



Preservation of wetland habitats in the upper Biebrza Valley

LIFE 11 NAT/PL/422

The main goal of 'Preservation of wetland habitats in the upper Biebrza Valley' LIFE11 NAT/PL/422 project is to protect endangered wetland habitats in the Natura 2000 site and precious wildlife species present there. The project is co-financed by the European Union under the LIFE Financial Instrument, National Fund for Environmental Protection and Water Management (NFOSiGW) and Biebrza National Park.

Total budget of the project: 4 817 551 Euro

Period of project implementation: 2012-2019



Biebrza National Park

biebrza.org.pl



European Commission

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National Fund for Environmental Protection and Water Management

nfosigw.gov.pl



Nature 2000

natura2000.gdos.gov.pl



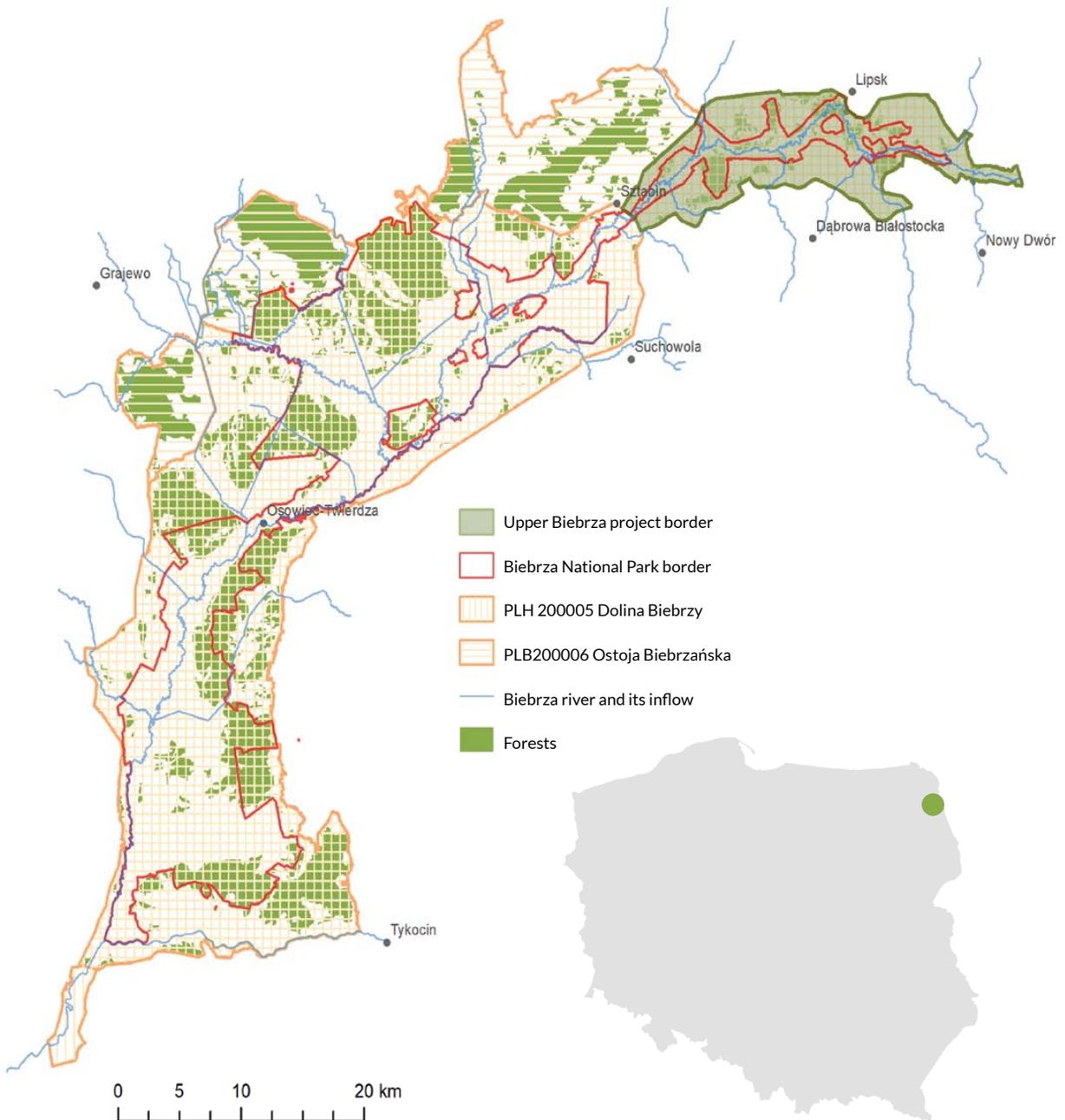
LIFE11 NAT/PL/422 project

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Project area



The area of the project's activities is approx. 17 400 ha and it covers the Biebrza Valley between Sztabln in the southwest and the state border with Belarus in the east. It is located in 5 communities: Suchowola, Dąbrowa Białostocka, Nowy Dwór, Lipsk, Sztabln.

The range of 'Upper Biebrza Valley' project includes Biebrza National Park area – its upper basin and north-eastern part of Natura 2000 network: Special Protection Area (PLB200006), Special Area of Conservation (PLH200008).



Project objectives

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GENERAL GOAL:
To bring back and maintain special mosaic of natural and semi-natural ecosystems, that condition high biodiversity in the landscape of Upper Biebrza.

Spatial habitats mosaic is what especially distinguish Upper Biebrza Valley, they mostly include wide alkaline and interim peatlands, wetland forests. During last decades a large-scale dewatering actions took place, mostly for rural purposes, followed by abandoning of wetlands areas caused a significant change in their functioning and deterioration of the habitat of rare plants and animals noted in Poland and Europe (i.a. fen orchid *Liparis loeselii*, marsh saxifrage *Saxifraga hirculus*, aquatic warbler *Acrocephalus paludicola*, black grouse *Tetrao tetrix*, lesser spotted eagle *Clanga pomarina*). To protect biodiversity of wetlands in the Upper Biebrza Valley area, a number of actions were implemented to preserve these

unique and one of most endangered ecosystems in Europe.

DIRECT GOALS:

- ✓ Restoration of configuration and historically shaped function of special wetlands mosaic of opened ecosystems
- ✓ Support and improvement of nature conservation management system
- ✓ Stabilization of groundwater level and reconstruction of wetlands
- ✓ Integration of nature conservation with sustainable local development, in particular with tourism



Why Upper Biebrza?

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In the past, wetlands were treated with distance and hostility. Efforts were made to turn them into more productive, modify them or to just forget about them. Only in last few decades their value has been recognized.

PRECIOUS WATER

In wetland ecosystems the most important factor, that conditions all other processes, is water. Optimally hydrated 'vivid' swamps are its natural reservoir. Only within the project area boundaries itself the marshes can cumulate approx. 219 mln m³ of water. For comparison, total artificial retention in Biebrza reception basin is less than 1 mln m³, while the largest retention basin in Podlasie – Siemianówka has almost 3 times less of total capacity. Up against limited water-dwelling resources in Poland, the retention of wetlands plays a significant role. Therefore one should strive toward to keep them in most unmodified condition.



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DIFFERENT, CALM, UNIQUE

The upper Biebrza Basin is characterized by a narrow valley, only 2-5 km wide, and a landscape of mineral islands surrounded by wetlands, that are part of moraine plateau cut by the waters of melting glacier. In deep tunnel valleys peat deposits were formed, reaching over 6 m in some places. The plateaus and outwash plain surrounding the valley are the areas of underground and surface water draining. Especially in eastern part of Biebrza basin its periodic excess is retained by thick, spongy peat deposit. Hence there are no river floods (soligenic supply). Below Kamienna river mouth, peat fields are supplied by disemboosing Biebrza river, which flows with small downgrade and during summer time has overgrowing vegetation causing water rise-up (fluviogenic supply).

The shape of river valley and its surroundings, together with specific water conditions resulting from them, had a significant impact on nature forming in this part of Biebrza wetlands.

Upper Biebrza Valley moraine islands



Wetlands – not only meadows

Wetlands are not only meadows with defined productivity, but also a place of unique environmental value, with most biologically diversified ecosystem found in the entire world. At the same time they are very sensitive to any kind of changes, especially drainage that causes irreversible effects and the loss of their original functions and qualities.



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Forest – not just trees

Forest is not only the trees, but also all other plants and organisms living in this environment. It is a very dynamic object, a network of interactions between animate nature, soil, water and air. They remain in the state of balance, which can be easily violated by changing or removing any element.



What do we protect?

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MOSS FIELDS

Alkaline fens, 7230 – they were formed by stable supplies of moving groundwaters, which are rich in minerals, mainly calcium ions, but poor in nutrients such as phosphorus and nitrogen compounds. Thanks to such properties the growth of an extremely large number of plant species is possible on peat fields. Among well-developed mosses in the lowest wetland level with *Calliergonella cuspidate*, *Hamatocaulis vernicosus*, *Limprichtia cossoni*, many types of sedge can be found i.a. *Carex lasiocarpa*, *Carex rostrata*, *Carex diandra*, *Carex limosa* and *Eriophorum angustifolium*. In the moss fields a semi-parasitic plant can be easily noticed - *Pedicularis sceptrum-carolinum* or beautiful orchids: *Dactylorhiza incarnata*, *Epipactis palustris* or *Liparis loeselii* in danger of extinction in our country. Plants occurring here since last glaciation – glacial relicts, are the evidence of high degree of naturalness. Among them are: *Saxifraga hirculus*, *Trichophorum alpinum*, *Polemonium caeruleum* and rare in Poland moss species such as: *Paludella squarosa*, *Helodium blandowii*, *Tomentypnum nitens*.

TRANSITIONAL PEATLANDS



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Transition mires and quaking bogs, 7140 – in places where the growing moss peats reduce the influence of groundwater, with simultaneous increase of rainfalls role, transitional peats are formed. We can then observe a kind of mosaic. Between peat bog aits with plants typical for high peat lands: bog cranberry *Vaccinium oxycoccos*, bog rosemary *Andromeda polifolia* and insectivorous common sundew *Drosera rotundifolia*, occur species typical for moss fields. Common species on transitional peatlands are also: purple marshlocks *Comarum palustre* or bogbean *Menyanthes trifoliata*.

WETLAND FORESTS

*Bog woodland, *91D0* – in Biebrza valley they develop mainly as a result of vegetation succession in the areas where people influenced water regimes and the use of wetlands in long term proved to be unprofitable. These are often young, not exceeding 60 years of age pine-birch wetland forests called *biele* <pol.>, and fragments of forest with characteristics of wetland pine woods surrounded by *biele*, encroached moss fields and alder woodlots. In undergrowth the sedge is dominant: fibrous tussock-sedge *Carex appropinquata*, lesser pond-sedge *Carex acutiformis*, woollyfruit sedge *Carex lasiocarpa*, bottle sedge *Carex rostrata*, upright sedge *Carex elata*, and also ferns: crested wood fern *Dryopteris cristata* and marsh fern *Thelypteris palustris*. Mossy layer is



well developed, includes: rusty bogmoss *Sphagnum fuscum* and many other sphagnum mosses. Naturally occurring processes change forests over the years. Thanks to dead trees they become an important habitat for many rare species of animals, plants and fungi. The inaccessibility of wetland areas make for preferable habitat for wolves and elks, nesting cranes or lesser spotted eagles.



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Protecting the wetlands, we also protect

all vegetation and animal species that live on them, enabling the survival of the most endangered ones, precious, highly specialized, with very narrow, strictly defined habitat requirements.



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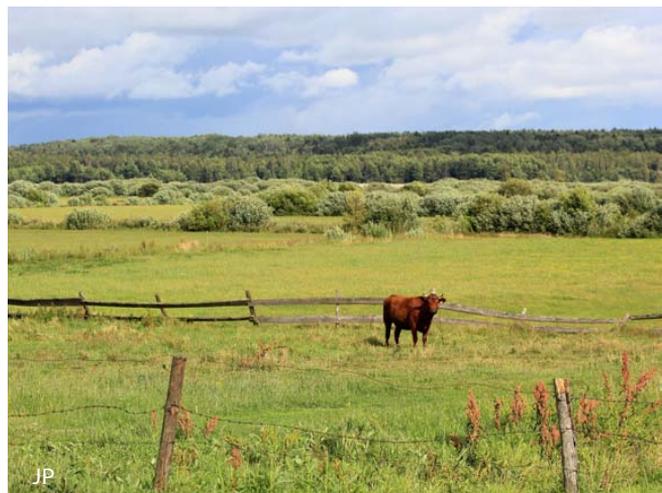
What threatens the wetlands?

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Constantly growing human pressure and changes in the surrounding world, have particularly strong impact on natural environment. Paradoxically, both intensification and abandonment of certain types of human activities contribute to changes in the environment, which in turn may cause deterioration or disappearance of habitats and species associated with them. Among the most serious threats for wetlands there are:

- ✓ **DEWATERING** – as a result of improper drainage and intensification of farming
- ✓ **DISAPPEARANCE OF TRADITIONAL AGRICULTURE** – abandonment of flooded peat fields or production intensification
Traditional, manual haying creates more diversified structure of vegetation and does not destroy wetlands, it is more nature-friendly than mechanical haying.

- ✓ **SECONDARY SUCCESSION** – when peat fields are encroached with trees and shrubs due to disturbed hydration relation
- ✓ **CLIMATE CHANGES** – have impact in structure and function of peat fields, what in return influences the climate



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Where we started?

GAINING REMOTE SENSING DATA

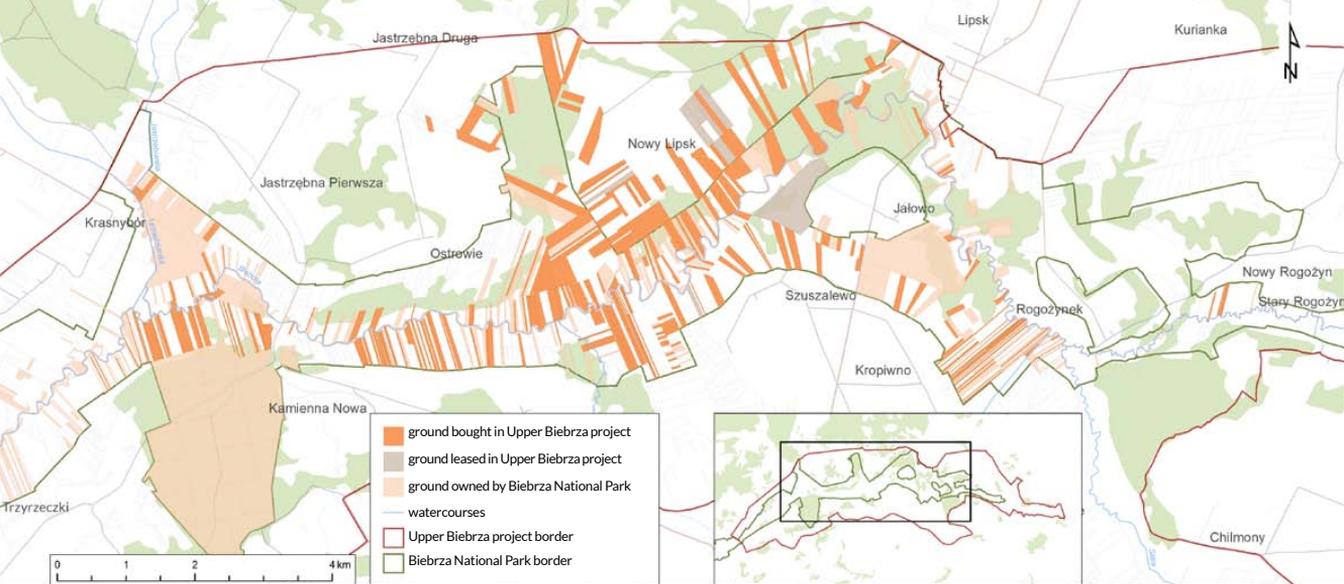
Collecting spatial data based on different sensors: Aerial Laser Scanner, multispectral, hyperspectral, thermal and crosswise cameras, became basis for future project activities. Survey conducted in 2013-2014 in the area of Upper Biebrza was the first project in Poland to use remote sensors' method on such a large scale. As a result the following were created: orthophotomap, aerial laser scanner data (Digital Terrain Model – NMT and Digital Terrain Cover Model – NMPT, Tree Tops Model), hyperspectral and thermal images. Due to area size, its inaccessibility, time and scale of the report, an innovative approach was implemented – with the use of remote data and analysis, professionals from many fields like: botany, hydrology and remote data research, created maps for: forest and non-forest ecosystems, vegetation and drainage network, which stood out with objectivity and high precision.

PURCHASE OF VALUABLE NATURAL LANDS

The basic problem of nature protection in the Upper Biebrza area, both in the form of active protection of open areas and passive protection of forest habitats, is the private ownership of land occurring in over 90% of cases. Such a restriction does not appear in any other parts Biebrza Valley. In addition this private property is very fragmented: lands are small and belong to large number of people. Conducting activities on private lands is extremely complicated, requires many arrangements and it is not possible without owner's permission. Moreover, lands owners in many cases do not accept methods proposed by the National Park nature conservation.

In order to achieve project goals, it was necessary to purchase valuable natural habitats located within Natura 2000 network, located both inside and outside the Biebrza National Park. Thus the extension of land ownership allows the protection of unique ecosystems and the introduction of conservation and renaturation treatments for the area.

Around 40% of Upper Biebrza area is a heavily drained, terrain out of which only 6% is managed by Biebrza National Park, the remaining detailed drainage works are managed at the own discretion by the owners of the land on which they are located.



In total, we obtained 754 ha of land with irrevocable designation of the purchased land for nature conservation purposes:

- ✓ purchased **664.5 ha**
- ✓ rented for the period of 20 years **89.5 ha of land**

ESTABLISHING WATER MANAGEMENT CONDITIONS

Water management in Upper Biebrza peat fields is focused on optimization of agricultural production and leave no space for superior aims arising from the need of peat fields protection and existing Natura 2000 network. To be effective in our work, we conducted an interdisciplinary environmental, engineering and legal research. For this purpose a team of specialists prepared a professional evaluation titled: 'Rules for the protection of the quantity and quality of water resources in Upper Biebrza

in regards to hydrogenic habitats' water needs', which contains 20 surveys and analysis. Based on data and information collected, it was possible to assess: water needs in hydrogenic habitats, current conditions of natural habitats and vegetation species functioning, surface water quality balance, creating of groundwater flow model and updating the status of the drainage network. Detailed analysis of spatial, natural and technical conditions enabled selection of seven areas, in which activities improving habitats' hydration should be carried out. For all the areas selected for renaturation a detailed functional and utility programs were developed, including planned work scope, technical solutions and implementation costs.

Results of analysis were then used for subsequent activities aimed at improving or attempting to preserve natural habitats in the condition that is not worsened at the very least.





How we protect the wetlands?

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NON-FOREST ECOSYSTEMS

Actions to protect the mossy fields, transitional peat fields and habitats being places for wetlands birds nesting and feeding.

For centuries meadows were a place to hay for local inhabitants. However an extensive farming became less profitable and increasing population needs came out as first in line. Biebrza Valley began to lose to agriculture – to make wetlands more productive, drainage works were started. Entire chain of events took place as a result of hydrological conditions interference, which finally led to impoverishment of large areas, reduction of their natural values and loss of their original functions. Some were irrecoverably destroyed, other abandoned, what as a consequence allowed expansive species to spread, trees and shrubs as well. Therefore measures have been taken to improve this situation, which are aimed at restoring proper water relations and inhibiting the succession of shrubs and tree growths in the wetland areas that are considered valuable in European scale.

RENATURIZATION OF LAND IMPROVEMENT

The most important factor for peat fields' development and existence are water conditions appropriate for their particular type. Their improvement, stabilization and thus better functioning of wetland habitats and species, required a number of actions. Based on data and information obtained in the first years, we were able to assess the needs of area's naturalization. They turned to be much larger than those previously anticipated in the project. In addition it turned out that we only have a direct decision-making impact on 8.1% of land located in areas of forecasted water elevation in



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field ditches. Despite land purchase and public consultations, the majority of project's key areas is beyond our control. As a result we carried out action only in one drainage facility (out of seven indicated in hydrologic analysis) – Kamienna-Kropiwno, divided into two sections important for existing habitats preservation: Szuszałewo and Kamienna Nowa.

As an effect, the following were created:

- ✓ 7 floodgates
- ✓ 3 thresholds
- ✓ 3 palisade baffles
- ✓ 2 culverts with dam
- ✓ technological dam with a length of 450 m for servicing hydrotechnical devices



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With optimal operation of all damming structures, the improvement of hydrological conditions is forecast in the area of 48.36 ha.

LIMITATION OF SECONDARY SUCCESSION

Driveways

Cessation of mowing swamp areas is very often the effect of the lack of roads – despite their existence in the records – allowing free access to plots located in peat bogs. In order to facilitate nature protection and the carrying out of agricultural works by local people, it was necessary to renovate impassable roads and fords, and to build new sections. In total 5 701 m of technical roads were repaired in 5 locations.

Equipment

A traditional hand-mow with scythes, practiced tens of years ago, is now gone. Therefore we bought new equipment, light and with new technical solutions, that does not damage sensitive habitats of high humidity:

- ✓ 5 sets of compact tractors – mowers for peat fields and special platforms to remove windrow
- ✓ 18 sets of manual petrol bushcutters to cut the shrubs



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Active protection treatments

In an effort to restore and maintain open nature of wetland ecosystems, first action was to cut down trees and shrubs, then a treatment imitating abandoned traditional hand-mow was introduced.

As an effect:

- ✓ 163,1 ha were cleared of shrubs
- ✓ 185,9 ha were mowed initially



before

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after

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FOREST ECOSYSTEMS

Actions to protect wetland forests

Wetlands forests are an inseparable element of Biebrza Valley landscape. They make biodiversity rich and are its important link. They are the habitat for many birds, a maintain for wolves and elks, as well as rare invertebrate species, valuable plants and especially fungi. It is all due to dead wood, which is the most important component in forest ecosystem. The way local people run forest usage does not help to protect this extraordinary ecosystem.

Overgrown swamp areas have increased their area over the last decades, but this was not reflected in the documentation, so they were not covered by any control and protection. Only the data obtained in the NMPT made it possible to compare the actual state of land cover with the data in the land register. Based on this, regulative actions were taken. An update of soil classification was performed on almost 514 ha of private lands in two county districts: Sokólski (405.4 ha) and Augustów (108.4 ha). As a result, many private lands included in nature habitat *91D0, still listed as meadows or wasteland, became



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forest record. The next necessary step was to create simplified forest management plans (UPUL), which cover increased forest area, in order to introduce management principles closely related to the needs of wetland forests protection rules. To increase their protection possibilities, compensation programme was introduced, encouraging local people to limit forest management and cutting trees. This programme was dedicated for local private forest owners. To a large extent, this innovative action will allow to observe in next years how life and changes progress in forest, which is not exploited by people as intensively as before.

As a result of forest ecosystem protection activities:

- ✓ Outdated land records for 514 ha were regulated
- ✓ Marshland forest area was increased by additional 178 ha
- ✓ Forests were taken under control and supervision in accordance with the Forest Act
- ✓ 108 ha of private forests were included in compensation programme.



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Research

Proper management of natural resources requires systematic observation, environment state control, data and processes collection. Long-term research has an appropriate cognitive value. As part of the project, following measures were introduced: monitoring of the status and quality of surface and groundwaters, monitoring of the selected plants and birds species. Monitoring results are collected in detailed annual and summary studies, created by experts in scientific fields.

TECHNICAL MONITORING

Status and quality of surface and groundwaters

Effective renaturation activities and thus protection of valuable natural resources, are associated with identification and elimination of endo- and exogenic interfering factors related to: water management, quality of environment or biological factors. In Upper Biebrza Valley these are land improvements. Some of its parts, despite of many years of agricultural usage, did not suffer significant habitat changes. It would seem easy to bright them back to satisfying ecological status by restraining water outflow. But the hydrological situation of wetlands in Upper Biebrza Valley is more complicated. There are two supplies for peat fields here: soligenic (groundwater flowing down from plateaus) and fluviogenic in western part (river flood). The proper wetlands condition depends on abundant and constant inflow of groundwater from drainage basin, so an important monitoring element is to examine the quantity and quality of surface and groundwater supply in various parts of the valley, taking changing hydro-meteorological conditions into consideration. For this purpose we created a monitoring network, using 40 electronic devices to automatically measure water levels and we located a meteorological station recording weather conditions. Observations and analysis indicated sections with large and constant water supply, and thus high renaturation potential and those, where water inflow coming from plateau may be insufficient in relation to the habitat needs. The quality of groundwater was assessed in relation to habitat requirements. Thanks to this research, it will be possible in near future to focus all efforts on renaturation of the areas, where there is greater chance of success.

Within Biebrza National Park there are not many drained wetlands, but outside of it, in Biebrza Valley bays and margins, there are many which were dried and turned into grasslands. This in turn caused peat fields disorder; among others in water depth retention, dynamic of groundwater, time and depth of surface drainage.



Installed technical monitoring network

was used to determine boundary conditions for groundwater flow model.

ENVIRONMENTAL MONITORING

Rare and endangered plant and birds species were selected for the research, as well as these which are more common, sensitive to habitat conditions, more responsive to environmental threats. Monitoring of their population, size and dynamics, and development directions in long term, enables to assess changes taking place in natural environment.



Fen orchid *Liparis loeselii* and marsh saxifrage *Saxifraga hirculus*

Results of two plant species monitoring in Upper Biebrza Valley: fen orchid and marsh saxifrage allowed to estimate its total resources in this area and define area of inhabited and potential convenient habitats.

Simultaneously, based on research carried out in the years 2013, 2015, 2017 and individual indicators and parameters assessment, first conclusions were presented regarding threats to their continued existence and method recommendation on how to protect them.



Protection of fen orchid and marsh saxifrage

in north part of Biebrza National Park is of key importance for these species preservation in Poland.

Results and conclusions:

- ✓ Fen orchid and marsh saxifrage within the upper basin of the Biebrza Valley form extensive populations that are among the most numerous in the country.
- ✓ Two plant species occupy relatively large habitat in comparison with other sites in the country and in case of fen orchid it is over 200 ha, in case of marsh saxifrage it is about 15 ha.
- ✓ Number fluctuation of both plant species depends on the amount of precipitation. In dry years, drainage ditches have negative impact on their population, where it is least numerous
- ✓ Expansion of shrub and woods is a threat for photosensitive plants.
- ✓ Active protection treatments carried out in the project allowed to temporarily reduce expansion of undesired plant species within the mossy areas.
- ✓ Irreversible structure changes and physicochemical properties of the land can cause a slow reduction in both plants population and disappearance of least numerous clusters. **Fen orchid and marsh saxifrage survival in upper Biebrza Valley is very likely in long term, however it requires continued active protection.**

Monitoring of selected bird species

The upper Biebrza Valley, although to a smaller extent comparing with the lower and middle basin, is an important habitat and breeding land for wetlands birds. Project's environmental monitoring included 6 bird species associated with wetlands including: globally endangered aquatic warbler *Acrocephalus paludicola*, corncrake *Crex crex*, black grouse *Tetrao tetrix*, white stork *Ciconia Ciconia*, crane *Grus grus* and lesser spotted eagle *Aquila pomarina*. In order to define research background, tests were conducted for each aquatic warbler and corncrake bulwark, based on principles of the national Monitoring of Common Breeding Birds. As a result, initial conclusions were formulated for individual species population:

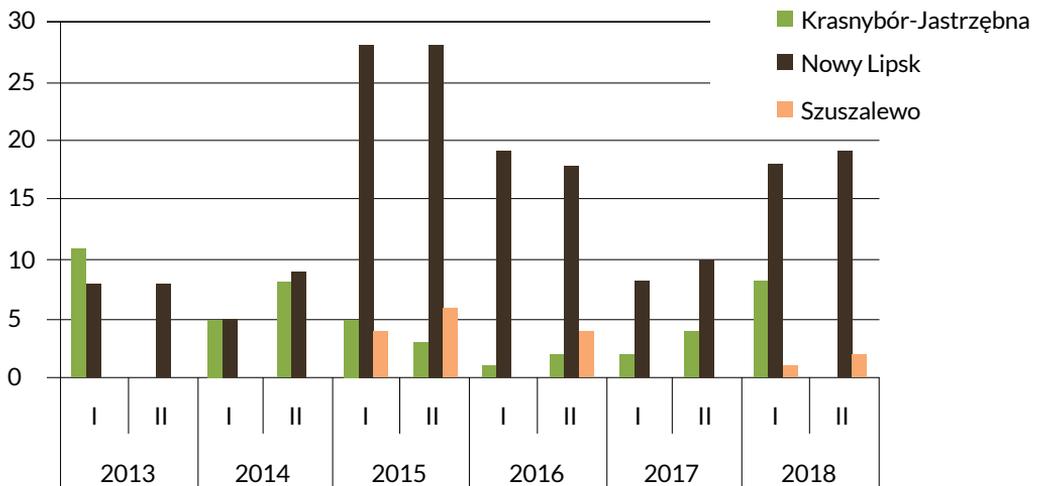
- ✓ Number of corncrake depends not only on habitat conditions, but first of all on mowing season. Early mowing leads to loss of breeding habitats, destruction of nests and death of brooding birds.
- ✓ Population of aquatic warbler occurs constantly in two areas. Other places may be unstable. Removing shrubs and mowing peat fields may increase potential habitat for aquatic warbler.
- ✓ Population of white stork monitored within the project is stable. However, with continuously developing agriculture and decreasing range of areas and food resources, it is necessary to keep constant monitoring of this species.





- ✓ Based on our research, population of lesser spotted eagle is estimated at 5-6 breeding pairs.
- ✓ Population of black grouse in upper Biebrza Valley can be considered as minimal or extinct. This may have many reasons, the most important are: increased pressure of predators, strong geographical isolation, climate change or negative habitat changes.
- ✓ Within project area we noticed places where cranes accumulate for the night during autumn migration: in total approx. 1 thousand individuals.

Number of aquatic warblers in particular bulwark in years 2013-2018



Tourism



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Upper Biebrza Valley is a unique land. A cultural borderland strongly embedded in Biebrza landscape together with nature mosaic, allow to experience interesting and pleasant moments and unforgettable adventures. New infrastructures makes it now even more exciting, giving a chance to spend a good time and have a perfect rest. Tourist infrastructure was created in harmony with nature and integrated into the surrounding landscape, located throughout upper Biebrza Valley:

- ✓ 5 viewing towers
- ✓ 6 shelters and 12 roofings as a place of rest
- ✓ nature and educational trail with wooden foot-bridges and floating bridge crossing on Biebrza river with total length of 5 km



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Information and promotion

Project activities were largely based on cooperation with local residents. To have better contact, provide an introduction to the subject of wetlands protection and positive reception of planned activities, 30 meetings were held with over 700 people attended. Their aim was also to promote and provide information about the project. A number of individual meetings focused on a specific recipients group – land owners located in areas where it was intended to start activities related to active protection of wetlands.

As part of the project, we held educational workshops titled: 'Water for the nature – how to wisely manage water supplies at peat fields', 'Wetlands not only meadows', 'Forest – not only trees', these workshops were dedicated to school children, youth and adults living in Biebrza counties and also study-case trips to other regions of Poland, showing local positive social initiatives.

Regular element of our informative campaign was an advertising flyer introducing project activities and promoting wetlands' protection. Additionally we had gifts to promote our project i.a.: calendars, bags, T-shirts, cups, notebooks, and a promo video 'Care for wetlands' which was broadcasted in television in order to reach wider audience.



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13 information boards were located beside the tourist infrastructure and in county towns.



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Project through the eyes of locals



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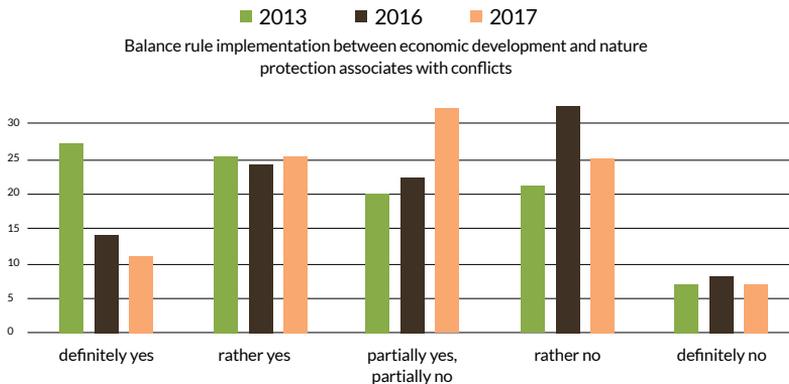
Social environment of the project is a kind of cultural melting pot: modernity mixes with tradition, we have economic and ideological diversity here, and implementation of our project inevitably leads to many conflicts. Upper Biebrza Valley focuses challenges of modern world which is dealing with diversity and the need to elaborate a model of co-existence with various interest groups.

Research conducted among local inhabitants in years 2013-2017 shows that the image of Biebrza Park Narodowy has improved.

- ✓ Percentage of people experiencing negative impact from Biebrza Park Narodowy activities significantly decreased – the number of committed opponents dropped down.

Is the conflict inevitable?

Balance rule implementation between economic development and nature protection associates with conflicts

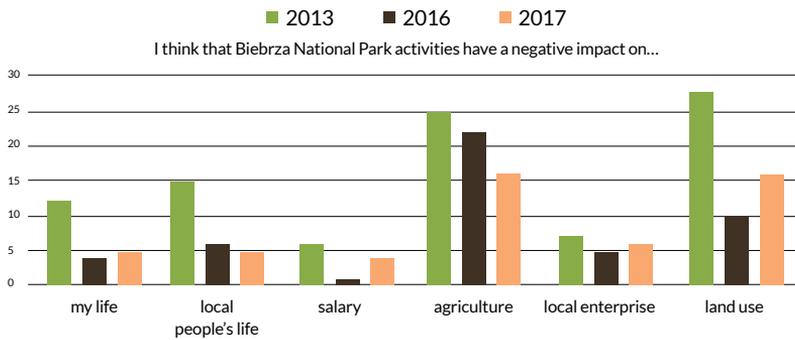


- ✓ Negative assessment of Biebrza Park Narrowway activities decreased – project’s activities compensated unfavourable conditions (in some farmers opinion) to conduct agricultural activities in protected area.
- ✓ Percentage of people thinking that nature protection is a barrier for local development

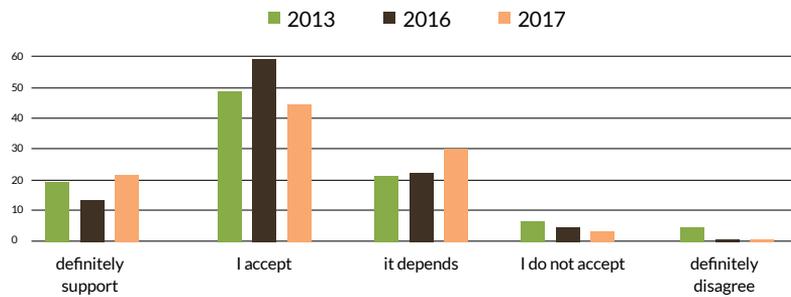
decreased. Local residents associate nature protection less and less with conflicts.

- ✓ Project activities gained relatively high public acceptance – most of survey’s interviewees stated that similar initiatives should be implemented in the future.

“The devil is not as black as it is painted...”



What is your general attitude towards Biebrza National Park?



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Summary



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The implementation of the project combining diversified areas of activities was certainly a big challenge. It focused on integrating unique wetland ecosystems protection with local residents' needs. Gaining social acceptance is the key factor for any nature protection related activities, also here it turned out to be necessary to start work on water relation improvements and wetland forest protection. During project lifespan there were few attempts to start cooperation with local authorities, which eventually resulted in signing an agreement with only two municipalities. We hope it will support further activities after the project ends.

Despite all efforts made, not all implemented tasks were completed within the planned scope. Only a better and deeper area recognition showed a right scale of renaturization needs, which significantly exceeded project's possibilities and assumptions. We did not obtain the right to use the land in the majority of significant areas. However, given the very complicated ownership situation existing in upper Biebrza Valley, an important step apart from purchase attempt to merge valuable areas, we achieved an agreement with private land owners. It gave us the opportunity to take first steps in water hydration improvement.

To preserve endangered habitats, it was equally important to recreate their open character by eliminating expansive species of herbaceous plants, shrubs and trees. To maintain long-lasting effect, it is recommended to keep extensive haying. Financing this form of protection in the following years after the end of the project is planned through participation in the agri-environment-climate program.

Constructing tourist infrastructure had a positive effects. Beside outdoor activities, it gives a chance to have direct contact with wetlands nature inaccessible on a daily basis, fulfilling important role in nature education. Increase of local residents awareness and knowledge of unique ecosystems and the need to protect them results in gaining the belief that the actions taken are right.

It is undeniable that this project enabled the implementation of activities aimed at preserving biodiversity of Biebrza wetlands. However we can not stop there. Huge amount of gained knowledge will definitely help in the future to manage this area in better, more comprehensive and complex manner to protect one of Europe's most valuable wetland habitats.



What is next in wetlands' care

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Keeping wetlands and river valleys in the best possible condition should be a priority in a fight against climate change. Global warming not only causes irreversible changes in nature, but is also a problem for whole humankind, bringing consequences for each of us. Is it worth trying then? What will be the effects of taken actions? – time will tell. Wetlands are constantly changing, we can observe this process comparing the nature from few dozen years ago with

the one now. But are we only passive observers? Does it mean we already lost? Drastic changes and constant wetlands diminish are primarily related to activities of man, who is trying to subordinate almost all, even most inaccessible corners of the world. Until there is a breakthrough in global human way of thinking, their disappearance is inevitable. Until then, all attempts to maintain these endangered habitats and species seem to be the only way to save them.

Therefore, let's continue activities to protect wetlands.

Caring for wetlands is also caring for people.



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Care of wetlands and people



Biebrza
National Park



Polish
National Parks