Białowieża Primeval Forest

The Largest Area of Natural Deciduous Lowland Forest in Europe

BY ANDRZEJ BOBIEC

Introduction

The Białowieża Primeval Forest (BPF) is an important lowland forest and a remnant of a natural deciduous, temperate forest ecosystem. The BPF is located on the border between Poland (58,000 ha. or 143,260 acres) and Belarus (67,000 ha. or 165,490 acres), 120 miles east of Warsaw. The Belarussian side of the BPF has been protected as a national park since 1991, and the Polish side includes the Białowieża National Park (BNP) covering only 10,500 hectares (26,000 acres) (17% of the Polish side). Half of the BNP is preserved as a Strict Nature Reserve (SNR) and has been approved as a Biosphere Reserve and the World Heritage Site in 1979.

The BPF has been protected in various ways for centuries. Currently, the most protected area is the SNR, where use is limited to scientific research and nature-based tourism. The remainder of the BNP is subject to limited intervention aimed at gradual restoration of natural characteristics and to provide supplemental winter forage to the unique woodland bison (*Bison bonasus*) that inhabit the area.

The entire BPF area on the Polish side is national property. More than 80% of that area, including numerous patches of old-growth forest and naturally regenerated stands, are subject to forest management conducted by the national forest agency (in Polish: Lasy Pamstwowe [LP]). Forest management involves harvesting, replanting, and pest control within the BPF outside the BNP.

At only 525 feet above sea level, the BPF covers a flat area of the watershed between the Baltic and Black Sea hydrological systems. The influence of continental climate causes a low average annual temperature of 43°F, cold winters with an average January temperature of 24.5°F, and an average annual precipitation of only 25 inches. The temperate forest is mainly represented by deciduous species of pedunculate oak, little-leaved lime, Norway maple, and hornbeam, but with an abundance of Norway spruce—a basic component of boreal forests. The woodland bison is the most well-known wildlife of the forest area. The focus of this article is on the Polish side of the BPF, which is subject to ongoing forest management and that could be protected, like the BNP, as the largest remaining deciduous lowland primeval forest in Europe.

Photo of author Andrzej Bobiec. Photo by M. Bobiec.

History of the BPF

How could a lowland deciduous forest persist in a natural state in this region of Europe, when it has been under continuous pressure from various rulers and governments since the Middle Ages? In the late 1300s, rule in Poland was taken over by the Great Duke of Lithuania, and this began the coexistence the of Kingdom of Poland and the Great Lithuanian Duchy. The duke declared the BPF forest area, located just on the border between Poland and the Lithuanian Duchy, as "royal" property and initiated a tradition of royal hunts. One hundred years later, almost 300 hundred rangers were employed in the royal forest area to keep the public from poaching and woodcutting. The rangers and their families were awarded continued royal service (intergenerational) and privileged access to the royal forest. By the 1620s, two types of management zones were designated in the royal forest: a mainstay area, reserved for

The lowland forest ecosystem in the Białowieża Primeval Forest. Photo by Andrzej Bobiec.

monarchs (de facto strict nature reserves), and peripheral forest compartments, used by the rangers and their families. The royal forest system lasted almost 300 years.

By the end of 18th century, there was no other forest in Europe with woodland bison, a species that historically was common in most parts of Europe. There were some grazing and game-breeding policies at the turn of 19th and 20th centuries, but the BPF was maintained almost unmanaged. Occasional forest harvesting occurred in the BPF when Russians ruled the area in the 19th century. During World War I (1914–1918), Germans began systematic industrial harvesting in the BPF. Since then the BPF has been gradually transformed into an area with a system of managed forestland.

Post–World War I political chaos allowed for excessive poaching that extirpated bison from their last natural forest range by 1919. In 1921, the nature preserve was designated on 4,700 hectares (11,500 acres) in a central part of the BPF. The area was managed as a nature sanctuary and was soon designated as the BNP, the first national park in Poland. The founder of the BNP, Professor W. Szafer, believed that national parks and nature reserves should remain "laboratories of wild nature and evolution." After World War II, the BPF was divided into the Polish and Belarussian areas. The Belarussian area was used as a special hunting ground for Communist Party members until 1991, when it was protected as a National Park.

According to the last forest inventory on the Polish BPF in 2001, forest stands that were 100 years old and older covered some 23% of the BPF. Over 30% of the BPF was secondary 60-to 80-year old stands that developed naturally on old, nonreplanted clearings. There is no other forest in Europe with such a large surface representing a well-advanced natural succession after the historic clearing of natural stands. Most importantly, the entire BPF could be protected like the BNP.

The Białowieża Primeval Forest is considered a natural heritage because of its long history of preservation and involvement of local communities.

What Have We Preserved?

The BPF is considered a natural heritage because of its long history of preservation and involvement of local communities. Some serious concerns remain about the future of the BPF.

The most well-known achievements following protection efforts in the BPF was successful restoration of a viable wild herd of European bison (approximately 600 animals are alive today in herds within Poland and Belarus) and the longest history of preservation in the BNP area. Ironically, establishment of the BNP has institutionalized the legal division of the BPF into areas for protecting natural forest processes and conditions, and a production forest, managed according to national forest management legislation. While the BNP is an important achievement, it requires that the management of the surrounding BPF supports the preservation of the BNP flora and fauna. For example, sustaining the woodland bison requires a larger range than the BNP provides, and these charismatic megafauna are the public symbols of naturalness for the BPF area. Less well-known and important species need protected area status to survive and thrive, such as wolves, or birds that nest in cavities of dead trees.

In an increasingly urban and agricultural world, rare and endangered forest ecosystems are dependent on protected late successional stages of natural communities. The biodiversity of the old-growth forest in the BNP is a

complex function based on the successional stage of the ecosystem, size of the area, and internal and external forest connectivity. A continuous supply of dead and downed forest wood contributes one-fifth of all aboveground forest biomass and secures long-term availability of various ephemeral habitats for myriad organisms, such as fungi (almost 3,000 species have been described in the BPF) and invertebrates. Many of the 10,000 species of insects found in the BPF have been defined as the old-growth relics, and several of them are reportedly extinct elsewhere. Many organisms are dependent on specific kinds of decaying wood.

A large number of old trees—living, sick, and dead—within the BPF provide for the ecological role of microhabitat redundancy, thus securing viability of populations dependent on such conditions. Uprooted trees within the lowland forest create new forest gaps by creating a physical barrier against intensive ungulate browsing on young trees. These regenerating forest patches then form a continuous mix of a new successional forest growth within the old-growth forest, so that the forest develops a complex mosaic of forest ecosystem structure. For example, the SNR within the BNP is the only forest area where all nine forest species of European woodpeckers nest. Maintaining the perpetuity of this shifting forest mosaic from initial to climax to decadential is a necessary condition for conservation of the endangered biodiversity.

The BPF and BNP are the last lowland forest in Europe where wolves and lynx naturally control red and roe deer populations. As in tropical natural forests, the breeding success of singing birds in this forest area depends more on the raptor (e.g., eagles and hawks) predation than on the food supply. These natural conditions and processes result in a wide diversity of bird species, but relatively small populations.

The BNP itself is not a self-sustaining ecosystem. For example, a lynx needs a territory as large as the SNR, and the territory of a single wolf pack is over twice as large as the protected area. The BNP needs the buffer area of the BPF to sustain these populations of predators. The dynamic structure of forest stands depends on natural perturbations that may be controlled during forest management activities within the BPF. For example, the natural regeneration of oak requires a high rate of disturbances, such as forest gaps created by infestations of round-headed bark beetles in spruce stands. These two species—long-living oak and a major gap-maker, spruce—seem to be strongly interrelated. Spruce seeds are dispersed by the great spotted woodpecker when the birds fix spruce cones into the thick bark of old trees, mainly oaks, during their attempts to feed on spruce seeds from the cones. In this way, the combination of old oaks and woodpeckers feeding on spruce seeds tends to create clumps of spruces—the future gaps necessary for oak regeneration following infestation by round-headed bark beetles. This cycle of oak and spruce regeneration is not likely to persist if the natural forest gap pattern is constrained by "pest control" of round-headed bark beetles, even if such pest control is only performed outside the SNR.

Norway maple covered by epiphitic mosses in the Białowieża Primeval Forest. Photo by Andrzej Bobiec.

Pest tree removal in the Białowieża Primeval Forest. Photo by Andrzej Bobiec.

The vision of extending the Białowieża National Park into the entire Białowieża Primeval Forest is one way to meet urgent conservation needs and to boost social and economic development in the region … .

In spite of some losses that have already occurred, there is still time to maintain or restore a self-sustained ecosystem and to prevent further loss of biodiversity. Such a restoration of natural processes and conditions requires a comprehensive management system involving natural disturbance patterns in the BNP and the entire BPF.

Pressure for Forest Products

According to the national forest agency (LP), Poland is too poor to "waste" a large amount of the marketable timber needed in the local economy. The claims that current forest management and harvesting is a required condition for the future of the BPF. However, due to long-term oversupply of cheap timber from Russia and Scandinavia, Polish forestry businesses are suffering from a deep economic recession. The LP forest management activity in the BPF (0.7% of the forestland in Poland) relies on national subsidies. The local economy, partly dependent on timber, does not necessarily need the relatively expensive wood from the BPF. For example, some community leaders complain that unless the trend of migration of young, educated people from the region to the large cities is reduced, the losses to the local social traditions and culture will be irreparable. Forestry seems to be of little interest to the local youth and has limited capacity to keep them in their hamlets.

While "multipurpose forestry" is a driving paradigm in the European Union (where forests comparable to the BPF were gone 200 years ago), the LP arguments for forest management are also made on an ecological basis. The LP observes that foresters must eradicate forest pests, otherwise spruce will disappear. The LP claims they must help nature in remodeling stand composition to be better adapted to soil and the changing air quality in Poland.

Riperian forest in the Białowieża Primeval Forest. Photo by Andrzej Bobiec.

Extend the BNP into the Entire BPF?

Since the beginning of the LP multipurpose forestry campaign, a great emphasis by conservationists was put on the socioeconomic aspects of legislation that supported the conservation of natural forests. According to the conservationists, the government is responsible for preservation of the remnants of natural forest as a living national monument and a laboratory of nature. They further claimed that the BPF was the best local and regional natural attraction and it should be both preserved and used by the local communities as an attraction, for visitors and tourists.

In 2000, a group of volunteers—ecologists, biologists, and foresters—mostly residents of the Białowiża region, discussed the principles of the BNP and how they could be extended to the entire BPF in Poland. The project involved representatives of many stakeholder groups. According to their discussion, a national park covering the entire BPF is the best legal approach to secure conservation of the BPF. The national park management approach could use zoning to preserve the clusters of old-growth forest, wetlands, and breeding areas of rare wildlife species (e.g., bison, wolf, lynx, eagle). In forest restoration zones, moderate silviculture measures could be applied to mostly secondary growth and artificial stands, where management will restore natural forest systems while providing for locally needed firewood and raw wood material (approximately 70,000 cubic meters per year versus the 2001 extraction rate 120,000 cubic meters).

Logging could be replaced by ecotourism as an engine of local development. The BPF has great tourism potential for the local communities to develop as gateways to the BPF, especially if it becomes more of a national park. According to a recent informal survey, the majority of the estimated 100,000 visitors each year come to the BPF either to see the natural forest or a woodland bison. The gateway communities could provide unique opportunities to show both the cultural and environmental uniqueness of the area through information and interpretation programs. According to the conservationists' discussion on the BPF region, it should host a permanent international center for studies on natural forest ecosystems, both for higher education and for cooperation between scientists studying natural forest areas.

The vision of extending the BNP into the entire BPF is the one way to meet urgent conservation needs and to boost social and economic development in the region—two compatible and complementary elements of this unique European region. After 10 years of an intense national campaign, it seems that a concerted and strong international assistance could help save what Poland has contributed to the European biological heritage through centuries of protection from the royal forest to the modern-day BPF and BNP.

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Woodland bison in the Białowieża Primeval Forest. Photo by Andrzej Bobiec.

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