

TYRULIAI BOG



LET'S STOP ITS DECAY

Review of Project Results:
Restoring the Biggest Damaged Bog in Lithuania

Layman's Report



The reviving bog

INTRODUCTION

Bogs have a distinctive feature – unique natural habitats, preserving a landscape hardly disturbed by humans, a rich realm of fauna and flora. They shelter plants preferring dampness



Ledum in blossom

that thrive there, also animals and birds adapting themselves with difficulty to the environment altered by humans, disturbed in wetlands, searching breeding places and looking for food. The Tyruliai bog is not an exception. Once being a bog complex with the largest fen in the country later it became the biggest peatland nationally. Thus, previously the biggest Lithuanian fen with its characteristic communities of plants and endangered animal species was annihilated, unrecognizably changing the world of wetlands, full of life. The impaired bog became a huge source of carbon dioxide emissions leading to a negative impact on climate change in the course of many years.

Having ceased the peat extraction works, due to a high ground water level, the collapsing drainage system erected by humans and beavers' activities, the natural bogging processes started. Seeking to speed up the natural

restoration processes in the Tyruliai bog that may have taken up several centuries, in 2013 the Lithuanian Ornithological Society started to implement the Project "Tyruliai - Life - Demonstrative restoration of the Tyruliai bog as a part of the initiative of the re-wetting of Lithuanian peatlands", with the Project period – over 4 years. The Project aimed at improvement of conditions for natural values found in the Tyruliai bog, in particular, for bird species preserved here, thus contributing to ensurance of their long-term and efficient protection and reducing climate change.

In the Project period, various nature management activities were implemented in the Tyruliai peatland, to which most attention and efforts were contributed to. Monitoring of impact of the implemented activities was carried out in order to evaluate their impact on protected bird species and plant communities in the bog. All activities of the Project were widely publicized aiming at providing information about the importance of such initiative to the public, the achieved results and future perspectives are presented in detail in this publication.



Ripe cranberries



Montagu's Harrier



Woody vegetation is cut off and removed



Pines in the peatland

WHERE WAS THE PROJECT IMPLEMENTED?

The Project activities were carried out in the Tyruliai State Zoological-botanical Reserve, established in 1992 and which was designated a Special Protection Area (SPA) in 2004. All Project activities were devoted solely for protection of the Tyruliai bog – a Natura 2000 site.

What is this area and why is it so important that has been designated a Special Protected Area of national and Community importance?

The Tyruliai bog was formed in the depression of two moraine units. Formerly, a water body of glacial origin stretched in it. Later, a solid marshland, 4 700 ha, was formed there. It was the third largest wetland in the country following the Čepkeliai and Žuvintas complex of wetland ecosystems. The Tyruliai bog was a quagmire where open sedge fens with a source of the Šimša stream came to transition mires bordering with raised bogs overgrown with small pine trees. The former wetland complex could be called a mire, though in northern Lithuania wetlands were called by a special

term – *tyruliai*. Unfortunately, we must use the past tense as no single patch of the natural wetland is existing today – the entire wetland was converted into peatland throughout the last fifty years. In 1953, drainage works and peat mining was started in the Tyruliai wetland. Thus, Tyruliai became the biggest peat extraction site in Lithuania. Here a dense network of drainage canals covering all wetland area was intro-



A bogbean

duced. The unique wetland created by nature throughout millenniums was transformed into a dismal and dusty waste ground by humans. Besides, huge amounts of CO₂ gas are emitted to the atmosphere caused by decomposing peat. The quality of waters in the nearby rivers suffer because organic and mineral substances are washed out. The peat extraction is being continued nowadays, though the existing peatland shrunk covering “only” 211 ha.

Some areas of the peatland where peat resources were extracted first, due to a high level of ground waters, the degraded drainage sys-

tem and beavers’ activities started bogging up. Ornithological fauna typical to open wetlands began to establish itself, and in 2004, aiming at protection of abundant populations of migrating Common Cranes, breeding Eurasian Bitterns and Spotted Crakes the area was designated as SPA. However, the spontaneous bogging process progresses slowly: it takes decades or more. But implementation of certain nature management measures can accelerate the wetland restoration processes, thus creating more favourable conditions for protected species, and even anticipating return of extinct natural values.



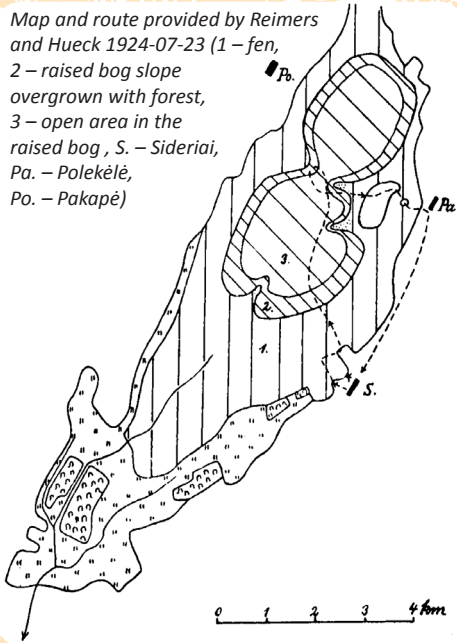
Vegetation is slowly restored in the exploited peatland

WHYS THIS PROJECT?

As formerly one of the largest Lithuanian wetlands was fully destroyed by peat extraction in the course of five decades only small patches of natural wetland flora with its characteristic fauna survived. Having completed peat extraction in the major part of the wetland solely areas of bare, dry peat extended, furthermore several big blazes occurred. Though due to the secondary spontaneous bogging

processes wetland areas of different type and size, i.e. shallow ponds, recovering open fens, started to form; however, here in newly forming habitats unfavourable succession processes of plant communities were observed - reed and bushy areas prevailed. Thus, seeking to ensure favourable conditions for formation of communities in open wetland or shallow water areas management works applied to the exis-

Map and route provided by Reimers and Hueck 1924-07-23 (1 – fen, 2 – raised bog slope overgrown with forest, 3 – open area in the raised bog, S. – Sideriai, Pa. – Polekėlė, Po. – Pakapė)



ting plants were indispensable. Besides, before commencing the Tyruliai-Life Project dry areas, mainly with poor vegetation occupied more than half of the target area.

However, peatlands:

- are poor in view of biodiversity;
- are not favourable for threatened and protected species of flora and fauna, including birds;
- produce large CO₂ emissions to the environment, thus leading to a big impact on climate change.

Taking into consideration the existing situation and the environmental potential of the area it was necessary:

- to adequately manage forming wetland and shallow water habitats providing conditions for long-term support and natural succession encouraging production of favourable conditions for threatened species;

- to start forming open habitats in the areas overgrown with woody vegetation of poor value;
- to adequately regulate hydrological regime in the area forming wetland areas, to the extent possible.

For the existing secondary restoration processes of the wetland habitats and new species or communities of fauna and flora finding their place in them, it was necessary to conduct comprehensive monitoring of the processes.

As general public knew very little about the significance of this protected area of Community importance for threatened natural values, the lack of relative information and the necessity to ensure its adequate dissemination at the local, regional, national and international levels was obvious.



Fragments of semi-open habitats



Open areas overgrow with trees and reeds



Young birch trees are cut off



Special equipment is used

WHAT HAS BEEN DONE?

In the Project period, 24 initially planned activities were implemented, including 6 activities for Project administration and practical conservation, monitoring and public awareness raising.

The preparatory activities (devoted for successful implementation of the practical conservation activities):

- the project for restoration of a favourable hydrological regime in the Tyruliai peatland.

Practical conservation activities (for conservation of natural values and reduction of climate change):

- 53 dams were constructed using local materials, wood and peat, and specially designed rabbits;
- woody vegetation on dry peatland, 278 ha, was cut out, where a favourable hydrological regime was restored within the Project framework ensuring formation of open wetland habitats;
- in shallow water reed fields, 200 ha, 4 m wide open belts (total 32 ha) were made cutting reeds under water, making the extended reed

stands fragmented; thus, favourable conditions for breeding waterfowl species were established;

- in cold seasons bushes and new reeds were cut off twice in boggy areas, 200 ha, establishing favourable conditions for formation of open wetland habitats and their further management;
- in vegetation seasons bushy areas and reeds were removed in wet peatland areas, 113 ha, and in addition the area was mowed two times, seeking to exterminate reeds occupying wetland habitats providing favourable conditions for formation of open wetland habitats and their further management;
- closure of 4 local roads was introduced aiming at reduction of bird disturbances in sensitive periods;



Cleared open belts in reed stands



- local roads, 9,6 km, were repaired used for fire prevention and extinguishment, practical nature protection and monitoring, inspecting purposes.

Impact monitoring

- ex ante and ex post monitoring programme for vegetation and birds was prepared;
- in 2014-2017, monitoring of vegetation and birds in the Tyruliai bog was carried on a regular basis;
- the interactive Arc-Gis map including the monitoring data was produced;

- the Project monitoring report on the impact of the natural values and socio-economic conditions and ecosystems of Tyruliai bog was prepared.

Information and publicity activities

- Project website was produced www.tyruliai-life.lt;
- publications about values of the Tyruliai bog and nature management works in progress were issued and distributed: 2 leaflets, a brochure about the Tyruliai bog and 5 wall calendars;
- the film “Reviving Tyruliai Bog” about natural values of the Tyruliai bog and nature management works in progress was produced and demonstrated;
- 5 notice boards and 2 observation towers for area visitors were erected;
- a workshop “Experience in the re-naturalisation of exploited peatlands and heavily damaged bogs” about experience in restoration of damaged bogs in Lithuania and neighbouring countries was organised; a special publication of delivered presentations was issued;
- over 10 events were organised for the local community and general public of the Šiauliai region.





Roosting of numerous migrating Common Cranes in the bog

WHAT ARE PROJECT ACHIEVEMENTS?

Having implemented the project of the favourable hydrological regime in the Tyruliai peatland, prepared by the Project, and having constructed 53 dams formation of wetland habitats was accelerated in a previously heavily drained area, 500 ha.

Having implemented three target activities when woody vegetation was removed and reeds were cut in the area, 600 ha, conditions were produced for restoration of open wetland habitats that are of particular importance for a number of threatened bird species and the ones protected in the Tyruliai bog, as well as for animals found here. In the Project implementation period, formation of wetland communities was observed in the major part of the area.



Man made dam

Furthermore, having cut bushes and reeds in the former marshy areas conditions for their further adequate management were produced using capacities of land manager, the State Forestry Enterprise.

Facilitated by open belts of fragmented extending reed stands many shallow water bodies in the Tyruliai peatland became attractive to breeding waterfowl. Thus, conditions were provided for a bigger number of protected waterfowl, in particular, Whooper Swans, Eurasian Bitterns, Red-necked Grebes, Little Crakes, Spotted Crakes. The conditions are also favourable for other crakes, ducks, feeding herons.

Due to performed works in relation to restoration of the hydrological regime and wetland habitats, in areas of the former Tyruliai peatland new wetland habitats started to form (including those of 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), the populations of target bird species protected here grew as follows:

- Eurasian Bittern (*Botaurus stellaris*) from 20 calling males in 2014 to 33 in 2017;



Eurasian Bittern



Little Crane



Spotted Crane



Whooper Swan

- Spotted Crane (*Porzana porzana*) from 12 calling males in 2014 to 13 in 2017;
- Little Crane (*Porzana parva*) 6 calling males were found in 2014, 14 in 2017;
- Whooper Swan (*Cygnus cygnus*) from 3 pairs in 2014 to 6-7 pairs in 2017;
- migrating Common Crane (*Grus grus*) from 1200 individual birds in 2013 to 1800 in 2016; 1400 individual birds were counted in 2017, and it was related to farming specifics in the adjacent fields that year.

Besides lapwings and nearby breeding cranes, other animals also like the restored open bog areas: rutting European red deer come, small groups of deer pasture, ungulates bring their young from secluded areas of the peatland. Possibly, their abundance attracted a family of wolves that settled in the Tyruliai bog, lynxes visit it regularly. In dammed up ditches and ponds beavers and otters are common.

The roads repaired in the implementation of the Project provide good conditions for fire protection. Nature observers use them in their observation activities, and general public has a perfect opportunity to get a closer acquaintance with biodiversity of the Tyruliai bog, wetland formation processes and the performed nature management works. For environmental institutions the roads facilitate their inspection work ensuring adequate protection of the area. The closures on repaired roads enable to regulate visitor flows in seasons sensitive for wildlife.

Besides, in the Project period, for the first time in the country evaluation of ecosystem services, namely of the bog, was conducted showing that the value of natural areas is considerably higher than that of its resources – the price of peat or timber. Such valuations are customary and understandable among general public in many European countries, though it is an innovatory attitude in our country.



Little Bittern

WHAT HAVE WE FOUND IN THE TYRULIAI BOG?

Besides threatened bird species known before, i.e. Whooper Swan, Eurasian Bittern, Spotted Crake, Little Crake, abundance of which increased having carried out bog restoration works, other protected and threatened species of birds, flora and fauna were found.

Black Grouse (*Tetrao tetrix*). Its lekking ground was found at the edge of the Tyruliai bog, by the village of Sidarai where up to 5 males were observed. Besides, at least 2 mating males were recorded in open areas of the bog, at the edges their offspring was observed.

Red-necked Grebe (*Podiceps grisegena*). Breed in several ponds on the peatland area. Increase in numbers was noticed compared to 2014. Evidently, cutting off reed belts and thinning out influenced it. Assessment: at least 30 bred in 2017.

Little Bittern (*Ixobrychus minutus*). 3 active male birds were recorded in 2016, and in 2017 – 1 calling male in reeds of the northern part of



Black Grouse



Red-necked Grebe



Grey-headed Woodpecker

the peatland found. It is a newly found species in Tyruliai.

Lesser Spotted Eagle (*Aquila pomarina*). 1 pair breeds in forests in the southern part of the Tyruliai peatland. After the nature management works in the habitats they regularly feed in the formed open areas.

Common Redshank (*Tringa totanus*). 4-6 pairs occupying their nesting territories were recorded. As for breeding this species needs minor open water areas, increased number of the species is evident after the nature management works were carried out.

Wood Sandpiper (*Tringa glareola*). 2 breeding pairs were recorded in open areas of the bog after the nature managements works were carried out in 2016. It is a newly found breeding species in Tyruliai.

Grey-headed Woodpecker (*Picus canus*). 12 breeding grounds of Grey-headed Woodpeckers were found in birch areas in the Tyruliai peatland area in 2017. It should be noted that here the density of this species is exceptionally high, compared to other forested areas in Lithuania.

White-backed Woodpecker (*Dendrocopos leucotos*). 1 bird was observed on a regular basis in the northern part of the peatland in 2017, with a high probability of breeding. It is a newly found species in Tyruliai.

In the area a pair of **Hen Harriers** (*Circus cyaneus*) was observed during the breeding period, later a female bird was recorded. Such facts are rare throughout Lithuania.

It should be noted that having implemented the activities foreseen in the Project the abun-



Eurasian Curlew

dance of individual breeding birds exceeded the threshold for designation of a site of importance for bird protection. These are: Whooper Swan, Little Crake and Grey-headed Woodpecker. The Project team proposed to include them in the **SPA** list of target bird species of the Tyruliai bog.

Besides birds, spawning Pond Loaches (*Misgurnus fossilis*) were noticed in clear water ponds in the Tyruliai peatland. This a new site where this endangered species was found in our country. Also during the research period 4 species of plants included in the Red Data Book of Lithuania were found: *Huperzia selago*, *Eriophorum gracile*, *Dactylorhiza longifolia* and *Dactylorhiza incarnata*.



Fir clubmoss



A badger



Observation tower

WHAT DOES THE PROJECT MEAN FOR THE PUBLIC?

- *Educational aspect.* In the Project implementation period the installed infrastructure, the publications and website enable public to learn more about protected natural values in the Tyruliai bog, its painful history and the restoration works carried out there in recent years.

- *Restoration of adequate water level in the damaged bog leads to a significant reduction of huge CO₂ emissions typical for drained wetlands.* Thus, the Project made a significant contribution to the society's joint goal to reduce the scope of climate change.

- *Favourable conditions were restored for nature wealth to thrive – berries, mushrooms, also for reproduction of hunted fauna, fish.* Having drained wetlands or converted them to peat extraction fields berry stalks disappear or become very poor and do not produce berries, wild animals retreat from destroyed nature areas. In open bog habitats restored by the Project highly increased harvest of cranberries was noticed, here elks and deer pasture, the ponds freed from reeds became popular among fishermen.

- *Aesthetic pleasure.* In recent years general public pays considerable attention to preservation of wildlife. Thus, the Project goals coincide with anticipations of public at large. Besides, for the community of Tyruliai and nearby villagers the bog together with its nature wealth became a symbol of pride for their native region. And finally, all interested in nature and visiting the Tyruliai bog for their educational purposes encounter aesthetic pleasure finding rare species of flora and fauna, noticing changing bog habitats or just finding themselves surrounded by tranquillity of wilderness.



Information board



The bog in spring

WHAT CHANGES HAVE TAKEN PLACE IN THE BOG?

Ornithologists who saw the neglected Tyruliai peatland at the beginning of the century can hardly believe in the changes having taken place in recent five years.

How has the Tyruliai bog changed?

- First of all, due to the repaired road, that used to be of a very poor condition, at present the entire bog, from its northern edge to its southern part is accessible by a vehicle or bicycle. It provides favourable conditions both for people interested in nature, forestry staff taking care of the area and fire protection services in case if they need access to the bog areas that previously were difficult to reach.

- A large part of formerly marshy areas, that due to beavers' activities or spontaneous processes were overgrown with reeds and bushes, after the management works became open fens with characteristic vegetation communities and fauna. As such habitats are scarce throughout the country endangered species are sheltered here, including birds protected in the Tyruliai bog. Migratory cranes like the bog as a roosting site.

- Having built over 50 dams above the draining pitches in former dry areas of the peatland communities of bog vegetation started to form, here breeding Common Redshanks, Wood Sandpipers, Lapwings, Spotted Crakes, other endangered birds were found, migratory cranes come here for roosting.

- Due to improved hydrological conditions and having carried out management works in the bog habitats of Community importance were identified: *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*

- Due to introduced open belt zones fragmenting extended reed stands the variety and abundance of waterfowl in ponds of the peatland increased significantly, including threatened and protected bird species: Whooper Swans, Red-necked Grebes, Eurasian Bitterns, Common Pochards and Gadwalls.

- Observation towers with the notice boards were erected. The first notice boards meet visitors at the entrance to the peatland area.



Round-leaved sundews

WHAT ARE THE FUTURE PLANS?

The future plans are related to the maintenance of restored open wetland habitats. This may be ensured only by regular management (at least twice a year) open wetland areas formed in the implementation of the Project. Currently, upon authorisation by the Government, the works ought to be carried out by the present manager of the territory (the major part of the Tyruliai bog covers state forest land) – the State Forestry Enterprise. We hope this institution, subordinate to the Ministry of Environment of the Republic of Lithuania, will adequately perform its obligation. It should engage in further maintenance of the repaired road being very important for fire prevention, as blazes always cause danger for dry peatlands.

It is expected the Ministry of Environment of the Republic of Lithuania, based on the Project proposals, will amend the SPA list of trigger bird species of the Tyruliai bog by including as follows: Whooper Swan, Little Crake and Grey-headed Woodpecker. The breeding populations of the above birds exceed the threshold for designation of a Special Protection Area (SPA).

Also, it is expected the Tyruliai bog shall be designated a Site of Community Importance (SCI) due to a numerous population of otters, Pond Loaches and identified sites of 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*.

The Administration of the Tytuvėnai Regional Park is responsible for and ought to carry out protection and monitoring, on a regular basis, of the protected bird species found in the Tyruliai bog, i.e. Whooper Swans, Eurasian Bitterns, Spotted Crakes, Little Crakes and Grey-headed Woodpeckers, migratory Common Cranes. However, according to the State Programme for Environmental Monitoring, monitoring of protected bird species in the Tyruliai bog is carried out every three years. Besides, it does not include monitoring of other threatened birds found here, such as breeding Black Grouses, Common Redshanks, Wood Sandpipers, etc. Thus, the Lithuanian Ornithological Society plans to monitor the situation of the above species on a voluntary basis.

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www.tyruliai-life.lt

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