

## **NATURAL COMPLEX OF THE BELOVEZHSKAYA PUSHCHA NATIONAL PARK IN THE TERRITORIES OF BELARUS AND POLAND**

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### **ABSTRACT**

National parks are both ecological and tourism richness of a country. Belovezhskaya Pushcha National Park is one of European largest and most important park and located on the territories of Belarus and Poland. The portion of the park in the territory of Belarus is very large and it is 150 069 ha, whereas its portion in the territory of Poland is very small – 10 502 ha. The National Park that has the oldest natural forests in Europe was declared as the Biosphere Conservation Area in 1993 within the framework of UNESCO ‘Human and Biosphere’ program. In the present study, climate, landforms, flora and fauna characteristics of the Belovezhska Pushcha National Park have been investigated and its ecological potential has been discussed.

*Keywords:* Belovezhskaya Pushcha National Park, Poland, Belarus.

### **AIMS AND BACKGROUND**

Natural ecosystem has completely changed on the 5th part of the land. According to the data of the International Union for the Conservation of Nature and Natural Resources, 74 species of birds (1.23%) and 63 species of mammals (1.43%) have disappeared from the earth in the last few centuries. The death of 75% species of mammals and 86% species of birds is connected with human activities. The loss of biodiversity

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from the destruction of natural landscapes and direct extermination by human beings comprise about 10 thousand species. Natural as well as anthropogenic factors influence the state of living organisms, their habitats and natural ecosystems in Belarus as well as in Poland. Climate changes, sharpening of the competition between local and alien species refer to the natural factors<sup>1</sup>. One of the main anthropological is the pollution of the environment caused by the functioning of industry, community facilities and agriculture, transport, and radioactive pollution of the territory as a result of the Chernobyl accident. Cutting of the forests, fires (in the forest, marsh, etc.), plowing of the meadows and mechanical hay mowing have resulted in the decrease of the biological diversity of Belarus. High level of urbanisation of some regions, intensive development of transport and also recreational activities have destroyed the habitats of animals and the place of plant and mushroom growing.

There are 19 817 rare species and wild animals and wild plants under the threat of extinction in the Red Book of the International Union for the Conservation of Nature and Nature Resources. Almost one fifth of all current species of vertebral animals and almost one fourth of species of plants, but for some species under the threat of extinction, this index exceeds 60% (Ref. 2). Further reduction of biodiversity may lead to the destabilisation of the biota, the loss of the completeness of the biosphere and its ability to maintain the main qualities of the environment necessary for life. According to the UN, 40% of the world economy depends on the biological diversity. That is why the preservation of the earth biodiversity is one of the main problems of the 21st century.

The problem in Belarus and Poland has been of current interest. The most effective way of the conservation of biodiversity is the formation and provision of stable functioning of the system of specially protected natural reservations and national parks among them.

## EXPERIMENTAL

Materials from the Ministry of Natural Resources and Environmental Protection, the State environmental institutions 'Belovezhskaya Pushcha', the State research and manufacturing association 'Scientific practical centre of biological resources of National academy of science of the Republic of Belarus'<sup>2,3</sup>, literary resources<sup>1,4,5-7</sup>, and internet resources<sup>8-11</sup> were used for examination of the national parks in Belarus and Poland.

In the national parks there are different kinds of activities such as environmental, scientific, touristic, recreational, healing and economic, including forestry, hunting, fishing and rural economy. There are two main streams of the research: monitoring of processes and events in the natural complex and fundamental research of the structure and dynamics of the natural meadow, forest, lake and river complexes, ornith- and teriofaunas.

## RESULTS

The National Park 'Belovezhskaya Pushcha' has been created for the preservation of the unique natural complex typical for the Republic of Belarus and Europe and for providing natural processes of evolution<sup>3</sup>. According to the statement of national park, 'Belovezhskaya Pushcha' as a natural complex of pan-European historical and cultural-ecological importance is defined by the following features; rather good preservation for European conditions of the majority of the components of geographical environment and separate biogeocenosis, existence of the last relics of once vast European forests with the existence of relic populations of plants and animals, variety of natural ecosystems on a comparatively small territory with a homogeneous geological structure and climate, geographical position on the boundary of east and west Europe with transitional bioenvironmental, climatic, hydrologic and natural-historical conditions<sup>4</sup>.

The territory of the national park is divided into two parts: Belarusian and Polish ones by the state boundary. It was first mentioned in 983 (Epatiev chronicle), but the order to close the reserve was established at the beginning of the 15th century. First of all, Belovezhskaya Pushcha was protected as a hunt holding of great Lithuanian knyazh and then of Russian imperial family<sup>2</sup>. Since 1939 Pushcha has had the status of State Nature Reserve and since 1957 – the status of State Hunting Reserve on basis of which National Park Belovezhskaya Pushcha was established.

The flora and fauna of Belovezhskaya Pushcha suffered greatly during World War I. Intensive construction of light railways for valued wood storage took place in Polish territory and some timber works were built for its reprocessing. 4.5 million m<sup>3</sup> of high-value wood were exported to Germany for two and half years. The amount was just the same as it was prepared in the Pushcha for the whole previous history. The animal kingdom of Belovezhskaya Pushcha suffered greatly during World War I. Bisons and fallow deer were exterminated by 1919, the number of deer and wild boars decreased sharply. Pushcha became the property of Poland after the war. In an international conference of environment conservancy in 1923, the Polish delegate Yan Stoltzman asked to save the bison from a complete extinction. After this, breeding bison nursery was created where six bison were brought from zoos, zoo gardens and private premises and the recovery of the population began. Wood farm Reservat was established close to the administration area of Pushcha (Belovezha) in the territory of 4594 ha in 1921. In 1924, the same wood farm got the status of upper forestry and since 1929 its whole territory (4640 ha) became a preserved area. In 1932 national park in Belovezha (4693 ha) was formed on the place of the forestry which functions today as well<sup>10</sup>.

In 1976 'Belovezha' was created a biosphere reserve in the Polish part of Pushcha according to the UNESCO program 'Man and biosphere'. In 1979 Belovezhsky national park was included into the World Heritage List by the decision of UNESCO. In 1992, this environmentally protected site of UNESCO was broaden by the part of State National Park 'Belovezhskaya Pushcha' and got the name of 'Belovezhskaya

Pushcha'. The united transfrontier object of the World Heritage UNESCO with the total square of 141 885 ha and buffer zone of 166 708 ha got the name of Bialowieza Forest, Belarus, Poland by the decision of the World Heritage Committee, June, 23, 2014 (Refs 8 and 9).

Belovezhskaya Pushcha in the territory of Belarus has the status not only of biosphere reserve of UNESCO, but also of the key ornithological and botanic territory. There are zones with a different forest preservation duty in Poland; close zone (first zone takes 11% of the whole park territory and is planned to be broadened up to 20%), local zone (second zone takes 35%) where forestry activity is prohibited, but attendance of population is permitted, transition zone (third zone – 18%) with moderate reconstruction, reduction zone (fourth zone – 36%) where it is possible to harvest for local necessities. There is a buffer zone around the park which includes forest districts of Brovsk and Belovezha. There is also a buffer zone from the side of Pogoreltsy and Masevo for reducing an anthropogenic impact on biological diversity<sup>10</sup>.

Belovezhsky National Park with the total square of 10 517.27 ha is the most important protected territory in Poland, where 5725.75 ha of the whole territory is under strict protection. It is the oldest national park in Poland, which was founded in 1921. Since 1992 the close zone with the neighbour territory of the preserved area of Belarusian national park has formed the transfrontier Polish-Belarusian object of world heritage. The rest part of Pushcha forms Forest Complex 'Forests of Belovezhskaya Pushcha'. There are 20 natural reserves, and only two of them are under strict protection. Besides, there are about 1200 trees which have been declared to be national monuments.

Within the national park, there are the following zones:

(1) Area of outstanding natural beauty, intended for preserving in the untaught state natural complexes and objects, providing conditions for their natural development. Within the area, all kinds of activity are prohibited excluding researches and measures for their protection.

(2) Area of control usage, intended for preserving natural complexes and objects, providing conditions for their natural development and restoration. Within the area, some kinds of economic and other kinds of activity and usage of natural resources according to the law of the national park are restricted.

(3) Recreational area, intended for tourism, relaxation and healing benefit. Within the area, there is an order providing protection and stable usage of the recreational resources.

(4) Economic area, intended for functioning of the national park. Within the area, there are economic and other types of activities with the usage of environmental technologies<sup>2</sup>.

There is also a protective zone adjoining the national parks. In the 'Belovezhskaya Pushcha' national park in the Belarusian part, 37% of the territory occupies an area of outstanding natural beauty, 32.3% – an economic area, 25.4% – an area of control usage, 5.1% – a recreational area<sup>1,2</sup>.

Modern relief of the territory of Belovezhskaya Pushcha was formed by the action of Sozh glacier and its melting waters. The surface is flat, slightly billowy, complicated with dunes, kames, and bolsons. There is the Belovezhskaya terminal moraine in the south-east of the park. The highest point is the mountain near the country of Porosovo (242.5 m), the lowest – the bank line of the river Lesnaya Pravaya near the country of Homutini (143.6 m). About one third of the territory is marshes. There is one of the largest marshes of lowland type in Europe – marsh Dikoe in the south-eastern part of the park. The scientists consider that the marsh is more than 6 thousand years old. There are 700 species of plants in it. A sedgy sphagnous swamp is considered to be unique for the Republic of Belarus<sup>2</sup>.

Aqueoglacial and eolian plains, stream valleys are situated on the territory of the national park in Poland. Vegetation changes depending on the form of relief. Swampy forests grow in lowlands, pine forests on the tops and slopes of sand hills.

According to the agroclimatological zoning of Belarus, Belovezhskaya Pushcha is referred to the south unstable humid warm zone of Belarus occupying its west suburb. It is here where the shortest and warmest winter, the most long-lasting vegetation period, the greatest warmth provision of the territory in the republic are seen<sup>3</sup>. According to the data of Republican Hydrometeorological Centre, the average annual temperature of the air is above zero (5.1 – 8.5°C). Average annual temperature in July is +17.8 – 4.4°C in January. Maximum and minimum temperatures reach +36.4 and –40.1°C, respectively. Annual average amount of precipitation is 653 mm and most part of it (66%) falls in the summer period<sup>10</sup>.

Hydrographic system of Belovezhskaya Pushcha is presented mainly by rivers and soil reclamation canals. The watershed of the Baltic and Black Sea is situated on the territory.

Soil covering is very diverse. On the moraine deposits brown forest soils and sod-buff-podzolic soils are formed, on the sandy deposits – sod-podzolic and soddy soils, and in lowlands – excessive humidity soils.

There are more than 1024 species of higher tracheate plants, 292 species of lichens, 270 species of bryophytic and more than 3000 species of mushrooms in Belovezhskaya Pushcha. In this relatively small territory, 70% of plants growing in the territory of our republic are found<sup>2</sup>.

Belovezhskaya Pushcha is the only large massive in Europe which has been preserved in its natural state with high age-related forests of west-European type with elements of west, north and south flora. Such forests grew on all the territory of Europe in the prehistoric times. In Belovezhskaya Pushcha, all the diversity of Belarusian forests according to the species composition, age structure and productivity, types of forests and their conditions of vegetation are represented. There are 120 types of forests, 13 forest formations on the territory of the park<sup>2</sup>. In Belovezhskaya Pushcha, 25 types of trees grow; and conifer forests are predominant in the national park. Almost all types of pine forests in Belarus can be found in Belovezhskaya Pushcha. An English oak dominates among broad-leaved species. Hornbeam forests occupy the 2nd place

among broad-leaved species<sup>1</sup>. Small-leaved forests of the Pushcha are represented by plantations of a black alder, pubescent and European birch, Dutch beech and linden. 38 species of bushes (avellane, buckthorn, juniper, raspberry, different willows, etc.) grow in the national park<sup>2</sup>.

Middle age of the Pushcha forests is 97 years, maximum – 200–300 years. There are 400–600-year-old oaks-giants in the Belovezhskaya Pushcha. A durmast oak, extinct species, grow in the area of 1000 ha. Pushcha is its east border of expansion on the plain. This species of an oak is in the Red Book of the Republic of Belarus<sup>2</sup>.

In the territory of Belovezhskaya Pushcha, 8 categories of rare and unique phytocoenosis which occupy more than 22% of the park territory grow<sup>1</sup>. It is the high age-related forests of west-taiga habitus, subatlantic and central European oak and hornbeam-oak forests, high age-related oak forests on sandy soils, central European lichen pine forests, ecosystems of lowland, transition and upland moor<sup>2</sup>.

Permanent grasses compose about 80% of herblike plants. Together with typical for Belarus herblike plants, ephemeral and ephemeraloid (whiteblow, anemone, notodontid moths, gagea and broad-leaved garlic, figroot buttercup, etc.), hemiparasite (eyebright, rattlebox, mistletoe, etc.), parasite (field dodder, toothwort), saprophyte (birds-nest orchid, fir-rope), xerophytes (sheeps fescue grass, thyme, mouse bloodwort) and etc. grow on the territory of the park.

Ancient forest of Belovezhskaya Pushcha is rich in lichen. Prevailing part of all rare lichen of Belarus (15 species out of 17) grows in Belovezhskaya Pushcha. It adapts to the most unfavourable conditions of the environment, the dryness of the sole and air, and the sudden weather change. 62 species of tracheate plants, 16 species of lichen, 12 species of mushrooms are in the Red Book of the Republic of Belarus (Ref. 2). The majority of rare plants of Belovezhskaya Pushcha are a cladotype. Most of them are situated on the boundary of their areolae or outwards. A mountain violet, yellow marsh saxifrage, wortleberry willow, European ivy, lady slipper, double-leaf, marsh sedge, etc. are referred to rare and under threat of extinction species of plants.

There are up to hundred plant societies in the Polish part of Pushcha. Broad-leaved and mixed forests are most typical in Pushcha. The forests on the territory of the national park in Poland consist mainly of fir-tree – 26%, pine – 24%, alder – 17%, oak – 12% and birch (weeping and white birch) – 11% (Ref. 10). There are also ash trees, lindens, Norway maples, poplars, aspens and elms. A wide-spread hornbeam composes the second layer of tree vegetation as a rule and is very rare a part of the first layer.

The forests of Belovezhskaya Pushcha are characterised by a good state of wild stand comparing with the other forests of Poland. Almost 40% of forest cover are represented by the trees that are older than 80 years. Mean age of wild stand in Belovezhskaya Pushcha is 73 years and 130 years on the close areas of Belovezhsky national park<sup>10</sup>.

Flora of Belovezhskaya Pushcha is estimated to have 1040 species of vascular plants, more than 3000 species of mushrooms, 375 species of lichens and 200 spe-

cies of moss. Many species of lichen and moss which were previously wide-spread have remained only in such places as Belovezhsky relict forest. Many species are directly connected with dead-wood, tree stumps, brush wood and bark of old trees. Belovezhsky relict forest is characterised by their presence.

Vascular plants of Belovezhskaya Pushcha are well examined. Only 664 species of vascular plants may be considered as natural components of forest ecosystems of Pushcha. Other species appeared in Pushcha after man created appropriate conditions for their growth. Nowadays there are 353 such species and they are on the increase. The most numerous family of vascular plants in Belovezhskaya Pushcha is composite family – 108 species, herbous – 85, sedgy – 66, Rosales – 59, leguminous – 54, etc.<sup>10</sup>

There are also spruce forests on the peat bog in the Polish part of Belovezhskaya Pushcha. The characteristic feature of such forests is considerable predominance of a fir tree in the timber stand with a total absence of deciduous trees. There are also cranberries among different species of moss and some rare plants.

More than 12 000 species of invertebrate animals and 362 species of vertebrate animals inhabit the territory of Belovezhskaya Pushcha<sup>2</sup>.

Mammals of Belovezhskaya Pushcha at the present time are represented by 59 species, which form about 85% of fauna<sup>5</sup>. 20 species are represented by rodents, 13 – chiropterans, 12 – carnivores, 7 – insectivores, 5 – cloven-hoofed and 2 – dublicidentates.

The European bison is of the most interest among them as having been included in the International Red Book. It is one of the largest animals in Europe and one of the ancient animals of our planet belonging to the class of bison. The length of the male body is 255–305, the height in the breast area is 170–195 c<sup>6</sup>. The females are of a smaller size. The weight of the grown is 600–850 kg (sometimes it can reach 1 t), of the female – 400–600 kg. Bison reaches full physical development at the age of 7–8 years, and lives about 25 years (Ref. 8).

Besides bison, there is the red deer, a European roe, moose, wild boar among hoofed animals in Belovezhskaya Pushcha. A red deer and wild boar are the most numerous among them, the amount of which can reach more than 1500 individuals in some years. The livestock of roes changes from year to year. It depends on the climatic conditions in the winter period and is regulated by the number of wolf and lynx. Recently the number of roes has been about 300 individuals in Belovezhskaya Pushcha. A moose is the most numerous species among hoofed animals. 80 individuals inhabit Belovezhskaya Pushcha<sup>8</sup>. The main reasons of low moose numbers are bad conditions for its inhabitation and a competition for food with a deer.

A hedgehog, mole, common shrew, etc. are typical for Pushcha. A common shrew is the smallest mammal of the world, the weight of which reaches only 3 g.

Avifauna of Belovezhskaya Pushcha is exclusively rich and diverse. There are 254 species of birds out of 310 species marked all over the territory of Belarus<sup>8</sup>. It is more than in the other parks in Belarus or Poland. About 180 species nest among them.

Belovezhskaya Pushcha is the place of all 10 species of woodpeckers existing in Belarus. It is here that is the typical inhabitant of European deciduous forests – medium woodpecker and the representative of north taiga forests – three-toed woodpecker, the inhabitant of primeval forests – white-packed woodpecker and exclusively synanthropic species – Syrian woodpecker, the smallest – wryneck woodpecker in Europe and the largest – black woodpecker, the most secret – grey-headed woodpecker and the most talkative – great spotted woodpecker<sup>8</sup>.

The inhabitants of Belovezhskaya Pushcha are owls represented by 11 species, most of which are included into the Red Book. The largest owl is the eagle owl, the weight of which can reach 3 kg, but the smallest – pygmy owl, 60–80 g (Ref. 8).

There are all 7 species of reptiles of Belarus in Belovezhskaya Pushcha. A grass-snake is the most typical of the snakes, which inhabits everywhere in the park and can be found most frequently in the wet places. An adder and smooth snake can be found rarely. A sand lizard and viviparous lizard, deaf adders also inhabit the park<sup>8</sup>.

There are 11 species of amphibian in Belovezhskaya Pushcha. It is a common newt, crested newt, fire-bellied toad, spade-footed toad, hyla, 3 species of frogs and toads. A brown frog and moor frog inhabit in wet forest habitats, but an edible frog in ponds with dead water. An European common toad is the most frequent out of all toads, which prefers wet forests<sup>8</sup>.

Ichthyofauna of Belovezhskaya Pushcha is represented by 27 species of fish and stone eel<sup>8</sup>. A roach, perch, ruff, pike, gudgeon, tench, crucian and Prussian carp are also typical in that habitat. Rare representatives are an eel and catfish. One species, Capricorn beetle, is included into the republican Red Book.

28 species of invertebrate animals (1 species of leech, 1 species of millipede, 26 species of insects) are included into the Red Book, including a medicinal leech, Norfolk coenagrion, European ground beetle, great Capricorn beetle. A Capricorn beetle, running toad, fresh-water turtle, and smooth snake are referred to as rare species<sup>2</sup>.

The most numerical species among the rare protected ones are birds, 64 species or 89% of the whole list of rare and petering out species of Belarus, including a red-necked grebe, smew, red kite, golden eagle, fish-hawk, booted eagle, barn-owl, eagle owl, Siberian gray owl, etc.<sup>2</sup> Swamp Dikoe is one of the main habitats of an aquatic warbler – a species under the threat of global extinction. Because of this, Belovezhskaya Pushcha has a status of a key ornithological territory with an international importance.

On the territory of the National Park, there are 10 species of mammals that are in the Red Book – a lesser noctule and northern bat, badger, European lynx, common dormouse, hazel and garden dormouse, common hamster, and European bison, the flock of which counts more than 400 individuals<sup>2</sup>.

The fauna of Belovezhskaya Pushcha in Poland is rich. It is characterised by the presence of different species. Until 2008, there were 11864 species of animals including 58 species of mammals, 240 species of birds, 7 species of reptiles, 12 species of amphibians, 32 species of fish, and invertebrate animals, etc.<sup>10</sup>



In the Belovezhskaya Pushcha in Poland, species of different climatic zones and regions exist. Modern mammals are presented by 58 species, which are representatives of six classes; insect-eaters (a mole, hedgehog, shrew, etc.), night bats, predaceous (a wolf, lynx, raccoon dog, badger, otter, etc.), cloven-hoofed (an elk, deer, roe and boar), rodent (a mouse, squirrel, vole, and dormouse) and double-toothed rodents (a European hare, and blue hare)<sup>10</sup>. 12 species of mammals are included into the Red Book in Poland. There are animals that have become extinct in the whole world and exist only on the territory of Pushcha. Besides, there are species for which the native habitat has decreased, for example, a European mink and wild cat. On the other hand, there is an increase in such animals as a raccoon dog, American mink, musk beaver, house and European mouse, field vole, etc.

A visit card of Belovezhskaya Pushcha is bison. Among hoofed mammals, there are also deer, roe deer, wild boar, and elk. A lynx, grey wolf (the density of wolf population is 2–3 samples on 100 km<sup>2</sup>), fox, least weasel, European weasel, European polecat, marten, otter and badger inhabit the Polish part of Pushcha. Among carnivore, there are introduced mammals, for example, an American mink. Gnawing animals (19 species) and bats are wide spread in Belovezhskaya Pushcha<sup>10</sup>.

240 species of birds have been counted in Poland. 12 species are in Red Book. 175 species of constantly breeding birds are registered<sup>10</sup>. Birds population is numerous and typical for original forests not damaged by economic activity. They are a black stork, grey crane, booted eagle, eagle owl, etc. Comparing with other national and European forest regions, Belovezhskaya Pushcha is rich in variety of species. Diversification of bird species is represented by birds of prey (15 species), owls (8 species), woodpeckers (8 breeding species and 1 migration type), slavkov birds (23 species).

Among the species that have recently appeared in the forest ones should also be mentioned; a redstart, canarybird and lential. Unfortunately, some of the forests breeding birds are considered to have vanished; a peregrine falcon, marsh owl, crested lark. The state of birds fauna in Belovezhskaya Pushcha is considered to be good with relatively small number of alien species which are not connected with forest environment.

The fauna of 12 amphibian species is represented in Belovezhskaya Pushcha in Poland. These animals are wide spread in Poland, but have a tendency of decreasing in population, on the verge of extinction. European fire-bellied toads were quite wide spread even on grassy glades which were situated inside the forest complex, but since late 90s the representatives of that species can be found only in several areals situated on the edge of the forest.

In addition to the European fire-bellied toads, there are European tree-frogs, spade-footed toad, running toad, grey and green toad, swamp and water frog, and 2 species of newts – common and crested newts in Pushcha.

Reptiles form a less numerous group of vertebrate and are represented only by 7 species in the Polish part of Pushcha. Such species as a sand lizard and water snake are least of all extended, but a blindworm, asp and water lizard are more extended

in Belovezhskaya Pushcha. European fresh-water turtle and smooth snake are very rare there.

Fish relates to the numerous systematic groups of animals that inhabit Pushcha in Poland. Forest rivers are not long, the water flows slowly and that limits the possibilities of development and habitation of many fish. There are no large reservoirs within the forest zone. 32 species of fish and round-mouthed fish (3 species of lampreys) were discovered in the reservoirs of Pushcha.

The world of invertebrate animals of Belovezhskaya Pushcha is diverse. Animalculines, flat worms, eelworms, hypotrichs, shellfish, worms, tardigrades, spiders, acarians, millepedes, insects, etc. are spread in Pushcha. Bugs and butterflies form 51%, orthopterous 49%, golden-eyed lacewings 48% of the national fauna<sup>10</sup>. Belovezhskaya Pushcha is considered to be a shelter for insect biodiversity that is important for the whole continent.

Belovezhskaya Pushcha is a native habitat for a great amount of animal species. The value and uniqueness of forest resources is not associated with the amount of species, but in the value of these species. There are a lot of species which are specific for native forest habitat in Pushcha. Another characteristic feature is low species density with considerable species diversity within one region.

Main threats of the biodiversity and uniqueness maintenance of the nature complex in the Polish part of Belovezhskaya Pushcha are<sup>7</sup>:

(1) Fragmentation of the left natural ancient forests in the complex which threatens hundreds of relict species of plants and animals. Forests with complicated regional, specific and age-related structure, conforming to the local conditions of growth are interchanging for growing stock of a simplified structure definitely with less diversity in flora and fauna.

(2) Violation of hydrological regime as a result of land drainage and hydrotechnical jobs on river flow regulations. The results of such activities may be seen in the long term after the activities are completed.

(3) Extensive agriculture and cattle breeding leads to the decrease of landscape variation through the disappearance of flood meadows and reduction of open area around the settlements. It decreases a fodder base for hoofed mammals, first of all for the bison, and results in the disappearance of plants and animals (for example, a corncrake and some species of butterflies).

The main threats of biodiversity and uniqueness of Belarusian part of natural complex in the Belovezhskaya Pushcha preservation are<sup>7</sup>:

(1) The problem of natural forest recreation in ancient growing stocks because of the increase in vegetable-feeders;

(2) Swamp drainage and river channel straightening;

(3) Intensive large-scale leading of agriculture within the territory of Pushcha and buffer zone.

Therefore, the environmental features of the Belovezhskaya Pushcha national park in the territory of two countries have been determined in order to help to preserve biodiversity.

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