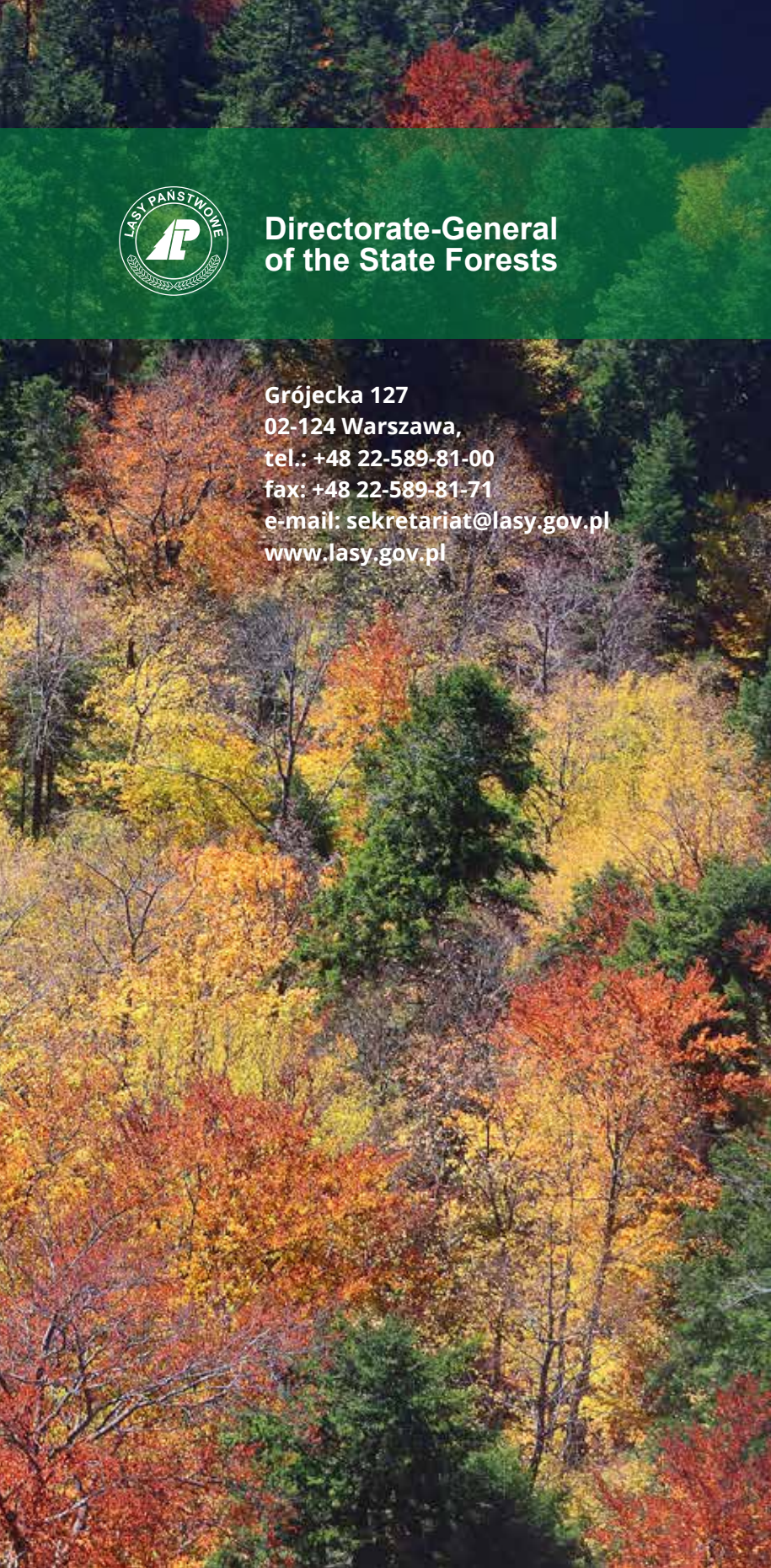

Poland
THE STATE FORESTS
IN FIGURES 2018
LASY PAŃSTWOWE
State Forests



Directorate-General of the State Forests

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THE STATE FORESTS – ORGANISATION

LEGEND:

SF REGIONAL DIRECTORATES

FOREST DISTRICTS

NATIONAL PARKS

FOREST COMPLEXES

TERRITORIAL RANGE of forest districts and regional directorates of the State Forests

The State Forests National Forest Holding (the State Forests) is an organisation which does not have legal personality and administers the state property on behalf of the Treasury. It is responsible for the management, on a self-financing basis, of all state-owned forests, with the exception of national parks, land under the administration of the National Support Centre for Agriculture, and forests leased under perpetual lease agreements. Its aims are to manage forests according to the principles of universal protection of forests, their sustainability, continuous use of all forest functions and the augmentation of forest resources. These aims are implemented in accordance with forest management plans drawn up for each forest district for a ten-year period.

The State Forests, whenever natural, social and economic conditions permit, fulfils the tenets of international agreements which include: the Forestry Principles and Agenda 21 adopted in 1992 at the Earth Summit in Rio de Janeiro; the Declaration of European Ministers of Forestry with regard to the protection of European forests (Strasbourg 1990, Helsinki 1993, Lisbon 1998, Vienna 2003, Warsaw 2007, Oslo 2011, Madrid 2015), and the Kyoto Protocol of 2005 concerning the role of forests in carbon sequestration. Since Poland's accession to the European Union on 1 May 2004, the State Forests have been implementing, within their remit, the programme Natura 2000.

The State Forests National Forest Holding operates in accordance with legal provisions of the Forest Act of 28 September 1991 (Journal of Laws 2017, item 788 as amended), the Ordinance of the Council of Ministers of 6 December 1994 on the principles of financial management in the State Forests National Forest Holding (Journal of Laws No. 134, item 692), the Accounting Act of 29 September 1994 (Journal of Laws 2018, item 395), and other statutory ordinances and regulations issued by the Minister of Environment and resulting from the Forest Act.

This brochure is based on the annual *Report on the Condition of Forests in Poland 2017*, which was commissioned by the Directorate-General of the State Forests and compiled by the Forest Research Institute, and on the annual *Financial and Economic Report of the State Forests National Forest Holding for 2017*.

THE STATE FORESTS IN FIGURES 2018

State Forests

AIMS AND OBJECTIVES OF THE STATE FORESTS

In accordance with the provisions of the Forest Act of 28 September 1991 (with later amendments) and the regulations and ordinances issued under this act, the main aims of the State Forests National Forest Holding are: to manage forests according to the principles of universal protection of forests, to maintain their permanence, to use all forest functions in a continuous and sustainable way, and to augment forest resources. The aims are pursued through sustainable multifunctional forest management in accordance with forest management plans developed for each forest district for a ten-year period. Each plan sets out silvicultural and protective objectives for specified fragments of forests (tree stands) and methods of achieving them.

The State Forests administers all forests owned by the State Treasury, with the exception of national parks, the land administered by the National Support Centre for Agriculture, or leased under perpetual lease agreements. This involves forest management and administration of land, real estate, and movable properties, as well as keeping an inventory of the property owned by the State Treasury. The State Forests continually monitors the condition of forests, keeps and updates data on the size of forest area and timber resources, observes and forecasts the level of fire hazard and the occurrence of tree pests and diseases.

The State Forests administers forests owned by the Treasury

The State Forests funds scientific research contributing to the advancement of forestry and forest management methods. Whenever natural, social and economic conditions allow, the State Forests implements the international agreements as laid down in:

- the Forestry Principles and Agenda 21 adopted in 1992 at the Earth Summit in Rio de Janeiro;
- the Declaration of European Ministers of Forestry concerning the Protection of European Forests (Strasbourg 1990, Helsinki 1993, Lisbon 1998, Vienna 2003, Warsaw 2007, Oslo 2011, Madrid 2015);
- the Kyoto Protocol (2005) concerning the role of forests in carbon sequestration.

Since Poland's accession to the European Union on 1 May 2004, the State Forests has been implementing, within their remit, the guidelines of Natura 2000 programme.

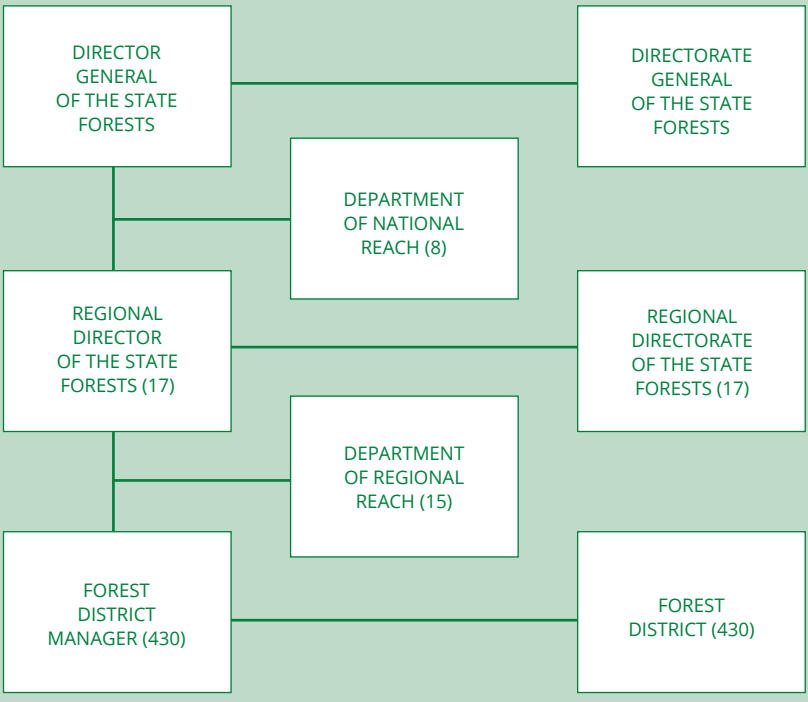
Other important objectives of the State Forests are to make forests accessible to society and to increase environmental awareness by providing forest and nature education.

ORGANISATION AND EMPLOYMENT. SCIENTIFIC RESEARCH

Organisational structure

The State Forests is a state organisational entity which administers property on behalf of the State Treasury and does not have legal personality; it operates on a self-financing basis.

The State Forests is headed by the Director-General who is assisted by the directors of regional directorates.



THE THREE-TIER STRUCTURE OF THE STATE FORESTS
(as of 31 December 2017)

As of 31 December 2017, the State Forests comprised the following organisational units:

- Directorate-General of the State Forests (DGSF);
- 17 regional directorates of the State Forests (RDSF);
- 430 forest districts;
- 15 organisational units (departments) with regional authority reporting to the regional directors of the State Forests (3 storage complexes, 2 fish farms, 2 transport and logistics, 3 service and production, 2 centres for forest transport, 2 forestry services, 1 training and recreation centre);
- 8 organisational units (departments) with country-wide authority reporting to the Director-General of the State Forests: the Research and Implementation Centre in Bedoń, the Forest Culture Centre in Gołuchów, the Forest Gene Bank Kostrzyca in Miłków, the State Forests Information Centre in Warsaw, the Forest Technology Centre in Jarocin, the State Forests IT Department in Sękocin, the Coordination Centre for Environmental Projects in Warsaw, and the Shooting Training Centre of the State Forests in Plaskosz.

The integral parts of the Directorate-General of the State Forests comprised 9 forest protection teams and 11 regional inspectorates of the State Forests.

The fundamental organisational unit in the State Forests is a forest district. Each is led by a forest district manager who independently manages the area according to the forest management plan and who is responsible for the condition of the forest. In 2017, as in the previous year, there were 430 forest districts with an average area of 17.5 thousand ha.

There are
430
forest districts within the State Forests

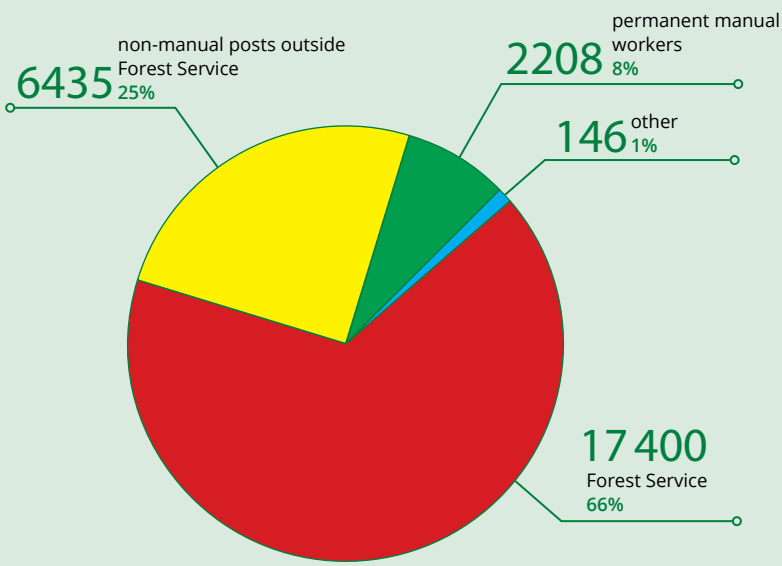
Employment

The average monthly employment in the State Forests in 2017 was 26 189 posts, which was 442 more than in 2016. The employment structure was as follows (in number of staff):

● permanent employees	26 043
including non-manual employees	23 835
● employees on fixed-term contracts	146

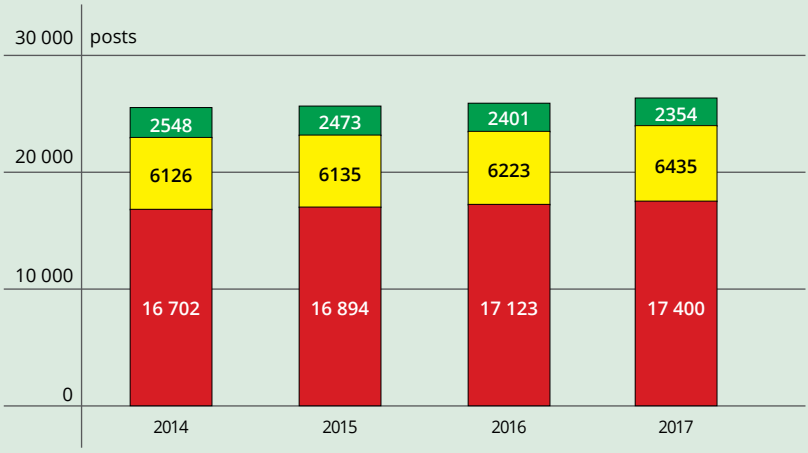
The average monthly employment within the system of statutory units of the State Forests was as follows:

1. In forest districts	23 725
including:	
● Forest Service	16 580
● non-manual posts outside Forest Service	5 294
● manual posts	1 851
2. In departments	1 074
● including non-manual posts	624
3. In the Directorate-General and in regional directorates (with Forest Protection Teams)	1 390
● including Forest Service	809



EMPLOYMENT STRUCTURE in the State Forests in 2017 (DGSF)

The analysis of average employment in the State Forests in the period 2014–2017 shows the increase in total employment in comparison with 2014.



EMPLOYMENT in the State Forests in 2014–2017 (DGSF)

As of 31 December 2017, a total of 26 521 people were employed in the State Forests, an increase of 541 persons as compared with the last day of 2016.

Research

Research commissioned by the Director-General of the State Forests in 2017 was both cognitive and utilitarian in nature, of fundamental importance for the development of all areas of forestry. Most research was carried out at the Forest Research Institute.

In total, 911 research projects were pursued in 2017 (including 1 project carried out by two contractors: the Forest Research Institute and the University of Life Sciences in Poznań), costing PLN 65 652.24 thousand provided by the forest fund. Of these, 44 projects were conducted at the Forest Research Institute, costing PLN 20 252.63 thousand, 38 projects involved universities and other institutions at a general cost of PLN 12 078 thousand, and 10 projects conducted by research consortia costing PLN 33 320.67 thousand.

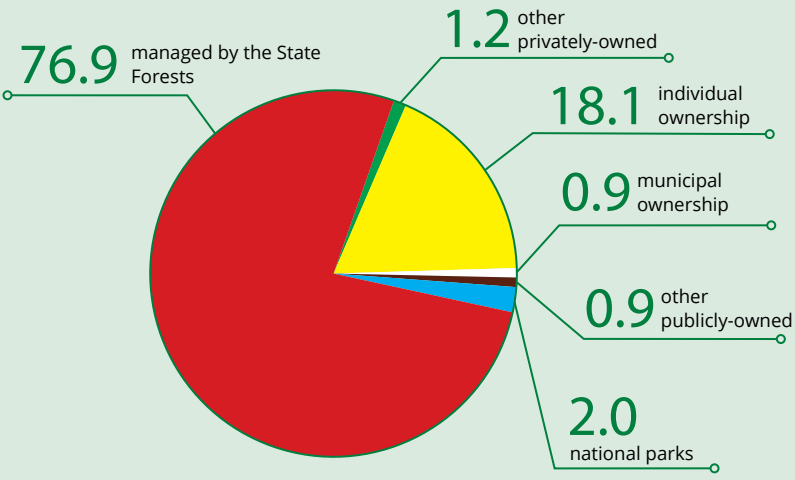
The results of the research studies were shared with the relevant units of the State Forests and other organisations outside SF for further implementation.

In 2017 the State Forests commissioned **91** research projects

RESOURCES OF THE STATE FORESTS

Forests in Poland

The forest area in Poland amounts to 9242 thousand ha (as of 31 December 2017, Central Statistical Office), which puts the forest cover at 29.6%. The majority of forests are publicly-owned (80.7%), including those administered by the State Forests (76.9%).



FOREST OWNERSHIP STRUCTURE in Poland (Central Statistical Office)

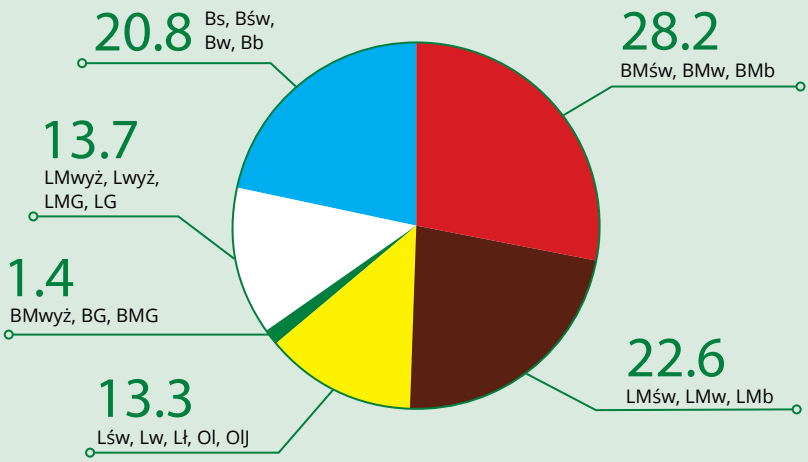
Land use structure

As of 31 December 2017, the total area of land administered by the State Forests amounted to 7 608 301.37 ha and it was structured as follows:

● forests, total	7 308 703.86 ha
including: afforested land	6 976 162.54 ha
non-afforested land	133 813.74 ha
● agricultural land	135 517.73 ha
● wasteland	95 270.09 ha
● waters	8 875.23 ha
● trees and shrubs outside the forest	12 008.62 ha

Area structure of habitats and dominant species

Forests in Poland mainly occur on the poorest soils, which is reflected in the structure of forest habitat types. Coniferous forest habitats predominate as they account for 50.4% of the total forest area, while the broadleaved sites account for 49.6%. Additionally, in both groups upland habitats occupy 6.5% of the forest area and mountain sites 8.6% of the total area of forests.



AREA SHARE of forest habitat types in Poland (National Forest Inventory 2013–2017)

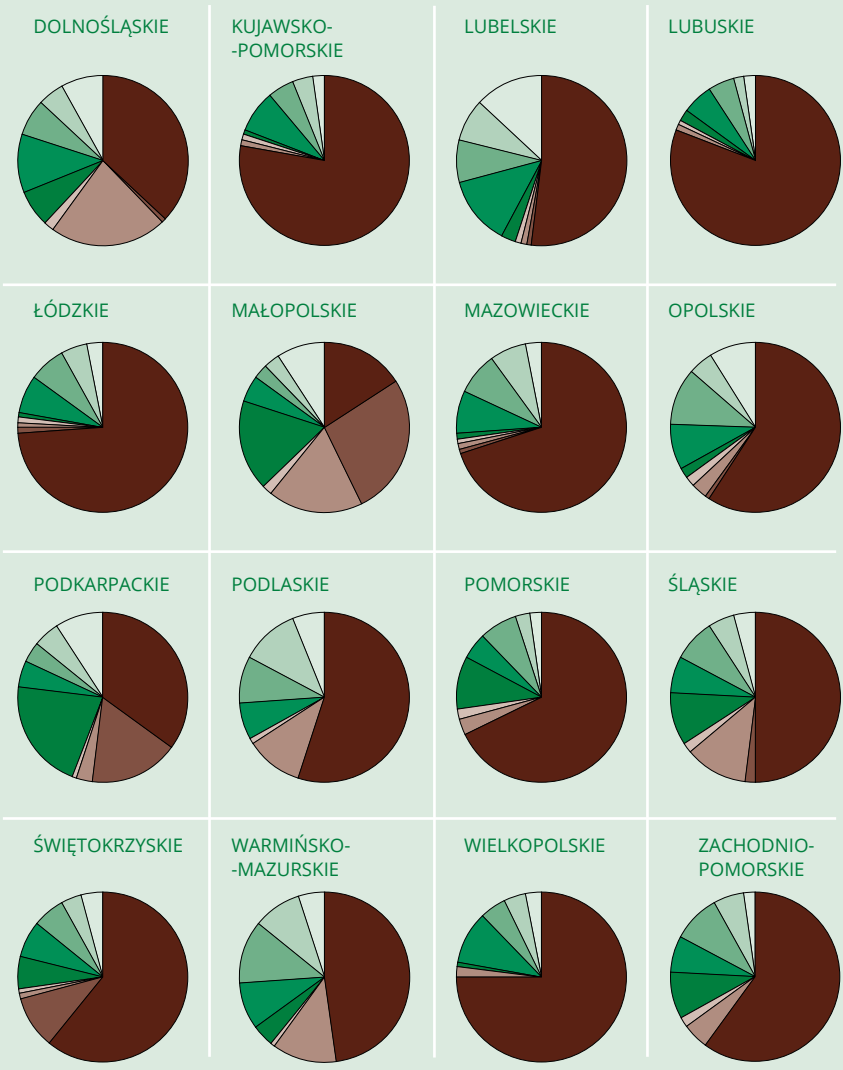
LEGEND:

Bb	– swamp coniferous forest
BG	– montane coniferous forest
BMb	– swamp mixed coniferous forest
BMG	– montane mixed coniferous forest
BMśw	– fresh mixed coniferous forest
BMw	– moist mixed coniferous forest
BMwyż	– upland mixed coniferous forest
Bs	– dry coniferous forest
Bśw	– fresh coniferous forest
Bw	– moist coniferous forest
LG	– montane broadleaved forest
Ł	– riparian forest
LMb	– swamp mixed broadleaved forest
LMG	– montane mixed broadleaved forest
LMśw	– fresh mixed broadleaved forest
LMw	– moist mixed broadleaved forest
LMwyż	– upland mixed broadleaved forest
Lśw	– fresh broadleaved forest
Lw	– moist broadleaved forest
Lwyż	– upland broadleaved forest
Ol	– alder forest
Olj	– alder-ash forest

Geographical distribution of habitats is largely reflected in the spatial structure of dominant tree species. Apart from the mountain regions, where spruce, fir and beech have a larger share in species composition, in most of the country pine is a dominant species in the majority of stands.

Coniferous habitats cover **50.4%** of the forest area in Poland

Coniferous species are dominant in 68.4% of the area of Polish forests. Pine, which in Poland has optimal climatic and site conditions within its Euro-Asiatic natural range and has developed many valuable ecotypes (e.g. pine from Tabórz and from Augustów), accounts

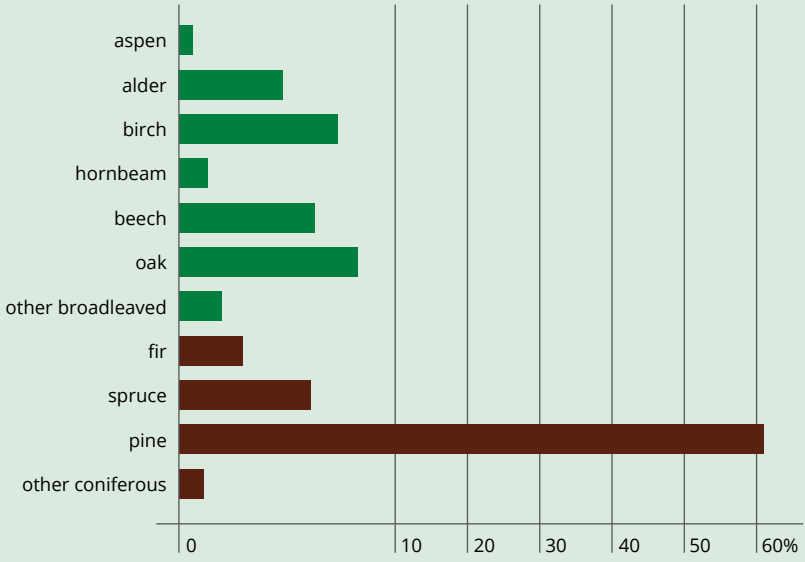


SPATIAL DISTRIBUTION OF TREE STANDS by dominant species and by voivodeship
(National Forest Inventory 2013– 2017)

LEGEND:

- PINE
- SPRUCE
- FIR
- OTHER CONIFEROUS
- BEECH
- OAK
- BIRCH
- ALDER
- OTHER BROADLEAVED

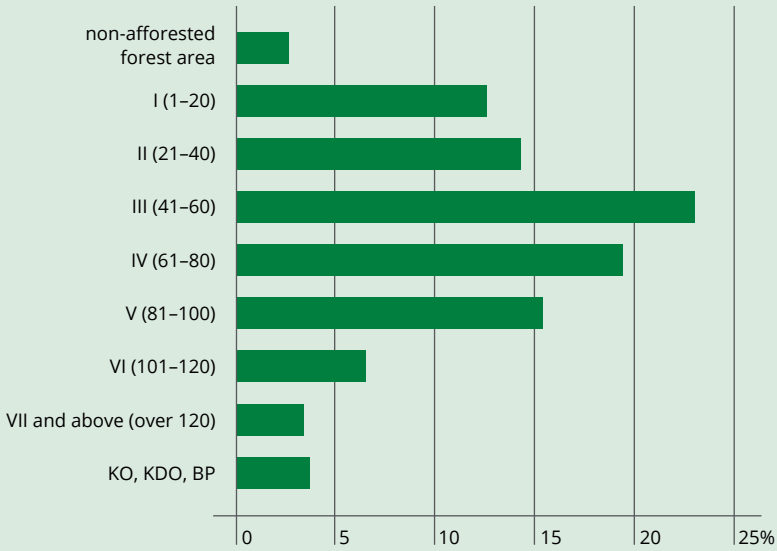
for 58% of the area of forests in all ownership categories, 60.2% of the area managed by the State Forests, and 54.9% in private forests (according to National Forest Inventory).



AREA SHARE OF DOMINANT SPECIES in the State Forests (National Forest Inventory 2013–2017)

Age structure

Stands representing age classes III and IV prevail in the age structure of forests and they cover 24.5% and 19.6% of the forest area, respectively. Stands older than 100 years including stands in restocking class (KO), class for restocking (KDO) and with selection structure (BP), account for 13.2% of the forest area managed by the State Forests, and in private forests – 3.6%. Non-afforested land in private forests amounts to 5.5%, while in the State Forests constitutes 2.7%.



AREA SHARE STRUCTURE OF STANDS BY AGE CLASS in the State Forests (National Forests Inventory 2013–2017)

Afforestation

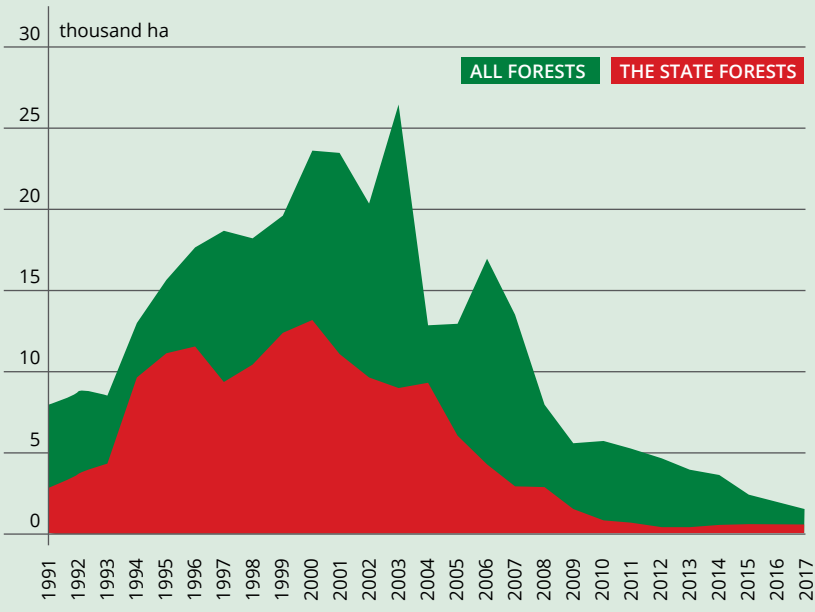
The basis for all afforestation in Poland is the *National Programme for the Augmentation of Forest Cover* (National Forest Programme – NFP) commissioned by the then Ministry of Environment, Natural Resources and Forestry. The programme was developed by the Forest Research Institute and recommended by the Council of Ministers on 23 June 1995. In 2002 the programme was modified. The main objectives of the programme are to increase the forest cover of the country to 30% by the year 2020 and to 33% by 2050, and to ensure an optimal spatial and temporal distribution of all afforestation.

Artificial afforestation carried out in 2017 covered 1628 ha of land in all ownership categories. The afforestation area was smaller by 383 ha (by 19%) as compared with the previous year. Moreover, in 2017, 154 ha were considered as afforested as a result of natural succession (in 2016 it was 177 ha).

Drastic decline in afforestation areas (from 16 933 ha in 2006 to 1628 ha in 2017, i.e. by 90%) is largely a result of changes made to the criteria by which private agricultural land is designated for afforestation within the framework of the Rural Development Programme, which include: the raise of the minimal acreage of dense afforestation area, withdrawal of permanent grasslands and areas designated as Natura 2000 sites from the EU subsidies for afforestation, and also attractive financial aid for agricultural production.

A similar drastic decrease in the size of afforested areas was observed in the State Forests, where in 2017 only 487 ha were artificially afforested, as compared with 9.7 thousand ha in 2004. This was a result of a rapid decline in the area of post-agricultural and uncultivated land transferred to the State Forests by the National Support Centre for Agriculture.

The NFP objective is to increase forest cover to **33%** in 2050

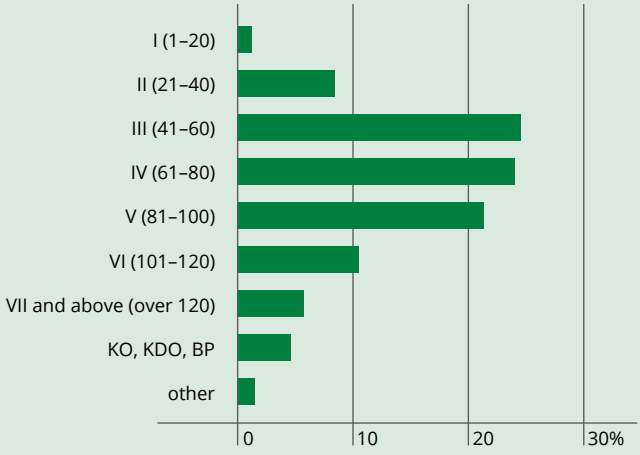


SIZE OF AFFORESTATION (artificial) in Poland in 1991–2017 (Central Statistical Office)

Timber resources

The main source of information about the volume of timber resources in Poland is the National Forest Inventory. According to the data collected in 2013–2017, and based on the forest area as it stood at the end of 2016, the timber resources in Poland amounted to 2587 million m^3 of gross merchantable timber, of which 2030 million m^3 were in the State Forests.

Almost half (48.3%) of timber resources in the State Forests are stands in age classes III and IV. The volume of timber resources in stands aged over 100 years including restocking class (KO), class for restocking (KDO), and selection structure (BP) accounts for 19.7%.

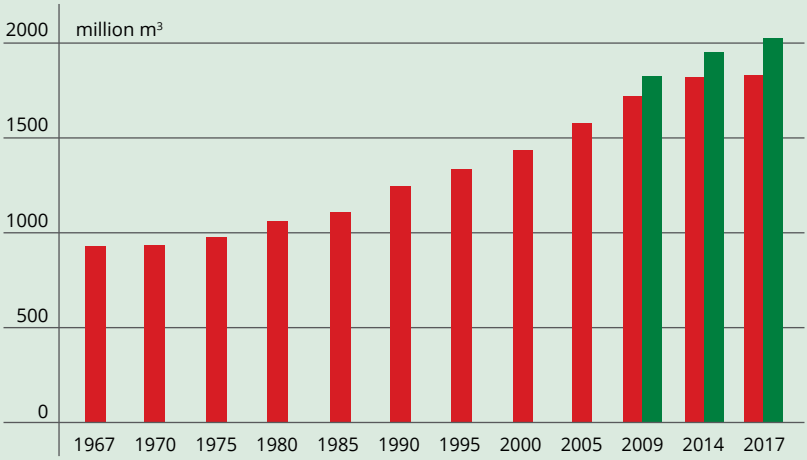


VOLUME STRUCTURE OF TIMBER RESOURCES by age class in the State Forests (National Forest Inventory 2013–2017)

According to the results of the National Forest Inventory 2013–2017, the average volume of growing stock in Poland's forests is 280 m^3/ha, whereas in the forests managed by the State Forests this value is 286 m^3/ha. Pine accounts for 56.5% in volume structure of timber resources in all ownership categories. In the State Forests this share is 58.7%.

Since 1967, when the first update of timber resources in the State Forests was made, there has been a steady growth in the volume of timber. In the last 20 years, from January 1997 to January 2017, the increment of gross merchantable timber in forests administered by the State Forests amounted to 1249 million m³. During that period 732 million m³ of merchantable timber was harvested, which means that 517 million m³ of gross merchantable timber, representing 41% of the total increment, remained to augment the volume of standing timber resources.

In SF wood resources have increased by **517** million m³ in the last 20 years



LEGEND:

THE STATE FORESTS BY NFI*

THE STATE FORESTS (UPDATE)

* National Forest Inventory data for periods 2005–2009, 2010–2014 and 2013–2017

AMOUNT OF TIMBER RESOURCES in the State Forests in 1967–2017, in million m³ of gross merchantable timber (Central Statistical Office, Bureau of Forest Management and Geodesy, National Forest Inventory)**; figures for 1 January**

The general increase in timber resources is not only a result of enlarging forest area. In the State Forests, it is primarily a result of harvesting timber in accordance with the principle of forest sustainability.

FOREST FUNCTIONS

Forests fulfil diverse functions, either naturally or as a result of human activities, the main of which are:

ENVIRONMENTAL (PROTECTIVE) FUNCTIONS

having positive impact on the global and local climate, regulation of water cycle in nature, prevention of floods, avalanches and landslides, protection of soil against erosion and landscape against steppization;

SOCIAL FUNCTIONS

providing health-enhancing and recreational conditions for society, contributing to the labour market and ensuring development of environmental awareness in society;

PRODUCTIVE (ECONOMIC) FUNCTIONS

which are mainly biomass renewable production, including wood and non-wood forest products, and effective management of hunting.

The State Forests have a legal obligation to operate according to the principles of sustainable forest management which is aimed at preserving the sustainability of forests and their continuous multifunctional use, as well as the augmentation of forests resources.

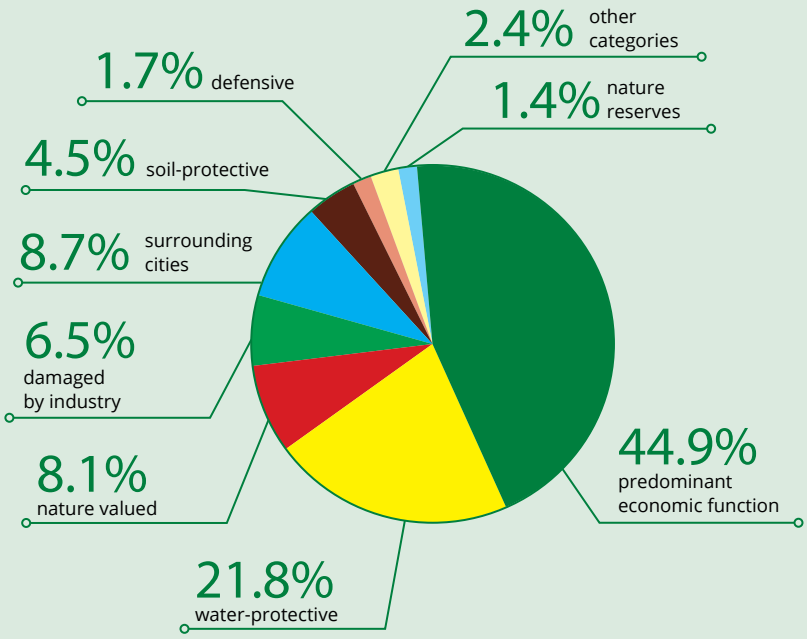
The very idea of sustainable forest management is based on the premise that forest ecosystems can fulfil a variety of functions. The State Forests have been developing this multifunctional characteristic of forests for many years, which is evident, for example, in the large proportion of protective forests in the total forest area under their administration.

Environmental functions of forests

Protective forests

The earliest regulations on social and environmental forest functions, and especially on distinguishing a category of protective forests, were included in the first post-war *Instruction on Forest Management*, published in 1957. By the year 1975, a total of 1485 thousand ha of forests were designated as protective, which comprised 22.5% of the forest area administered by the State Forests at that time. As of 1 January 2017, the combined area of protective forests increased to 3811 thousand ha, which represents 53.7% of the total forest area, or 55.1% including 103 thousand ha of nature reserves.

Protective forests cover 53.7% of the total forest area within the State Forests



SHARE OF PROTECTIVE FORESTS in the State Forests in 2017 (DGSF)

Protective forests are subject to different management practices, depending on their predominant function. These may include limited clear-cutting, raising the felling age, adjusting the composition of species to their function, creating recreational facilities, etc.

Carbon sequestration

Assessment of the amount of carbon absorbed by ecosystems (including forest) was, until recently, of almost exclusively scientific interest. The growing threat of climate warming caused by the increased amount of CO_2 in the atmosphere, and raised social awareness of this threat in particular, have brought about more practical dimension expressed in the Kyoto Protocol (in force since 16 February 2005). The value of forestry activities which foster increased carbon sequestration has been financially estimated and included in the overall balance of emission and absorption of greenhouse gases.

The general rules for assessing the amount of carbon sequestered by forests and the possibility to include this amount in the total balance for CO_2 emission are based on the decisions taken at the Conferences of the Parties for Climate Change, the objectives of the Kyoto Protocol and climate agreement signed in 2015 in Paris. The last Conference of the Parties (COP23) took place in November 2017, in Bonn, Germany. Its main purpose was to develop a road map for the implementation of the Paris Agreement, to be adopted at the next meeting in Katowice. It was agreed that individual countries would make every effort to reduce global warming as soon as possible (the maximum growth cap was set at 2°C), which would be achieved by further reductions of greenhouse gases and pollutants, mainly CO_2. In this respect, the opinion was maintained that the binding of this gas to forest ecosystems is one of the most effective methods of slowing down the increase of global temperature.

Forests in Poland absorb over **36 million** tonnes of CO_2 per year

Poland's position on methods of reducing emissions is based on the use of renewable energy sources, including geothermal energy, and the potential of forest areas to absorb CO_2. In practice, this means undertaking activities related to enlarging the forest area of the country (the potential for afforestation is nearly 2 million ha of poor soils that do not guarantee profitable agricultural production), as well as introducing the second storey, fast growing species, subplanting, promoting natural regeneration and reduction of clear-cuts, all of which will lead to an increase in the amount of plant biomass accumulated in forest ecosystems. Since 2016, the State Forests have been implementing a pilot project of Carbon Forests (CF), whose aim is to increase the absorption of CO_2 and other greenhouse gases by forests as a result of implementation of additional activities in forestry. The above objectives will also be met by other activities undertaken by the State Forests, such as promoting the construction of houses made of wood, which are a kind of carbon storage.

The amount of carbon in the wood biomass of Polish forests has been estimated at 822 million tonnes, including the growing stock – at 685 million tonnes and the underground part – at 137 million tonnes; the content of carbon in dead wood was estimated at 32 million tonnes *(SoEF 2015)*. The amount of CO_2 absorbed annually by forests (including the utilisation and gas absorption by soils), according to data for 2015, is estimated at 36.5 million tonnes, which roughly translates into nearly 10.0 million tonnes of carbon.

Social functions of forests

Forest education

Forests are a natural place for recreation and leisure, particularly for the inhabitants of large conurbations. Forests are a popular destination for excursions, mainly organised by schools, which give young people an opportunity for direct contact with nature. Recreation in forest is an excellent opportunity for forest education.

Forest education in all parts of the State Forests is based mainly on the ordinance of 9 May 2003, issued by the Director-General of the State Forests, concerning the directions of the development of forest education in the State Forests and the guidelines for creating forest education programmes in forest districts. The general objectives of forest education are: to disseminate in society the knowledge on forest environment and sustainable forest management, to raise social awareness on reasonable and responsible use of all forest functions and to build trust in foresters' professional activities. Educational activities are carried out by qualified teaching staff, whose competence is constantly enhanced by specialist training.

Various educational programmes organised by the State Forests attracted over 5 million participants in 2017. Among the events and activities offered were usual outdoor lessons and guided tours, lessons in forest education classrooms, meetings with foresters at schools and outside schools, educational exhibitions, forest competitions, fairs and many others.

Over **5 million** participants in educational programmes in SF

The largest group of participants in didactic activities were primary school children. The educational events were also attended by students and adults.

Such a variety of educational activities was possible because of the commitment of over 9 thousand foresters who devoted part of their time to forest education. They were supported by an attractive and varied teaching infrastructure which includes: forest education centres (64), educational classrooms (290), educational shelters called 'green classes' (600), educational trails (1030), educational points (1925), other facilities (2985), and also overnight accommodation.

Educational activity of the State Forests is financed mainly from the forests districts' own resources, from the relevant Regional Fund for Environmental Protection and Water Management and the National Fund for Environmental Protection and Water Management. In 2017, approximately PLN 31 million were spent on forest education, out of which PLN 28 078 million (90.5%) came from the forest districts' own resources, PLN 1.667 million (5.4%) from the forest fund, an aggregate sum of PLN 870 000 (2.7%) from Regional Funds for Environmental Protection and Management, and PLN 461 000 (1.4%) from other sources.

About PLN 31 million spent by SF on forest education

The unquestionable leaders of forest education are promotional forest complexes (PFCs) which attract about 30% of the participants in the educational programmes prepared by foresters. Qualified and experienced educators have at their disposal the best-devel-

PROMOTIONAL FOREST COMPLEXES in Poland in 2017

oped infrastructure which includes forest education centres (34), educational classrooms (53), educational shelters so called 'green classrooms' (138), educational trails (234), educational points (478), other facilities (583), 'green school' and overnight accommodation.

Promotional forest complexes are particularly important for science, because the interdisciplinary research carried out within their areas is based on fully recognised forest environment. The study results allow for the improvement of forest management methods and for setting acceptable limits on economic (commercial) intervention in forest ecosystems. They are also an alternative to overcrowded national parks, where tourism is regulated by very strict rules. PFCs not only give the opportunity to learn about the principles of ecological forest management but they also ensure free access (also for the disabled) and unrestricted contact with nature.

The State Forests' policy on promoting sustainable forest management allowed to create 25 PFCs, located in all 17 regional directorates of the State Forests. The combined area of promotional forest complexes is almost 1279 thousand ha, out of which over 1256 thousand ha are located in the area administered by the State Forests (over 17% of its territory).

Tourism

The educational offer of the State Forests is integrated with a wide range of tourist attractions available to all ages and social groups. The visitors to forests have at their disposal a well-developed accommodation consisting of nearly 4500 thousand beds available in recreation and training centres, also guest rooms and hunting lodges. There are over 20 000 kilometres of walking routes, nearly 4000 kilometres of cycling routes and about 7000 kilometres of horse riding routes. Visitors have access to over 600 bivouac sites and camping places. Camp fires are permitted in 400 designated locations, either in the forest or nearby. Cars may be left at 3160 forest parking lots or vehicle parking places. Tourists may use 614 other facilities, also 36 training and recreation centres, about 130 hunting lodges and over 200 guest rooms. Current tourist offer provided by the State Forests can be found at the website **www.czaswlas.pl**.

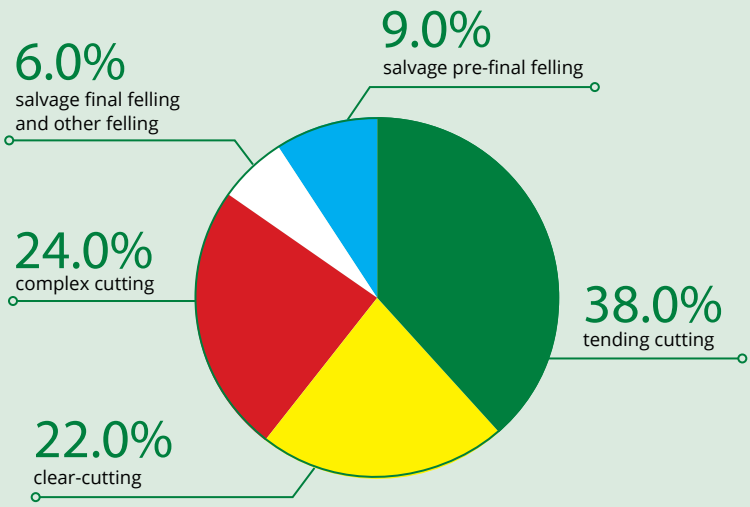
Littering is one of the consequences of the more intense tourism in the forest areas. Despite educational campaigns and provision of appropriate infrastructure, the cost of keeping forest clean is continually growing. Only in 2017, the State Forests spent nearly PLN 18.2 million on forest cleaning and over 114 thousand m^3 of litter were removed.

Productive functions of forests

Structure of timber harvest

In 2017, the amount of net merchantable timber harvested in Poland was 42 699 thousand m^3 (by 3570 thousand m^3 more than in 2016). In the State Forests the felling amounted to 42 213 thousand m^3 of raw timber, including 40 627 thousand m^3 of net merchantable timber (108.3% of the approximate prescribed cut by volume), of which 21 339 thousand m^3 (107.1% of prescribed cut) were obtained in final felling, and 19 289 thousand m^3 (109.7% of the prescribed cut) in pre-final felling.

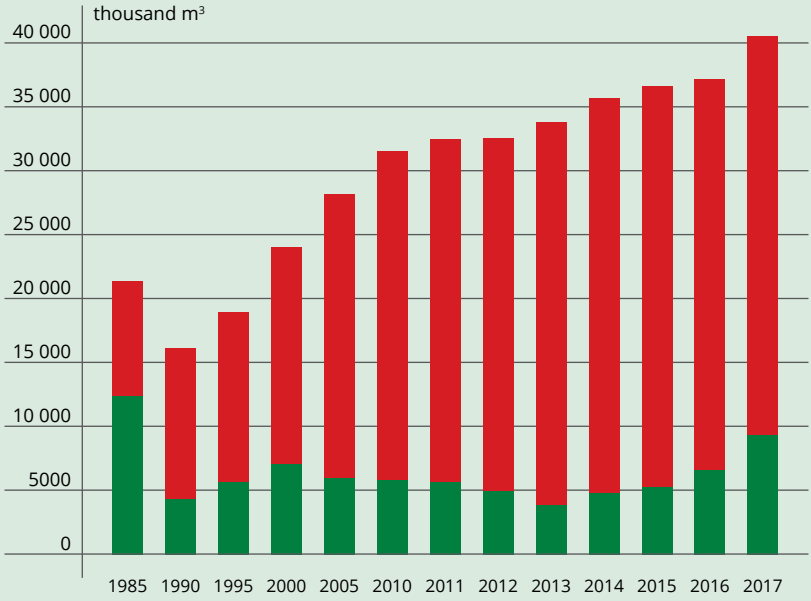
The volume of timber harvested for sanitation reasons by clearing dead wood, broken or fallen trees damaged in natural processes, or by wind activity, gradations of insect pests, disturbances in water relations, air pollution and the anomalies of the weather, in 2017 amounted to 8607 thousand m^3, or 21.2% of the total harvest of merchantable timber; this value is slightly lower than the average in the last 10 years, amounting to 20.9%.



HARVEST OF MERCHANTABLE TIMBER by type of felling in the State Forests in 2017 (DGSF)

The State Forests, during the last 20 years (1998–2017), utilised 95.4% of the prescribed cut in final felling, and 112.1% of the prescribed cut in pre-final felling (by volume) determined in forest management plans as indicative.

In the State Forests in 2017, under the clear-cut system, 9137 thousand m^3 of merchantable timber was harvested, which accounts for 22.5% of its total harvest. The clear-cut area amounted to 36.2 thousand ha and was slightly larger than the average for the past two decades at 27.4 thousand ha. The gradual reduction in size of the clear-cut areas is indicative of the progress



SHARE OF DEAD WOOD, BROKEN AND FALLEN TREES in total harvest in the State Forests in 1985–2017, in thousand m³ of net merchantable timber (DGSF)

in implementing the sustainable forest management, however the clear-cuts are often necessary because of large-scale damages caused by wind and other abiotic factors, or forest dieback caused by drought, fungal disease or insect gradation.

AREA OF CLEAR-CUTTING in the State Forests in 1980–2017 in thousand ha (DGSF)

SILVICULTURE

The aim of silviculture is to ensure the sustainability, continuity and development of forest ecosystems. The foresters achieve this by applying methods of stand regeneration and of profiling species and age structures, which are based on natural processes. These methods of renewal, tending and protection are used at all stages of stand development. Particular attention is paid to environmental conditions of a tree and a stand development and the protection of near-natural ecosystems.

The most important forest management activities undertaken in the State Forests in 2017 were (in hectares):

1. Nursery production (total productive area of forest nurseries)	1 916
2. Restocking and afforestation (including afforesting gaps and second storey planting)	55 665
including: ● natural regeneration	5 815
● afforestation, in total	634
including: ● natural succession	147
3. Amendments and fill-in planting	4 158
4. Forest tending, in total	310 623
including: ● planting understoreys	299
● soil cultivation and weed control	178 150
● early cleaning	50 743
● late cleaning	78 045
● other tending treatment (including pruning)	3 385
5. Thinning, in total	473 789
including: ● early thinning	94 673
6. Land drainage, in total	67 880
including: ● mineral fertilising of forests	60
7. Stand conversion, total	5 229

NATURE CONSERVATION

The State Forests, in compliance with the Forest Act and the state policy on forests, have for many years been maintaining an inventory of all statutory forms of nature protection, which is kept updated, e.g. while drawing up nature conservation programmes in forest districts.

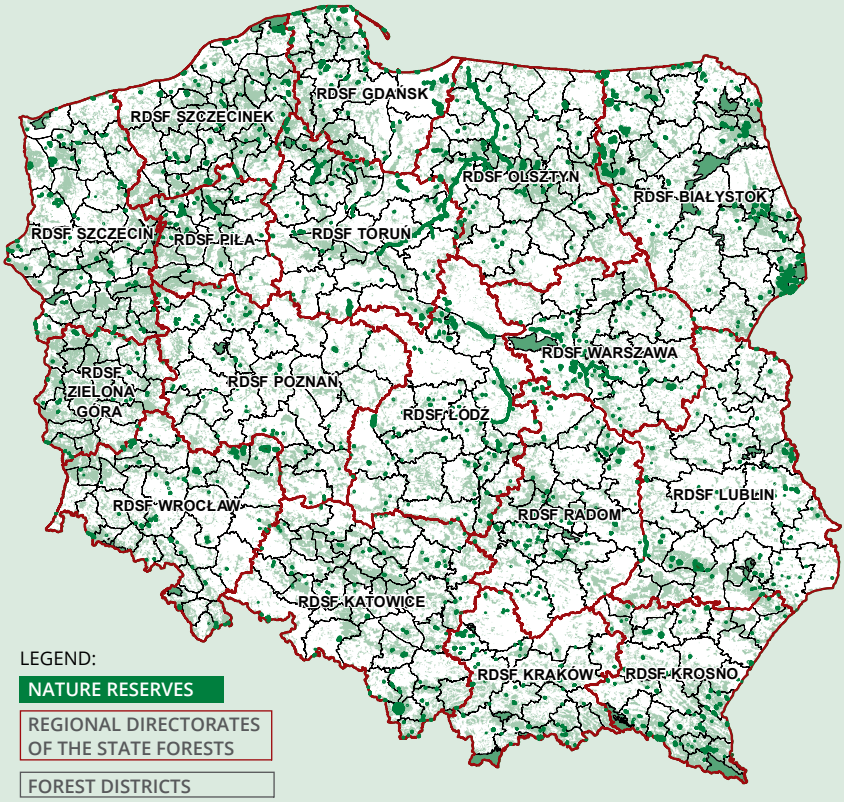
As of 31 December 2017, the State Forests inventory included the following:

- 1282 nature reserves with an area of 123 thousand ha, of which more than a half comprised forest reserves;
- Natura 2000 sites covering a total area of 2890 thousand ha (38.0% of the State Forests territory), including:
  133 special protection areas (SPA) for birds covering 2216 thousand ha (29.1%),
  708 sites of Community importance (SCI) with a combined area 1661 thousand ha (21.8%);
- 11 184 natural monuments, including:
  8810 individual trees, 1484 groups of trees, 130 tree avenues, 522 erratic boulders, 238 rocks, grottoes and caves, and 160 areas under monument protection (322 ha);
- 8937 ecological conservation areas, in total 29 576 ha;
- 131 documentation sites with an area of 1149 ha;
- 147 nature and landscape complexes with a combined area of 39 716 ha.

In the State Forests, over 3655 protective zones for endangered species, which were officially approved, comprise a total area of 150 509 ha, of which over 22% is an area of all-year protection. Protected are refuges of birds (3230), mammals (3), reptiles (123), insects (13), plants (5), lichens (280) and other (1).

In order to preserve biological diversity and restore endangered species of flora and fauna, the State Forests also initiate their own programmes aimed at maintaining habitats and species at good condition. Among them are mainly the 'Programme for the Preservation of Forest Genetic Resources', and such projects as the 'Programme for the Restitution of Fir in the Western Sudetes', 'Programme for the Restitution of Yew' and programmes focusing on reintroduction of capercaillie, peregrine falcon, lynx, edible dormouse and European bison, also within its own financial resources there are programmes of *in situ* and *ex situ* conservation of such species as wild service tree, smooth snake, hermit beetle, great capricorn beetle, stag beetle, hare, grey partridge and many others. In forest districts there are animal rehabilitation centres (8), botanical gardens (8) in forest districts: Kudypy, Kaliska, Gryfino, Syców, Gdańsk, Karnieszewice, Marcule, and in the Forest Gene Bank Kostrzyca; also arboreta (3) in for-

Natura 2000 sites cover **38%** of the State Forests' area



NATURE RESERVES IN POLAND within the lands administered by the State Forests (DGSF)

est districts: Tułowice and Supraśl, and in the Centre of Forest Culture in Gołuchów.

In order to increase the efficiency of management in forest areas characterised by a high diversity of species, with particular reference to Natura 2000 sites, the State Forests have launched a system of periodic universal inventories of plant and animal species and other organisms. In 2017, a large-scale nature inventory project was launched in the area of the Białowieża Forest and Krosno RDSF.

The number of game animals in Poland is one of the highest in Europe, what is indicative of the richness of species of the forest fauna. Population sizes of major species have remained at high level for several years so the great pressure on the forest environment from these animals results in damages. As compared with the previous year, the populations of most free-living game species in 2017 increased slightly. The largest increase was noticed in the size of population of deer (by 30.8%), mouflon (by 11.4%) and roe deer (by 6.6%); and a decrease in population of wild boar (by 13.9%) and fox (by 1.43%). In the last decade, however, there was an increasing trend as far as most species are concerned. The significant increase was noted in the population of elk (by 294%), fallow deer (by 88%), deer (by 85%), and mouflon (by 85%). The reverse trend was observed only in the population of grey partridge (by about 22%) and fox (by over 7%).

The population of elk increased by **294%** over the last decade

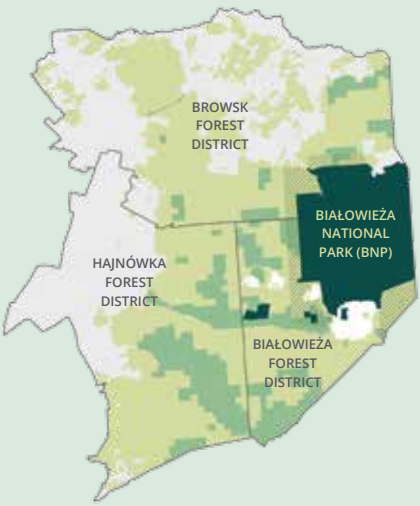
Białowieża Forest

The Białowieża Forest, covering the areas of the Białowieża National Park (10.5 thousand ha) and three forest districts: Białowieża, Browsk and Hajnówka (52.6 thousand ha) is a very valuable forest ecosystem inscribed on the UNESCO World Heritage List. The whole Forest constitutes the Protected Landscape Area 'Białowieża Forest' and Natura 2000 Site PLC200004 'Białowieża Forest'.

By the year 2017, in the part of the Białowieża Forest managed by the State Forests, 21 nature reserves, including forest (14), fauna (4), flora (2) and peatland (1) were created, with a total area of 12 030.92 ha. Furthermore, 1126 natural monuments – mainly single trees, 110 ecological conservation areas with a total acreage of 695 ha and 200 protection zones (around lung lichen and nesting sites of birds) with a total area of 2477.13 ha were established . Under the provisions of the Forest Act, the area managed by the State Forests has been designated as the Promotional Forest Complex 'Białowieża Forest'.

In addition to nature reserves, where human intervention is subordinated to nature protection, other areas which reduce human activity to various degrees have been created. On 31 March 2016, the Director-General of the State Forests issued Decision No. 52 on establishing detailed principles of forest management within the territories of Białowieża and Browsk forest districts, which introduced a reference area (about 5610 ha) with severe restrictions on forest management. In total, the reference areas and nature reserves cover 17.6 thousand ha, i.e. slightly over 33% of the combined territories of Białowieża, Browsk and Hajnówka forest districts.

In BF nature reserves and reference areas cover **33%** of forest districts



LEGEND:

- BIAŁOWIEŻA NATIONAL PARK (BNP)
- THE STATE FORESTS (SF)
- BUFFER ZONE OF BNP
- NATURE RESERVES IN THE STATE FORESTS

BIAŁOWIEŻA FOREST – administrative division and forms of nature conservation

Following the decision of the Director-General of the State Forests, an inventory has been carried out in the Białowieża Forest since 2016. The inventory covers the most important natural and cultural resources, including selected species of birds, insects, amphibians and one species of bat (western barbastelle), as well as rare and protected plants, natural habitats and objects of cultural heritage. This is the first inventory of selected components of the Białowieża Forest which covers its entire territory.

In 2017, archaeological excavations included surface tests consisting of the verification of points designated on the basis of remote sensing data (LIDAR) and drilling boreholes. The historic material obtained during the research (mainly soil samples) was forwarded for archaeobotanical analyses.

In 2017, 578 areas located in the Białowieża Forest were tested for the content of organic carbon in forest soils at five basic depths of the soil profile (including ectohumus).

Ornithological inventory in 2017 covered 9 species of birds (common crane, Eurasian eagle owl, red-breasted flycatcher, collared flycatcher, boreal owl, Eurasian pygmy owl, European nightjar, white-backed woodpecker and three-fingered woodpecker).

There are **88** m^3/ha of deadwood in the Białowieża Forest

Within the framework of entomological inventory of epigeal insects, mainly beetles belonging to Carabidae and Staphylinidae families, 87 030 individuals of 107 species were caught with the use of 599 traps. In March and April 2017, an inventory was carried out of the sites of beetle species living under the bark of dead trees, i.e. *Cucujus cinnaberinus*, *C. haematodes* and *Boros schneideri*. The inventory was a continuation of the research which began in 2016. 156 specially designed traps with adjacent container were used for the inventory of hermit beetle. 362 individuals of hermit beetle were caught in 2017.

The herpetological inventory within the forests managed by the State Forests noted the occurrence of northern crested newt in 21 sites and fire-bellied toad in 4 sites.

In 2017, in 14 locations (including on transects) 85 individuals of western barbastelle were caught and only 57 individuals of other bat species, which makes the western barbastelle the dominant species of the chiropteran fauna in the Białowieża Forest.

The inventory also allowed to determine the amount of deadwood in the Białowieża Forest, which has been continually growing since 2012 when the bark beetle gradation started. The amount of deadwood reached 5.7 million m^3 in 2017. During one year (beginning in April 2016) the quantity of deadwood increased by over 1.5 million m^3. At present, the average amount of deadwood in the Białowieża Forest amounts to approximately 88 m^3 per one hectare.

PROJECTS PARTLY FUNDED BY THE EUROPEAN UNION

The State Forests National Forest Holding is the beneficiary of the projects co-financed by the European Union under the Operational Program 'Infrastructure and Environment' 2014–2020:

- **Comprehensive project for adaptation of forests and forestry to climate change – small retention and counteracting water erosion in lowland areas**
  The project is implemented by 113 forest districts from 17 regional directorates of the State Forests. In 2017, 4 applications for payment were submitted to the National Fund for Environmental Protection and Water Management for the total amount of eligible expenses of PLN 1 693 038.10. All applications were approved and refunded for a total amount of PLN 1 439 082.42, co-financed by the European Union.

- **Comprehensive project for adaptation of forests and forestry to climate change – small retention and counteracting water erosion in mountain areas**
  The project is implemented by 47 forest districts from 4 regional directorates of the State Forests. In 2017, 4 applications for payment were submitted to the National Fund for Environmental Protection and Water Management for the total amount of eligible expenses of PLN 1 384 957.87. The applications were approved and refunded for a total of PLN 1 177 214.21, co-financed by the European Union.

- **Comprehensive project for forest and forestry adaptation to climate change – prevention, counteracting and reducing the risks of forest fires**
  The project is implemented by 136 forest districts from all 17 regional directorates of the State Forests. In 2017, 4 applications for payment were submitted for PLN 2 173 593.62, and PLN 1 847 554.58 was refunded.

- **Comprehensive project for species and habitats conservation in the areas managed by the State Forests National Forest Holding**
  In 2017, the State Forests National Forest Holding was subject to the formal and substantive evaluation of its application for co-financing the project which is implemented by 98 districts from 15 regional directorates of the State Forests. In 2017, the first application for payment for the amount of eligible expenses of PLN 405 941.07 was submitted to the National Fund for Environmental Protection and Water Management.

DEVELOPMENT PROJECTS OF THE STATE FORESTS

In 2017, the State Forests implemented or was preparing to implement 14 development projects which, in particular, supported development of non-urbanized areas. The most important of these are:

- **Active protection of black grouse on grounds administered by the State Forests**
  As part of the project, refuge areas have been designated where forest districts conduct activities aimed at creating appropriate habitat conditions for the black grouse. In 2017, 46 black grouse were re-introduced. The construction of the Black Grouse Breeding Centre in the Spychowo Forest District has begun, where breeding is carried out in temporary aviaries.

- **Comprehensive project for the protection of the European bison by the State Forests**
  The aim of the project is to maintain the European bison population by: improving the living conditions, enriching the food base and ongoing monitoring. In 2017, two transports of bison were sent to Spain (8 individuals) and to the Czech Republic (10 individuals). Additionally, a comprehensive service of herds was carried out, the fodder was purchased and laid out, a viewing tower was built in Borki, project documentation for the homestead in Lidzbark was prepared, an adaptive homestead was built in the Augustów Forest District, contracts were signed with the local farmers for the lease of 107 ha of meadows. A bison gene bank will be established. The implementation of the project involves 22 forest districts, the Białowieża National Park, the Forest Culture Centre in Gołuchów, the Forest Gene Bank, the Warsaw University of Life Sciences and the Association of Bison Lovers.

- **Osprey protection in Natura 2000 special protection areas**
  The project will identify the habitats of osprey and factors posing a threat to them in all Natura 2000 locations in Poland. It is planned that all known habitats will be put under special protection as a result of establishing a network of custodians for nests and sites, conducting satellite monitoring and recreating osprey habitats through the construction of new arboreal nests and platforms on high voltage poles. The project is being implemented with the participation of external funds under the LIFE programme.

- **Carbon Forests**
  The main objective of the project is to demonstrate the role of forests in mitigating the negative effects of climate change and in the absorption of greenhouse gases. In 2017, additional activities within the framework of the project were implemented in 17 forest districts. An indicator of the project's success will be a measurable increase of absorbed carbon dioxide in comparison to the reference stands in which no additional activities have been carried out.
  An important factor will be the participation of businesses in purchasing the absorbed Carbon Dioxide Units (JDW) which will demonstrate their social responsibility in the field of environmental protection. Eight letters of intent have been signed so far.

- **Polish wooden houses – live in harmony with nature**
  The project aims to develop and implement technical standards for the construction of energy-saving wooden buildings in SF NFH.

- **Healthy food from Polish forests**
  The main aim of the project is to popularize game meat, honey and forest floor produce. Activities are directed towards the development of non-urbanized areas by creating conditions for employment in local enterprises and self-employment in individual farms. The project advocates the broadly understood protection of bees and promotes beekeeping as a branch of the economy which enriches the natural resources of forests and their surroundings, as well as positively affects the labour market in non-urbanized areas.

- **Great Forest Trail**
  The project aims to improve the management of the forest tourist infrastructure by creating a comprehensive tourist offer. A newly created web portal will include a tourist map of SF (also in the mobile version), ready-made suggestions for trips and opportunities to spend time in the forest. In 2017, the Wolf Trail was opened as a form of promoting the idea of Great Forest Trail.

FOREST PROTECTION

Types of stress factors

Forests in Poland are among the most threatened in Europe which is mainly because of the country's location on the border of two climates, i.e. continental and maritime. As a consequence, the simultaneous and constant impact of a number of factors have detrimental effect on the health condition of forests. These negative phenomena, often described as stress factors, can be classified into three broad categories with respect to their origin: **abiotic**, **biotic** and **anthropogenic**.

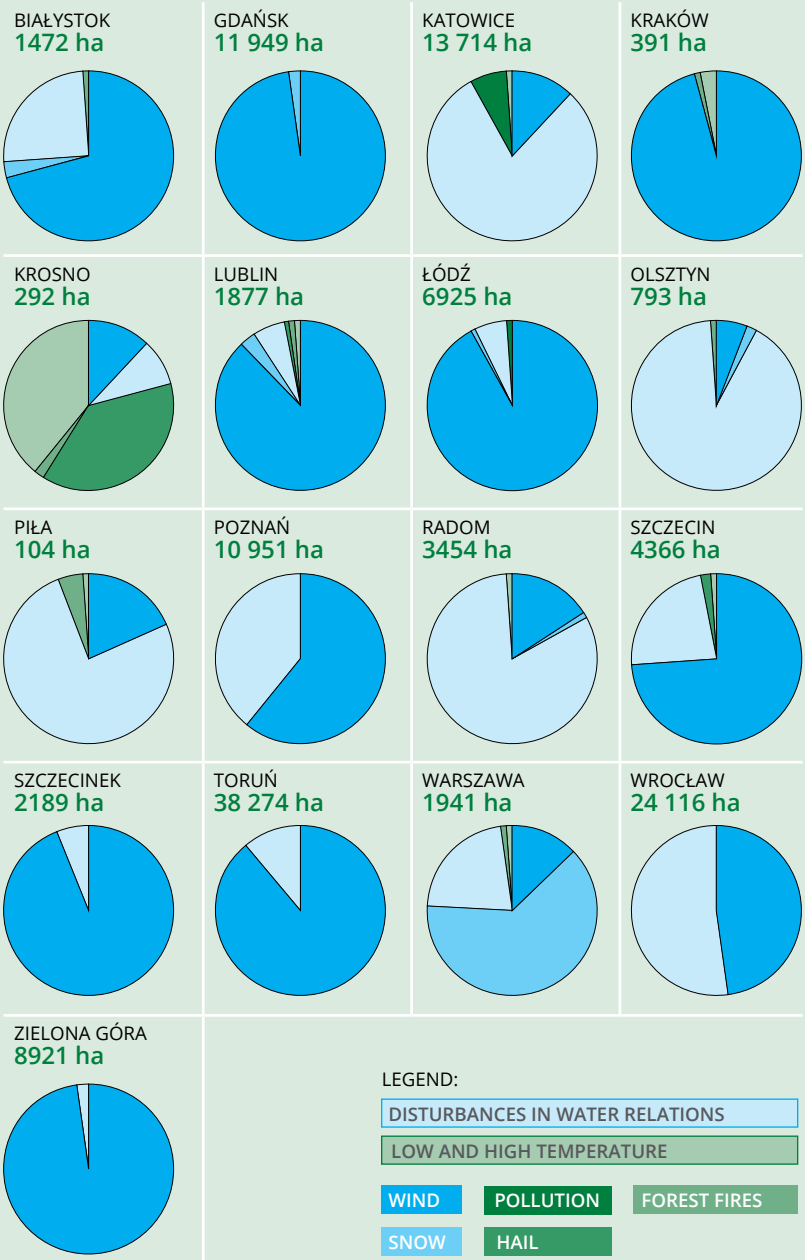
The influence of stress factors on forest environment is very complex and often based on synergy. Additionally, the reaction to the occurrence of an incentive may be delayed in time.
This creates a great difficulty in interpreting the observed phenomena, especially in relation to direct causal relationships. The research and observation carried out so far reveal that simultaneous occurrence of many stress factors highly and continually predisposes forest to disease and causes continuing processes of destruction in the forest environment. More intensive periodical occurrence of just one stress factor (pest gradation, drought, forest fires) may cause the collapse of the ecosystem's biological resistance and disastrous threats (local or regional).

Threats from abiotic factors

In 2017 drought and wind were major natural disasters in forests

In 2017, the main natural disasters in the country were hurricane-force winds and drought. It is noteworthy that there was nearly twofold increase in the area of stands damaged by abiotic factors. While in 2015 it amounted to 48.5 thousand ha, in the next year (2016) it was 92.8 ha. In 2017, the damaged area reached a record 131.7 thousand ha, including 89.9 thousand ha damaged by hurricane-force winds alone. These figures represent a 97% increase on the previous year and 185% increase on the year 2015 in the area damaged by all abiotic factors.

Damage to forests caused by at least one abiotic factor was reported by 83% of forest districts (27% reported one factor as a cause of damage, 28% reported two factors, 23% three factors and 4% four factors). Hurricane winds were responsible for damage to the largest area (89.9 thousand ha in 223 forest districts). The second most significant factor were disturbances in water relations, mostly drought (38.4 thousand ha in 183 forest districts).



AREA OF STANDS aged over 20 years damaged to varied degrees by selected abiotic factors in 2017 in each RDSF

One of the most important natural disasters which occurred in 2017 was a hurricane of 11–12 August. It devastated forests in several dozen of forest districts in Pomerania and Kujawy. In the forests managed by the State Forests, the stands were completely or partially destroyed in nearly 60 forest districts of the Toruń, Gdańsk, Poznań, Szczecinek, Łódź and Wrocław RDSFs. The Toruń and the Gdańsk RDSFs suffered the most. In the Toruń RDSF alone, the estimated volume of timber from broken and fallen trees caused by the August hurricane amounted to about 5.5 million m^3. This equals the amount of a three-year permitted harvest within planned forest management for all forest districts in the Toruń RDSF.

The areas managed by the State Forests which were affected by the hurricane included 22 nature reserves and areas created within the framework of the Natura 2000 – 15 bird areas and 134 habitat areas. Numerous natural monuments, valuable seed stands, bird protection zones and habitats of many valuable or rare species of animals and plants have been destroyed. Approximately 20% of the area of the National Park 'Bory Tucholskie' (approximately 1000 ha) has been damaged to varied degrees.

Biotic threats

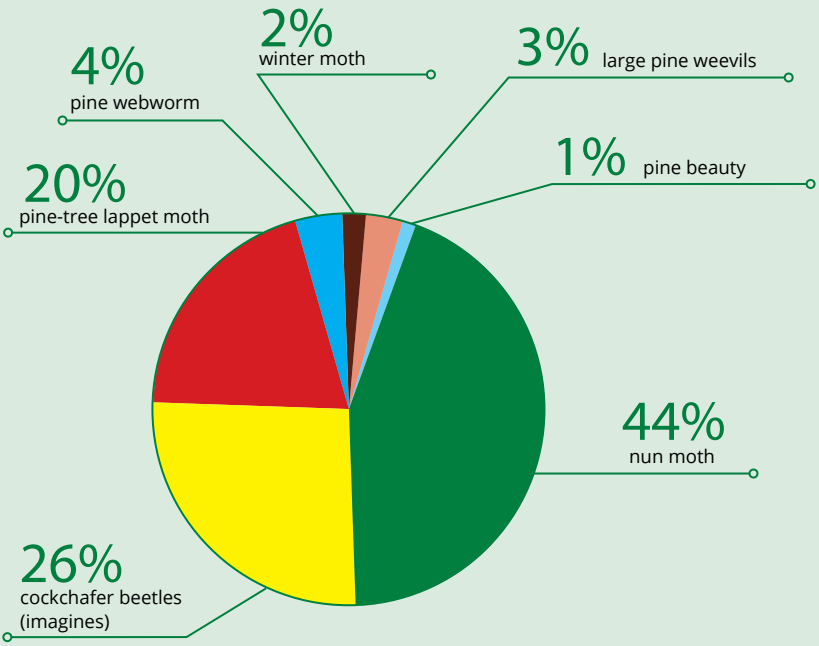
Threats to forests from primary insect pests

In 2017, in the forests administered by the State Forests the threat from insect pests increased significantly. The total area where they occurred exceeded 300 thousand ha – a threefold increase as compared to 2016. It was necessary to apply control treatment aimed to reduce populations of 37 pest species or groups. In 2017, the total area of stands subject to this control treatment exceeded 96 thousand ha and was over three times larger than the aggregated combating area in the previous year.

Major pests damaging stands in 11 regional directorates of the State Forests were folivores of pine stands. Control treatment was applied to nearly 64.7 thousand ha of stands, including 41.3 thousand ha for nun moth and 18.9 thousand ha for pine-tree lappet moth.

In 2017, the second group of insects causing most damage were pests of broadleaved stands, mainly imagines of cockchafers. The total area subject to control treatment for 15 various species depending trophically on broadleaved stands (mostly oaks) amounted to 26.7 thousand ha, of which 24.6 thousand ha (92%) only for imagines of cockchafers combated in 22 forest districts in 7 regional directorates of the State Forests.

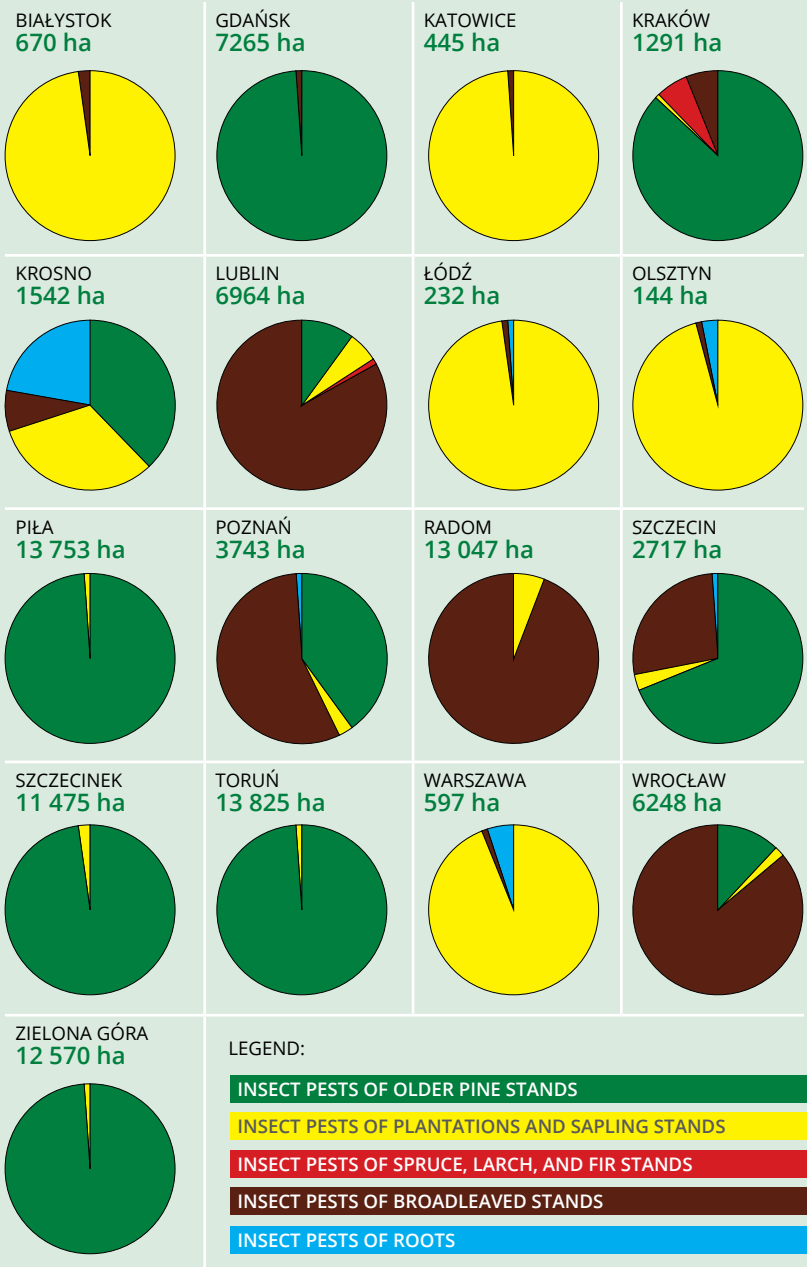
In 2017 control treatment was applied on about **96 thousand ha** of forests



AREA SHARE OF POPULATION CONTROL TREATMENT for major primary pests in 2017

The total area of nurseries, plantations, and sapling stands of pine subject to control treatment amounted to nearly 4.6 thousand ha, including protective treatment against *Hylobius* pine weevils which was applied on 2.7 thousand ha.

In nurseries and plantations located in 44 forest districts, control treatment for root pests of forest trees and shrubs was applied on nearly 441 ha.

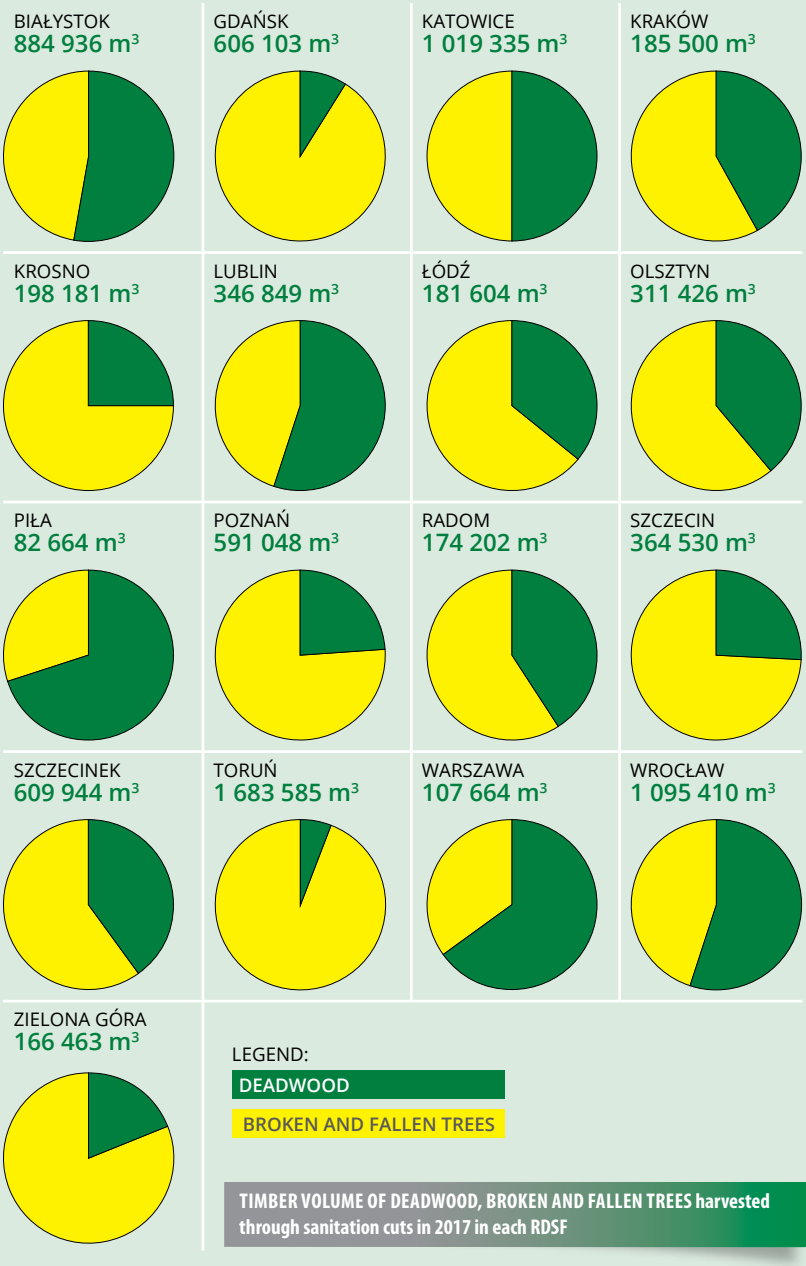


AREA OF POPULATION CONTROL TREATMENT for major groups of primary pests in 2017 in each RDSF

Threats to forests from secondary insect pests

In 2017, the harvest of timber through sanitation cuts amounted to 8.6 million m^3, out of which 8.1 million m^3 were pine, spruce, larch, oak, birch, and ash; whereas 0.5 million m^3 were other forest–forming species.

The most threatened were coniferous stands: 7.4 million m^3 of dead wood were harvested by sanitation cuts, including 4.7 million m^3 (63%) of broken and fallen trees.



TIMBER VOLUME OF DEADWOOD, BROKEN AND FALLEN TREES harvested through sanitation cuts in 2017 in each RDSF

The volume of pine timber harvested in 2017 within the framework of sanitation cutting scheme was 4.91 million m^3, of which 3.85 million m^3 were broken and fallen trees. In 2017, major secondary pests of pine stands were the following: *Pissodes* pine weevils, steelblue jewel beetle (*Phaenops cyanea*), *Tomicus* pine shoot beetles, and engraver beetle (*Ips acuminatus*).

The amount of spruce timber harvested in sanitation cutting in 2017 amounted to 2.3 million m^3, of which broken and fallen trees were about 0.7 million m^3 (25%). Major secondary pests of spruce stands were: the European spruce bark beetle (*Ips typographus*), small spruce bark beetle (*Polygraphus poligraphus*), and six-toothed bark beetle (*Pityogenes chalcographus*).

The size of sanitation cutting in deciduous stands in 2017 was significantly smaller at 1.2 million m^3, of which 79% were fallen and broken trees.

Threats to forests from infectious fungal diseases

In 2017, infectious diseases were reported over a combined area of 178 thousand ha of stands, a decrease of nearly 17.5 thousand ha (by 9%) as compared with 2016. This is the consequence of the limited size of both pine shoot dieback and diseases of roots, trunks and stems.

The most significant changes in the level of threat concern diseases of assimilatory apparatus, namely pine shoot dieback, which covered an area four times smaller than in 2016. In case of other diseases, the size of threatened areas increased slightly or remained at the same level. The area affected by pine gall rust moderately decreased (by 26%), also the occurrence of fungi causing cankers and inner rots of trunks and stems was reported in area smaller by 1.7 thousand ha (it was 15.4 thousand ha in total).

In comparison with 2016, the health condition of deciduous stands deteriorated. The dieback of broadleaf species was more intense and affected almost all observed species: about 40% increase for beech, birch, ash, 14% for alder, and a two-fold increase among other tree species was recorded. Only in tree stands with the participation of oak, the size of an area with symptoms of dieback decreased by 7%. The total area of tree dieback amounted to 8.6 thousand ha (in 2016 it was 6.6 thousand ha).

A combined area of occurrence of root diseases was by 5 thousand ha smaller, and the area size of stands affected by *Heterobasidion* root rot and *Armillaria* root rot decreased by 5% and 1%, respectively.

In nurseries the area affected by diseases remained at the level of 2016, which is 0.4 thousand ha. The occurrence of diseases in stands aged up to 20 years was reported on a smaller area than in 2016 by merely 2.0% (by 0.3 thousand ha). Fungal diseases in mature stands (aged over 20 years) occurred in the area of 162.3 thousand ha, which is smaller by 17.2 thousand ha than in the previous year.

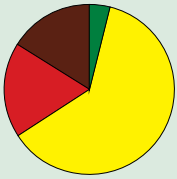
In general, infectious fungal diseases of roots still occupy the dominant position in the structure of forest threats (in total 143.8 thousand ha, which is 80.8% of the total area affected by diseases), pine gall rust and the diseases of trunks and stems were reported in a combined area of 15.8 thousand ha and dieback of broadleaf trees covered 8.5 thousand ha. In 2017, the diseases of assimilatory apparatus were recorded in the total area of 9.4 thousand ha.

Protective treatment applied in forestry in order to control the spread of infectious fungal diseases is carried out in forest nurseries and in stands, as and when it is necessary. In 2017 protective treatment was applied on a combined area of 22.8 thousand ha, whereas chemical treatment on 1.0 thousand ha and biological treatment on 17.5 thousand ha.

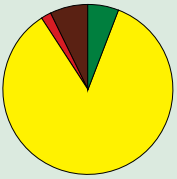
In 2017 infectious diseases affected
178 000 ha
of forests

In SF root diseases cover
80.8%
of the total area affected by infectious diseases

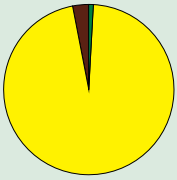
BIAŁYSTOK
1598 ha



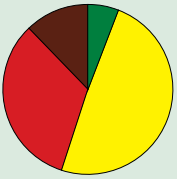
GDAŃSK
8125 ha



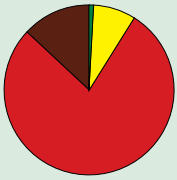
KATOWICE
32 670 ha



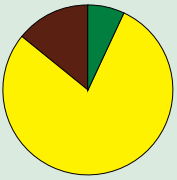
KRAKÓW
1469 ha



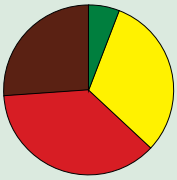
KROSNO
10 155 ha



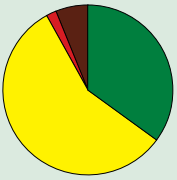
LUBLIN
3120 ha



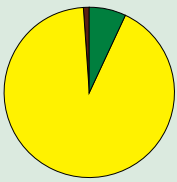
ŁÓDŹ
2054 ha



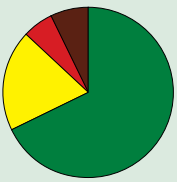
OLSZTYN
613 ha



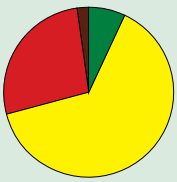
PIŁA
8529 ha



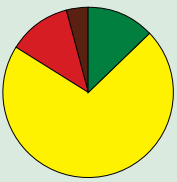
POZNAŃ
5843 ha



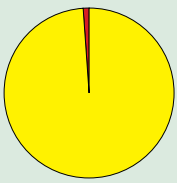
RADOM
3599 ha



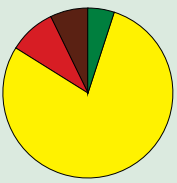
SZCZECIN
10 302 ha



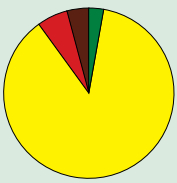
SZCZECINEK
17 141 ha



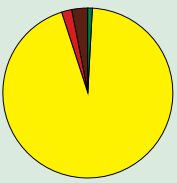
TORUŃ
19 963 ha



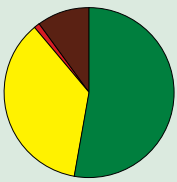
WARSZAWA
4931 ha



WROCŁAW
46 856 ha



ZIELONA GÓRA
588 ha



LEGEND:

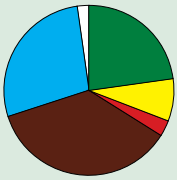
- DISEASES OF ASSIMILATORY APPARATUS
- DISEASES OF ROOTS
- TRUNK AND STEM DISEASES
- DIEBACK OF BROADLEAVED STANDS

AREA SIZE OF DAMAGE to tree stands caused by groups of fungal infectious diseases in 2017 in each RDSF

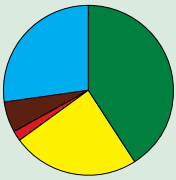
Threats to forests from animals

In 2017, damage to stands caused by game and protected animals was reported in the combined area of 86.9 thousand ha. Damage caused solely by game, including deer, fallow deer, roe deer, wild boar and hare was reported on 64.9 thousand ha, of which 32.5 thousand ha are plantations, 24.6 thousand ha are sapling stands, and 7.7 thousand ha are stands in older age classes. Damage caused by protected species was reported on 21.9 thousand ha.

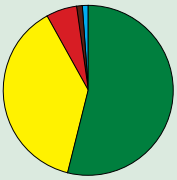
BIAŁYSTOK
11 506 ha



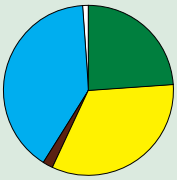
GDAŃSK
2113 ha



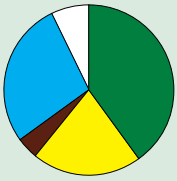
KATOWICE
6091 ha



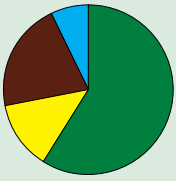
KRAKÓW
1517 ha



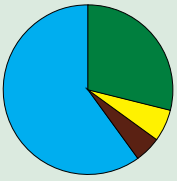
KROSNO
3732 ha



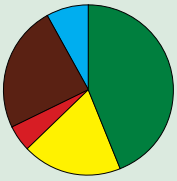
LUBLIN
5639 ha



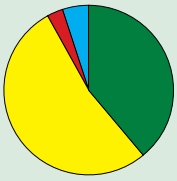
ŁÓDŹ
5234 ha



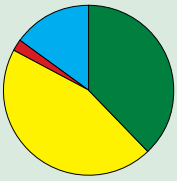
OLSZTYN
5561 ha



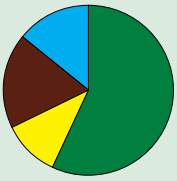
PIŁA
7995 ha



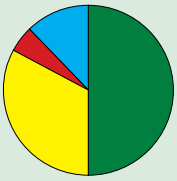
POZNAŃ
3824 ha



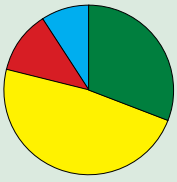
RADOM
2018 ha



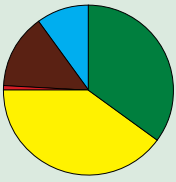
SZCZECIN
3170 ha



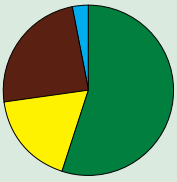
SZCZECINEK
4107 ha



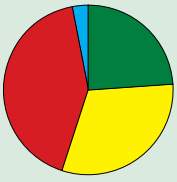
TORUŃ
4000 ha



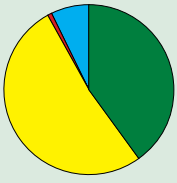
WARSZAWA
2809 ha



WROCŁAW
13 640 ha



ZIELONA GÓRA
3935 ha



LEGEND:

GAME ANIMALS - PLANTATIONS

GAME ANIMALS - SAPLING STANDS

GAME ANIMALS - OLDER STANDS

ELK

BEAVER

BISON

AREA OF PLANTATIONS, SAPLING STANDS AND OLDER STANDS in which damage exceeding 20% was reported, caused by game and protected animal species in 2017 in each RDSF

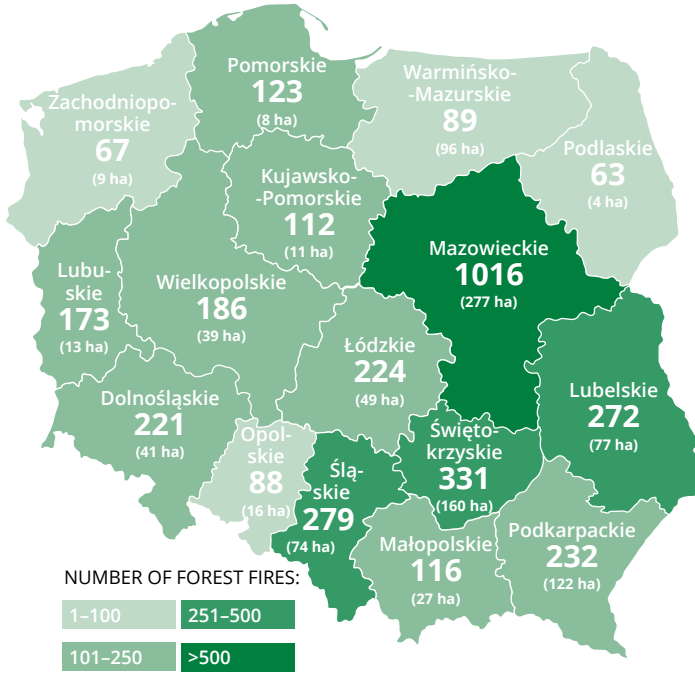
In 2017
11.5
thousand ha
of forest were damaged by diseases

Besides damage from game, in 2017, the animal species under various forms of protection were also reported as being harmful to forests, above all elks, beavers, and bison. The greatest damage of average and severe level caused by elks was reported in the Białystok RDSF (4 thousand ha), Olsztyn (1.3 thousand ha) and Lublin (1.2 thousand ha). Damage to stands from beavers was reported on a combined area 11.5 thousand ha. As in the case of injuries made to stands by elks, beavers are also the most harmful in north-eastern Poland, in the area of the Białystok RDSF (3.2 thousand ha). The European bison as a population of free-living animals in the forest environment, live in the areas of Białystok, Krosno, Piła and Szczecinek RDSFs. Injuries to stands caused by bison were reported on a combined area of 520 ha, of which 261 ha in the Krosno RDSF, and 237 ha in the Białystok RDSF.

Threats to forests from anthropogenic factors

Forest fires

In 2017, in Poland as a whole 3592 forest fires were recorded, which is by 1694 less than in the previous year. 1023 ha of stands were burnt, by 428 ha less than in 2016. The largest number of fires, as in 2016, broke out in the Mazowieckie voivodeship (1016, which is 28.3% of the total number of fires), the lowest, however, in the Podlaskie (63), the Zachodniopomorskie (67) and the Opolskie (88).



NUMBER OF FOREST FIRES AND BURNT AREA SIZE in 2017 in each voivodeship

In 2017, in the State Forests there were 1005 forest fires (28.0% of all forest fires in Poland) in the area of 202 ha (19.8% of the total), excluding the territories used by the military. The largest number of fires in 2017 took place in the Katowice RDSF (173), then in RDSFs in Wrocław (113), Radom (102) and Zielona Góra (100). The greatest area affected by fires was in the Katowice (42 ha) and Lublin RDSFs. In 2017, in the State Forests no great fires were reported (>10 ha), however, in 2016 there were 2 great fires reported of a combined area more than 20 ha.

In 2017, in the territory used by the military there were 76 fires, which comprised 136.12 ha (in 2016 there were 121, and covered 144.92 ha).

The average area of fire in the forests in all ownership categories in 2017 amounted to 0.28 ha (by 0.01 ha more than in 2016). As compared to 2016, the average area of fire in the State Forests also increased slightly – by 0.03 ha, reaching 0.20 ha.

The most frequent causes of fires in the State Forests were arson (34%) and negligence (13%), however the share of fires from an unknown cause amounted to 45% of all fires.

In 2017, the largest number of fires occurred in June (25.4% of fires, i.e. 914), then May (20.7%), August (16.1%) and April (13.7%). In fire season (April–September) there were in total 84.7% of fires, the smallest number was in September (1.3%) and July (7.5%).

Air pollution

Forest monitoring provides information on major pollutants in the forest areas. The network of intensive monitoring consists of 12 permanent observation plots distributed in the area of Poland:

- northern and north-eastern Poland in forest districts: Gdańsk (Gdańsk RDSF), Strzałowo (Olsztyn RDSF), Suwałki (Białystok RDSF), and Białowieża (Białystok RDSF);
- central and western Poland in forest districts: Chojnów (Warszawa RDSF), Łąck (Łódź RDSF), Krucz (Piła RDSF), and Krotoszyn (Poznań RDSF);
- southern Poland in Upper Silesia in the Zawadzkie Forest District (Katowice RDSF), and in mountain and foothill areas in forest districts: Szklarska Poręba (Wrocław RDSF), Bircza (Krosno RDSF), Bielsko (Katowice RDSF) – up to 2013, and Piwniczna (Kraków RDSF) – up to 2013.

Five plots are located in pine stands, two in oak stands, and two in beech stands. Three active plots are located in spruce stands (forest districts: Suwałki, Szklarska Poręba and Piwniczna), like the fourth, currently not functional plot in Bielsk.

According to Central Statistical Office, in recent decades in Poland the emission of sulfur dioxide and nitrogen dioxide has decreased significantly. Decreasing emissions were accompanied by a decrease in the

concentration of gaseous pollutants recorded in forest areas covered by air quality monitoring. This concerned mainly sulfur dioxide, the concentrations of which had been clearly decreasing until 2007, followed by a period of slower drop in concentrations. Nitrogen dioxide concentrations over the period 1998–2017 were relatively stable.

In 2017, average monthly concentrations in the air measured on observation plots was within 0.3–5.3 μg SO_2 m^{-3} (mean annual value 0.6–2.53 μg SO_2 m^{-3}) and 1.5-16.6 μg NO_2 m^{-3} (mean annual value 3.2-9.9 μg NO_2 m^{-3}). Higher concentrations of SO_2 than in other regions of the country were recorded in Upper Silesia (Zawadzkie), in the foothill regions in southern Poland (Bircza, Piwniczna), and in central Poland (Krotoszyn). The highest concentrations of NO_2 were in the area of central Poland (Chojnów, Łąck, Krotoszyn) and in Upper Silesia (Zawadzkie).

THREATS TO FOREST SUSTAINABILITY

Natural disasters always carry the risk of rapid and massive development of the organisms depending on damaged tree species. Taking into account the state of the populations of main forest pests, the size of the natural disaster of 11–12 August, 2017 and other factors affecting further weakening of stands damaged by wind, the main threats to forest sustainability can be determined.

There is a constant and increasing threat to pine stands from steelblue jewel beetle (*Phaenops cyanea*) and engraver beetle (*Ips acuminatus*). In oak stands, another gradation of oak splendour beetle (*Agrilus biguttatus*) is likely to occur. Because the size of the natural disaster makes clearing all damaged stands impossible during one growing season, the length of time necessary to harvest the whole mass of fallen and broken trees (2–3 years) increases the risk of rapid pest development, especially in partially damaged stands. Drought of 2015 and the resulting deficit of ground water add to negative factors affecting the stands damaged by the hurricane. Large gradations of nun moth, pine-tree lappet moth, and pine beauty in pine stands damaged by wind are very likely. In the coming years, the forest districts where stands were significantly damaged by the wind in 2017 are likely to be threatened by pathogenic organisms (fungi, oomycetes).

In 2017 rebuilding was carried out on **5200 ha** of stands

The main responsibility for rebuilding forests and maintaining them in good health condition and proper structure falls on the State Forests. In 2017, rebuilding of stands in SF was carried out in the area of 5.2 thousand ha, cleanings on 128.8 thousand ha, and thinning on 412.2 thousand ha. Moreover, the stability of stands was being reinforced by introducing understoreys (0.3 thousand ha), second storey (2.5 thousand ha), afforesting gaps (1.0 thousand ha), and by agricultural operations and water drainage treatment (67.4 thousand ha).

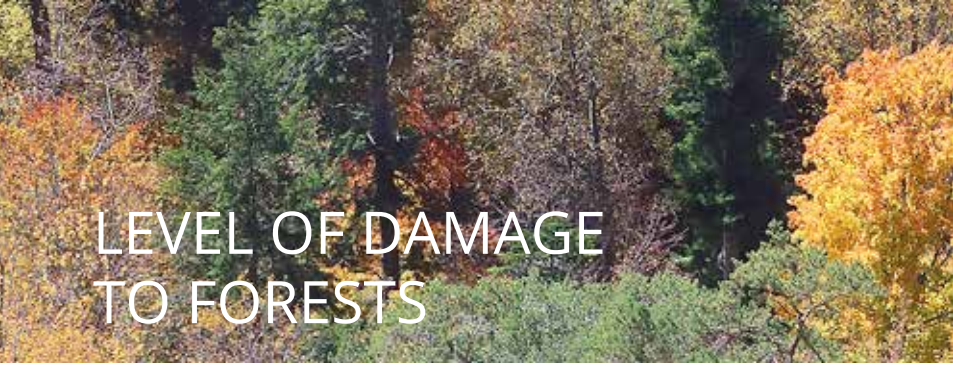
The work which is being done in order to enhance the sustainability of forests often has limited effect in the face of increasingly frequent anomalous weather events. Therefore, it was necessary to find longer-term solutions to preserve threatened forest ecosystems in Poland, including securing seed material from trees, shrubs and forest floor vegetation. As a result, the Forest Gene Bank Kostrzyca, located in Miłków at the foothills of the Karkonosze mountains, was opened in the middle of the 1990s. The objectives

for the Forests Gene Bank were prepared by the State Forests and the Institute of Dendrology of the Polish Academy of Sciences.

Forest Gene Bank has a stock of over **8000** genetic resources

The Forest Gene Bank Kostrzyca has a stock of over 8000 genetic resources relating to 114 forest plant species, both whole populations and individual plants. Of these, 28 species are forest-forming trees and shrubs, such as: Scots pine, Norway spruce, European larch, Douglas fir, black pine, black alder, European beech, Weymouth pine, and common ash. The remaining species are of rare and protected plants which are enlisted in the *Polish Red Data Book of Plants*. Resources of the Forest Gene Bank Kostrzyca are stored refrigerated (–10 and –20°C) and in cryogenic conditions (from –150 to –196°C). Seed lots come from selected seed stands, conservation stands, other stands, as well as parent trees, legacy trees or conservation trees and others.

The activities of the Forest Gene Bank are of country-wide strategic importance as they concern the conservation of forests genetic resources and selective silviculture of forest trees, testing the progeny of: selected seed stands, parent trees, seed orchards, seed crop plantations; also protection and restitution of common yew and wild service tree, the restitution of fir in the Sudetes, and also *ex situ* protection of endangered and protected plant species.



LEVEL OF DAMAGE TO FORESTS

The level of damage to forests in Poland has been assessed every year since 1989 as part of the Forest Monitoring programme, which is one of the elements of the National Environment Monitoring system. Since 2007, there has been a network of Level I Permanent Observation Plots of 16 x 16 km density, established in accordance with the design principles for the ICP Forests Monitoring Networks. In 2009, the network of observation plots was densified to 8 x 8 km plots, and since this year it has become better integrated both with the Forest Monitoring programme and the National Forest Inventory.

Monitored are forests in all ownership categories and being under different forms of protection. Measurements are taken in observation plots located in stands aged more than 20 years; sample trees of all tree species are selected for scrutiny from major layer of stand.

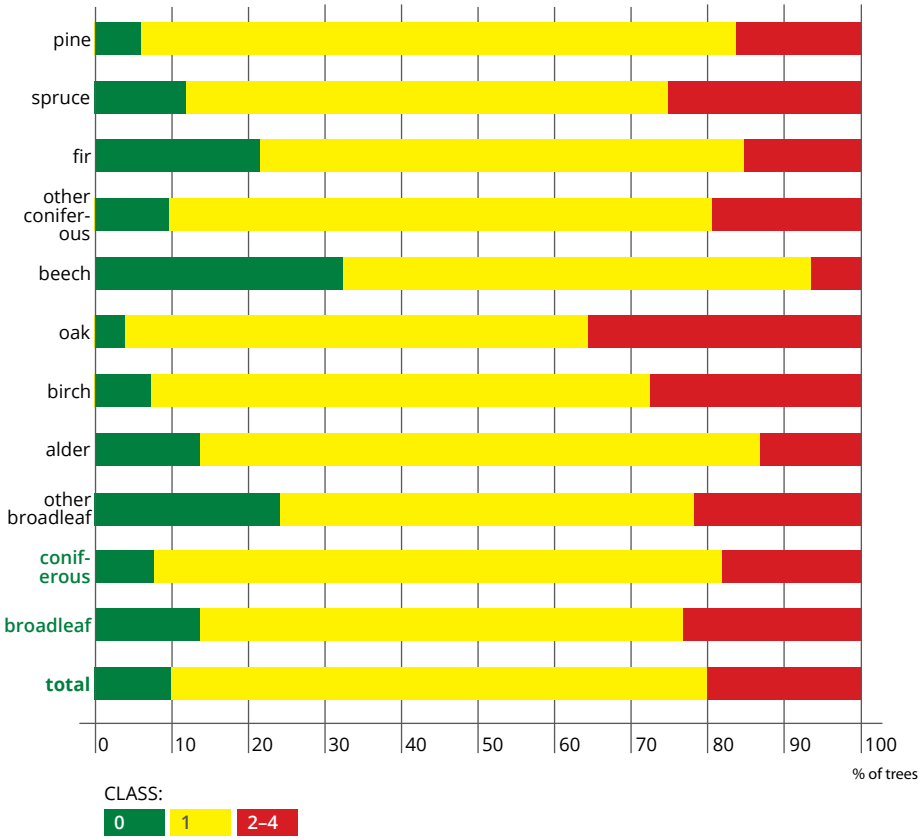
One of the basic parameters for the assessment of tree damage is the level of defoliation, i.e. the loss of leaves or needles, estimated at 5% deviation.

In 2017, the assessment of the condition of crowns was made on 40 180 trees aged over 20 years which are located on 2009 Level I Permanent Observation Plots. The average defoliation of all species amounted to 22.8%, coniferous – 22.7%, broadleaved – 22.9%. The share of healthy trees (up to 10% defoliation) of all species was 10.0%, and of damaged tress (over 25% defoliation) – 20.2%. Broadleaved species had larger share of healthy trees (13.7%) and larger proportion of damaged trees (23.3%) than coniferous species (7.9% and 18.4%, respectively).

Beech
is the healthiest tree in Polish forests

Among coniferous species the healthiest was fir which was characterised by the highest proportion of healthy trees (21.2%), low share of damaged trees (17.4%) and the lowest average defoliation (20.7%). The most damaged was spruce with low share of healthy trees (12.0%), the highest proportion of damaged trees (25.6%) and the highest average defoliation (24.4%).

Among broadleaved species the healthiest was beech with the highest proportion of healthy trees (32.7%), the lowest share of damaged trees (7.1%) and the lowest average defoliation (16.7%) in this group of species. The most damaged was oak with the lowest



SHARE OF MONITORED TREE SPECIES by defoliation class on Level I Permanent Observation Plots

share of healthy trees (3.8%), the highest proportion of damaged trees (36.2%) and the highest average defoliation (26.1%).

Countrywide, there is very little variation in the condition of forests of different ownership types. The highest proportion of damaged trees was recorded in national parks (29.1%), lower in forests of 'other ownership' (25.0%) and in private forests (22.4%), and the lowest share was in the State Forests (18.9%).

PROMOTING SUSTAINABLE FORESTRY

In 2017, communication activities of the State Forests focused on shaping public awareness and attitudes regarding the benefits of forests and the importance of sustainable and multifunctional forest management. These objectives were implemented through a promotional campaign 'State Forests. Welcome – The Forest: a Good Neighbourhood', coordinated by the State Forests Information Centre. The aim of the campaign was to demonstrate that forests administered by SF are managed according to the best standards and effectively meet social, ecological and economic needs of society.

'The State Forests. Welcome – The forest: a good neighbourhood' is the motto of the State Forests' social campaign in 2017

In 2017, the State Forests Information Centre (SFIC) developed promotional and display materials supporting the campaign 'State Forests. Welcome – The Forest: a good neighbourhood'. Within its framework, SF organised and coordinated promotional events countrywide, including:

- Science Picnic organised by the Polish Radio and the Copernicus Science Centre,
- 'Earth Day',
- 'National Forest Day' under the honorary patronage of the President of the Republic of Poland,
- central celebrations of the 16th edition of the 'Day of the Polish Forget-me-not' festival,
- Polish Lumberjacks Championships,
- 'The Great Mushroom Picking',
- an exhibition 'Learn about Mushrooms – Avoid Poisoning',
- an exhibition in the parliament (*the Sejm*) 'Natural Richness of the Forests of Podkarpacie and Bieszczady',
- opening of the Wolf Trail,
- the campaign 'We plant 1000 trees per minute',
- 13th edition of the Forestry Fair in Rogów.

In 2017, SFIC was responsible for the promotional and information work associated with the State Forests' development projects, including: 'Polish wooden houses', 'Great Forest Trail', 'Active protection of black grouse on land administered by the State Forests', 'Carbon Forests', 'Healthy food from Polish forests' and the 'Comprehensive project for the protection of the European bison by the State Forests'.

The State Forests used all available media to inform about forestry and forest management – from the television and radio broadcasts to the Internet services, social media, and various types of publications. In cooperation with external television stations, the following programs were produced and broadcast:

- ‘Straight from the Forest’ – a TV series (26 episodes) about Polish foresters who, for years, have been implementing the idea of sustainable forest management;
- ‘Holidays with the Republika’ – four TV programmes co-produced by the State Forests and Republika TV;
- ‘Inka. There are Things More Important than Death’ broadcast on channel TVP 3, co-produced with Polish Television S.A. (granting a licence);
- an information campaign on channels TVP 1 and TVP 2 about the bark beetle gradation in the Białowieża Forest.

In 2017, the State Forests Information Centre took part in the production of the following:

- a series of eight programs for Polish Radio 1, concerning the history and achievements of Polish forestry, promotion of forest produce and sustainable forest management, the Białowieża Forest and forms of active nature protection;
- economic debates on Polish Radio devoted to Polish wooden houses and to climate change and its impact on the forest environment.

Following the Decision No. 2 of the Director-General of the State Forests of 4 January 2016 regarding the establishment of the Internet television, the official State Forests channel (TVLP) became available on YouTube. In 2017, it broadcast over 250 films. TVLP has over 8300 subscribers and films have been watched nearly 2.4 million times for the total duration of 6.3 million minutes.

Since October 2016, the second TV channel of the State Forests – ‘Echa Leśne TV’ has been operating on YouTube. It is aimed at nature lovers, tourists, mushroom pickers, people using forests for sports and all who are interested in forests as a hobby. In 2017, almost 40 episodes of a series entitled ‘Faces of Forests’ and reports from various events were broadcast. It also broadcast relaxation movies and short films about curious and interesting facts related to forests. In total, 65 films were shown.

The primary source of information about the State Forests and Polish forests in general is the website www.lasy.gov.pl, which contains information on the structure of the organization, its history, forest management, protection of Polish forests, as well as its business and social activities. The site has two sections: ‘State Forests. Welcome’ (addressed to tourists and nature lovers) and ‘Forestry. Professional service’ (addressed to foresters, academics, forestry students). In 2017, the homepage of the State Forests recorded over 4.4 million visits and over 7.7 million page views.

In order to educate society about the wildlife, SFIC operates two online broadcasts:

- Żubry Online (bison) – almost 3 million views,
- Rybołowy Online (osprey) – over 240 000 views.

The profiles of the State Forests' units on Facebook are currently the most popular communication tools. For people from outside of the State Forests, Facebook fanpages are the most convenient channel to communicate with forest districts. In 2017, the number of fanpages increased from 160 to 209. The number of fans of the main fanpage run by the State Forests Information Centre was 55 000. The average daily reach of recipients is 80 000 people.

The official State Forests profile in the largest social networking site Instagram was operational throughout 2017. The profile is used to promote the beauty of forests under the management of the State Forests, as well as showing and explaining the work of foresters and promoting nature education. In 2017, 578 photos were submitted and the profile was watched by 7500 people.

One of the basic activities of the State Forests Information Centre is the promotion of sustainable forest management through the quarterly Echa Leśne. In 2017, the publication focused on nature conservation and the consequences of natural disasters. There was also a special edition about the Białowieża Forest. This magazine is also available in digital version for Android and iOS platform.

In 2017 the State Forests Information Centre published **26** titles

In 2017, SFIC continued with publishing the *State Forests Information Bulletin*. It is the official publication of the Director-General of the State Forests, containing normative acts, orders, decisions and announcements referring to the current activities of the State Forests. In 2017, the State Forests Information Centre was also responsible for the release of three special issues.

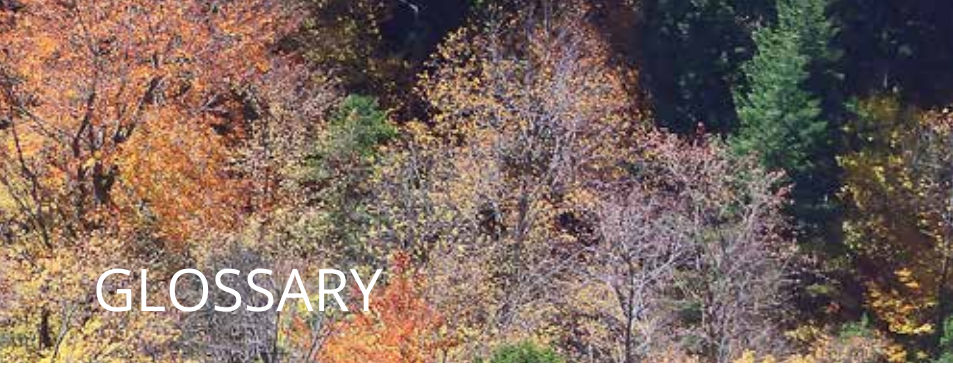
In addition, the State Forests Information Centre, in 2017, prepared many publications adapted to the promotional, informational and educational needs of the State Forests. In total, 26 items were published and 8 publications were prepared for printing the following year.

The State Forests also prepared information materials for their own employees. This task is carried out through the professional monthly magazine *Głos Lasu* and the State Forests newsletter.

In cooperation with the IT Department of the State Forests, the Information Centre completed the development and implementation of the State Forests Employee Portal and began to submit its content.

In 2017, SF Information Centre also undertook information and communication activities regarding the Białowieża Forest. These included:

- a meeting devoted to crisis communication regarding the Białowieża Forest (8–9 March, 2017);
- a crisis communication plan for the Białowieża Forest;
- infographics devoted to the Białowieża Forest in Polish and English versions;
- a special edition of *Echa Leśne* entitled 'Long Live the Forest – 100 Years in Foresters' Care';
- Polish and English versions of a leaflet '25 questions about the Białowieża Forest';
- information pack on the Białowieża Forest, prepared for the State Forests' field units;
- a film dedicated to the Białowieża Forest, addressed to the general public;
- short films explaining the situation in the Białowieża Forest, released on the Internet and broadcast by TVP;
- cooperation with external media journalists (publications in *The Economist*, *Tygodnik Powszechny*, *Dziennik Gazeta Prawna*, TVP Info portal);
- materials (photographs, films, figures and descriptive data, infographics, leaflets) for journalists and politicians taking part in the European Forest Week organized in Poland.



GLOSSARY

A

Afforestation – new forest established in non-forest areas previously used for agriculture or constituting uncultivated grounds.

Age class – agreed, usually 20-year period which allows grouping of stands according to their age; stands aged up to 20 years form class I, stands aged from 21 to 40 years form class II, and so on.

Amount of cut, yield – the amount (volume) of timber scheduled for removals in management and financial plans.

Annual prescribed cut by volume in the State Forests – an annual measure of forest use, determined in forest management plans for each forest district as a sum of final and pre-final (intermediate) felling (approximately equalling 1/10 of the cut prescribed for a 10-year period). The quota is variable and depends on the condition of forests; the total sum of annual prescribed cuts in each district must be balancing over a 10-year period, i.e. at the end of the current forest management plan.

- **annual prescribed cut by volume in final cuts in the State Forests** – an annually averaged sum of prescribed final cuts agreed for every forest district; the volume of final cuts in particular forest districts is determined in the forest management plans as absolute maximum in the whole (usually 10-year) planning period and therefore must not be exceeded.
- **annual prescribed cut by volume in pre-final cuts in the State Forests** – an annually averaged sum of approximate prescribed pre-final cuts agreed for every forest district.

B

Biological diversity (biodiversity) – the variety of life forms on Earth or in a given area, usually related to three levels of nature organization:

- **species diversity** – variety of species;
- **ecological diversity** – a variety of community types (biocoenoses, ecosystems);
- **genetic diversity** – a variety of genes forming a gene pool of a population.

Broken and fallen trees – trees broken or thrown down by wind, heavy rain, or snowfall.

C

Class for restocking (KDO) – a type of vertical structure of stands in which there is simultaneous felling and restocking under the shelter of parent stand, and in which the level of renewal has not met the standard requirement yet.

Cleaning – a series of tending treatments aimed at adjusting species composition, species mixture

C

and structure of restocking; regulating the density of stands and improving the quality of saplings;
- **early cleanings** – cleanings in plantations prior to crown closure;
- **late cleanings** – cleanings in plantations during the period between crown closure and the beginning of stands' natural self-thinning.

Clear-cuts – an area from which whole stand has been removed in final felling, designated for renewal within five incoming years.

D

Deadwood – trees which are dead or dying as a result of excessive density in the stand, attacks of primary or secondary insect pests, the impact of industrial emissions, changes in water conditions, etc.

Defoliation – loss of leaves or needles which intensifies with a worsening health condition of a tree.

Diameter at breast height (DBH) – thickness (diameter) of a standing tree measured at the standard height of 1.3 m above the ground.

E

Ecotype – *race, ecological form* – the entire population of one tree species or other plant covering a particular area; it develops as a result of long-lasting ecological conditions decisive for its establishment. Ecotypes differ with regard to their physiological properties and, less frequently, morphological characteristics.

Epiphytotic – epidemic (mass) occurrence of plant disease in a given area, caused by a single pathogenic agent (e.g. fungus) whose development is facilitated by a particular set of favourable conditions.

Eutrophication – a process of accumulating nutrient substances in the environment as a result of natural or anthropogenic processes; the amount of plant nutrient override the environmental capacities to use it or decompose by other organisms.

F

Final felling (cutting) – wood harvesting associated with stand's renewal or deforestation of land due to change in the land use; the timber obtained in final felling is final felling harvest.

Forest cover (or index thereof) – percentage of the area covered by forests in the total geographical territory of a country.

Forest habitat (site) type – a basic unit of the typological classification of forest sites applied in Poland comprising a forest area with similar site condition.

Folivores – leaf-eating animals.

G

Gene conservation stands (*in situ* conservation stands) – stands selected for preservation of endangered populations of the indigenous forest tree species.

Gradation – mass occurrence of insects as a result of favourable environmental factors for a given species.

Growing stock (standing volume) – the thickness (volume) of all live trees in a given area (stand, province, country, etc.) with a diameter at breast height over 7 cm (measured with bark). Growing stock may be calculated per hectare.

I

Imagines – adult insects; imago is the final stage in the process of biological development of insects which undergo metamorphosis.

M

Merchantable timber (large-size wood) – (1) volume of wood with the diameter 7 cm measured with

bark at the thinner end (refers to growing stock); (2) round wood with the diameter at least 5 cm measured without bark at the thinner end (refers to felled wood);

gross merchantable timber – with bark;

net merchantable timber – without bark and with no loss during logging.

Pathogens – factors causing disease; primary pathogens attack healthy organisms, secondary attack already damaged organisms (e.g. trees).

Pre-final cutting (felling) – harvest of wood related to forest tending.

Promotional forest complex (PFC) – a functional forest area of special ecological, educational and social value, established for the purpose of promoting sustainable forest management and protection of nature resources in forests.

Productive seed stands – stands whose origin and good quality indicate that their seed crop is very likely to produce valuable offspring ensuring in given ecological conditions long-lasting production of timber of satisfactory quality and quantity.

Protective forests – forests that mitigate or prevent the impact of natural risks and hazard; forests under special protection because of their function.

Regeneration (renewal, restocking, reforestation) – new forest established in place of the previous stand which was either removed by felling or destroyed by natural disaster;

natural renewal – established by self-seeding or offshooting;

artificial renewal – planted by man.

Restocking class (KO) – a type of vertical structure of stands in which felling and restocking is practiced concurrently under the shelter of the parent stand whose level of regeneration allows to move on to the next stages of tending.

Selected seed stands – the most valuable seed stands aimed mainly at seed supply therefore they are excluded from logging for a defined period of time (excluded from final felling).

Selection structure (BP) – a type of vertical structure of stands in which there is mutual penetration of groups and clamps of trees and shrubs being of different age and height.

Small-sized timber – round wood with a diameter at the thicker end up to 5 cm (measured without bark).

Thinning – tending cuts made in stands after they have undergone the period of cleanings, during which economically undesirable trees are removed. Thinning has positive effect on stands as the increment of thickness, height and crown size of trees is more intense therefore the quality of stand improves.

early thinning – covers the period of intensive natural selection of trees;

late thinning – covers later period.

Timber resources – combined volume of trees in forest, usually equated with the measured (estimated) volume of merchantable timber in stands.

Volume (thickness) of wood – the amount of wood, measured in cubic metres (m^3).

M

P

R

S

T

V

ABBREVIATIONS

BF	Białowieża Forest
BNP	Białowieża National Park
BP	selection structure (type of vertical structure of stand)
CF	Carbon Forests
DGSF	Directorate-General of the State Forests
FGB	Forest Gene Bank
KDO	type of stand (class for restocking)
KO	type of stand (restocking class)
NFI	National Forest Inventory
NFP	National Forest Programme
PFC	Promotional Forest Complex (LKP)
RDSF	Regional Directorate of the State Forests (RDLP)
SoEF 2015	*State of Europe's Forests 2015. Status & Trends in Sustainable Forest Management in Europe*
SFIC	State Forests Information Centre (CILP)
SF NFH	State Forests National Forest Holding (PGL LP)

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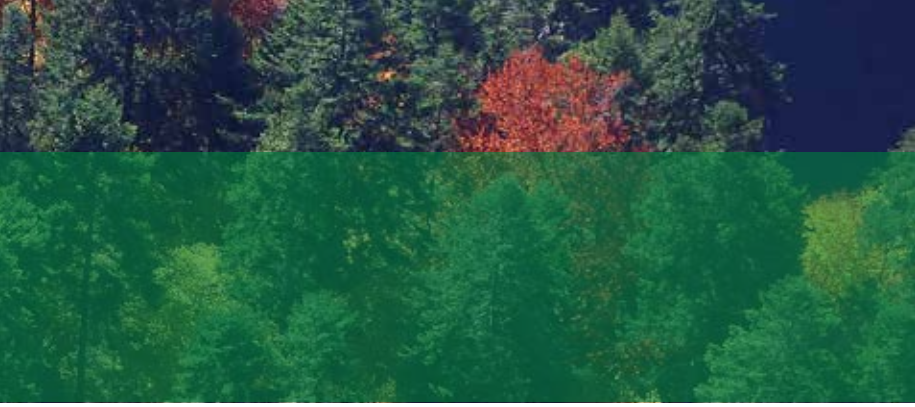

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