

Bialowieza National Park and Science

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BIALOWIEZA NATIONAL PARK
Bialowieza, Poland

BIALOWIEZA NATIONAL PARK AS A RESEARCH OBJECT

Bialowieza National Park (BNP) lies in the center of a great forest complex: Bialowieza Forest (145,000 ha), divided by the state border between Poland and Belorussia. BNP has 5,346 ha. Its main function is as a strict preserve (4,747 ha so managed) containing mainly forest ecosystems with stands of natural origin. They are the best-preserved European lowland forest lying in a zone of deciduous and mixed forest, which could be defined as “natural” or “old-growth” forest. The BNP is a biosphere reserve and World Heritage Site.

BNP's value to research arises from:

- ◆ the exceptional state of its ecosystems, which are minimally altered by human activity;
- ◆ the strict protection under which the park is kept, which makes it possible to realize long-term investigations based on permanent study plots;
- ◆ its position at the center of a great forest complex, with economic forests and partially preserved forests, that makes it possible to investigate the course of chosen processes and phenomena in primeval forests, economic forests, and forests with limited economic activity;
- ◆ the park's containing numerous rare and endangered species of plants, fungi, and animals—relicts of primeval forests that are important for science; and

◆ the exceptional biogeographical location of the Bialowieza Forest near the range of natural distribution for numerous species of plants, fungi, and animals, as well as vegetation types.

Thanks to the protection of the park since 1921, a well-known center of biological and forest sciences was created in the village of Bialowieza, which now contains four research institutes: the Polish Department of Protection's Forestry Research Institute; Bialowieza Geobotanical Station of Warsaw University; the Mammals Research Institute of the Polish Academy of Science; and the Plant Populations Laboratory Institute of Botany. BNP itself also has a small research laboratory.

GOALS OF RESEARCH

The main goals of investigations in BNP are to:

◆ inventory all elements of nature, e.g., flora, fauna, individual and population variability, geological structure, soils, hydrology, and registration of meteorological phenomena;

◆ establish the representativity of BNP for the wider Bialowieza Forest and the general borderland region between Central and Eastern Europe;

◆ study natural processes, especially long-term ones, that can proceed unimpaired only in protected areas like BNP;

◆ recognize the differences between processes under natural succession in a forest free of human impact and those which take place in a forest subject to different levels of human activity (especially those processes that should have a direct or indirect influence on natural elements of timber production);

◆ investigate the mechanisms and degree of influence of human activity within the park—including scientific investigations themselves, educational activities, and tourism—

as well as activities in surrounding areas; and

◆ monitor the state of the environment.

ORGANIZATION OF RESEARCH

Because BNP is relatively small, it is necessary to reconcile different functions of the park without conflicts. For this reason, BNP is divided into zones: (I) mass tourism and education; (II) intensive scientific investigations and education at the secondary or high-school level; (III) research and experiments requiring larger or relatively isolated plots; and (IV) observational research of unlimited duration, requiring total isolation.

All research in BNP is coordinated by the park's Scientific Council (an advisory body of the park administration). Experimental investigations are permitted only if they do not make visible changes in the flora, fauna, or natural course of ecological processes. Complementary investigations are to be realized outside of the park in existing reserves set aside for the purpose. In practice, all research projects need approval by the Scientific Council of BNP from start to finish. In 1991, over 50 research projects based in Poland were carried out in BNP. Some of these were carried out together with foreign specialists.

The main form of research is that done on long-term, permanent study plots. The oldest, an investigation of changes in tree stands free from human impact, was established in 1936 (Kowalski 1982). There are actually over 100 permanent study plots in the park, complemented by points for monitoring groundwater levels, air pollution, or tree genetics.

The laboratory equipment at the research institutes located in the village of Bialowieza greatly facilitates the preliminary preparation of collected samples. There also exists results of previous investigations (both raw documentation and publica-

tions), basic data on climate, vegetation, soils, geological structure, and inventories of the main groups of plants, animals, and fungi. In the library of BNP are catalogued all publications relating to Bialowieza Forest. Nearly all are available in Bialowieza's libraries. The park also has information on the location of comparative collections of different systematic groups from its territory. Nearly 8,300 publications on the area had been produced up to the end of 1990, apart from popular weekly magazines thematically connected with Bialowieza Forest. From that total, 3,872 present results of original investigations made in Bialowieza Forest. A bibliography on Bialowieza Forest is published regularly (Karpinski and Okolów 1967; Okolów 1976, 1983, 1991). It is necessary to mention that in the Belorussian part of Bialowieza Forest—now proclaimed as a national park—is a research department, and its investigations are published too. The establishment of a transboundary biosphere reserve in Bialowieza Forest (now being undertaken) calls for the coordination of research and monitoring systems so that the results will be comparable.

REVIEW OF THE MOST IMPORTANT RESEARCH RESULTS

From numerous works of inventory of selected systematic groups of plants and animals, one of the most interesting, in broad scale, are investigations of Polyporaceae fungi, which, apart from their value as inventories, have made an important contribution to the taxonomy and ecology of this group (Domanski et al. 1973). Of similar importance from zoology are investigations on diurnal butterflies that reveal threats to several species and protective measures (Krzywicki 1967). Autecological work has been carried out on selected species of fungi, higher plants, terrestrial vertebrates, insects, and intestinal parasites of mammals.

The discovery of seasonal changes in the dimensions of the skull of shrews, known as "Dehnel's phenomenon," is particularly well known (Dehnel 1949).

Beginning with the first director of BNP, Józef Paczoski, who was a founder of geobotany, wide work on vegetation was attempted to develop this branch of science in Poland (Paczoski 1930). Its continuation over a half-century is summarized by Falinski (1986). Many ornithological investigations have been carried out since 1975 by a team under the leadership of L. Tomialojc (Tomialojc and Wesolowski 1990). Based on permanent census plots, their work is of interest to the ecology and breeding biology of bird communities. Finally, since 1978 a predator study has been continuing, checking the movements of lynx, pine marten, weasel, and polecat (Jedrzejewski et al. 1990).

EXAMPLES OF WORK IMPORTANT FOR NATURE PROTECTION

Almost all investigations in the park have some importance for the protection of nature locally, but some are relevant to all of Poland and even beyond.

Work by field biologists based in Bialowieza village discovered that BNP does not contain all the natural communities typical of Bialowieza Forest as a whole. This led to the creation of a network of complementary preserves (Sokolowski 1976). Thanks to these investigations, Bialystok Province now has Poland's richest and most comprehensive set of landscape parks and nature preserves. Scientists from Bialowieza prepared plans for the creation of Wigierski National Park and Knyszynski, Narwianski, and Suwalski Landscape Parks. Work compiled at the Bialowieza Geobotanical Station—Falinski's (1975) map of the anthropogenic changes in Polish vegetation—was a principal tool in

determining the prospective network of reserves for the entire country.

Numerous important data sets have been collected on the recovery succession of vegetation in abandoned hay meadows lying in swampy river beds (Falinska 1990) and on low-quality habitats used in former times as farmland (Falinski 1980). They help to predict vegetation succession in several existing and proposed protected sites. Research on local ecotypes of trees, begun more than 40 years ago (Kociecki 1968), recently was continued by Poland's Department of Nature Protection; it has importance for forestry practices and protection of genetic resources.

Finally, BNP is world-famous for the work done there on reintroduction of European bison. This work was possible only because of parallel wide-ranging investigations on the bison's morphology, biology, ecology, physiology, and role in forest ecosystems (Krasinski 1978). It is understandable why the the IUCN's Species Survival Commission group on European bison is chaired by a scientist from Bialowieza, and why the bison's pedigree book is maintained at BNP. Employees of the park helped establish free-ranging populations elsewhere in Poland, as well as a breeding center (initially stocked by animals from Bialowieza) in Margeride, France.

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