THE BIAŁOWIEŻA PRIMEVAL FOREST

RESTORATION

Centrum Informacyjne
Lasów Państwowych

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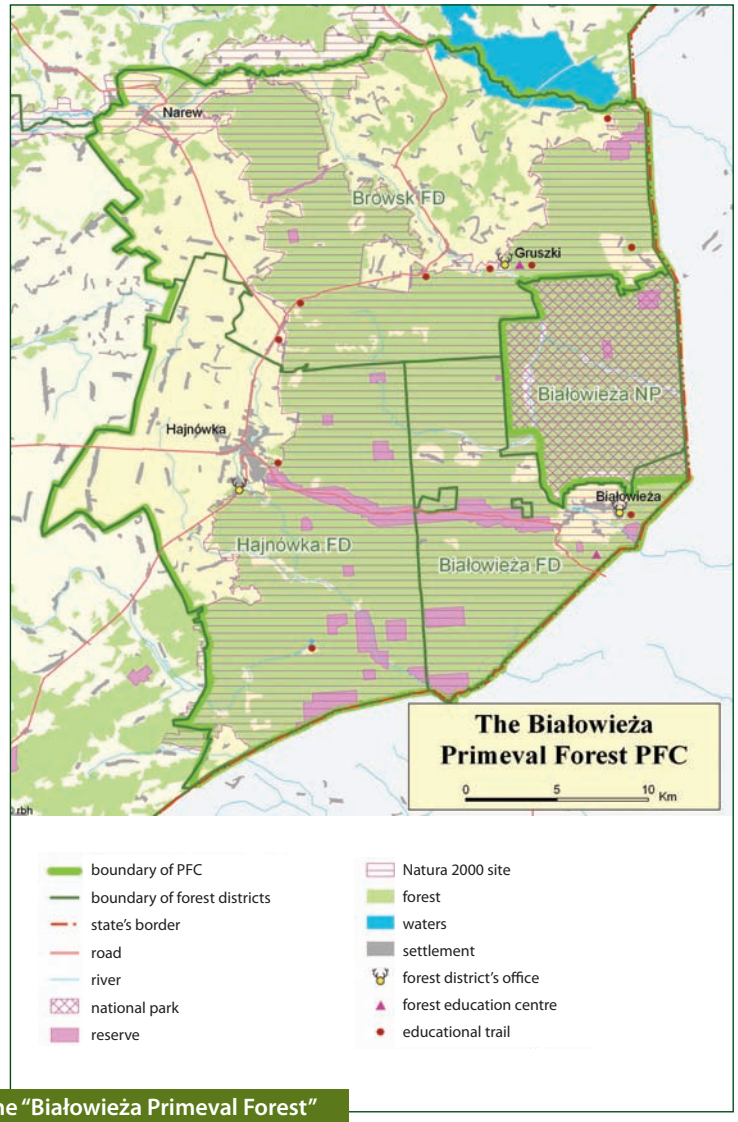
NATURAL FOREST AGAINST THE FACTS

There is no such thing as Białowieża Primeval Forest which is often presented by the environmentalists as whole, virgin, natural and untouched by man – the last natural European forest in which forest management should not be allowed and which should be left entirely to the laws of nature.

Although a large forest complex of that name, covering nearly 1,500 km^2, does exist on the Polish-Belarusian border, these sort of statements can only be applied to approximately one-third of the 600 km^2 area on the Polish side. Half of this area lies within the confines of the Białowieża National Park (BNP), and the other half within nature reserves, the largest of which was established on the initiative of the State Forests (SF) and is known as the "Natural Forests of the Białowieża Primeval Forest".

These forest areas were the hunting grounds of kings and tsars and, for that reason, logging was forbidden in them. These were also areas where tree felling was unprofitable because of their marshy character or lack of convenient access. On the remaining land, logging proceeded for hundreds of years – sometimes in a devastating and occasionally in a rational manner, including restocking of clear-felled areas. In 1994, the State Forests established the "Białowieża Primeval Forest" Promotional Forest Complex (PFC) to conduct



The "Białowieża Primeval Forest" Promotional Forest Complex (R.H.)

Why do environmentalists claim that the territory of the Promotional Forest Complex (in the photo) is already covered by "virgin forests"? (M.K.)

multifunctional, sustainable forest management in accordance with the provisions of the Forest Act.

The prime objective was to re-establish the virgin nature of the managed Białowieża forests while allowing, *for example*, timber harvest. However, environmentalists argue that the area of the Promotional Forest Complex is already covered by "virgin forests" and that their management is nothing else but "devastation which in a few years will lead to the loss of our world heritage".

So, what is the "virgin forest"? Is it the whole forest complex of the Białowieża Primeval Forest or just the fragments of the Białowieża National Park and nature reserves?

Adam Wajrak who promotes in the press the ideas of so-called environmentalists is inconsistent in his statements. In the same article he writes: "where nature is allowed to act – a forest develops; where man is allowed to act – there is no forest. Białowieża Primeval Forest, or rather its small fragments, is a forest", to later add: "We have to take care of the Białowieża Primeval Forest, one of the last preserved genuine virgin forests we still have".

Dr. Tomasz Samojlik, a researcher at the Mammal Research Institute of the Polish Academy of Sciences in Białowieża states that "the term "virgin forest" can undoubtedly be related to a small central fragment of the Białowieża Primeval Forest, covering about 50 square kilometres, where only minimal traces of past logging can be found and which is legally protected." This is only half of the Białowieża National Park. Why then do the environmentalists try to convince the public that the managed forests within the PFC are "natural

forests?" This may be understandable in the light of the following statement of Ingwald Gschwandtl, Vice-President of the UNFF: "Natural forests touch and move our hearts, because we all have a deeply rooted longing for unspoiled nature. Since forest issues can easily evoke people's emotions, they are an attractive target for political activities". And indeed – activists of ecological organisations refuse to discuss with foresters and officials of the Hajnowski County where the Białowieża Primeval Forest is located, matters such as the methods and advantages of pursuing management in the PFC forests, while trying to enforce their diktat on the matter. These are undoubtedly strictly political actions.

THE KING'S IDEA

In 1675, King Jan III Sobieski signed with Piotr Przebędowski, a judge at Limburg, "a contract for the harvest of forest goods" on the basis of which he would be permitted to harvest certain quantities of "potash, oak wood, oak, pine, ash logs, and other forest goods" in the Białowieża Primeval Forest for fifty thousand zlotys payable annually in two instalments. The acquisition would take place "as he pleases, where the best conditions can be found", provided that "wildlife refuges remain intact".

The King extended the contract for another three years on condition that "if the judge harvested any other goods in other than the specified seven wildlife areas, the contract would be cancelled". These documents were found in the archives by Dr. Tomasz Samojlik and Professor Bogumiła Jędrzejewska from the same Research Institute while studying the history of the Białowieża Primeval Forest who summarised their findings: "It is interesting that the old idea of dividing the Białowieża Primeval Forest into protected "wildlife refuges" and those exploited for timber has survived until the 21st century and remains the source of conflict.

It is also interesting that this old idea is readily forgotten when the term "virgin" is assigned to the entire area of the Białowieża Primeval Forest. While King Jan III Sobieski safeguarded "wildlife refuges to remain intact", today the forest fragments which have been exploited for wood for a long time are being questioned. It should be acknowledged, however, that the exploitation of the Białowieża forests dates back to the times of Władysław Jagiełło, who took them over in 1430 after the death of his cousin Witold, the Grand Duke of Lithuania. It also coincides with increased settlement in the region at that time. During the reign of Zygmunt III Waza, they were regarded as so-called "table goods" meaning that the generated income did not go to the state treasury, but to the ruler.

The old idea of dividing the Białowieża Primeval Forest into protected "wildlife refuges" and areas exploited for timber has survived until today (P.F.)

Initially, trees were cut down to obtain land for settlements and agricultural use, and to provide wood for construction and fuel. Later also for sale to other regions of the Kingdom and abroad. In the archives in Lisbon and Madrid, documents were found showing that in the 15th century shipbuilding timber was shipped by sea from Gdańsk, whereto it was rafted up the Vistula and Narew rivers, the latter running along the northern edge of the Białowieża Primeval Forest. Oak logs exported to England for the construction of churches followed the same route.

The Białowieża trees were also processed locally by settlers. They produced potash, charcoal and tar from the ash of burned wood. To obtain one kilo of potash, they had to burn half a tonne of wood (!). There was a great demand for these products in the 17th and 18th century. Charcoal was needed for the smelting of metals and the production of gunpowder. Potash was used in the glass industry, for bleaching textiles and the production of soap. To increase production, in the second half of the 18th century, Antoni Tyzenhauz, Treasurer of the Grand Duchy of Lithuania, brought many new settlers from Mazowsze, housing them in the newly established villages. At the same time, to improve timber rafting, some sections of the river Narewka were regulated and a canal connecting it with the river Narew was built.

Forests were exploited in many different ways. Wet habitats were utilised for metal ores, to smelt iron. Forest litter was burned to obtain better conditions for livestock grazing. This led to frequent fires, often spreading to other forest fragments. However, the protection of wild animal refuge areas continued until the end of the Polish-Lithuanian Commonwealth. Some researchers agree that thanks to the protection and sustainable, multifunctional management of forest resources, the Białowieża forests had survived until that time in the "near natural" state.

WOOD OR HUNTING?

The same research shows that under the Russian occupation "drastic changes affecting both stands and wildlife" took place in the Białowieża Primeval Forest. Empress Catherine gave away huge fragments amounting to 400 km^2 to her favourites: field marshal Count Peter Rumyantsev and Governor of Lithuania General Nikolai Repnin among others. As a result, most of these areas were deforested by the new owners seeking a quick profit. For example the whole "Kraśniczańska guard", one of 13 guards into which the Białowieża Primeval Forest was then divided disappeared.

In 1821, tsar Alexander I imposed a ban on harvesting timber in the entire Białowieża Primeval Forest for the sake of the bison that lived there. He revoked it seven years later after massive protests of all the parties interested in acquiring timber. His successor, Nicholas I, ordered felling, including more than two thousand oaks, for the shipbuilding industry, and made the Hajnówka forests a source of timber raw material for the further development of the Russian fleet. In the mid 19th century some organisational work took place in the Białowieża Primeval Forest: the stands were described, divided into sectors, and the method of harvesting wood was determined. In the next few years 174 thousand trees were cut down.

After the first hunt organised by the tsar in 1860, the need to protect the Białowieża forests was once again brought to light, as it became apparent that hunting for such impressive animals as bison was possible only in the Białowieża forests and the Caucasus region. Nineteen years later, the tsar issued an order forbidding the cutting of trees in bison refuges. In 1888, the Białowieża Primeval Forest became the private property of the tsar's family and the objective of the forest management was to organise hunts that would bring as many trophies as possible. The red deer which had disappeared from the local forests in the 18th century as a result of the long-term climate cooling and excessive hunting, were reintroduced into the Białowieża forests. To launch a new population, tsar Alexander II received eighteen of these animals in exchange for bison from John Henry XI Hochberg, the Prussian Prince of Pilsch (Pszczyna). The animals were also imported from parts of the Austro-Hungarian Empire and after a while the herd amounted to as many as seven thousand individuals. To diversify the hunt, fallow deer from different breeding centres were introduced. All large predators such as bear, wolf and lynx were killed in order not to impede the reproduction of deer. Even eagles and owls were shot. The number of ungulate herbivores increased to such a level that huge tracts of forests lost their floor vegetation and underbrush. In addition, the Białowieża forests were at that time trampled and grazed by six thousand cows and large herds of pigs which were allowed to forage freely in an area of over 280 km^2.

Timber harvesting proceeded wherever it did not interfere with animal breeding. In more fertile habitats hundred-meter-wide clear-cuts were established, retaining a small number of trees for seed production. In coniferous forests, trees thicker than 25 cm were cut and every six years forests were "cleared" of deadwood.

Under the Russian occupation the Białowieża Primeval Forest became the private hunting grounds of the tsar. Today there is no trace of the tsar's palace and only a few accompanying buildings survive, including the 1845 manor-house (M.K.)

TO CUT!

In August 1915, during the early stages of World War I, the army of Kaiser Wilhelm II entered Białowieża and defeated the Tsarist army. The Germans began systematic, large-scale cutting of the Białowieża forests. In Hajnówka, they built Europe's largest system of dry distillation of wood and factories for the production of wood wool and wood prefabricates for building houses. They also opened sawmills in Białowieża, as well as in Czerwonka and Narewka. A 130-kilometre narrow-gauge steam railway was built in the forest for the transportation of cut trees, in addition to about 200 kilometres of portable tracks on which wagons were pulled by oxen. 1,200 workers from Germany and 8,000 locals were involved in logging and wood processing. Also 3,000 French and Russian war prisoners were forced to work in the forest. Within three years, the Germans cut and removed from the Białowieża forests 5 million m^3 of wood, primarily oak and ash. They left behind 6,500 hectares of clear-felled areas and twice as big an area cleared of the thickest trees.

Patches of forest cut by Centura are overgrown by birch and aspen (P.F.)

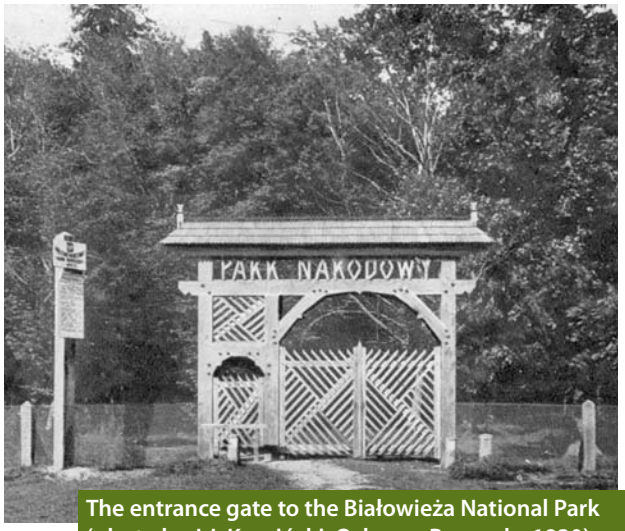
Another disaster on similar scale occurred in already independent Poland. In 1924, the Polish government struggling with a huge budget deficit, entered into an agreement with The British European Century Timber Corporation, known as Centura, granting it a 10-year concession for an annual cut of 325 thousand m^3 of timber from the Białowieża forests. Centura was obliged to use 10-hectare clear-cuts and retain seed trees. In fact, the clear-cuts often exceeded a hundred hectares each and no attempt was made at their renewal. Because of the protests raised by foresters monitoring this devastating exploitation, the government decided to break the agreement with *Centura*, which meant that the State Forests had to pay compensations. After 5 years of this devastating exploitation, the government cancelled the contract with Centura but by then the Białowieża Primeval Forest had lost some 2.5 million m^3 of timber. In 1919–1923, the Polish forest administration cut nearly 1.5 million m^3 of timber in the Białowieża Primeval Forest, but only ca 350 thousand m^3 under a clear-cut system. The total volume of harvested timber between 1915 and 1924 amounted to 9 million m^3, while at the beginning of this period, the volume of all trees suitable for sawmilling was estimated at 30 million m^3.

THE KING'S IDEA COMES AND GOES

Professor Władysław Szafer on a botanical excursion with students and colleagues in the 1930s (CILP archives)

When Hugo Conwentz, a German professor of natural sciences and forestry visited the Białowieża Primeval Forest in 1916, he immediately recognized its value as a unique environment in western and central Europe, not for its hunting opprotunities, but for nature conservation. He began to promote the idea of creating a nature protection area of approximately 50 km^2 in the delta of the rivers Hwoźna and Narewka. His plans were successful and that area was excluded from felling and thus saved from the devastation caused by the German occupants in other parts of the Białowieża forest.

After the end of World War I, Władysław Szafer, a prominent naturalist, professor in the Jagiellonian University and Chairman of the National Commission



The entrance gate to the Białowieża National Park (photo by J.J. Karpiński, Ochrona Przyrody, 1930)

for the Conservation of Nature visited the Białowieża Primeval Forest. Although there were no longer any bison in the Forest, but he pointed to the need to protect the area which once had been their refuge. A year later *Sylwan*, the journal of the Polish Forest Society published a proposal of the Society to establish a National Park in the Białowieża Primeval Forest. In 1921, the "Rezerwat" Forest District was set up within the boundaries outlined by Władysław Szafer, and later three smaller nature reserves were also added. This meant that Centura had to avoid these areas when setting up clear-cuts. In 1932, the "Rezerwat" Forest District, remaining under the administration of the State Forests, became the National Park of Białowieża. Poland became the fourth country in Europe, after Switzerland, Sweden and Spain, to use this form of nature protection, and the National Park in Białowieża, administered by the State Forests Research Institute, was the twelfth of this kind on the continent. During that time, bison returned to the Park, beginning with a few individuals imported from various zoological gardens as a result of the effort of the International Society for the Protection of Bison and its founder professor Jan Sztolcman. Before the outbreak of World War II, eight forest reserves had been created in the Białowieża Primeval Forest, with a total area slightly larger than half of the National Park. Thus, nearly 6% of the Forest area was covered by legal protection. In other parts of the Białowieża Primeval Forest, traditional management was conducted. In the years 1930–1939, the renewal program covered 20 thousand hectares of clear-felled areas, also including those left by Centura, and the volume of harvested timber amounted to approximately 4 million m^3.

The King's idea of dividing the Białowieża Primeval Forest into protected and managed forests came to an abrupt end when the Red Army entered Poland in 1939. After more than a hundred years, the Bolsheviks returned to the idea of tsar Alexander I to confer the status of

The first bison herd returns to Białowieża, 19 September 1929 (photo by J.J. Karpiński, Ochrona Przyrody, 1930)

In the "Nieznanowo" Reserve (P.F.)

nature reserve to the entire Białowieża Primeval Forest. This, however, did not prevent the Soviet authorities from intensifying logging which, until their retreat caused by the German attack in June 1941, had amounted to 1.5 million m^3. Fortunately, the Białowieża National Park was spared from felling.

The idea of transforming the Białowieża Primeval Forest into a large nature reserve prevailed under the German occupation. Timber harvesting was halted throughout the Forest which was to become the "Reichsjagdgebit", or the hunting ground for the Reich. As the bison population at that time did not exceed a dozen or so individuals, the so-called Heck cattle, which were supposed to be the restored auroch, were released into the forest.

After World War II, the new state border cut the Białowieża Primeval Forest into two parts. The Belarus part covered an area of 800 km^2. In 1991, a national park

was established there which included other forests and agricultural lands. On the Polish side, the Białowieża National Park occupied the same area as before the War. The rest of the Forest was entrusted to the administration of the State Forests. In 1961, the "Lipiny" Nature Reserve was established in the area covering 56 hectares which contained the only habitat of sessile oak in the entire Białowieża Primeval Forest. Eight years later, the pre-war Landscape Reserve named after Władysław Szafer was re-established on 1,357 hectares along the Hajnówka – Białowieża road. In 1974, two new nature reserves were established: "Nieznanowo" on nearly 28 hectares to protect the natural forest fragment of Białowieża, and "Pogorzelce" on over 7.5 hectares of the forest with a large share of *Tilia cordata*.

In the managed Białowieża forests, whose timber resources in 1948 were estimated at 9.5 million m^3, the annual volume of timber harvested at that time, with the exclusion of reserves, amounted to about 200 thousand m^3.

MORE FOREST IN THE FOREST!

In the early 1970s, the idea that the management in the Białowieża forests should not be conducted according to the same rules as in other managed forest complexes increasingly gained the approval of the members of the Polish Forest Society, mostly foresters and forest scientists. The Białowieża forests differed quite significantly from those typical to other regions pine monocultures aged less than 100 years, but they were gradually loosing their uniqueness. Their spatial division left after the tsarist rule was one of the distinguishing characteristics. They also boasted the most magnificent spruces reaching a height of more than 50 metres, not found elsewhere. The share of old-growth stands was still significant, and the proportion of deciduous tree species accounted for about 30%. It was the cutting of old trees, whose presence reminded of the earlier glory of the Białowieża Primeval Forest that raised the greatest objections. After the war, the average age of the local trees dropped from 75 to 72 years. Wood was harvested, as in other parts of the country, mostly using clear-cuts which were usually artificially regenerated by planting pines as a preference. As a result, the Białowieża forests began to increasingly resemble other lowland forests.

In 1975, the Ministry of Forestry and Wood Industry, succumbing to the pressure from the Polish Forest Society, decided to change its policy on forest management in the Białowieża Primeval Forest. The new principles were published in a document known as *The Statute for the Białowieża Primeval Forest*. Their aim was to preserve the virgin nature of those fragments of the managed forests, which still retained their naturalness or to restore it in other forest fragments. First of all, the rotation age,

i.e. the average age at which individual tree species were considered mature for felling, was significantly increased. For example, oak would be allowed to grow for up to 240 years, pine – to 160 years and so on. This would reduce the volume of timber harvest by almost one-sixth and it could not be exceeded. The number and size of clear-cuts were reduced and the fullest use of natural regeneration was recommended. Any interference in water relations through the drainage of land was forbidden. The importance of the non-productive functions of forests was, for the first time, stated in the executory provisions, affecting the forest practice. The new approach to the managed Białowieża forests was confirmed when seven new nature reserves were established in a short time: they were "Wysokie Bagno", "Głęboki Kąt", "Michnówka", "Sitki", "Starzyna", "Szczekotowo" and "Dębowy Grąd", covering a total area of 745 hectares.

The "Michnówka" Reserve (P.F.)

Hundreds of years of human presence and activity in the Białowieża Primeval Forest have changed its character, affecting even "wildlife refuges" which today are placed under strict protection. This was done for example through keeping for many years of the inflated number of bison regularly fed from the early 18th century, when August III the Strong ordered to mow hay for them, by allowing trampling of forest vegetation by the herds of red deer having no natural enemies, or by an influx of air pollutants and lowering of the groundwater level. Anthropogenic changes were more pronounced in areas so far regarded as managed forests, for example hundreds of hectares of floodplain forest ecosystems were devastated during the exploitation of metal ores. However, the greatest changes occurred in the original species composition of stands which are currently dominated by pines and spruces. For centuries, the settlers exploited mainly deciduous trees, largely reducing their share in the stand. Oaks were cut to provide an excellent construction material. Their natural regeneration was limited, to a large degree, by pigs feeding on acorns and red deer browsing shoots of the young trees. Burning of the underbrush and undergrowth was carried out for centuries in order to acquire land for cattle grazing. This contributed to the appearance of extensive tracts of pine forest, described by the famous Polish writer Eliza Orzeszkowa, already known in the 16th century. The huge fire in 1811, which lasted for half a year, initiated the expansion of spruce. During World War I, this species

The Leśna river valley – part of the "Natural Forests of the Białowieża Primeval Forest" Reserve consisting of 19 forest fragments with a total area of 8,500 hectares (P.F.)

was given preference by the Germans in the restocking of clear-cuts. In turn, the patches of cut forest that had not been restocked by Centura were overgrown by birch and aspen which, in the original species composition, had played a minor role. Pine was being artificially regenerated before and after the War and was spreading over the adjacent areas. The appearance of even-aged stands, differing significantly from a diversified age structure of natural forests, was the effect of the use of clear-cuts.

In spite of this, in the managed part of the Białowieża Primeval Forest there were still fragments very little altered by man. In 1995, the following nature reserves were established there: "Kozłowe Borki" with an area of 246 hectares, "Podcerkwa" – 228 hectares, "Podolany" – 15 hectares, "Olszynka Myśliszcze" – 276 hectares, "Berezowo" – 115 hectares, "Przewłoka" – 78 hectares, "Siemianówka" – 224 hectares, the "Valley of Waliczówki" – 44 hectares and "Gnilec" – 37 hectares. In addition to these reserves, 83 ecological utility areas were created, covering 376 hectares and 1,107 individual trees were designated natural monuments. Protective zones were established around the nests of protected birds and sites of

their regular presence, covering an area of 1,761 hectares, and around the habitats of rare lichen species covering an area of 254 hectares. On the initiative of the foresters, an inventory of the habitats of one of the endangered lichen species called lungwort was carried out and it was put under legal protection. The foresters did not stop at creating dozens of protective zones, they also transplanted this rare lichen species into many new locations. The managed forests, together with the reserves and other forms of nature protection established within them, were designated as areas of protected landscape and included in the European system for the protection of birds and habitats Natura 2000. According to Professor Andrzej Szujecki from the Warsaw University of Life Sciences – SGGW, the managed Białowieża forests have today a more protective regime than the majority of stands in the Polish National Parks.

In 1996, the Białowieża National Park was doubled in size but the environmental organizations started to demand that the entire Białowieża Primeval Forest should be given the status of a national park and left to the laws of nature. The State Forests established a special committee of scientists to analyse the soundness of this idea. The committee surveyed the managed forests and inventorised all the stands which might have been considered entirely free of past human intervention. As a result of the committee's work, all the stands were in 2003 included in the newly created nature reserve "Natural Forests of the Białowieża Primeval Forest", covering an area equal to the National Park in its present boundaries.

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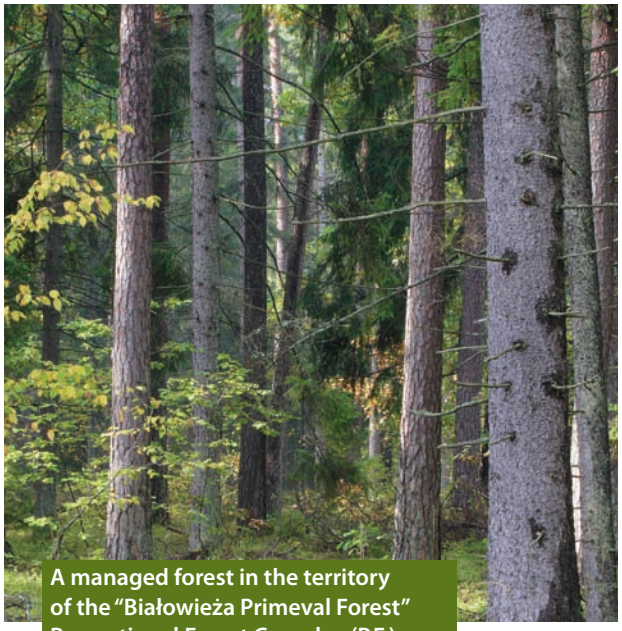
The remaining area of the "Białowieża Primeval Forest" Promotional Forest Complex established in 1994 comprises forests that have been transformed as a result of many years of exploitation, in which the creation of new nature reserves to protect the *status quo* would not make sense. It was therefore decided that management in these forests should be pursued in the manner that would allow them, with the passage of time, to become "virgin forests". This goal was the same as that set in *The Statute for the Białowieża Primeval Forest* nearly twenty years earlier, but today it seems more realistic as forests cease to be regarded primarily as a "wood factory" regularly supplying the planned quantities of wood after the adoption of the 1991 Forest Act. Restoration of the virgin nature of the Białowieża forests, which were not required to generate income, was now financed by the forest fund, established by the State Forests.

In addition to the forest management plan, the "Białowieża Primeval Forest" PFC is governed by a number of detailed regulations. Decision No. 23 of the Minister of the Environment and Natural Resources of 1994 anticipates division of the managed forests into three zones, with



A managed forest in the territory of the "Białowieża Primeval Forest" Promotional Forest Complex (P.F.)

different protective regimes, depending on the distance from the boundaries of the Białowieża National Park.

Ordinance No. 30 of the Director-General of the State Forests of 1994 recommends assessment of the state of forest resources and pursuing forest management in line with ecological principles.

Ordinance No. 11 of 1995, amended in 1999, specifies concrete actions that should be taken to improve forest management according to ecological principles.

Decision No. 24 issued by the Director-General of the State Forests in 1996 introduced principles of protection of live and dead trees designated as natural monuments and of rare tree species in the Białowieża Primeval Forest. The Decision recommended that in protection zones I and II, 3–5 trees should be retained until their natural death on each hectare of land where timber is harvested. It also forbade the felling of live and dead oaks, pines and spruces with the diameter at breast height larger than 80 cm; alder, ash, linden trees, hornbeam and aspen with the diameter exceeding 70 cm; maples with the diameter exceeding 60 cm, and goat willow with the diameter exceeding 30 cm.

Finally, Decision No. 48 of the Director-General of the State Forests of 1998 forbade cutting of trees and stands older than a hundred years, except for health reasons and with the approval of the Chief Nature Conservationist.

Regulations recommending retaining in the forest a certain number of dead trees and decaying wood, which is a result of natural processes, apply to all forest complexes throughout the country. Such regulations are a manifestation of the new understanding of modern forestry based on environmental principles, as dead and dying trees are a very important component of forest ecosystems.

They are used by birds such as woodpeckers, willow tits and nuthatches to make nesting hollows without which they could not reproduce. Some birds occupy hollows made by others: owls (tawny owl, Tengmalm's owl and pygmy owl), flycatchers (spotted flycatcher, pied flycatcher, red-breasted flycatcher and collared flycatcher), tits (blue tit and marsh tit), stock pigeons and other bird species. They are also used by mammals: bats, squirrels, edible dormouse, forest dormouse, garden dormouse, hazel dormouse and marten. In overturned trees and under them, thrushes, robins, dunnocks, wrens and eagle owls build their nests. Fallen trunks are an excellent habitat for small invertebrates

and shrews that feed on them, as well as for the voles and European pine voles which, in turn, are the prey of weasels. Decayed wood is a feast for many insects from the family of weevils, jewel beetles and longhorn beetles. Mites, millipedes and centipedes also feed on it, themselves being food for pseudoscorpions. The trunks of rotten trees are the biotope of lichens and mosses and, eventually, the seedlings of new trees appear.

Currently, the amount of deadwood in the Białowieża forests, where cutting of all old and thick trees is prohibited, is estimated at 15 m^3/ha, while in other managed forests in Poland it is about 6 m^3/ha.

Trees in the "Białowieża Primeval Forest" PFC are cut only for sanitary reasons, or to fulfil the silvicultural objectives. The Białowieża spruce trees have been attacked for years by bark beetles, occasionally causing an outbreak. The only way to combat the insects is to cut down trees, in which they forage and deposit eggs, before a new generation is hatched. This is the only departure from the rule of retaining dying trees in the forest, justified by the danger of spruce stand decline. In the Belarusian part of the Białowieża Primeval Forest, where no intervention was undertaken, bark beetles killed in a short time spruce trees with the volume of 3 million m^3.

Timber is also harvested as part of the cleaning and thinning operations intended to provide more favourable growth conditions for the young generation of trees.

The timber harvest in the "Białowieża Primeval Forest" PFC also results from the necessity to reconstruct the stands whose species composition is not adjusted to habitat conditions, *i.e.* fertility and moisture content of soils on which they grow. In 1995–1998, a detailed soil analysis commissioned by the State Forests was conducted in the "Białowieża Primeval Forest" PFC. The results showed that the habitat conditions on over half of its area are suitable for the forests composed of tree species such as oaks, lindens, maples, ashes and elms. After many years of exploitation, these species are unable to regenerate by self-seeding because in some stands they do not occur at all. The reconstruction of stands should in the first place be carried out in the spruce forests dating back to World War I, in birch and aspen forests developed through spontaneous natural regeneration on the clear-cuts left by Centura, as well as in pine monocultures planted in the 1930s and after World War II. Foresters gradually restore virgin forests in these areas, using a so-called group felling system. It consists in cutting out 15–20-acre openings in the forest canopy in which target tree species are planted.

The tending of stands established by self-seeding is a very difficult task. To grow in to a new generation of forest, they need a sufficient amount of sunlight through thinning of the overstory. This, however, is hardly possible because of the restrictive rules on tree cutting. The timber harvest planned for 2011, as set in the Decision of the Minister of the Environment, cannot exceed 48 thousand m^3, which is just over 10 per cent of the increment volume of stands in the "Białowieża Primeval Forest" PFC. Cutting trees along watercourses and in coniferous forests growing on bogs is totally forbidden. Furthermore, 5 to 20% of each area where any form of timber harvest is pursued must remain intact, depending on the type of protective zone.

SHORTAGE OF WATER AND ... SPACE

Besides the environmental organisations which demand halting any management activities in the entire Białowieża Primeval Forest, there are other environmentalists who consider such demands a pure propaganda harmful to nature. The Polish Society for the Protection of Virgin Nature (PTOPP) claims that the Białowieża Primeval Forest is dying because of water deficiency and that something should be done about this rather then increasing areas where nature is left entirely to itself.

Recent decades have seen a steady decline in the groundwater level. The reduction of moisture content in Białowieża nature reserves amounts to 17%, while

Topiło ponds on the river Perebel (M.K.)

Lesser spotted eagle. In 2007, of the 29 pairs of these birds nesting in the Białowieża Primeval Forest only two had successfully hatched and raised chicks (G.K and T.K.)

in the national park it can even reach 37%. This is undoubtedly due to the drainage of a vast marshy area known as the Dziki Nikor Mire on the Belarusian side in the 1950s and 1960s. The drainage works were also carried out in Poland, on the Białowieża Glade in the immediate vicinity of the Białowieża National Park.

In the past, the river beds of the main forest rivers: Narewka, Hwoźna and Lutownia were regulated, which speeded up the flow of water. The courses of many streams were straightened, to the same effect. The headwaters area of the river Leśna Prawa has been altered and the river now carries much less water than before but more sewage from Hajnówka. The water level in Topiło ponds has decreased and The State Forests have commissioned hydrological studies of the river Perebel which feeds these reservoirs to identify a solution to this phenomenon. Irrespective of that, foresters build water gates made of wood, stones or fallen trees on small mid-forest rivers to slow down the water flow. In recent years, such activities have been taken up in 42 locations. Beavers are helpful in the implementation of "small-scale retention", but the results are still unsatisfactory. Extensive drainage causes disappearance of boggy coniferous forests, alder woodlands and riparian forests, as well as many flora and fauna species. The shortage of water causes encroachment of forests onto the bogs. The same happens to the riverside meadows where spring flood water no longer stagnates. They remain unmown for years on the pretext of nature conservation or for economic reasons. As a result of these processes, various bird species using marshy and open water habitats as their breeding and feeding sites disappear from the Forest, among them black stork, capercaillie, eagle owl, marsh harrier, Montagu's harrier, European roller, hoopoe, *etc*. In 2007, when PTOPP completed the inventory of the nests of the lesser spotted eagle, it turned out that of the 29 pairs of these birds only two had successfully hatched and raised chicks.

FOR SPOTTED EAGLES AND BISON

The scarcity of open areas is exacerbated by the departure from using clear-cuts by foresters. Instead, they began the rehabilitation and mowing of 260 hectares of meadows and pastures overgrown with shrub thickets. They built 30 artificial hunting perching poles from which lesser spotted eagles could hunt rodents, a major component of their diet. They also built 29 stacks for storing hay, the main food source of bison during winter, also eaten by the red deer and roe deer. With a view to creating the optimum conditions for the development, spreading and migration of the bison population, foresters provided 36 watering places in various locations and planted 22 hectares of orchards, consisting of wild apple and pear trees whose fruits and shoots are a delicacy for bison. The control of the size of bison herds through hunting is the duty of the Białowieża National Park, while the reduction of other wild animal populations and the organization of hunts are the responsibility of foresters.

Wildlife management in the "Białowieża Primeval Forest" PFC is conducted according to the long-term plan which anticipates that in 2017 no more than 59 elks, 1,688 red deer and 1,550 roe deer will live in this area. The number of boar cannot exceed 1,534. If these levels are exceeded, the damage to the forest caused by browsing, bark stripping and the trampling of young trees by wild animals can be severe. To achieve the optimal conditions, a few elks and 250 roe deer specimens are needed at present but the permissible number of red deer is exceeded by about 1,300, and wild boar – by nearly 800. Foresters have to take into account the nutritional requirements of dozens of wolves and lynxes inhabiting the Białowieża forests, which are under species protection. It is estimated that to survive a lynx needs to hunt at least 60 roe deer, its favourite prey. Instead, hunters can shoot smaller predators like fox and racoon dog.

A lynx needs to hunt at least 60 roe deer each year in order to survive (P.F.)

DO THE FORESTS NEED FORESTERS?

Adam Wajrak, who writes on environmental issues in the press, once wrote that for a layperson, the Białowieża Primeval Forest is associated with the bison and magnificent trees. And this is true. But to survive, the bisons need help from foresters. They need sufficient food in winter and the provision of meadows and forest clearings for grazing in summer; otherwise most of them would die of starvation or move to cultivated fields. Similarly, spruce stands in the Białowieża Primeval Forest would have long died if the reproduction of bark beetles had not been controlled.

Laypersons themselves, including tourists, holiday-makers or students, who come to the Białowieża forests to relax and learn about the native wildlife, also need the assistance of foresters. One of the main objectives of the "Białowieża Primeval Forest" PFC is to provide forest education to society, especially to school children. Since its establishment, thousands of visitors have benefited from the educational programmes provided by foresters, such as nature classes at camp fires, guiding on educational forest trails and visits to the forest education chambers. They not only teach schoolchildren but also organize seminars for teachers.

Foresters feed bison in the winter (P.F.)

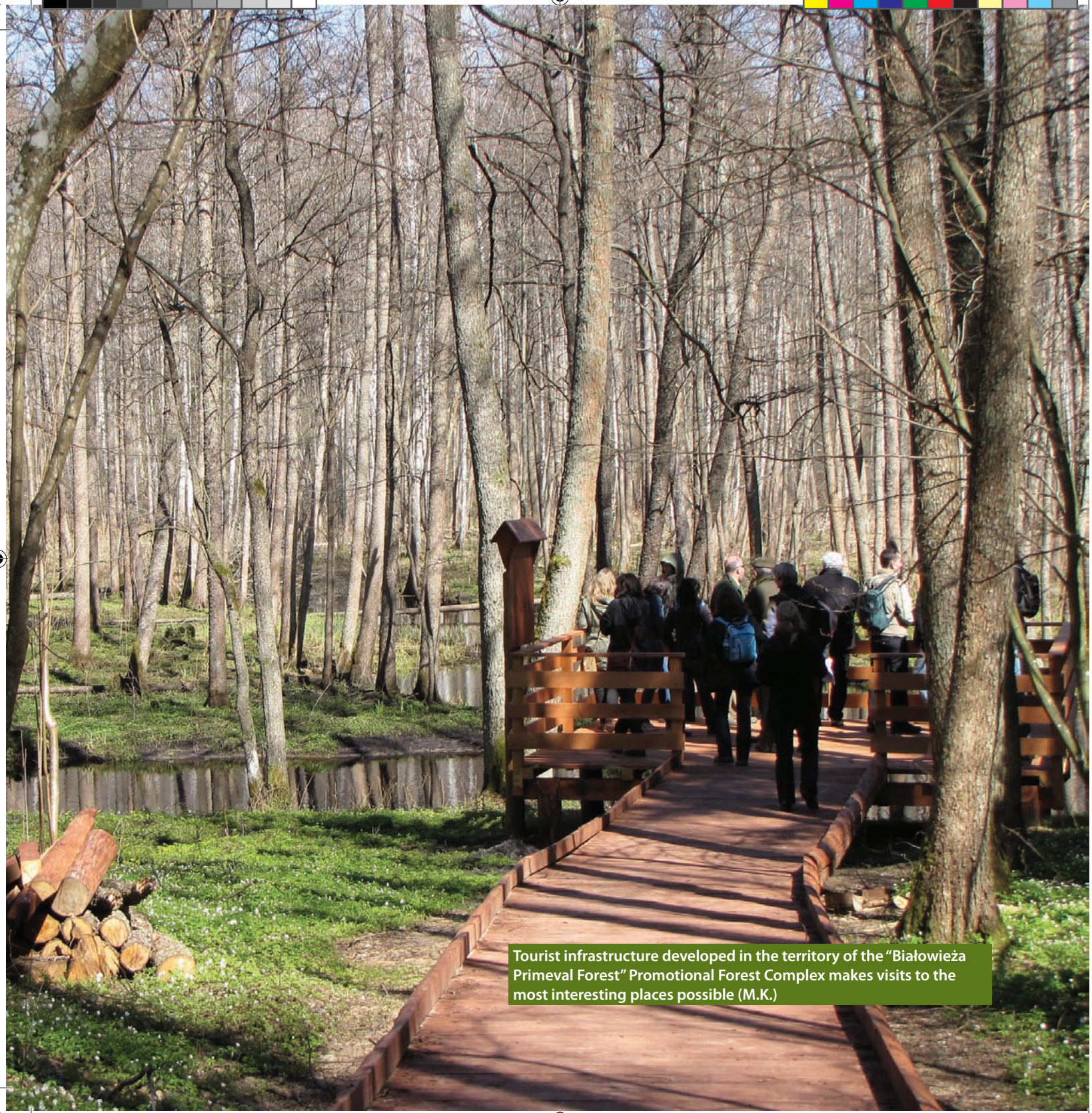
One of the main attractions of the Białowieża Primeval Forest is the narrow-gauge railway, which provides not only educational but also recreational experience. There is an increasing interest in tourism and recreation in this area and it is the responsibility of foresters to ensure that no harm is done to nature. They need to develop tourist infrastructure and education facilities in order to minimise tourist impact on the forest interior, especially the reserves and animal refuges. Foresters are involved in promoting such forms of tourism that are least harmful to the environment. In recent years, they have set up more than 200 km of hiking, biking and horse riding trails in the forest. On the outskirts of the managed forests recreation infrastructure has been developed, including a campsite, six car parks, three parking places for horse-drawn carriages, seven sites adapted for lighting a campfire and sixteen different types of shelter protecting from wind and rain.

With the increased influx of people to the "Białowieża Primeval Forest" PFC, the threat of accidental fires or even arson becomes increasingly serious. In the past decade 48 fires have broken out there, including one in the Białowieża National Park, which destroyed more

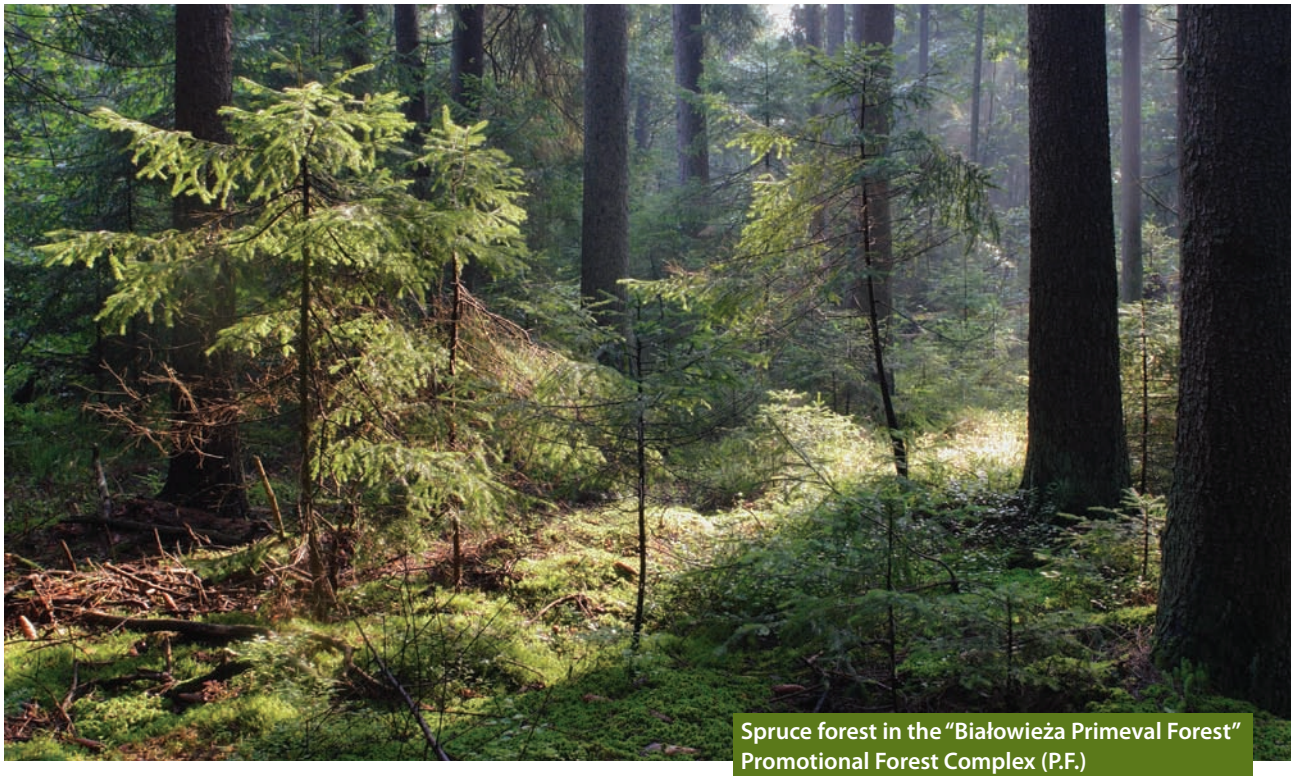
Forest railway to Topiło is one of the main attractions for tourists (P.F.)

than 20 hectares of forest. The relatively small average area of a single fire indicates that the forest fire protection system is effective. The area of the Białowieża forests is controlled from three fire look-out towers and foresters are equipped with patrolling and fire fighting vehicles which usually arrive first to extinguish fire.

Another threat to the Białowieża Primeval Forest is timber theft which is on the increase due to the smaller amounts of wood being harvested. Meanwhile, some environmentalists argue against any cutting of trees in the managed forests, even those suffering from dieback as a result of bark beetle attacks. They claim that bark beetles, being an important component of forest ecosystems, should have the right to exist and reproduce as part of the forest life cycle. Not only spruce stands are threatened by decline. Oak forests are also dying



Tourist infrastructure developed in the territory of the "Białowieża Primeval Forest" Promotional Forest Complex makes visits to the most interesting places possible (M.K.)



Spruce forest in the "Białowieża Primeval Forest" Promotional Forest Complex (P.F.)

because of the attacks of two-spotted oak borers feeding under the bark. It is believed that their mass occurrence can be stopped using the same method as in fighting the bark beetle outbreaks. A 75-year study carried out in the Białowieża National Park shows that in the next quarter century large areas of original broadleaved and mixed forests characterized by species such as ancient pines, spruces, oaks and birches will be replaced almost exclusively by hornbeam. Only foresters are able to counteract this natural process of transforming the Białowieża Primeval Forest into an unimpressive "hornbeam forest" by using the appropriate cutting system to control forest renewal.

By conducting sustainable forest management in the "Białowieża Primeval Forest" PFC, the State Forests is able to restore the primeval nature of forests in this area. They can do this by imitating natural processes, without letting the "laws of nature" rule, i.e. by eliminating those processes that lead to the disappearance of spruce stands or whole tracts of forest. Some environmental activists and organizations don't agree with this, arguing that people are entitled to observe, without exception, all

"biological processes" taking place without human intervention in the Białowieża Primeval Forest.

If we give way to such pressures and abandon forest management in the Promotional Forest Complexes, the revenues from tourism will many times exceed the income from timber harvest. However, the bison will still remain the main attraction of the Białowieża Primeval Forest – not those living in the wild in the national park, but those kept in the show pen. Forest management does not affect the show animals in any way, so they will not gain on their attractiveness if all management activities cease.

In 2010, approximately 140 thousand visitors came to see the bison, in contrast with approximately 20 thousand nature lovers who came to observe natural processes occurring in the strict protection zones within "Orłówka". Exactly the same number of passengers used the narrow-gauge railway running through the PFC forests from Hajnówka to Topiło. The large ponds at the final station of this route are admired by all visitors.

The ponds were created decades ago to store the trunks of felled trees. The above example demonstrates that the results of forest management in the Białowieża Primeval Forest can be as attractive to tourists as "the last natural forest in Europe" and the processes occuring there. Some environmentalists do not want to accept this. However, there is a way to reconcile these contradictory views by simply drawing from the experience of King Jan III Sobieski …

INTERNATIONAL YEAR OF FORESTS • 2011

One of the main objectives set for the "Białowieża Primeval Forest" Promotional Forest Complex which was established in 1994, is to restore the virgin state of the managed Białowieża forests while allowing, timber harvest. Environmentalists claim that the territory of the Promotional Forest Complex (PFC) is already covered by "virgin forests", and that their management is nothing else but "devastation which in a few years will lead to the loss of our world heritage". Why do they attempt, against the facts, to convince the public opinion that the managed forests of the "Białowieża Primeval Forest" PFC are natural forests? Is Ingwald Gschwandtl, Vice-President of the UNFF, right in saying that natural forests touch and move our hearts, because we all have a deeply rooted longing for unspoiled nature. Since forest issues can easily evoke people's emotions, they are an attractive target for politicians.

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