiary Didysis tyrulis, State Service of Protected Areas, administrations of protected areas, Regional Environmental Protection Division of Siauliai, Ministry of Environment, NGOs, Siauliai State Forest Enterprise, Tytuvėnai State Forest Enterprise, Administration of Tytuvėnai Regional Park, Radviliskis district municipality, Tyruliai secondary school, participants of events of other projects under cooperation, Project Steering Committee, LOD members and participating of LOD nature protection events.

The film participated in the competition for 2016 to receive national movies award of Petras Abuševičius (it was submitted on 28 October 2016). The film was very popular among viewers. The film was also presented in national TV channel – LRT on 18 December 2016.

The movie was placed on Youtube and has more than 3.900 revisions. It was also presented in “Kauno diena” e- version. .

The film was broadcasted for ten times on national and regional TV channels: Siaulių TV (regional): 11/05/2016 (20:00 PM), 12/05/2016 (16:35 PM), 15/05/2016 (13:50 PM), 18/05/2016 (20:00 PM), 21/05/2016 (21:40 PM), 26/05/2016 (22:30 PM), 29/05/2016 (13:50 PM), 27/11/2017 (19:30); 29/11/2017 (20:00); 13/12/2017 (20:00 PM); LRT Kultura (national): 28/02/2016 broadcasted during D. Juoceryte series of broadcasts “Pradek nuo saves”. The announcement with filmed episodes from the film was created and broadcasted for six times on Siaulių TV channel.

E.3 Organizing of the public events

Action implementation dates:

Planned start date	Actual start date	Planned end date	Actual end date
01/05/2014	01/10/2014	30/06/2017	30/11/2017

Current status of the action: completed.

Action related milestones and deliverables:

Milestone	Original deadline	Implementation status
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Three events for public held	31/10/2017	Ten events organized
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The Action was implemented by LOD, with assistance of Didysis tyrulis. During the entire project ten public events were organized. The project intended to organize more public events that initially planned in the application, because the society – especially local community, children and youth – showed great interest to participate in such events.

All material used in the events (invitations, agendas, lists of participants, etc.) had Life and Natura 2000 logos. When possible a clear reference to the project was also placed.

Seminar and excursion for public “Reconstruction of Tyruliai wetland: values and planned works” was organized on **19 September 2014**. During the event LOD presented planned and already implemented project activities, explained in a simple and understandable manner why wetlands and Tyruliai wetland in particular are so valuable. After the event participants were taken to birdwatching excursion guided by ornithologists in Tyruliai surroundings and wetland. The excursion was organized in quite large area: participants observed birds roosting places (cranes, swans, other) in surrounding agricultural fields and meadows, and then went to wetland area to observe gathering of cranes for night resting as well as other birds. As the excursion area had to be travelled in a rather short afternoon time before dark, a bus was rented for the excursion. There were 44 participants from local community, administration of Tytuvėnai Regional Park, local school, associated beneficiary, others.

Seminar and excursion for public “Night voices of Tyruliai” was also devoted to celebrate Natura 2000 day, and was organized on **15 May 2015**. The event was reported to Life events database. During it the participants in popular manner were explained what European Natura 2000 wetland is and why Tyruliai is a part of it. During the event progress of the project was also presented to local community. As after the presentations a night excursion in the dark had to follow, the participants saw presentation about what species can be observed in Tyruliai wetland at that time, could listen to the records of birds and animals that could be heard during the excursion. When the darkness started the participant went to the excursion on foot. They were guided by ornithologists, who could explain what birds were heard. There were 28 participants from local community and local school, Tytuvėnai Regional Park, Šiauliai Environment Protection Department, Radviliskis environment protection agency, Tyruliai elderly, members of LOD, and others.

Seminar and excursion for schoolchildren for Radviliskis V. Kudirka progymnasium nature club was organized on **6 October 2015**. There were 16 participants (children, accompanying teacher) of the seminar and excursion. During it children had visited the wetland, found out about the natural values of Tyruliai wetland, what nature conservation actions are implemented by the project and why. As the children had to come to Tyruliai wetland from Radviliskis (about 30 km) and then excursion covered quite a large area of wetland, a bus was rented for the excursion. The project activities and already reached results were presented to the participants (children and youth from the region) of the event devoted for the **Earth day seminar on 6 April 2016 in Tyuvenai Regional Park**, also, for the participants of the **LOD annual meeting (members of LOD) on 9 April 2016**. Pictures from the event are presented below.

A seminar and excursion for public **“Night voices of Tyruliai”** devoted to celebrate Natura 2000 day was organized on **13 May 2016**. The event was reported to Life events database. There were 43 participants in the event, that started with a presentation of the project progress to the local community and visitors in Tyruliai town, and then was followed by walking tour to the wetland. The excursion was guided by ornithologists, who explained what bird species were heard.

The interest to the night excursion was so great, that in addition a seminar and **excursion** was organized for **students of Radviliskis district Siaulenai M. Siksniš gymnasium on 27 May 2016**. During this excursion students learned about processes of formation of wetlands, they visited production sited of Didysis tyrulis and saw peat extraction process, and also had excursions to the reviving sites and observation towers, could learn about importance of wetlands and implemented restoration works.

Tyruliai community was also invited to participate in **Crane counting** on **23 September 2016**. Ecologists and young volunteers from Tytuvėnai regional Park and Dubysa Regional Park also joined the event. There were more than ten participants. The participants split into three groups and counted migrating Cranes according to the methodology. Later, the results were discussed in Tyruliai community house.



Photo: Counting of the migrating cranes with local community members

On **05 May 2017** was organised already traditional seminar and excursion **“Night voices of Tyruliai”** for local community and other public. Firstly, the participants of the event gathered in Tyruliai Community house, and listened to the presentations about achievements of the project, what natural values are being protected in the wetland, and were reminded what birds can be observed at that evening in Tyruliai. As there were more than 30 participants, they

were spited into groups and guided by ornithologists of LOD they went for the night excursion to the wetland. In total there were 29 participants from local and surrounding communities, neighbouring Raseiniai and Šiauliai. On **22 September 2017** was organised public event **“Good-bye for Crane”** in Tyruliai. The participants of the event had listened to the presentations about the protected migrating species that are in Tyruliai wetland, went to the excursion that was guided by ornithologists of LOD. Later on some of the participants together with LOD experts counted cranes, and could observe landing of more than 1 100 cranes. In total there were 17 participants in the event – members of local community, volunteers from Tytuvėnai regional par and children from V. Kudirką secondary school (Radviliskis). On **29 November 2017** a final event “Presentation of the results to Tyruliai community” was organised. The participants of the event were local people of Tyruliai town. They were introduced with the final results and achievements of the project. In total there were 10 participants in the event – members of local community.

Also, we would like to note, that on **09 May 2017** the project was **presented in the event dedicated for the 25th anniversary of the Life programme**, which was organised by the MoE and the Agency for the Management of Environmental Projects under MoE. The event was organised in College of the Social Sciences (in Vilnius). The Ministry of Environment had opened the event, in total there were over 130 participants. As a part of the event a “project fair” was organised, so the Project had its information point there, were project staff made presentation of the project and answered to the questions of the event participants.

All the seminars had a positive social affect to the local communities, as it contributed to better internal communication of the community, so that the people of small community would be gathering for public events, that are rather rare in the town. Also, due to the events local people got to know better local nature, and wetland in particular, why it is valuable, what are large benefits that it brings to the society as such. Also, local people get better to know nature as such, have more favourable attitude towards nature conservation.

E.4 Set up and maintenance of project website

Action implementation dates:

Planned start date	Actual start date	Planned end date	Actual end date
01/09/2013	01/09/2013	31/08/2017	30/11/2017

Current status of the action: completed.

Action related milestones and deliverables:

Milestone	Original deadline	Revised deadline	Implementation status
Project website set-up	30/11/2013	10/02/2014	Completed

The Action was implemented by LOD, with assistance of Didysis tyrulis. The project website www.tyruliai-life.lt was created and was regularly updated with the latest news on the project Action from October 2015.. The project information was provided in Lithuanian and English. The interactive map of monitoring results (Action D.1) and progress on the implementation of the concrete conservation actions are presented on the project website. Website was updated

with all relevant project documents (including reports, published material, etc.) and information on implementation of the project actions. The website has Life and Natura 2000 logos and has clear reference to the project.

The final statistics of the project is that averagely there were 210 visitors of website per month, and 321 seances per month.

E.5 Work with media

Action implementation dates:

Planned start date	Actual start date	Planned end date	Actual end date
01/09/2013	01/09/2013	31/08/2017	30/11/2017

Current status of the action: completed.

Action related milestones and deliverables:

	Deadline	Revised in Modification request	Implementation status
Milestone			
6 press releases prepared and distributed	30/06/2017	30/11/2017	Completed 17 press released
20 articles in periodicals and environmental magazines, newspapers, web portals published	01/11/2017	30/11/2017	Completed 61 articles in press/magazines and web portals
4 TV & 4 radio broadcastings on the national channels	01/08/2017	30/11/2017	Completed 10 TV broadcast, 4 radio broadcast

Information dissemination through media started from the very beginning of the project. The Action is implemented by LOD, with assistance of Didysis tyrulis.

During entire project the project had this media coverage: 10 TV broadcast, 4 radio broadcast; 10 articles in press/magazines; 51 articles in web portals, 17 press releases. .

On 13/04/2014 the media representatives of GRYNAS.LT new portal had visited project site and made a video reportage about the Tyruliai wetland, its values and planned project activities. They had met project team members form LOD and Didysis tyrulis. The TV reportage was available on the internet TV portal of GRYNAS.LT (<https://www.delfi.lt/video/laidos/grynas-tv/pelkeje-gludincia-pigia-energetine-zaliava-teks-palikti-gervems.d?id=64371644>).

In addition, we would like to mention, that the results of the project ecosystem services analysis (Action D.2) were presented to the wide international range of stakeholders by expert in two international conferences, one, of which was of the global importance:

- Presentation “Cultural ESS in wetlands: from national survey to local assessment” was presented in the 9th Ecosystem Services Partnership (ESP) world conference “Ecosystem Services for Eco-civilization: Restoring connections between people and landscapes through nature-based solutions”, which was organised on 11-15/12/2017 in Shenzhen, China (www.espconference.org). The conference program contained a broad range of topics on the latest state-of-the-art on the science, policy and practice of ecosystem services, there were about 350 presentations.
- Presentation “Cultural ESS in wetlands: from national survey to local assessment” was presented in the MAES meeting “Assessing and Mapping Ecosystem Condition”, which was organised on 27-28/06/2017 in Brussels, Belgium. The seminar was attended by stakeholders from EU and beyond.

E.6 Production and distribution of printed information materials about Tyruliai bog SPA and project activities

Action implementation dates:

Planned start date	Actual start date	Planned end date	Actual end date
01/09/2013	01/09/2013	31/03/2017	30/11/2017

Current status of the action: completed.

Action related milestones and deliverables:

	Deadline	Revised deadline (Mid-term report)	Revised deadline (Progress report)	Revised deadline (Modification)	Implementation status
Deliverable					
Two project leaflets	30/11/2013	30/06/2016	-	-	1 st leaflet 30/11/2013 2 nd leaflet 30/06/2016
Brochure about Tyruliai bog SPA	31/10/2015	31/03/2016	02/11/2016	-	Completed
Milestone					
Wall-calendar for four different years published and distributed	31/03/2017	-	16/12/2016	30/11/2017	Completed Wall calendars for 2014, 2015, 2016, 2017 and 2018 published and distributed

Since the beginning of the project two project leaflets, five wall calendars (for the years of 2014, 2015, 2016, 2017 and 2018), and brochure of the project were published. All published materials have Life and Natura 2000 logos and clear reference to the project. The Action is implemented by LOD, with assistance of Didysis tyrulis.

First **project leaflet** about the project goals, actions, description of the targeted species and presenting the scheme on the implementation of the project activities was published by 30/11/2013. 500 copies of the leaflet were printed and distributed to the public, among local community and all concerned stakeholders during bilateral meetings. The electronic version of the leaflet is available on internet.

The second project leaflet was published on 30/06/2016, 500 copies were produced and distributed. The electronic version of the leaflet is available on internet. Full-coloured four **wall calendars** were published for the years 2014, 2015, 2016, 2017 and 2018 (350 units for every year) at the end of years 2013, 2014, 2015, 2016, and by the end of project in 2017 respectively. All calendars were produced and published as supportive awareness raising and visibility material. The calendars were fully distributed during meetings with stakeholders concerned, local communities, schools and public, with the main focus on nature loving people. Please note, that the fifth calendar, for the 2018 was planned in the modification of the project.

The **brochure about Tyruliai bog SPA** was published (500 copies) by 02/11/2016. The brochure content covers description of conservation measures on the Tyruliai bog SPA and its protected birds species. Implemented nature management measures and their reached results are described with a strong focus on the Tyruliai bog restoration initiative as a pilot case for Lithuania. Brochure was distributed to such stakeholders, like local communities, relevant regional parks and forest enterprises, national and local nature conservation authorities, NGOs, relevant municipalities and land management authorities, and local people living around the formerly destroyed other peat-bogs. Since these measures can be applicable to other destroyed peat-bogs, the publication also will serve as educational tool for the stakeholders of similar Natura 2000 sites, schools and universities. Use of **logos on documents and durable equipment** was not specified in project proposal, however LOD and associated beneficiary Didysis tyrulis place Life and Nature 2000 logos on documents, related to project and follow the Commission's requirements on use of logos. All purchased durable goods as required, were marked by stickers with Life and Natura 2000 logo.

E.7 Production of Layman's report

Action implementation dates:

Planned start date	Actual start date	Planned end date	Actual end date
01/05/2017	01/05/2017	31/07/2017	30/11/2017

Current status of the action: completed.

Action related milestones and deliverables:

Deliverable	Deadline	Implementation status
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Layman's report	15/11/2017	Completed
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The Layman report was prepared, and 400 copies of it in Lithuanian and 400 copies of it in English were printed and distributed to national and international stakeholders (nature conservation organisations and authorities, administrations of protected areas, green-route NGOs, specialists of other similar projects). The illustrated publication in a simple and reader-friendly manner presents project goals, implemented activities, achieved results and involved partners. It described habitats and species conservation problems that were addressed by project, and applied methods and actions that were taken to solve these problems, and the results reached by the project. Electronic version of the publication in both languages is available on project website.

E.8 Seminar on the restoration of the destroyed peatlands and dissemination of the project results

Action implementation dates:

Planned start date	Actual start date	Planned end date	Actual end date
01/01/2017	01/09/2016	30/06/2017	30/06/2017

Current status of the action: completed.

Action related milestones and deliverables:

Deliverable	Deadline	Implementation status
Seminar materials	30/06/2017	completed

Preparation to the seminar started already in autumn of 2016, when LOD started to discuss possible concept of the seminar, identify possible participants, timing and event venue as well as search venue booking possibilities. Preliminary it is planned, that the seminar will be organised on the second or third week of May. The exact date will be decided before the first announcement of the seminar, which will be announced and distributed among the potential participants by the end of February.

The seminar "Experience in re-naturalisation of exploited peatlands and damaged wetlands" was organised on 10-11 May 2017. There were 33 participants there – stakeholders from more than ten institutions interested in restoration of wetlands. Also, there were two wetlands restoration specialists from Belarus.

The first day of the seminar was devoted for the problems and importance of the restoration of wetlands and peatlands, discussions were carried out on the natural value of the damaged wetlands ecosystems. The presentations were done by representatives of LOD, Lithuania Fund for Nature, MoE, State Forest Service, State Service of Protected Areas, Tytuvėnai Regional Park, Representatives of Academy of Sciences of Belarus. The second day of the seminar was devoted for the visits to the project sites, where different project habitat management activities were implemented, different types of installed dams were examined, participants visited observation towers and information stands installed by the project.

5.3 Evaluation of Project Implementation

Applied methodology

The applied methodology in the most cases proved to be successful, while in some cases a few technical problems that are being solved when implementing actions of the project were met. Those problems are mainly related to implementation of practical habitat management measures in wet areas of the Tyruliai bog.

Meteorological conditions also became a problem. Initially in the project application cut of ligneous plants, reed stands and other vegetation in wet and swampy areas was planned on frozen soil in winter season. However, all winters were mild during the past project implementation period and soil was deeply frozen only for a rather short periods and were too short to implement planned amount of the management measures. Thus, practical conservation measures, related to management activities on swampy areas (Action C.2 and C.4) were implemented in significantly lesser extent during the first project implementation year as it was planned according to the time-plan for that period. This was the main reason why the project beneficiaries were looking for other options and the only identified realistic and potentially effective solution was to use special machinery adapted for working in swampy areas with soft soil. However, none of project beneficiaries had such machinery, thus, these services needed to be outsourced to subcontractors having relevant capacities and machinery, who supported project beneficiaries in the implementation of the habitat management actions C.2, C.4 and C.5. The experience from the later winters (2014–2017) showed that such solution might solve problems faced when managing swampy areas.

Another problem was related to clearing/wood cutting on the areas, which were registered as a forest stands in Tyruliai bog. The national legislation does not allow clear-cut in such areas, even the ones that are foreseen as management measures in spatial management document of Tyruliai Nature Reserve (the same area as Tyruliai bog SPA) approved by the Government of the Republic of Lithuania (please note, that same management measures were selected for the implementation of the Action C.2 in the Project application). Beneficiaries were looking for solution again and had a number of meetings with representatives of various divisions and departments of the MoE, including headquarters of the Forestry department. Besides, MoE was additionally informed about this problem on several occasions, so the situation is expected to improve in the future, in particular, due to forestry sector reform started in 2018. Finally, as the solution it was decided to revise current forest management plans and this way to receive the permission for clear-cuts at least in some areas that are the most important for nature conservation in the southern part of the project territory.

Solving of both problems described above caused rather significant delay of the implementation of the Actions C.2 and C.4 in the first winter season. However, the project caught with the delay after contracting of external sub-contractors. The average costs for the

implementation of above mentioned actions remained almost the same and the project did not require additional funding for “C” actions even for work in much worse conditions.

Construction of the woody dams started following common methodology by using local soil and wood materials for their construction. The location and technical solutions were also based on the solutions of the Technical Hydrological project, which was prepared under project preparatory action A.1. However, during the project implementation after inspecting the constructed dams the Project Steering Committee took decision to improve at least a major part of dams by the plastic walls. The enforcement was needed because the natural dams constructed from local substrate could not prevent leaking of water and ensure sufficient raising of water pool (bief) level. This methodology was based on the experience of LIFE12 NAT/LT/000965 Aukstumala project. After the consultations with managers and experts of above mentioned project, the constructed dams were enforced with plastic pile sheets.

The clear-cut of the reed belts was based on the experience of other organizations, which described this methodology in the scientific papers. Also it should be mentioned that birds' monitoring data showed that total Bittern* population significantly increased from 20 territory males in 2014 to 33 in 2017 in the Tyruliai bog SPA. Besides, quite numerous populations of the Little Crake and Whooper Swan, which are species of the EU importance, were discovered showing significant increasing in number during the project implementation period in the Tyruliai bog SPA – breeding populations of 6 calling males of Little Crake and 3 pairs of Whooper Swan were identified in 2014, while 14 calling males of Little Crake and 6-7 pairs of Whooper Swan were counted in 2017. Because all those species are closely related with certain conditions of the reed stands (a longer edge line of the reed stand), the number of the species increased significantly during project implementation period as a result of the implementation of the practical conservation measure – C.3 “Cutting of the reed stands in the already flooded areas/ponds”. As regarding to the monitoring actions (D.1 and D.2), the coordinating beneficiary used methodologies that were approved at national (for D.1) and international (for D.2) levels.

Achieved vs. planned results, lessons learned

All practical conservation actions (C.1 – C.7), which were planned in the project application were fully completed and relevant indicators reached during the planned project implementation period, i.e. until the end of August 2017. Moreover, some savings allowed to increase the area of the managed territory under the actions C.2 and C.3 on 30 ha and 7 ha accordingly during prolonged project period, which was approved by the EC basing on the Project Modification request. While formerly open bog areas, which were overgrown with reed were repeatedly managed (the three times instead planned two) under action C.5. This action was additionally implemented during prolonged project period as well. It should be noted that quite significant number of the ditched blocking dams were constructed during the prolonged project implementation period too – 21 additional dams were constructed during the prolonged project period.

Regarding achieved project results, area of the managed dense reed stands on wet bog sites (Action C.5) is 13 % (113 ha) higher than it was planned (100 ha) in project application, area

of exterminated reed growing in flooded sites (Action C.3) is also 60 % (32 ha) higher comparing to planned 20 ha. The local road for fire prevention (Action C.6) was improved on the 9,6 km length section (instead planned 8,5 km) and maintained regularly. The higher results mainly are reached because of use of the special machinery for the work on swampy soil (Action C.5) or very shallow wetlands (Action C.3), which do not make negative impact on the habitats condition. While, in case of the Action C.6, savings from not purchased grader for tractor allow to restore and maintain longer section of the local road. The main lesson learnt is that for proper management of large boggy territories covering hundreds of hectares of the directly managed areas use of special machinery is extremely essential and cost effective and allows managing large areas in limited time period with reasonable costs of purposive habitat management. In addition, longer project period also supports reaching higher results if means of saved budget are available.

Task/objectives	Foreseen in the revised proposal	Achieved	Evaluation
To prepare the technical project for re-wetting of the dry peat areas on the Tyruliai bog (A.1)*	Not changed	Yes, fully achieved	The technical hydrological project prepared, negotiated with stakeholders and approved by relevant institutions including made revisions because of additionally constructed dams
To restore the hydrological regime on the open areas of Natura 2000 site through re-wetting of more than 500 ha of dry peat basing on the prepared technical project (C.1)*	Not changed	Yes, fully achieved	The construction of the 53 dams completed instead of planned 30 in the project application
To restore of the former open bog habitats by extermination in the area of of 250 ha overgrown with woody vegetation (in the areas selected for the restoration of the hydrological regime) (C.2)*	Not changed	Yes, fully achieved	Woody vegetation exterminated in the area of 280 ha instead of planned 250 ha in the project application
To improve the	Not changed	Yes, fully	200 ha of former open sedge-grass

capacity of at least 200 ha of former open sedge-grass areas and more than 100 ha dense reed stands overgrowing wet peatland areas (C.2, C.5*)		achieved	habitats managed twice. 113 ha of dense reed stands on wet peatland areas were managed three time instead of planned 100 ha with planned two cuts in the project application
To increase the capacity of more than 200 ha of reed stands growing in flooded ponds by the exterminating reed in at least 20 ha (C.3)*	Not changed	Yes, fully achieved	The capacity of more than 200 ha reed stands growing in flooded area was increased by exterminating reed in the belt of the total area of 32 ha instead of planned 20
To reduce disturbance of birds by closing cars traffic in large area of Tyruliai bog (C.7)	Not changed	Yes, fully achieved	Cars traffic in large area of Tyruliai bog was closed by blocking and shutting-down passage of local roads in 4 places as it was planned in the project application
To maintain the fire prevention scheme by improving condition of local roads (C.6)*	Not changed	Yes, fully achieved	The most important and effective fire prevention measure in peatland is improving/maintaining quality of local road on the 9,6 km length section (instead of planned 8,5 km) and maintaining it regularly including project prolongation period
To monitor the impact of the project actions on the natural values, whole ecosystem and socio-economic conditions (D.1, D.2)*	Not changed	Yes, fully achieved	Birds and habitats monitoring in entire territory of Tyruliai bog SPA focusing on the managed areas is being conducted annually including prolonged period. Evaluation of impact of the project on the ecosystems and socio-economic conditions completed also covering prolonged project period
To raise public awareness on the conservation of natural values,	Not changed	Yes, fully achieved	Awareness of the general public was increased due to dissemination of information through mass media, project film, project leaflets,

climate change mitigation and possibilities to restore destroyed bogs (E actions)*			brochure and calendars, website with GIS database of monitoring data and nature diary, public events, installation of the infrastructure for visitors (notice boards, observation towers) that were done during reporting period
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* - this action was also implemented during the prolonged project period after the approved Modification request

Visibility of results

Results that are immediately visible at very early implementation stage are results of some practical conservation actions (Actions C.3, C.4, C.5 and C.6), ex-ante – ex-post monitoring (D.1) and such dissemination actions as leaflets, wall-calendars, information and articles in media, website, public events (Actions E.3–E.6). While visibility of results of concrete conservation actions increased in next birds breeding seasons because of higher number of the registered breeding pairs and migratory individuals of trigger SPA species in the Tyruliai bog. Bird monitoring data clearly shows positive impact of the implemented actions on the conservation status of the targeted bird species, ensuring of which is the main objective of the project.

The results of some public awareness actions, like production of leaflets and calendars, broadcasting and distribution copies (on DVD) of the project film as well as project website with GIS database became visible and available for the public after wide and appropriate dissemination of those products. At the same time, effect of work with media and public events makes it very rapid, i.e. as soon as awareness product/action is implemented.

Amendments of the project

The project amendments, which are related to changing of the executors and/or responsible beneficiaries on the implementation of the practical conservation actions (C.2-C.5) allowed to reach current results, some of which already exceeded indicators planned in the project application (Actions C.3, C.5, C.6). Besides, amendment of mentioned conservation actions also allowed catching-up with some delayed actions (C.2, C.4) in one implementation season. Besides, all mentioned results were reached under such meteorological conditions that are extremely unfavourable for the implementation of some conservation actions in wetland area like mild winter with unfrozen or slightly frozen soil, etc., which significantly changed conditions for implementation of habitats management measures on swampy and/or very wet soil. Without these amendments the implementation of several project conservation actions (C.2, C.4, C.5) and, consequently, whole project could be at a risk. However, changing of the executors and/or beneficiaries responsible for implementation of the practical conservation actions allow not being at a risky situation even if mild winters will appear in upcoming (remaining) two cold seasons of project implementation.

Besides, more than half of foreseen areas for the implementation of the Action C.2 (as well as some areas for implementation of the Actions C.4 and C.5) could not be used for the clear cut

of the woody vegetation until the forest management plans of Tytuvėnai and Šiauliai state forest enterprises were respectively adjusted and officially approved. The preparation and official approval of the forest management plans' adjustment was a new precondition, which was not foreseen in the project application. Such situation happened because the project application was based on the decisions of the Tyruliai Nature Reserve (the same area as Tyruliai SPA) spatial management plan, which had foreseen clearing of large overgrown areas of Tyruliai bog and was approved by the Government of the Republic of Lithuania. However, later (after the start of the implementation of the project Action C.2) the project got the evidence that according to the national legislation, decisions of the Tyruliai spatial management plan can be implemented only if they are included into forest management plans. Thus, the preconditions on the revision of the forest management plans were originated by the site management needs and were related to the specific nature conservation requirements – clearcut of woody vegetation in rather large territory of protected forested areas.

Effectiveness of dissemination

The most of already implemented project dissemination actions were effective in terms of number of general public informed. The most effective and informative was public awareness in media (E.5), mainly because of large number of the internet publications and articles in press and magazines (61) as well as press releases (17) and participation in radio (4) news and 10 TV broadcast, which are extremely popular among the society. Another quite successful dissemination action was website (Action E.4) having almost 7.000 visitors during the period from the July 2014. Although large number of general public was not involved in the project events (E.3), the events were extremely popular among the local community in project area and neighbouring territories for both – young generation and older group – of local people. By the help of the project events as well as installed 5 notice boards and 2 observation towers (E.1), and printed materials – brochure and the first project introduction leaflet (E.6) the most of the local people were informed about the project aims, actions and expected results. Besides, printed materials – two leaflets (500 copies each edition) and 4 wall calendars (300 copies each) – were used for informing of all relevant stakeholders around the country on the project objectives, planned and implemented actions with respective results.

A film on the Tyruliai bog and project activities (E.2) was produced in the format of 500 copies of the DVD and distributed among all relevant national and international (en version) stakeholders. The film was very popular among viewers. The film was also broadcasted for nine times on national TV channel – LRT and regional Šiaulių TV channel with announcement with filmed episodes from the film was created and broadcasted for six times. The movie was placed on Youtube and has more than 2.600 revisions. It was also presented in “Kauno diena” electronic newspaper.

5.4 Analysis of long-term benefits

Environmental benefits

The main project objective was to ensure the favourable conservation status of the priority bird species Bittern* (*Botaurus stellaris*), which breeds exceptionally in dense reed stands flooded by water, Spotted Crake (*Porzana porzana*), which prefers open fens with domination of sedge grasses, although could inhabit in reed stands as well, and migratory Common Crane (*Grus grus*), which use open wet areas of the site for staging. Conservation of those species were achieved through: 1) improvement of the habitats condition and increasing their capacity; 2) restoration of the hydrological regime of the some areas at the Natura 2000, 3) support of natural succession of the sedge-grass communities, 4) reduction of the birds disturbance, 5) maintenance of fire prevention scheme and 6) raise of public awareness about the destroyed bog restoration possibilities.

Implementation of these measures improved capacity of the habitats, which are important for the protected bird species and expand the area of effective and targeted protection across large area/part of the Tyruliai bog SPA thus ensuring the wider distribution with favorable breeding conditions for the species and using whole habitat capacity of the site. Implementation of these conservation measures in Tyruliai bog was very timely, since wood vegetation and reed stands had occupied quite large areas of formerly open habitats already, which may lead to rapid deterioration of breeding conditions for targeted bird species of the SPA if no measures to prevent this are taken. Therefore, species-based conservation measures supported conservation status of the species.

Besides, several potential other bird species, which met SPA designation criteria were identified during implementation of the action D.1 Ex-ante – ex-post monitoring: Little Crake (*Porzana parva*), Whooper swan (*Cygnus cygnus*), Grey-headed Woodpecker (*Picus canus*). All those species are proposed to be designated as trigger species of Tyruliai bog SPA. The number of the breeding bird species of EU Importance (listed in the Annex I of the Bird Directive), with reference to the current observations already reached 21 species. Thus, conservation of the trigger species supports protection and conservation of whole biodiversity in the Natura 2000 network. This is why urgent management initiatives in the Tyruliai bog were of great importance. Actually, this area is one of the most important for birds, listed in the Annex I of the EU Bird Directive, in that region of Lithuania.

Project had the only preparatory action, which was related to preparation of the technical project on the restoration of the hydrological regime of the Tyruliai bog, i.e. re-wetting of the rather dry peat areas. This action was important in order to get higher effectiveness of the implementation of the practical conservation action focused on re-wetting of dry peat land areas (Action C.1).

Practical conservation measures started by restoration of formerly open wetlands, but currently overgrown with bushes and reed. In parallel, clearing of woody vegetation on dry

peat area started from very beginning of the project because this action was in close relation to re-wetting process with a condition that wood vegetation will be removed from management areas. One more management action was related to reed, growing on the flooded areas (Action C.3), i.e. typical breeding habitat of the Bittern*. Cutting of the dense reed stands also focused on increasing of the ecological capacity of such habitat, trying to attract the breeding pairs of the Bittern* and support increasing of the species breeding population. This action was implemented as urgent activity in order support breeding population of the species and stop its decrease. For example, 19 territorial Bittern males were registered exactly in the managed areas out of 23 total population of Tyruliai bog in 2015. The total Bittern population increased from 20 territory males in 2014 to 33 in 2017. Proper reed stands management also supported improvement of the breeding habitats of other two bird species of the Annex I of the EU Bird Directive – Little Crake and Whooper Swan, which are proposed for designation as the trigger species of this SPA. Blocking of the local roads (Action C.7) was focused on the reduction of the disturbance of birds, especially in the areas related with conservation of the trigger species, this is why this action was completed during the first two years of the project. And finally, reparation of the local roads is closely related to fire prevention on the bog, at the same time protecting breeding habitats of birds against fire and ensure favourable conservation status of the species there.

As the managed habitats belong to the area with a formal status of forest land, implementation of some management measures, which are related to clearing of areas overgrown with rather dense tree stands (Actions C.2 and C.4) met some problems. However, after number of meetings and negotiations with relevant institutions it was decided to revise current forest management plans and this way to receive permission for clear-cuts at least in the areas which are the most important for nature of conservation in the project territory. Thus, after implementation of the practical nature conservation measures, the capacity of those areas increased and the areas were used by the protected species, especially, migratory Common Crane and also breeding Spotted Crake, Wood Sandpiper (*Tringa glareola*), Lapwing (*Vanellus vanellus*), Redshank (*Tringa tetanus*). All those breeding species have status of threatened bird species in EU and therefore should be protected.

Long-term benefits and sustainability

a. Long-term/qualitative environmental benefits

Regarding the long-term objectives for managing wet sedge habitat, woody vegetation in case of such habitat are growing very slowly. Current situation in the bog areas with low sedge vegetation is a result of the natural succession for at least 30 years. It means that single bushes and/or trees or scares stands started growing before the formation of the sedge layer or later. It means that after extermination of the growing woody vegetation, open boggy habitats with sedge communities should be formed for several decades. Regarding the reeds, their stands are quite scares at the moment in sedge bog areas, because of sedge predomination. However, because of accumulation of old dead reed, their stands are getting denser every year. Thus, we removed both growing and old reed stands (Action C.4, C.5) and repeated this action twice in right time (late summer for action C.5). This should determine the atrophy of reed stands. At the same time, sedge will be in better conditions (no competition and overshadow with reed)

and will overrun reed during coming years. Now, our long-term objective is to manage properly former open bog areas in order to restore sedge habitat and leave it for natural regeneration. According to our evaluation, rather open area will exist for twenty upcoming years. However, supporting measures can also be implemented during mentioned period in order to support natural regeneration process. National and EU financial mechanisms can be available for such kind of bog habitat management actions. Taking into consideration, that the only land manager of the Tyruliai bog – State Forest Enterprise (VĮ “Valstybinių miškų urėdija”) has delegated governmental functions to ensure proper management of the forest state land in the whole country, it is obliged to maintain restored bog open habitats after the end of the project. According to the current plans of the State Forest Enterprise, they are going to declare to the National Rural Development Programme for payments the maintenance of at least 250 ha of the restored open bog habitats in 2019.

National legislation does not allow clear-cut in the areas, which have forest land status, even the ones that are foreseen as management measures in spatial management document of Tyruliai Nature Reserve (the same area as Tyruliai bog SPA) approved by the Government of the Republic of Lithuania. The same management measures were selected for the implementation of the Action C.2 in the Project application. This was why project beneficiaries were looking for solution and had a number of meetings with representatives of various divisions and departments of the MoE, including headquarters of the Forestry department. Besides, MoE was additionally informed about this problem on several occasions, so the situation is expected to improve in the future. Finally, as the solution it was decided to revise current forest management plans and this way to receive permission for clear-cuts at least in some areas that are the most important for nature of conservation the project territory. This project experience raised the country-wide problem, which is related to proper management of the formerly open bogs belonging to the forest land. This discussion moved to the MoE and even changes of the national Forestry Law will be initiated basing on cases of this project as soon as debates on the changes of the national Forestry law will start. According to the current plan, these debates will start at the end of the 2018. A seminar focusing on this problem was organized by the State Protected Areas Service under MoE in order to go forward and reach the legal decision for solving of the problem in December 2015. However neither clear decision on the improvement of the current legislation on forestry nor proposal regarding changes of the concrete legal acts were agreed with representatives of the responsible state institutions during the organized seminar. This is project decided to make changes of the Forest Management Plan for Tyruliai bog and covered cost of this work. Lately, the requirements of the proper management of the open bog area should be incorporated into each relevant local Forest Management Plan. However, such practise, which was discussed with the MoE, will be implemented after the revision of the current national Forestry Law only, thus, will be implemented into the practise not earlier than 2019. The active participation of the Coordinating beneficiary in the negotiations on the revision of the national Forestry Law is included into the project After-LIFE Conservation Plan.

b. Long-term / qualitative economic benefits

Long-term qualitative economic and social benefits were assessed during implementation of

the project Action D.2 by applying innovative approach to estimating and valuing ecosystem services, prepared for the European Commission (document “A synthesis of approaches that assess and value ecosystem services in the EU in the context of the TEEB”) and Mapping and Assessment of Ecosystems and Their Services (Technical Report - 2014 - 080) adapted to the scale of Tyruliai bog, time constraints and budget limitation. The conclusions and findings are presented in the Final report of this action, which is uploaded in the project website. Taking into account the list of priority ecosystem services in the Project area, the following main methods for the monetary evaluation of ecosystem services were selected as optimal ones: Market prices based, Cost based, Benefit (value) transfer and Travel cost. According to the assessment data and information, also the database of values for benefit transfer as well as to the specific features of the Project area – e.g., being one of the largest peatlands in the Lithuania’s territory – and taking into account general scarcity and fragmentation of peatland ecosystems in Lithuania, *the preliminary economic value of the Project areas’ ecosystem services potential is about 941 Eur per hectare per year, or from at least 3.26 million euros annually for the territory.* The value of habitat and shelter provision for breeding and migrating species, hydrological cycle and water flow maintenance, erosion control, climate regulation, filtration of waste and waste water represents up to 86 % of above mentioned total value the ecosystem services. The preliminary assessment of the possible changes of quality and use of the selected ecosystem services after the implementation of the Project activities allowed to notice the following trends: increase – in provision of hydrological cycle and water flow maintenance, pest control, habitat and shelter provision for breeding and migrating species and potential for nature tourism; positive tendency – infiltration of waste and waste water, pollination, climate regulation services, potential for leisure fishing, potential for science and education; negative tendency – in air quality regulation.

c. Long-term / qualitative social benefits

Already now it is obvious that significant part of the project actions is closely related to participation of local community of Tyruliai settlement and neighbouring villages. The project partner – associated beneficiary Didysis tyrulis – is located in Tyruliai settlement and all employees of the company are local people. Thus, a significant part of concrete conservation actions implemented by local people ensured their working contracts at least for the project implementation period. Unemployment level is very high in Tyruliai settlement because of outlying location, thus employment for the period of several years is very important from the economic and social point of view. This also determines lower costs of men-power (because of lower salaries rate in the countryside), but from another hand, supports the local economy with rather high unemployment rate.

In addition to direct economic benefits, local public benefits due to habitats restoration, which supports the cranberry plants. The proper management of the reed stands growing in the shallow water – cutting of the belts in the reed stands, does not have negative impact on other sectors, such as fishery, recreation, hunting and others, or even is positive in some cases. The project is also important for local population because spreads information about Tyruliai, so the region becomes more known, which, on the other hand, also attracts more people from other regions to visit the site. Besides, local people will feel important because they are

directly involved in restoration of the bog. This should increase their identity. Thus, the project ensures better **socio-economic** conditions for local population at the same time ensures restoration and better protection of the bog ecosystems.

The stakeholders got a lot of benefits from the implementation of the project actions as well. Firstly, the land managers Siauliai and Tytuvėnai State Forest Enterprises benefit because of improved local road, which might be used for fire prevention. Besides, the local roads also can be used for daily forest management work. Administration of Tytuvėnai Regional Park benefit because from support on the implementation of bird monitoring in Tyruliai bog SPA as well as from proper management actions at the site for implementation of which they are responsible and which supports favourable conservation status of the protected species.

We also would like to note, that studies indicate, that in our biogeographical conditions restoration (rewetting) of destroyed bog with open peat layer also significantly contributes to the reduction of the greenhouse gasses emissions from area, thus we can also claim, that the approach that was used by the project also contributes to and has positive effect on climate change.

d. Continuation of the project actions by the beneficiary or by other stakeholders.

Prospects for the future of the site are related to the permanent maintenance of the open bog habitats. This can be achieved only by regular moving of grass vegetation (at least every second year) in the restored open areas of the bog. These conservation measures, according to the decision of the Lithuanian Government, have to be implemented by the current land manager (the biggest part of Tyruliai bog is covered by the state forest land) – the State Forest Enterprise. Following verbal bilateral agreement with the Coordinating beneficiary – LOD, the State Forest Enterprise is planning to start maintenance of not less than 250 ha of restored open bog habitats in 2019.

State Forest Enterprise is also responsible for further maintenance of the reconstructed road, which is of extreme importance while preventing forest fires, as well as performing control functions by the Nature Protection Agency, Administration of the Tytuvėnai Regional Park and staff of the local division of the State Forest Enterprise. This road is also used by visitors of the site (for cognitive and recreation purposes).

Ministry of Environment of the Republic of Lithuania (MoE), following project proposals, committed to update trigger species list of the Tyruliai bog SPA with 3 new species: Little Crane, Whooper Swan and Grey-headed Woodpecker, thus to ensure their favourable conservation status in the area. All mentioned breeding birds' populations significantly exceeding the officially approved national SPA designation threshold.

It is expected, that the MoE will designate Tyruliai bog as pSCI for protection of Otter (*Lutra lutra*), fish species from the Annex 2 of the Habitats Directive – loach (*Misgurnus fossilis*) as well as habitats of the Community importance – 7140 Transition mires and quaking bogs; 7230 Alkaline fens; 7120 Degraded raised bogs still capable of natural regeneration and 7150 Depressions on peat substrates of the *Rhynchosporion*.

Tytuvėnai Regional Park Directorate is responsible for general supervision of the site as well as monitoring of the trigger birds' species populations: breeding Whooper Swan, Eurasian Bittern, Spotted Crake, Little Crake, Grey-headed Woodpecker and migrating Cranes. However, according to the State Environmental Monitoring Programme, the monitoring actions in Tyruliai bog shall be performed as frequent as every three years. While, monitoring of other rare birds' species, which have been observed here – breeding Black Grouse, Common Redshank, Wood Sandpiper, etc., is not foreseen by the Programme, therefore Lithuanian Ornithological Society will regularly monitor status of the protected birds' species in Tyruliai bog on voluntary basis.

Tytuvėnai Regional Park Directorate, which is responsible for monitoring of the Tyruliai bog SPA as well as educational and publicity actions, is committed to continue maintenance of the established project infrastructure.

CB – LOD is committed to continue lobbying activities during the public hearing process of the Forest Law amendments (which is expected to start early 2018). LOD is seeking to ensure, that maintenance requirements for land managers will be clearly defined for the forest status land with open wetlands habitats. Meanwhile, restoration of the formerly open bog areas, which became overgrown with bushes and other woody vegetation, as nature conservation measure should be included into the common forest management plan.

Reliability, demonstration, transferability, cooperation

The project solutions on the implementation of the practical conservation measures were the most cost-effective if to compare to analogous habitat management actions in boggy habitats in other areas of Lithuania. The reached higher indicators in case of the most actions (Action C.1, C.2, C.3, C.5 and C.6) confirm it. The cost-effectiveness was caused by use of the best practices approach having in mind less costly component (Actions C.1 – C.5). For example, the project use already tested experience of other projects on the dam of the bog drainage ditches (Action C.1) using the local natural materials: wood and peat. This caused rather low costs (no costs of the construction materials), while efficiency is also based on the experience from other projects. Besides, the proper management of the reed stands growing in the shallow water – underwater cutting of the belts in the reed stands, does not have negative impact on other sectors, such as fishery, recreation, hunting and others, or even in some cases it is positive. Underwater cutting of the belts in the reed stands might be implemented everywhere if it is important for bird protection avoiding potential conflicts with land managers and users, thus have strong demonstrative aspect and might be replicated in other sites of the country or elsewhere abroad. In addition, this is cost-effective measure for the protection of certain species, because does not require preparation of special planning documents and large men-power resources. Besides, for the companies, which used peatbogs across the country for peat extraction there is an important message and visible project example that open dry peat layer after the stop of peat excavation should be flooded or just re-wetted in order to support the formation of grass vegetation, because such actions are extremely important for reduction of carbon emission and, accordingly, reduction of negative impact on climate change process.

Administration of Tytuvėnai Regional Park benefit because from support on the implementation of bird monitoring in Tyruliai bog SPA, from proper management actions at the site for implementation of which they are responsible as well as obtained experience of proper management of the damaged peatland areas, which are also included in to the territory of the Tytuvėnai Regional Park (Tytuvėnu Tyrelis). In addition, project activities and implementation of dissemination actions determine better visibility of the area around Tyruliai. The project visibility among various stakeholders is going to be increased during implementation of the Action F.5 – communication with other projects and through the project web site. For the common public, basing on the experience of other projects, all the most effective awareness and dissemination measures are planned and most of them have started already.

The project experience can be easily repeated in other EU countries and beyond EU space, where restoration of the destroyed peatbogs is an important issue, especially, in case of restoration of the heavily destroyed peatlands because of vast dimensions peat extraction. Coordinating beneficiary is going to distribute information on it experience among the BirdLife partners across the Europe.

Best Practice lessons

The project uses already tested experience of other projects on dam of the bog drainage ditches (Action C.1) by using such local natural materials as wood and peat. Such measures for re-wetting of the drained wetlands or even restoration of former hydrological regime were implemented in the several drained bogs in the country. Construction of the woody dams started following practise by using local soil and wood materials for their construction. The location and technical solutions were also based on the solutions of the Technical Hydrological project, which was prepared under project preparatory action A.1. However, during the project implementation after inspecting the constructed dams the Project Steering Committee took decision to improve at least a major part of dams by the plastic walls. The enforcement was needed because the natural dams constructed from local substrate could not prevent leaking of water and ensure sufficient raising of water pool (bief) level. This methodology was based on the experience of LIFE12 NAT/LT/000965 Aukštumala project. After the consultations with managers and experts of above mentioned project, the constructed dams were enforced with plastic pile sheets.

Special machinery with double wheels was used for habitat management on swampy or wet and soft soil (Actions C.2, C.4 and C.5). This is based on the experience of the coordinating beneficiary that was gained during implementation of other projects on habitats management in different types of wetlands as well as widely used elsewhere in of Lithuania and proved to be reliable and effective. Besides, experience on the costs of use of such machinery from other projects allowed to calculate the cost-effectiveness of these measures. It should be noted that in case of extremely mild winter additional small size and not so heavy machinery was used for the implementation of the action C.4.

Cutting of the belts in the reed stands is based on the proved data of special scientific research on some lakes of southern Lithuania. Although such measures never been implemented on a large scale for nature conservation purposes in the country, there were some limited attempts in a few aquaculture ponds for a short-term period. Thus, such practical measures were selected for the implementation of the Action C.3 in Tyruliai bog because of very high potential of positive impact on breeding populations of several waterbird species, which was registered by mentioned experimental scientific research. These data were published in some scientific papers.

Best practice from other projects or experience from different protected areas of the country was also used for the planning and construction of watching towers and information boards. From the point of view of the effective presentation of the important information and dissemination of the project results, different design information boards were planned. Those, which been constructed on very frequently visited places near-by important road, contain information which is quite visible from distance (e.g. by driving cars) – one large photo of the protected bird species and important slogan for protection of natural values. While, in the information boards, which are set-up near-by watching towers, information on project aims, planned results and their importance for protection of natural values, are presented in detail with several photos because visitors stay close to these boards for longer time and use it for study of presented information. Even those observation towers are not very large, however there is enough space for rather big number of the visitors (for more than ten) because the construction has two-terrace approach.

As regarding to the monitoring actions (D.1 and D.2), the coordinating beneficiary used methodologies that are approved at national (for D.1) and international (for D.2) levels

Innovation and demonstration value

Proper management of the reed stands growing in the shallow water, i.e. underwater cutting of the belts in the reed stands, is a very **innovative** action for the areas, which are important for the conservation of breeding Bittern and various species of crakes (Spotted, Little crakes, Water Rail) as well as other waterbirds species. Although this conservation measure was based on proved data of special scientific research in some lakes of Lithuania, results of these researches had never been applied in conservation practice in the country on wider extent, and only some limited practical attempts were done in a few aquaculture ponds for short-term period. If the monitoring data will prove the effectiveness of the application of such practical bird conservation measure, it might be applicable in other SPAs, at least the ones that are designated for protection of Bittern, Spotted and Little crakes. Another important point is that described measure (Action C.3) does not have negative impact on other sectors, such as fishery, recreation, hunting and others, and sometimes even makes it positive. Thus cutting of belts in reed stands might be implemented everywhere if it is important for bird protection avoiding potential conflicts with land managers and users. This is also rather cost-effective measure for protection of certain species, because does not require preparation of special planning documents, large manpower resources and make rather low disturbance impact on birds, thus can be implemented immediately after bird breeding season, although the local

birds are still in the managed area. This is why the implementation of the Action C.3 on the Tyruliai bog has high **demonstration** value and will be available for replication in other sites of Lithuania or other countries that encounter similar problems.

An **innovative** web-based nature diary of Tyruliai bog was created by the project. This database, accessible for everyone through the Internet, not only serves as a public information tool, but also makes possibilities of various levels of feedback, including reporting on observed natural values there. This nature diary can be created for other Natura 2000 sites (visited by the naturalists on voluntary basis), especially, where data on natural values is lacking. Naturalists who visit such areas can put their personal information on the nature observations there. Thus, nature diary for Tyruliai bog also has a **demonstration** character that can be developed in other countries too.

Evaluation of the effectiveness of the project actions compared to the initial situation on the ecosystem services, assessment of the socio-economic impact of the project actions, and in addition, project actions' impact on the ecosystem functions restoration is also an **innovative** practice for Lithuania. The last issue is of high importance because Tyruliai bog restoration activities are implemented in the largest destroyed bog ecosystem in Lithuania, which was destroyed because of long lasting (almost for fifty years) peat excavation.

Long-term indicators of the project success

As the project targeted conservation of three bird species – Bittern, Spotted Crake and Common Crane as well as newly proposed trigger species – Little Crake, Whooper Swan and Grey-headed Woodpecker, their abundance and distribution of local populations in Tyruliai bog are the main indicators, which clearly illustrate their conservation status in this SPA. This can be assessed during regular monitoring of the trigger bird species of Tyruliai bog SPA in the future as it is planned in the National Environmental Monitoring scheme. Bird monitoring data of the first project year (2014) will be baseline information for further evaluation of the species conservation status. The number of the breeding pairs of the current trigger and newly proposed trigger birds' species (Bitter, Spotted and Little crakes, Whooper Swan and Grey-headed Woodpecker) should be the main quantitative indicators used for the evaluation of their conservation status as well as number of individuals of the staging migratory Common Crane in the Tyruliai bog SPA. The baseline numbers of the breeding pairs or calling males as well as individuals of migratory birds are presented in the Final ex-ante – ex-post monitoring report, which is uploaded on the project website. The project positive outcomes/results will be evaluated as favourable if the conservation status of all trigger bird species will be favourable in the future. It means the number of the breeding pairs of Bitter, Spotted and Little crakes, Whooper Swan and Grey-headed Woodpecker as well as number of the staging migratory Common Cranes after the end of the project must be higher comparing with the numbers in 2014.

Besides, the set of 33 indicators was proposed by the project for the afterwards monitoring of the ecosystem services' quality and use intensity in the Project area. The indicators are specified in the Final Report of the Ecosystem services of the Tyruliai bog.

Project success also can be assessed by evaluation of continuation of habitat management actions on Tyruliai bog. Having in mind demonstration character of project practical conservation actions and that project covered just the most important areas for bird protection of Tyruliai bog, an extension of the similar management activities to other areas of the SPA should support favourable conservation status of the targeted bird species and their habitats. Thus, the area of properly managed abandoned areas (firstly by clearing of overgrown former open areas, etc.) of Tyruliai bog should be an indicator of project long-term success.

Additional indicator of long-term project success can be increasing of area of natural habitats of the Community importance, four types of which were identified for the first time for this Natura 2000 site during the conducted detailed botanical monitoring work: 7140 Transition mires and quaking bogs, 7230 Alkaline fens, 7120 Degraded raised bogs still capable of natural regeneration and 7150 Depressions on peat substrates of the *Rhynchosporion*. This monitoring data can be a baseline information for further evaluation of the status of the habitats of EU importance.