

Dispute over the future of the Białowieża Forest: myths and facts.

A voice in the debate

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The last months have seen the return of the long-standing dispute between the supporters of intervention into the natural processes and human management in the Białowieża Forest, and the advocates of extending its protection, arguing that it is a unique forest and an invaluable treasure of nature. We demand maintaining the current restrictions on forest management, and hence we are a party in this dispute. Below, we summarise the most important conflict issues, debunk myths and correct the half-truths which regularly appear in some media.

What is forest?

Central to the dispute over the form of the Białowieża Forest's protection is the different understanding of the word **FOREST**. For the proponents of Forest utilisation, a forest is a management object subject to various treatments, which ensure the best effects in obtaining an economically valuable timber resource. Consequently, a forest is mainly an association of trees in a given area (tree stand). Because the wood of different tree species has a different market value, the species yielding the highest income are favoured (e.g. oaks, pines or spruces) at the cost of other species of low economic value, such as aspens, hornbeams or lindens. The attention of managers is focused on **tree stands** of the most desired (profitable) species, at an age that allows for their current or future economic use. Protection of a forest understood in this way is based on preventing any events that might diminish future yield. As a result, all the organisms that hinder the growth of the profitable tree species, or cause their premature death, become 'pests', which should be 'extinguished'. Achieving the economic goals requires that man seize control over the forest processes and constantly intervene into them.

For the advocates of nature conservation, a forest - as argued by Jan J. Karpiński, Professor in Forestry Science, in the 1950s - is a "dynamic creation of nature, in which, through a network of relationships, associations and mutual effects, coalesced into an undividable whole are: specific vegetation, dominated by trees; the animals associated with it; and the geological substrate, soil, water and climate, used by the plants and animals". All the organisms are equal in such a forest, there are no less and more 'valuable' species, nor there are useful and harmful ones. There are no better and worse processes. The growth of a forest is a result of natural events and does not require human intervention.

The word 'forest' used with so strikingly different meaning loses its communication value; for this reason, to avoid ambiguity, we shall henceforth use two terms: **'managed (cultivated) forest**, referring to a forest controlled by man and subjected to his constant intervention, and **'natural' forest**, in which man does not interfere with natural processes. In this distinction it is not relevant whether in the past a 'natural' forest experienced some form of human exploitation, since the 'natural' forest is not identical with the 'primeval' forest. These two forms of forest (managed and natural) are mutually exclusive; only one of them can exist in a given place and time. However, it is possible that they are separated in space; the 'managed' and the 'natural' forest will then cover different parts of a single forest complex.

Who are the parties of the dispute?

Typically, the dispute over the protection of the Białowieża Forest **is publicly presented as a conflict between 'foresters' and 'ecologists'**. Some media regularly create an image of an *ecologist*, a *green* or an *eco-fanatic* - an obsessed, unstable and unqualified person. Labelling people with a different opinion in this way means that they are defeated from the very beginning. The public learns that irrational amateurs, for some foul reasons, put a spoke in the wheel of rational actions of experts (foresters). All is clear then, no need to read/watch further, it is immediately obvious who is right.

Who are the 'ecologists' then? This term is used to refer to all the persons/organisations which demand the Białowieża Forest to be protected as a 'natural' forest and which oppose the plans to dramatically increase logging. These include, among other:

State Council for Nature Conservation (PROP) – an advisory body at the Ministry of the Environment, consisting of prominent specialists in nature conservation and environmental protection (PROP 2015).

Committee on Nature Conservation PAS – an autonomous body of the Polish Academy of Sciences, set up in 2015, consisting of representatives chosen by the scientific community, gathering international specialists in nature conservation. (KOP PAN 2008, 2015).

Scientists from several universities, institutes and non-governmental organisations, the authors of ‘Why dead spruces are necessary in the Białowieża Forest’, (including some members of the Advisory Committee to the President of Republic of Poland in 2006) (Bobiec et. al 2016).

The Council of the Faculty of Biology and Environmental Protection, University of Silesia. (Council UoS ... 2016).

The Council of the Faculty of Biological Sciences, University of Wrocław (Council of UoWr ... 2016).

The Scientific Council of the Białowieża National Park (Council of BPN 2015).

In addition, for more than 20 years the **Councils of the Biology Faculties at the University of Łódź and University of Poznań** have been calling for discontinuation of logging in the Forest sections of natural origin and protecting the whole of it as a national park.

These demands have been signed by **many representatives of forest sciences**, including the ones with professor title.

Increasing logging in the Forest has also been unanimously backed by the most important **nature non-profit organisations**, who postulate that it should be retained a natural forest. These include e.g. the Greenmind Foundation (Greenmind 2015, Stanowisko. .2016), Greenpeace (Greenpeace 2015, Stanowisko. .2016), Naturalists' Club (Klub Przyrodników 2015a, 2015b), Polish Ethological Society (Polskie Towarzystwo Etologiczne 2016), Polish Society for Nature Protection ‘Salamandra’ (PTOP ‘Salamandra’ 2016), Polish Society for Bird Protection and 13 other ornithological societies (PTOP 2016), the *Pracownia na rzecz Wszystkich Istot* (Pracownia... 2016, Stanowisko. .2016), Association for Nature WOLF (Stowarzyszenie dla Natury ‘Wilk’ 2015), WWF (Stanowisko. . 2016, WWF 2016), as well as co-owners of the Białowieża Forest - **the Polish citizens**, most of which demand a better protection of the Forest and not increased exploitation. The appeal to Prime Minister Beata Szydło was signed by 119,958 people (as of 8 March 2016, Kocham Puszcę 2016).

Who are the ‘foresters’? They are persons/organisations that have a direct or indirect financial interest in continuing forest management and increasing the amount of timber logged in the Forest. These comprise: representatives of the State Forests administration authorities; representatives of timber processing plants; part of the Ministry of Environment civil servants and part of forest scientists (the forest scientists with opposite views automatically become ‘ecologists’). This group, in its own economic interest, will search for all possible ‘reasons’ and justifications for increasing logging.

It should be noted that the ‘ecologists’ group contains a number of forest faculties alumni, as well as people with scientific titles in forestry science. Consequently, the dispute over the Białowieża Forest is not one between ‘foresters’ and ‘ecologists’, but between interest groups of people/organisations involved in exploitation of timber resources of the Forest on the one hand, and scientific and non-profit organisations, as well as a large part of Polish citizens that demand protecting the Forest as a natural forest on the other hand.

Nature conservation in the Białowieża Forest at present

The Białowieża Forest is a continuous forest complex bordering Poland and Belarus, of natural value acknowledged worldwide. The whole of the Belarussian part, along with its forefront, is protected as a national park, while the Polish part (about 62,000 ha) is comprised by a national park (10,500 ha), nature reserves (about 12,000 ha) and other forests (about 39,500 ha).

The whole of the Białowieża Forest has been recognised as the only one in Poland **UNESCO natural world heritage site**, as it fulfilled the selection criterion IX ('an outstanding example representing significant on-going ecological and biological processes in the evolution and development of terrestrial, fresh water, coastal and marine ecosystems and communities of plants and animals') and criterion X ('a site containing the most important and significant natural habitats for *in-situ* conservation of biological diversity, including those containing threatened species of outstanding universal value from the point of view of science or conservation'). **Hence, the Białowieża Forest is a transnational good.** It could be awarded the UNESCO world heritage status only after Poland obliged to protect the spontaneous **processes taking place in forests and cease logging also in the managed part of the forest sections of natural origin.**

The Polish part of the Białowieża Forest has also been recognised as:

- an integrated Natura 2000 Special Protection Area and a Special Area of Conservation (PLC 200004),
- an international IBA (Important Bird Area) bird site (PL046),
- a protected landscape area (almost the whole of the Forest),
- a UNESCO Biosphere Reserve,
- the Promotional Forest Complex 'Białowieża Forest'.

What determines the Białowieża Forest's world-class natural and cultural value?

(1) The Białowieża Forest has the best preserved fragments of lowland deciduous and mixed forests in the European Plain, which used to cover Europe between the Atlantic Coast and the Ural (Faliński 1986, Wesołowski 2007, Askins 2014).

(2) A considerable part of the Białowieża Forest is subject to natural processes not disturbed by direct human intervention. They affect all the components of the forest, from plants, through herbivores and predators, to organisms decomposing dead debris. Examples of these processes are long-term pulsing rhythms of tree seeds production (e.g. by the oak, hornbeam and maple), cyclic mass insect (e.g. winter moth, European spruce bark beetle) and rodent outbreaks, regulation of animal populations size through variable food resources and predation, and gradual decaying of trees and long-lasting decomposition of their debris (reviewed in Okołów et al. 2009).

(3) The Forest is one of the few places in Europe with very well-preserved communities of organisms characteristic for natural forests and their habitats as well as substrates. In the Forest, there are naturally diverse assemblies of mosses, fungi and lichens, growing on old trees and decaying logs; communities of insects and plants inhabiting wind throws and logs; natural communities of mammals, including a complete (five species) ungulate community; communities of predators and their prey, parasites and their hosts, and many others (Gutowski and Jaroszewicz 2001).

(4) The Forest is characterised by a well-preserved, especially in the already protected areas, species, age (including the decaying sections) and spatial structure of tree stands, as well as the presence and substantial amount of the tree species not occurring (or occurring only occasionally) in other forest complexes in Poland: linden, elm and maple. These features often determine the occurrence of very rare organisms and the completeness of their assemblies.

(5) An enormous number of species of living organisms occurring in the Białowieża Forest makes it a Europe-wide diversity hotspot (about 1,070 species of vascular plants, about 260 species of bryophytes (Faliński 1986) and about 4,000 species of fungi, including over 400 lichen species (Cieśliński and Czyżewska 2002), over 10,000 insect species, 180 breeding bird species and 58 mammal species, including the largest terrestrial mammal in Europe - the bison (Gutowski and Jaroszewicz 2001). Many of the species living here (especially invertebrates, lichens and fungi) are relict species, globally threatened with extinction, associated with the ecosystem of primeval forests (e.g. the species dependent on extensive complexes of hundreds-year-old tree stands, large amounts of decaying logs, etc. (reviewed in Gutowski et al. 2004).

(6) Preservation of the primeval (developed in the course of evolution) life cycles of many organisms (Tomiałojć et al. 1984, Wesołowski 1983, 2007, Jędrzejewska and Jędrzejewski 1998).

(7) The most numerous in the world free-ranging population of the European bison, the largest terrestrial mammal of the European continent. The Białowieża Forest, as it is well-preserved thanks to the several-century targeted protection, became the backwoods for the bison and could host this species in a restitution scheme, after it was exterminated during World War I (Kraśnińska and Kraśniński 2004).

(8) 600-year-long tradition of targeted and effective protection of the complete forest ecosystem. From the 15th century until the end of the I Rzeczpospolita (the Polish-Lithuanian Commonwealth, 1569–1795), the Białowieża Forest was protected as royal land, and in the 19th century - as a hunting area of Russian Tzars. The protection system, developed for several centuries (1500s-1700s) with the help of numerous well-paid local services, is unique in Europe and worldwide an example of effective protection of a forest with the most valuable animal species (reviewed in Samojlik 2005).

The natural values of the Białowieża Forest mentioned above **make it an invaluable hotspot of species and genetic diversity; a living laboratory; a unique model for biological and forest sciences, nature conservation and natural resource management; an irreplaceable model and a point of reference for any comparisons with environments that have been more transformed by man** (Hunter 1990, Angelstam 1996, Rebane et al. 1997, Angermeier 2000, Stutchbury and Morton 2001, Wesołowski 1983, 2005).

Thanks to its values, **the Białowieża Forest attracts thousands of tourists** and hundreds of scientists from all over the world. It is not for its beautiful spruce sections but for the fact that it is home to unique animal, plant and fungi species, as well as diverse tree species in a range of growth stages, lush development and slow death. It is because it allows for studying responses, relationships and links between forest organisms in unique conditions of close-to-natural forest.

The key threats for the natural and cultural values of the Białowieża Forest:

(1) The cutting of natural forest, started at an industrial scale in 1915, has endured until this day in a considerable area of the Forest, and timber was intensively logged until 2012. In the last 100 years, several millions of cubic metres of timber were logged in the Forest. Cutting old-growth stands of natural origin and replacing them with new tree plantings led to a major change in the natural processes, a dramatic decline in the native diversity due to loss of species - especially Forest relicts - and reducing the amount of substrate (e.g. decaying wood), which are critical to forest biodiversity (Kimmins 2004, Wesołowski 2005).

(2) Sanitary cutting (removing dying trees) and other forms of fighting 'pests', leading to (just as in the case of felling old-growth stands) substantial disruption of the natural processes and impoverishing forest biodiversity.

What will happen if the proposals of the Białowieża Forest Division are implemented?

In October 2015, the Białowieża Forest District (*Nadleśnictwo Białowieża*) submitted a request for approval of an annex to the Forest Management Plan ('*Plan Urządzenia Lasu*') for 2016-2021. What will happen if these proposals (Dokumentacja ... 2015) are implemented? Within only six years, additional 318,000 m³ of timber will be felled, on an area of 6,922 ha. Timber production and other management works will take place in ca. 60% of the Białowieża Forest District (excluding nature reserves), including the currently excluded from human intervention old-growth tree stands of natural origin (and felling 200-year-old trees), as well as wet and swamp forests. As a result, **the area of the highest natural value old-growth tree stands (more than 100 years old) would decrease by as much as 20%!** In February 2016, the forest administration changed their mind and submitted to the Regional Directorate of Environmental Protection in Białystok another request for a permission to log 188,000 m³ of timber in 2012-2021 (TVP Białystok 2016), which means cutting additional ca. 120,000 m³ in this six-year period. The felling will take place mainly in the oldest tree stands. The main target will be - especially important for the maintenance of the biological processes characteristic for a natural forest - large and old, as well as dying and dead trees. Removing thousands of such trees in a short time will significantly worsen the conditions for all the specialist species living in old forest. Planting the resulting clearings with selected tree species will only increase these losses. One strong disturbance - a bark beetle outbreak - would be addressed by a disproportionately larger disturbance, a large-scale intervention into natural forest development. The 'medicine' would be worse than the 'disease'.

Myths and facts about the protection of the Białowieża Forest

Below, we present our replies to the statements made in the debate over the protection of the Forest, available in the public space. Our comments are provided with references to sources, the list of which is given at the end of the paper, allowing each reader to independently verify the facts that we mention.

1. The Białowieża forest conflict is an ideological conflict and not one based on facts and knowledge (Chałupka 2016)

In some media and in some opinions published on the webpage of the State Forests **the experts' opinions disoradnt with the foresters' views are ignored** (see Who are the 'foresters' above). Emotional statements are emphasized, while opinions of specialists are

omitted, shortened or taken out of the context. Instead of using counter-arguments, the term ‘ecologists’ is used (see Who are the ‘ecologists’ above). Indeed, the debate over the protection of the Białowieża Forest is partly a dispute over values (what should be protected), however, most other issues concern verifiable and observable natural events. For example, if it is known that halting an outbreak of the bark beetle through cutting the invaded spruces is not effective (see p. 2), but nevertheless, using the bark beetle as a ‘justification’, enormous intensification of logging is proposed, then it is certainly an action that is justified ideologically (or economically) and not by specialist knowledge.

2. *Tree felling is the only remedy for a bark beetle outbreak* (Kotarski 2015, Fronczak 2016, Hilszczański 2016, RDLP Białystok 2015, Stanowisko ... 2016c, Świstak 2016)

This opinion is not confirmed by facts. It has not been observed that - compared to areas in which the bark beetle was never combated (strict reserves) - intervention in managed forest (‘sanitary’ cutting) reduced the number of dying spruce trees and the rate of their dying (Schlyter and Lundgren 1993, Gutowski and Krzysztofiak 2005, Grodzki et al. 2006).

This method could be effective only if, in the whole forest, it would be possible to detect and quickly (before the beetles leave trees) remove at least 80% of the spruce trees attacked by the insects (Fahse and Heurich 2011). **In the Białowieża Forest, due to large reserve areas and the national park, this is not possible**, which is well known to the forest administration authorities. Consequently, using the slogan about the necessity to ‘combat the bark beetle’ as a reason for increasing cutting is not supported by the available knowledge. That it is merely an easy excuse, can also be seen in the changed demands of the forest administration. In October 2015, the State Forests claimed that in order to reduce the numbers of the bark beetle it is necessary to cut additional 318,000 m³ of timber. Four months later (February 2016) it turned out that - to achieve this goal - it is sufficient to cut only about one third of this amount and there is no necessity to apply ‘sanitary’ cutting in wet and swamp forests (see What would happen... above). Is it because during these four months, the number of bark beetles dropped so dramatically and because they stopped attacking spruces in riverine and alder forests? If the outbreak is indeed coming to end spontaneously, then the only ‘reason’ for increasing cutting is not justified.

3. *If, as foresters and ecologists, we do not act and let bark beetles spread to areas with healthy trees, woodpecker species, especially the Three-toed Woodpecker, will lose their breeding and foraging habitat* (Hilszczański 2016, Goździewska 2016a).

The Three-toed Woodpecker is actually four times less common in the managed part of the Białowieża Forest, in which dead spruce trees have been removed while fighting the bark beetle, than in the strict reserve of the Białowieża National Park, despite the low amount of spruce in the latter (Walankiewicz and Czeszczewik 2010). This woodpecker species avoids forest patches with management and maintenance works, even if they cover a small area and a low number of trees (Kajzer and Sobociński 2012).

4. *A sudden end of life and decomposition of [spruce] tree stands in such an extensive area can be hardly named anything else than a great tragedy/disaster for the Forest* (Mucha and Liziniewicz 2013, Fronczak 2015, Kotarski 2015, Niedzielski 2015, RDLP Białystok 2015, Goździewska 2016a).

The current outbreak of the bark beetle is certainly a large-scale disturbance. It results from a combination of various factors, of which of considerable importance are the mistakes made in the past (planting spruce in a large area of the Forest). Hence, uniformly-aged spruce stands appeared in large areas, which today are attacked by bark beetles (see p. 10). Still, it is not the most intense of the outbreaks that has been observed in the Forest (Mokrzecki 1923), as 80-90% spruce trees will survive it (see p. 6).

5. When spruces die, shortly afterwards vast open areas will appear in the Forest, covered by grasses, raspberries and ferns. Later, with time, they will be settled by pioneer tree species, such as willows, birches or aspens. These pioneer tree stands, in terms of natural and aesthetic values will not differ much from the early forest succession stages which can today be frequently seen in abandoned farmland, e.g. near Warsaw (Kotarski 2015, RDLP Białystok 2015, Goździewska 2016b, LOP 2016, Świstak 2016).

First, no vast open areas will appear, since the overall area of dying spruces will cover not more than 2-3% of the Forest. Second, the most recent studies in mountain areas that were affected by bark beetle outbreaks several years ago (the borderland of Germany and the Czech Republic) indicate that gaps appearing after the death of spruces enable growth of numerous young spruce trees, which soon replace the dead trees, thus initiating natural regeneration. Any pioneer tree species (willow, birch or aspen) that manage to sprout in the gaps quickly give way to the abundantly growing spruces (Zeppenfeld et al. 2015). Occurrence of pioneer species leads to a temporary increase of the Forest's biodiversity. This is a normal process in natural forest dynamics (Begon et al. 2006).

6. The spruce has been declining in the Forest and this is bad news; the spruce will disappear from the Białowieża Forest if no protective measures are taken (= cutting trees invaded by bark beetles) (LOP 2016, Radio Maryja 2016, RDLP Białystok 2015, Świstak 2016).

Until the climate changes, the spruce will be present in the Forest as it has been present over the last thousands of years. The current outbreak has so far caused the death of about 10% of spruces. Even if twice as many died by the end of the outbreak, 80% of them will survive. Thus, arguing that the spruce will disappear in the Forest if the attacked trees are not cut, is not true. In addition, in the nature reserves and parts of the Białowieża National Park that are left untouched, the place of the spruce trees killed in the previous outbreak (2001-2003) was taken by vigorously growing young spruces, which today are a few meters high (Fig. 1). Today, spruce trees are overrepresented in the managed part of the Forest due to promoting (excessive planting) this species in the past. Hence, the death and slow decay of some of them can even have a positive effect, as it will allow for the development of a more diverse forest.

7. Without human intervention, the Forest will die (Goździewska 2016a, Stanowisko ... 2016c). **Foresters want to rescue the Forest** (Sasin 2014, Fronczak 2015, Niedzielski 2015, Chałupka 2016, Goździewska 2016a, Hilszczański 2016, Stanowisko ... 2016c, Świstak 2016).

The Forest, in contrast to crops, is not a human creation. Trees settled in this area spontaneously, after the retreat of the glacier and - despite many disturbances - they have grown there until this day. In the current climate conditions in Poland it is not possible that a forest could go extinct. Rather, there is a problem with maintaining open forestless areas. If overgrowing is not prevented, these areas are rapidly colonised by trees (Falińska 1996). The current model of a 'plantation forest', seemingly indispensable for the existence of the Białowieża Forest, was not introduced there earlier than 100 years ago (in 1915) by German invaders.

Since the Forest is not going extinct, there is no need to rescue it. It is the natural forest that is in fact declining, being turned into a managed forest, planted in line with the human concepts of what a forest should be like. Currently, the spruce trees invaded by the bark beetle are dying. If they are left in the forest, for several years the dead and decaying trees will serve an important biological function: they will provide habitat for numerous species, slowly giving back to the environment the matter accumulated in their tissues; they will fertilise the soil and facilitate growth of a new generation of trees. Cutting and removing them from the forest is

harmful in nature terms and leads to substantial impoverishment of the whole forest ecosystem (Gutowski et al. 2004, Bobiec et al. 2016). The Forest will last so long as the forest trees are let die and decompose, and young trees are let grow naturally.

8. In the case of complex forest ecosystems, the passive protection causes their actual decomposition and loss of their natural values, which are the object of protection and must be permanently preserved (Chalupka 2016).

Allegedly, a forest left on its own (surrendered to natural processes) disintegrates. This view is indeed astonishing. The nonsense of this statement is evident if one is aware that the human (*Homo sapiens*) appeared on the Earth about 200,000 years ago, forest management in the contemporary form arose in the end of the 18th century and its methods were first applied in the Białowieża Forest only 100 years ago. On the other hand, the forest - the most complex terrestrial biological system - developed hundreds of millions years ago and survived great geological disasters without the help of humans. Similarly, the tropical rainforests that for several millions of years have existed in the valleys of the Congo and the Amazon Rivers have thrived well without the 'help' of humans. It is man, by cutting and burning, who has created the highest threat to them today.



Spruce trees attacked by the bark beetle die and remain in the forest. Photo by G. Hebda



Dead spruce trees fall and form a cover for young trees. Photo by G. Hebda



The place of the killed old spruce trees is taken by young spruces and deciduous



Changes that take place in fewer than ten years from the death of big trees. Photo by A. Bohdan

trees. Photo by A. Bohdan

Fig. 1. What will happen if humans do not intervene; how natural processes ‘cope with’ an outbreak of the bark beetle.

9. The Forest, without active protection measures, is losing its biodiversity; in places where man ceased its activity, there are a number of processes which compromise the condition of the valuable priority habitats. The object of protection, for which sections of the Forest have been exempt from human activities, ceases to exist (Fronczak 2015, Hilszczański 2016, Radio Maryja 2016, RDLP Białystok 2015, Goździewska 2016a, Świstak 2016, Brzezicki et al. 2016).

Biological diversity (biodiversity) is an ambiguous term, referring to several levels of diversity. In order to speak about the loss of diversity, it is necessary to first explain what exactly it means. Cutting a section of old-growth stand of natural origin and planting young trees in its place will always cause a dramatic drop in the diversity of species, processes and structures. Organisms dependent on the presence of large and dying trees will lose their habitat. A diverse, **3M** forest (**multispecies, multilayer, multigenerational**) will be replaced by a simplified, **3S** forest (**single-layer, single-aged and often single-species**). Hence, preservation of the diversity typical of a natural forest requires **abstaining from intervention into its processes**.

Human management, in turn, enhances diversity through the creation of new types of habitats, previously non-existent in the Forest, mainly non-forest ones (such as fields, meadows, clearings, roads, etc.). This invites organisms requiring open areas and alien species, which in turn increases the total number of species occurring in the Forest. However, many of them are non-native species, not to mention that some of them, due to their invasiveness, can even pose a threat to the native species. Maintaining such habitats requires constant human action to prevent encroachment of bushes and trees. These anthropogenic areas, however, cover less than 5% of the Forest (Faliński 1986). In the remaining 95% of the area, abandonment of forest management will enhance biological diversity.

10. That the composition of the tree stands in the Białowieża Forest is becoming less complex is bad; changes in the Forest tree stands are disadvantageous (Sasin 2014, Goździewska 2016b, Kruczek 2016, Brzezicki et al. 2016).

Natural forest is much more than tree stands. The main reason for the simplified tree stand structure is forest management, or replacement of diverse forest areas of natural origin by forest plantations consisting of only one or a few favoured tree species, which produce economically desired resource (see What is a forest? above and p. 17).

11. The oak does not regenerate in the Forest (Vera 2000, Antczak 2009, Program ochrony... 2011, Brzezicki et al. 2016)

In line with its life strategy, young oaks hardly ever appear under the canopy of old trees (including oaks), and hence they should not be expected to grow there. Young oaks grow in gaps created by dying trees, especially numerous in the areas exposed following a bark beetle outbreak, overgrown by grass and raspberry (Bobiec et al. 2011; Bobiec and Bobiec 2012).

12. The hornbeam will be the dominating species in the Forest, which is wrong (Sasin 2014, Goździewska 2016b, Hilszczański 2016, Kruczek 2016, Winięcki 2016).

The hornbeam is the main species in an oak-hornbeam forest, which means that it will naturally be abundant in the spontaneously developing oak and hornbeam communities prevailing in the Forest. Because this species does not produce valuable timber, in managed

forest it used to be eliminated to give place to more economically profitable species. A natural response to an earlier disturbance is - after the human pressure ceases - an increase in the abundance of hornbeam in the forest. However, in the oak-hornbeam forest in the strict reserve of the Białowieża National Park, in which for nearly hundred years the natural processes have not been interfered with, the hornbeam remains only one of the many co-occurring tree species.

13. *In the managed section of the Forest, the oak and pine, which are very important species e.g. for preserving the 'primeval' nature of tree stands, were restored on purpose. This is why their current condition and demographic structure are much better* (Goździewska 2016b).

In the case of natural forests, one cannot speak of a 'favourable' demographic structure. This structure will vary depending on the stage of forest development and should not be assigned value. Speaking of 'a more favourable demographic structure of tree stands' in economically managed forests is a typical example of the cultivation view, as opposed to the ecological view. Trees are removed from the managed forest when their rapid growth ceases, i.e. when they reach one third up to a half of their biological age. Regulations do not take into account the existence of older individuals. If a human population lacked people older than 30 years, could we consider its demographic structure favourable?

14. *These problems would not arise, or at least certainly not at such a large scale, if the half-natural compromise management model, proposed by foresters, was adopted in the Forest. The model reconciles several forest functions, such as - in the first place - taking care of forest continuity and the stability of processes. Rejecting this model by decision-makers has resulted in the today's disaster* (Goździewska 2016b, Polskie Radio Wnet 2016).

The real scale of the disturbance was presented above (see p. 6). The permanence of the Forest, which emerged without the contribution of humans and has so far survived all disturbance, is not threatened; the Forest will manage today, too, as long as it is not interfered with (see p. 7). Claiming that intensive intervention into the natural processes (cutting, planting and tending) is the same as taking care of their stability is self-contradictory. The continuity of natural processes by definition excludes human intervention.

15. *The current disastrous condition of the managed part of the Białowieża Forest is a result of the chaotic actions of the previous Ministry of the Environment and an influential lobby of 'the greens', resulting from the passive, 'point' or object-like approach to the protection of the Forest* (Chałupka 2016, Hilszczański 2016).

The current state of the managed part of the Białowieża Forest is first and foremost a result of the decisions taken during hundred-year-old practices, which have step by step been transforming the natural forest into the managed forest with single-species and uniformly-aged tree stands. However, the condition of the Forest is not disastrous (see p. 7). If disturbances caused by human management are prevented, the forest will be given a chance to recover.

16. *Forest scientists and practitioners having relevant knowledge, experience and insight into the forest ecosystem are able to stop unfavourable processes. Through active conservation practices they can both preserve and restore a forest devastated by various factors* (Chałupka 2016).

When protecting natural processes, one does not assess them as favourable and unfavourable. If restitution of the natural forest was that simple, the whole Western Europe would be long covered by such forest. Still, however, the German, the Dutch, the French, the British and other nations come to the Białowieża Forest and the National Park to see and to study a natural forest.

17. *The previous administration of the Ministry of the Environment limited the possibilities of active forest protection available to foresters, by dramatically reducing logging. This decision caused a chaotic growth of insect populations (bark beetles, larger European elm bark beetles and other)* (Goździewska 2016a, 2016b, Świstak 2016).

The forest management plans (i.e. documents that guide forest management) that were in force since 2012 indeed reduced logging, exempting the sections of the Forest of the highest natural value. However, this is not related whatsoever to the current outbreak (see p. 2) of the European spruce bark beetle. The high intensity of its outbreaks is partly a result of the previous management practices. Long-standing replacement of multi-species natural forests by spruce plantations led to overrepresentation of the spruce in the Białowieża Forest. A series of dry years weakened spruce trees and facilitated their infestation by bark beetles. In addition, the great supply of spruce created perfect conditions for the growth of bark beetle numbers. ‘Active forest protection’, which consists of felling, is a response to one disturbance with an even greater disturbance, which causes highly negative effects (see above, What would happen..., p. 2 and Fig. 2).

18. *Thanks to the wise management by foresters, there are 12,000 ha of reserves and over 1,500 natural monuments in the area administered by the foresters in the Białowieża Forest* (Goździewska 2016a).

This is only partly true. Most reserves in the Białowieża Forest were created to protect a natural forest by avoiding forest works and preventing its transformation into a managed forest. Creating reserves and reducing cutting was partly initiated by foresters but more often so (unfortunately) was actively opposed by them. That there are **only 1,500 natural monuments** in the Białowieża Forest is not something to be proud of; it points to the scale of the loss of the Forest's values, caused by forest management. If it had not been for the logging in the last 100 years, there would be more than 15,000 of monument oaks with diameter above 4 m, not to mention other species. However, there are only about 3,000 monument oaks, of which most are found in the strict reserve of the Białowieża National Park, which had never been managed. In the managed part, the ‘people who utilised the Forest’ removed 85-90% of the monument oaks (Korbel and Niechoda 2016, TVP Białystok-Wielkie drzewa 2014). This can hardly be considered a merit.

19. *Several cubic metres of dead wood are wasted in the Forest; also referred to as: there is decaying wood in the forest* (Mucha and Liziniewicz 2013, Hilszczański 2016, Polskie Radio 2016, Radio Maryja 2016).

If the value of timber in a forest is reduced to the mere market value of planks produced from it, then indeed leaving it in the forest is wastefulness. However, dead wood plays other important roles and retaining ‘decaying’ wood in the forest is not wastefulness but a key factor providing habitat for a large number of organisms (Gutowski et al. 2004, Bobiec et al. 2016).

20. *Due to the reduction of logging, the local community has problems obtaining fire wood* (Mucha and Liziniewicz 2013, Radio Maryja 2016).

The amount of logged timber planned for 2012-2021 should cover in excess the local demand for wood used not only for fuel but also for construction purposes and in other applications. In 2014, the three administrative units in the Białowieża Forest sold in total 31,847 m³ of timber on the local market, while they logged 67,706 m³ (Pismo ... 2015). Consequently, if there is shortage of wood on the local market, this is a result of its inappropriate distribution, as it is sold outside of the region, and not the logging quota set in forest management plans.



The spruces attacked by the bark beetle are cut during 'sanitation' cutting. Photo by G. Hebda



Infestation by the bark beetle is used as justification for cutting even the oldest and the greatest spruce trees (more than 250 years old and more than 40 m high). Photo by an unknown author



The cut spruces are transported from the Forest. Photo by J. A. Korbek



Apart from spruces, other trees are removed and soil is prepared for a plantation. Photo by A. Bohdan



Young trees are planted and the plantation is enclosed with a mesh. Photo by A. Bohdan



After a few years, young trees (here pine) develop in the enclosure. Photo by W. Walankiewicz

Fig. 2. 'Active forest protection' - ways of coping with an outbreak of the European spruce bark beetle through forest management.

21. Extending protection over a larger area of the Forest will make it closed for entry by people ('the greens want to throw people out of the forest') (Kruczek 2016)

This statement is not supported by facts. Nobody has ever intended to close the Białowieża Forest for the inhabitants and tourists. After the last extension of the Białowieża National Park, a large part of the newly joined area was made available for visiting and collection of berries and mushrooms. Likewise, any plans of extending the National Park to the whole of the Białowieża Forest provide a majority (about 80%) of the area available for visitors, as well as picking berries and mushrooms. Already today the dynamic growth of demand for tourist, restaurant and eco-education services is an important stimulus for the development of the Forest villages. It suffices to compare the number of hotels, pensions, guesthouses and restaurants in the Forest between now and twenty years ago, when the Białowieża National Park was enlarged.

Why we write this. Based on scientific data from relevant specialist literature, our goal was to debunk the myths and half-truths that are published in some media. We hope that, with the help of information provided in this article, the reader will be better prepared to formulate an opinion about whether we need natural forests or not. It is worth keeping in mind that the Białowieża Forest, which today is the object of the dispute, is only 0.7% of all the forest areas in Poland. We postulate that it is granted permanent protection, so as - just like us today - the next generations can be proud that the sensitivity and wisdom of their ancestors ensured that this unique forest of outstanding natural value survives.

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