

POLAND 

THE STATE FORESTS IN FIGURES



State Forests



Directorate-General of the State Forests

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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 Agricultural Property Agency 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, fulfil 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 Forestry Ministers 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 Law 2015, item 2100 as later 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 Law no 134, item 692), the Accounting Act of 29 September 1994 (Journal of Law 2013, item 330 as later amended), and other statutory ordinances and regulations resulting from the Forest Act. This brochure is based on the *Annual Report on the Condition of Forests in Poland 2015*, 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 2015*.

STATE FORESTS – CONTACTS



LEGEND:

- SF REGIONAL DIRECTORATES
- FOREST DISTRICTS
- NATIONAL PARKS
- FOREST COMPLEXES
- TERRITORIES OF FOREST DISTRICTS
and regional directorates of the State Forests



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THE STATE FORESTS IN FIGURES

2016



State Forests

AIMS AND OBJECTIVES OF THE STATE FORESTS



AIMS AND OBJECTIVES OF THE STATE FORESTS 3

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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. These 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 proper methods of achieving them.

The State Forests administer all forests owned by the State Treasury, with the exception of national parks and the land administered by the Agricultural Property Agency 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 monitor the condition of forests, keep and update data on the size of forest area and timber resources, observe and forecast the level of fire risk and the occurrence of tree pests and diseases.



State
Forests
administer
forests owned
by the
Treasury

The State Forests fund scientific research which contributes to the advancement of forestry and forest management methods. Whenever natural, social and economic conditions allow, the State Forests implement 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 Forestry Ministers 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 have 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 education.

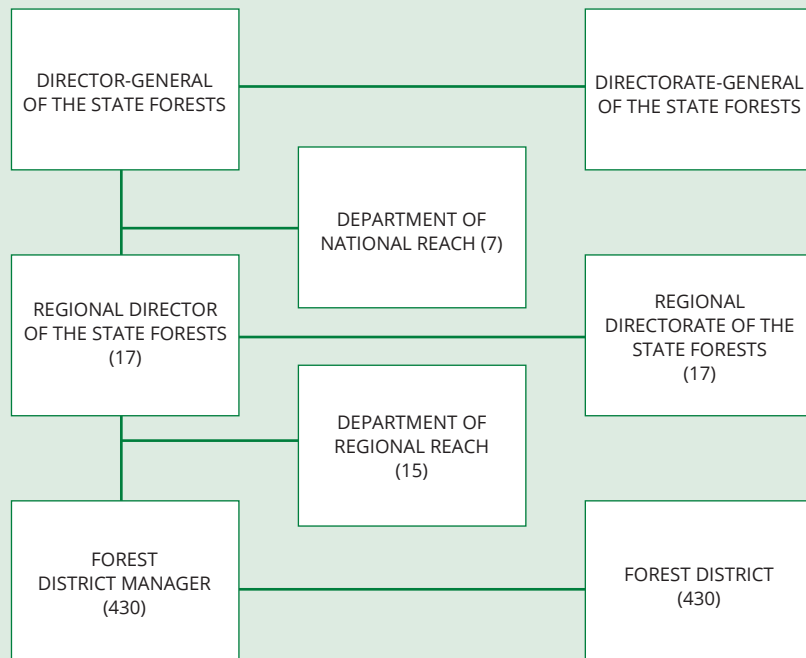
ORGANISATIONAL STRUCTURE AND EMPLOYMENT. SCIENTIFIC RESEARCH



Organisational structure

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

The State Forests are headed by the Director-General, assisted by the directors of regional directorates.



THE THREE-TIER STRUCTURE OF THE STATE FORESTS
(as of 31 December 2015)

As of 31 December 2015, 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 fisheries, 2 transport and logistics, 3 service and production, 2 forest transport, 2 forestry services, 1 training and recreation centre);
- 7 organisational units (departments) with country-wide authority reporting to the Director-General of the State Forests (the Research and Implementation Centre in Bodoń, the Forest Culture Centre in Gołuchów, the State Forests Information Centre in Warsaw, the Forest Technology Centre in Jarocin, the State Forests IT Department in Sękocin, and the Coordination Centre for Environmental Projects in Warsaw) and to the director of RDSF in Wrocław (the Forest Gene Bank Kostrzyca in Miłków).

The remaining integral parts of the Directorate-General of the State Forests comprise 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 forest. In 2015, 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 2015 was 25 502 people, which was 126 more than in 2014. The employment structure was as follows (in number of staff):

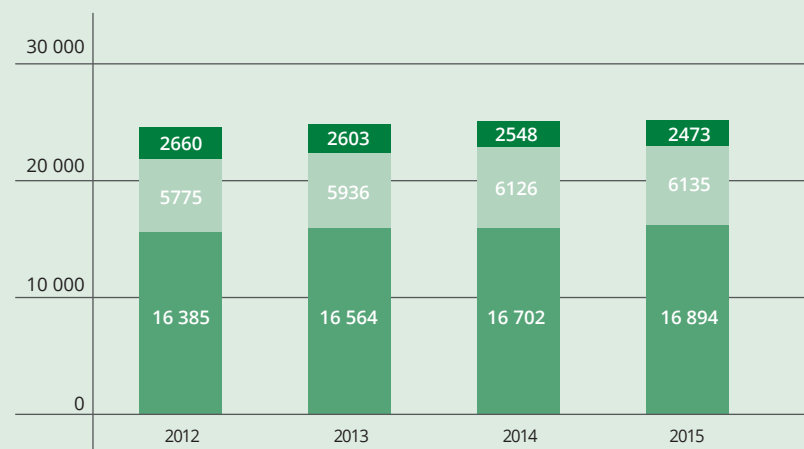
● permanent employees	25 335
including non-manual employees	23 029
● employees on fixed-term contracts	167

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

1. In forest districts including:	23 204
● Forest Service	16 155
● non-manual posts outside Forest Service	5 065
● manual posts	1 984
2. In departments	1 012
● including non-manual posts	576
3. In the Directorate-General and in regional directorates (with Forest Protection Teams)	1 286
● including Forest Service	727

Detailed examination of average employment in the State Forests in the period 2012–2015 indicates the increase in total employment in comparison with 2012. In comparison with the previous year, in 2015 the employment was higher by 126 persons.

As of 31 December 2015, a total of 25 609 people were employed in the State Forests, an increase of 176 compared with the last day of 2014.



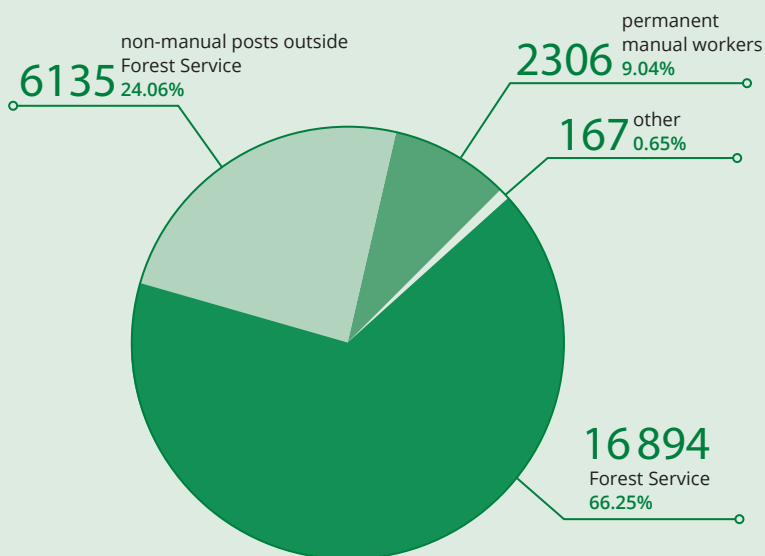
LEGEND:

FOREST SERVICE

NON-MANUAL POSTS
OUTSIDE FOREST SERVICE

ALL MANUAL WORKERS

EMPLOYMENT IN THE STATE FORESTS in 2012–2015 (DGŚF)



EMPLOYMENT STRUCTURE in the State Forests in 2015 (DGŚF)

Scientific research

Research commissioned by the Director-General of the State Forests in 2015 was significant for the development of all areas of forestry. Most research was carried out at the Forest Research Institute.

In total, 99 research projects were pursued in 2015, costing PLN 42 070.5 thousand provided by the forest fund. Of these, 54 projects were conducted at the Forest Research Institute, costing PLN 26 804.8 thousand, 45 projects involved universities and other institutions at a general cost of PLN 15 265.7 thousand.

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

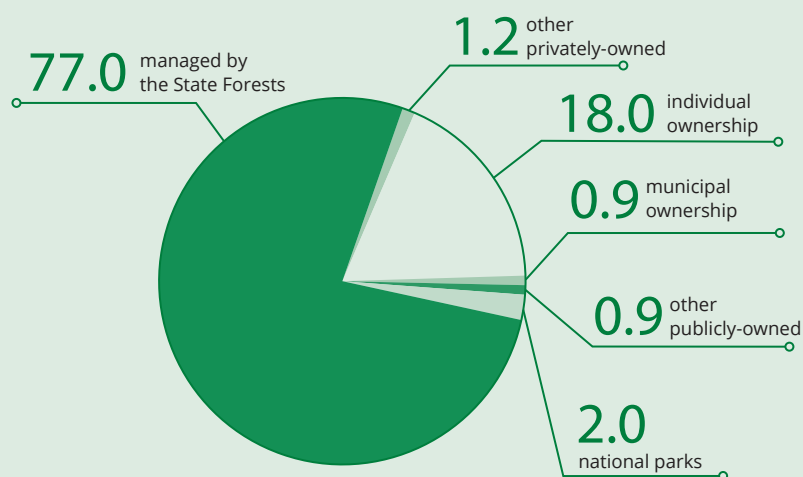


In 2015
the State Forests
commissioned
99
research
projects

RESOURCES OF THE STATE FORESTS



The forest area in Poland amounts to 9215 thousand ha (as of 31 December 2015, Central Statistical Office), which puts the forest cover at 29.5%. In Poland, the majority of forests are publicly-owned (80.8%), including those administered by the State Forests (77.0%).



FOREST OWNERSHIP STRUCTURE IN POLAND, in % (Central Statistical Office)



Land use structure

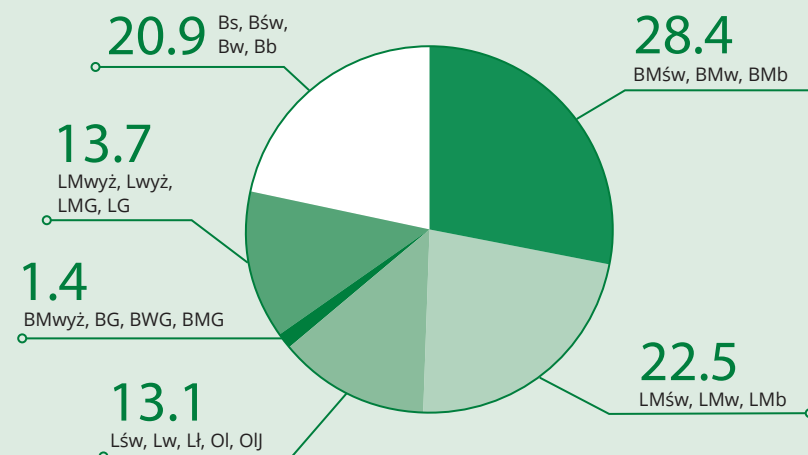
As of 31 December 2015, the combined area of land administered by the State Forests amounted to 7 606 607.39 ha and it was structured as follows:

● forests, total	7 298 874.70 ha
including: afforested land	6 983 991.14 ha
non-afforested land	115 681.14 ha
● agricultural land	139 231.78 ha
● wasteland	98 476.74 ha
● waters	8 973.83 ha
● trees and shrubs outside the forest	12 036.25 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 51% of the total forest area, while the broadleaved sites account for 49%. Additionally, in both groups upland sites occupy 6.3% of the forest area and mountain sites 8.6% of the total area of forests.



AREA SHARE (in %) of forest habitat types in Poland (NFI 2011–2015)

LEGEND:

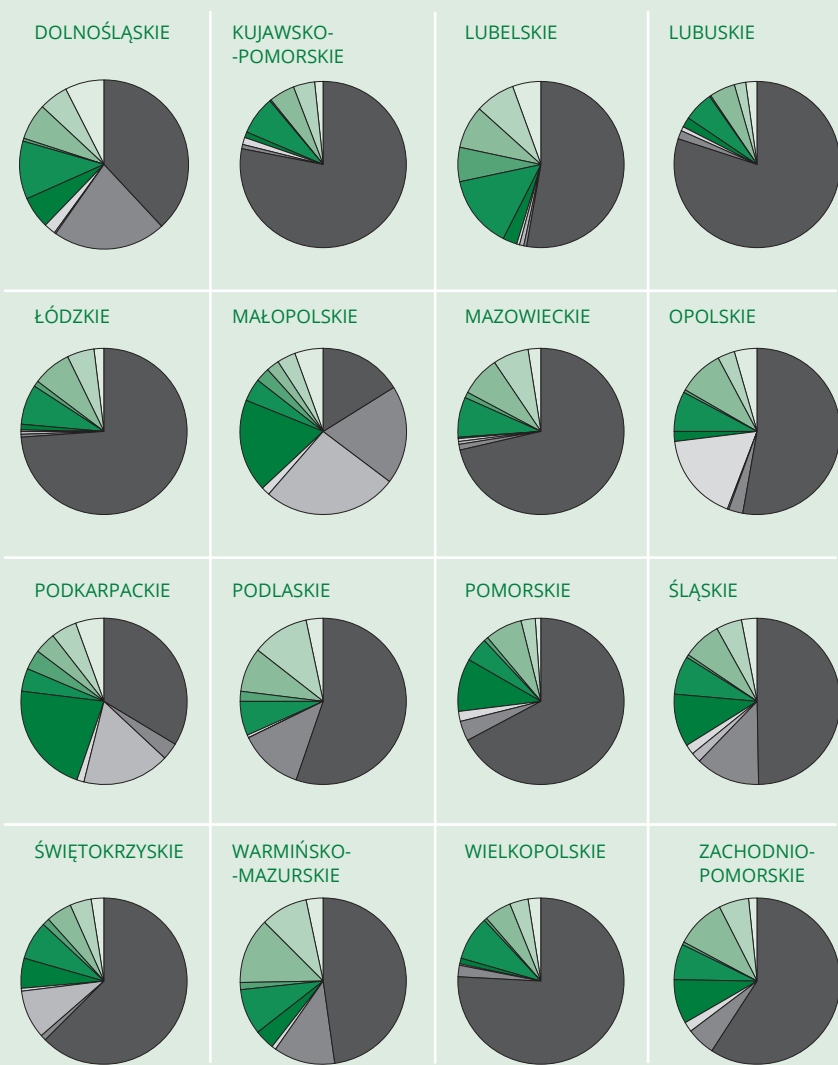
Bb	– swamp coniferous forest	LG	– montane broadleaved forest
BG	– montane coniferous forest	Lł	– riparian forest
BMb	– swamp mixed coniferous forest	LMb	– swamp mixed broadleaved forest
BMG	– montane mixed coniferous forest	LMG	– montane mixed broadleaved forest
BMśw	– fresh mixed coniferous forest	LMśw	– fresh mixed broadleaved forest
BMw	– moist mixed coniferous forest	LMw	– moist mixed broadleaved forest
BMwyz	– upland mixed coniferous forest	LMwyz	– upland mixed broadleaved forest
Bs	– dry coniferous forest	Lśw	– fresh broadleaved forest
Bśw	– fresh coniferous forest	Lw	– moist broadleaved forest
Bw	– moist coniferous forest	Lwyz	– upland broadleaved forest
BWG	– high-mountain coniferous forest	OI	– alder forest
		OIJ	– 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 forest habitats cover
51%
of the forest area in Poland

Coniferous species are dominant in 68.7% of the area of forests in Poland. Pine, which in Poland has optimal climatic and site conditions within its Euro-Asiatic natural range and has developed many valuable ecotypes (e.g. taborska and augustowska pines),

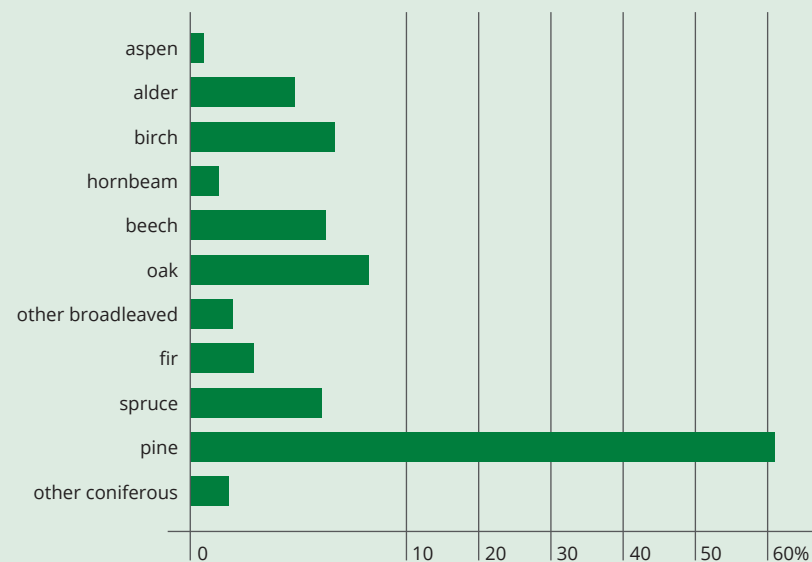
accounts for 58.1% of the forest areas in all ownership categories, 60.3% of the area managed by the State Forests, and 55.4% in private forests (National Forest Inventory).



SPATIAL DISTRIBUTION OF TREE STANDS by dominant species and by province
(National Forest Inventory 2011–2015)

LEGEND:

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



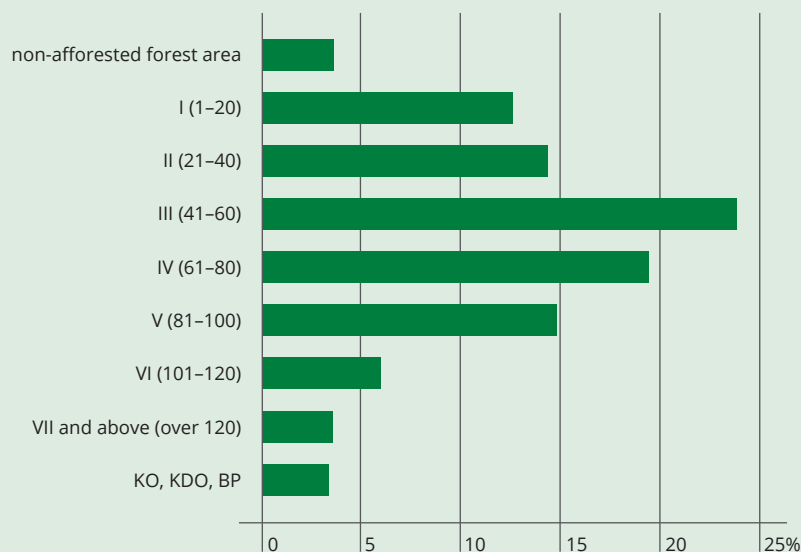
AREA SHARE OF DOMINANT SPECIES in the forests administered by the State Forests (NFI 2011–2015)





Age structure

Stands representing age classes III and IV prevail in the age structure of forests and cover 25.5% and 19.1% 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 12.6% of the forest area managed by the State Forests. Non-afforested land in the State Forests constitutes 3.1%.



AREA SHARE STRUCTURE OF STANDS by age class
in the State Forests (National Forest Inventory 2011–2015)



Afforestation

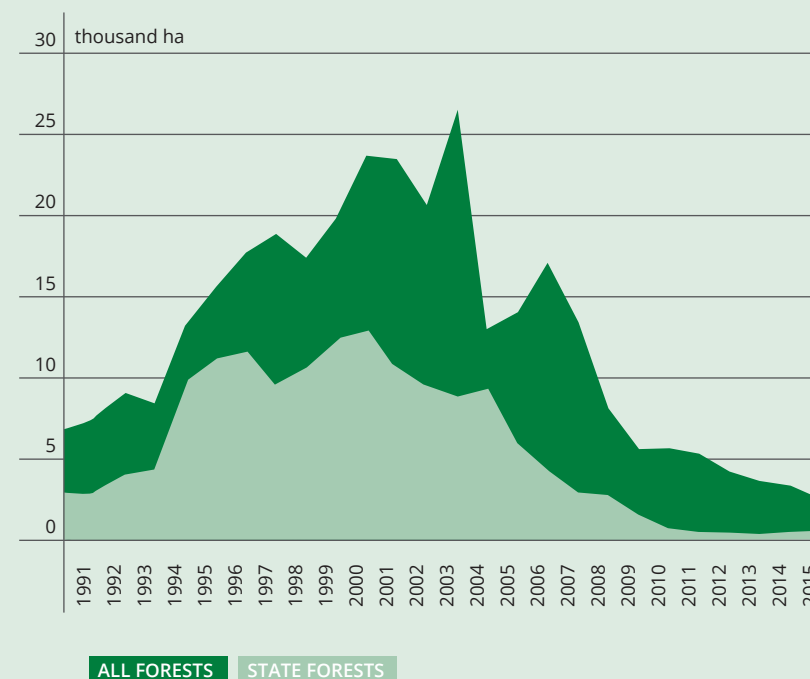


The basis for all afforestation in Poland is the *National Programme for the Augmentation of Forest Cover* (National Forest Programme – NFP) commissioned by the then Ministry of Environment, Natural Resources and Forestry. The programme was developed by the Forest Research Institute and recommended by the Council of Ministers on 23 June 1995. In 2002 the programme was modified. The main objectives of the NFP 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 in 2015 covered 2270 ha of land in all ownership categories. The afforested area was smaller by 1505 ha (40%) as compared with the previous year. The drastic decline in afforestation (from 16 933 ha in 2006 to 2270 ha in 2015, i.e. by 87%) 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, as well as attractive subsidies for agricultural production.

A similar drastic decrease in the size of afforested areas was observed in the State Forests, where only 748 ha were artificially afforested in 2015, 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 Agricultural Property Agency.

The NFP
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increase forest
cover to
33%
by 2050



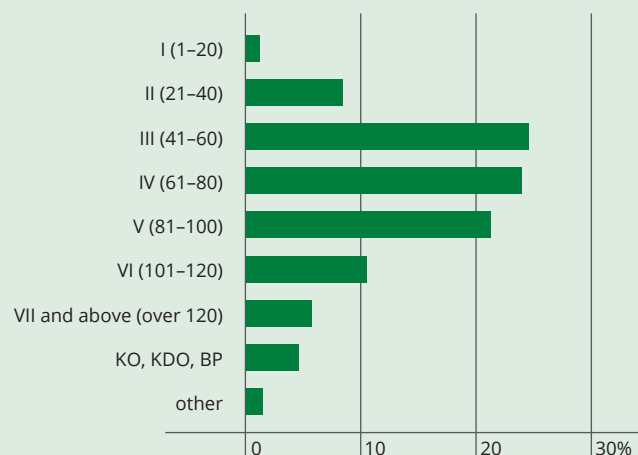
SIZE OF AFFORESTATION (artificial) in Poland in 1991–2015 (Central Statistical Office)



Timber resources

The main source of information about the volume of timber resources in Poland is the National Forest Inventory. According to the statistics collected in the years 2010–2015, and based on the forest area as it stood at the end of 2014, the timber resources in Poland amounted to 2491 million m³ of gross merchantable timber, of which 1965 million m³ were in the State Forests.

Almost half (49.0%) 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 19.3%.



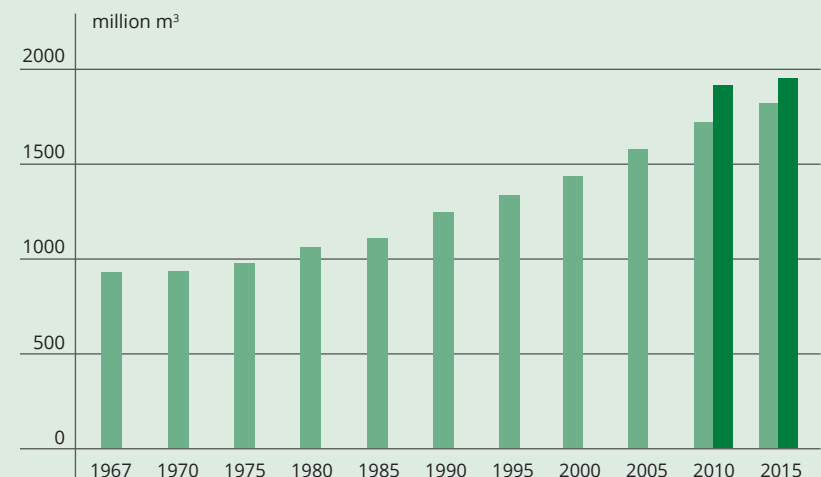
VOLUME STRUCTURE OF TIMBER RESOURCES by age class in the State Forests (National Forest Inventory 2011–2015)

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 1995 to January 2015, the increment of gross merchantable timber in forests administered by the State Forests amounted to 1225 million m³. During that period 687 million m³ of merchantable timber was harvested, which means that 538 million m³ of gross merchantable timber, representing 44% of the total increment, remained to augment the volume of standing timber resources.

In the last 20 years the SF timber resources have increased by

538

million m³



LEGEND:

STATE FORESTS BY NFI*

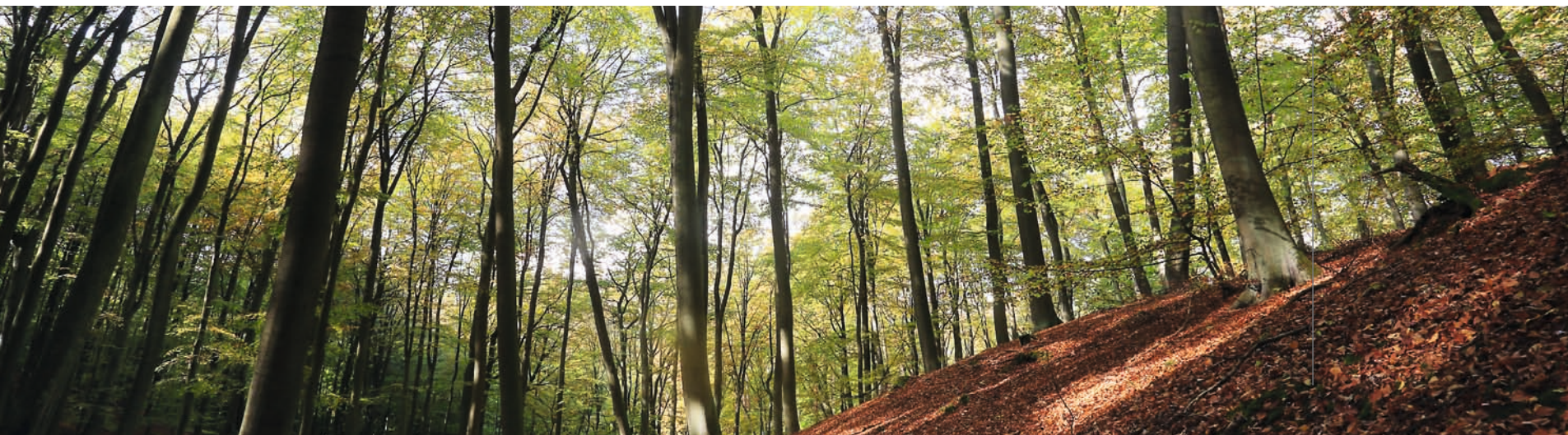
STATE FORESTS (update)

* National Forest Inventory data for periods 2006–2010 and 2011–2015

AMOUNT OF TIMBER RESOURCES in the State Forests in 1967–2015, in million m³ of gross merchantable timber (Central Statistical Office, Bureau of Forest Management and Geodesy, National Forest Inventory); figures for 1 January

According to the results of the National Forest Inventory 2011–2015, the average volume of growing stock in forests managed by the State Forests was 277 m³/ha. Pine accounts for 58.6% in volume structure of timber resources.

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 line 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

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 steppisation;

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

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

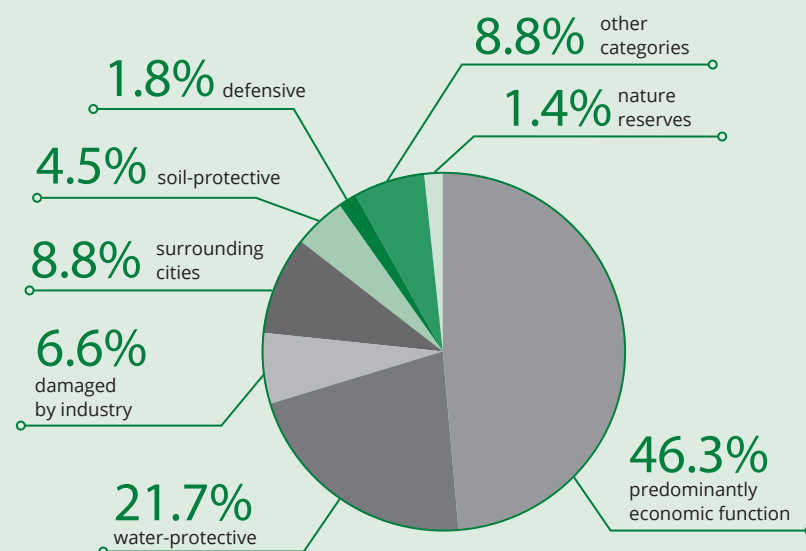
The State Forests have a legal obligation to act according to the principles of sustainable forest management which is aimed at preserving the sustainability of forests, their continuous multifunctional use, and the augmentation of forests resources.

The 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 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 2015, the combined area of protective forests increased to 3709 thousand ha, which represents 52.3% of the total forest area, or 53.7% including 102 thousand ha of nature reserves.



SHARE OF PROTECTIVE FORESTS in the State Forests in 2015 (DGSP)

The share of protective forests in all ownership categories in the total forest area in Poland currently has reached 41.2%, and including the area of nature reserves – 42.3%.

Protective forests are subject to different management practices, depending on their most important and predominant function. These are modified and 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 CO₂ 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 CO₂ emission are based on the decisions taken during the Conference of the Parties for Climate Change and the assumptions of the Kyoto Protocol. The last conference which took place in Paris in December 2015, ended with a new climatic agreement signed by each state taking part in the Convention. It was agreed that one of the most effective methods to slow the increase of global temperature, is the sequestration of CO₂ by forest ecosystems. The Paris Conference appealed to take effective measures in order to limit deforestation of large forest areas and to ensure enlarging the afforested land and timber resources, mainly through planting new stands. The concept of 'forest carbon farms' was also presented in which forest management methods are adjusted so that forest ecosystems capture and store additional amounts of CO₂.

The data on timber resources show that the amount of carbon stored in the wood biomass in Poland has been estimated at 822 million tonnes; the amount of carbon in deadwood has been assessed at 32 million tonnes (SoEF 2015). The annual amount of sequestered CO₂ by forests (including the gas use and absorption by soils) is estimated at 41.4 million tonnes, which equals approximately 11.3 tonnes of carbon.

The State Forests aims resulting from the provisions of the Forest Act are in line with the goals set out in the Kyoto Protocol and the Paris Agreement, which is evident in the growth, in the last decade, of forest area and resources managed by the State Forests by 57 thousand ha and 379 million m³ respectively. The average growing stock increased in the same period from 229 to 275 m³/ha.

The State Forests, by subsidising research projects have undertaken actions in order to strengthen knowledge on carbon dioxide balance in managed forests, and to develop methodology for obtaining necessary data to measure carbon sequestration by forest areas. Efforts are also made to test the possibility of introducing Removal Units (RMU) into domestic market, which would be 'produced' and shared by the State Forests with the external entities and within the framework of the so called additional activities in forestry.

Social functions of forests

Forest education

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



Forest education in all parts of the State Forests is based mainly on the Ordinance no 57 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. Education is carried out by qualified teaching staff, whose competence is constantly enhanced by specialist training.

Various educational programmes organised by the State Forests attracted over 3.5 million participants in 2015. Among the events and activities offered were usual outdoor lessons and guided tours, classes in forest education chambers, meetings with foresters at schools, meetings outside schools, educational exhibitions, forest competitions, fairs and many others.



Forests in Poland absorb over
41
million tonnes of carbon dioxide per year

Over
3 million
participants in educational programmes

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 (65), educational chambers (269), educational shelters called 'green classes' (562), educational trails (1011), educational points (1882), other facilities (2734), and also overnight accommodation.

Educational activity of the State Forests is financed mainly from the forest districts' own resources, but also from the relevant Regional Fund for Environmental Protection and Water Management and the National Fund for Environmental Protection and Water Management. In 2015, approximately PLN 33.2 million were spent on forest education, out of which PLN 28 051.8 thousand (84.6%), came from the forest districts' own resources.

Within the framework of the forest educational activities, the State Forests collaborated with numerous centres of environmental education, as well as national parks, community culture centres, museums, non-government organisations, churches and mass media.

It is worth noticing that the unquestionable leaders of forest education are promotional forest complexes (PFC) which attract about 30% of the participants in the educational programmes prepared by foresters. Highly qualified and experienced educators have at their disposal the best-developed infrastructure which includes forest education centres (37), educational chambers (55), educational shelters called 'green classes' (121), educational trails (234), educational points (529) and other facilities (434).

In addition, promotional forest complexes are particularly important for science because the interdisciplinary research carried out within their areas is based on fully investigated and recognised forest environment. They are also an interesting 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 and unrestricted contact with nature (see cover for a map and a list of PFCs). The combined area of promotional forest complexes is almost 1274 thousand ha, out of which over 1200 thousand ha are located in the area administered by the State Forests (over 17% of their territory).

Tourism

The State Forests' educational offer 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 4.5 thousand beds available in recreation and training centres, also guest rooms and hunting lodges. There are over 20 thousand kilometres of walking routes, nearly 4 thousand kilometres of cycling routes and about 7 thousand 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 find useful 614 other facilities, also 60 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 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. In 2015, the State Forests spent nearly PLN 17.5 million on forest cleaning and over 122 thousand m³ of litter were removed.



Accommodation
in the SF is nearly

4.5
thousand
beds



More than
28
million PLN
spent by the SF
on forest
education



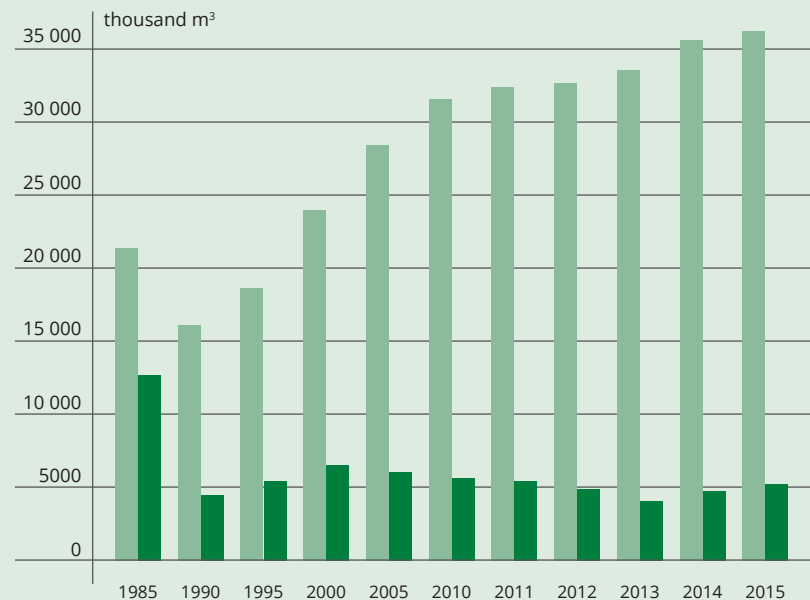
Productive functions of forests



Harvesting of timber

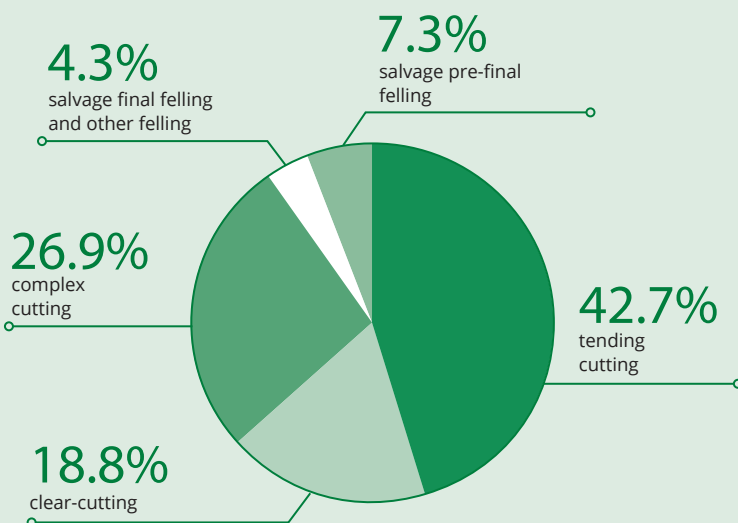
In 2015, the amount of net merchantable timber harvested in Poland was 38 327 thousand m³ (i.e. by 665 thousand m³ more than in 2014). In the State Forests the felling amounted to 38 408 thousand m³ of raw timber, including 36 497 thousand m³ of net merchantable timber (102.1% of the approximate prescribed cut by volume), of which 18 253 thousand m³ (97.0% of prescribed cut) were obtained in final felling, and 18 224 thousand m³ (107.7 % of prescribed cut) in pre-final felling.

The volume of timber harvested for sanitation reasons by clearing deadwood, 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, amounted in 2015 to 5097 thousand m³, or 14.0% of the total harvest of merchantable timber; this was one of the lowest shares in the last 30 years, although it was a little higher than that in the previous year.



LEGEND: MERCHANTABLE TIMBER DEADWOOD, BROKEN AND FALLEN TREES

SHARE OF DEADWOOD, BROKEN AND FALLEN TREES in total harvest in the State Forests in 1985–2015, in thousand m³ of net merchantable timber (DGŚF)



HARVEST OF MERCHANTABLE TIMBER by type of felling in the State Forests in 2015

clear-cut areas is indicative of the progress in implementing sustainable forest management, however the clear-cuts are often necessary due to large-scale damages caused by wind and other abiotic factors, or forest diebacks caused by drought, fungal disease or insect gradation.

The State Forests, during the last 20 years (1996–2015) utilised 93% of the prescribed cut in final felling, and 112.3% of the prescribed cut in pre-final felling (by volume) determined in forest management plans.

In 2015, under the clear-cut system, 6861 thousand m³ of merchantable timber was harvested in the SF, which accounts for 18.8% of its total harvest. The clear-cut area amounted 24.2 thousand ha and was slightly smaller than the average value for the past decade amounting 25.2 thousand ha. The gradual reduction in size of the





AREA OF CLEAR-CUTTING in the State Forests in 1980–2015, in thousand ha (DGSF)

In the last five years, the size of timber harvest, expressed by the volume of net merchantable timber to one hectare of the forest area, has stabilised at 5.14 m³/ha; in 2014 this indicator (calculated over a five-year period) was 5.03 m³/ha. The size of harvest in the State Forests does not exceed the permitted level and, as of the data from the last 20 years, it constitutes nearly 56% of current increment.

The proportion of the size of felling in current increment is a commonly used indicator of consistent sustainable development, often used by specialists outside forestry. However, it should be used with caution as its values are determined to a large extent by the age structure of forests with a sizeable share of stands characterised by large increment but relatively low use.



The aim of silviculture is to ensure the sustainability and continuity 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 2015 were (in hectares):

1. Nursery production (total productive area of forest nurseries)	1 993
2. Restocking and afforestation (including afforesting gaps and second storey planting)	59 575
● natural regeneration	8 438
● afforestation, in total	932
including: ● natural succession	184
3. Amendments and fill-in planting	3 717
4. Forest tending, in total	306 417
including: ● planting understorey	471
● soil cultivation and weed control	172 277
● early cleaning	51 973
● late cleaning	78 872
● other tending treatment (including pruning)	2 824
5. Thinning, in total	440 786
including: ● early thinning	98 988
6. Land drainage, in total	66 153
including: ● mineral fertilising of forests	29
7. Stand conversion, total	6 561

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. on drawing up nature conservation programmes in forest districts.

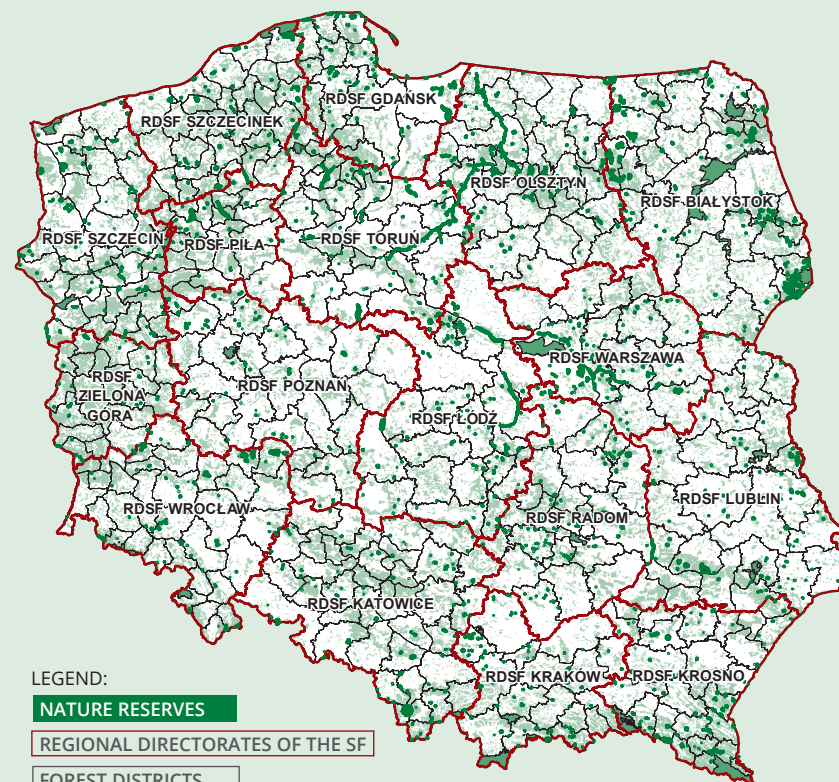
As of 31 December 2015, the State Forests inventory included the following:

- 1279 nature reserves with an area of 123.4 thousand ha;
- Natura 2000 sites covering a total area of 2891 thousand ha (38% of the State Forests territory), including: 133 special protection areas (SPA) for birds covering 2217 thousand ha (29.1%) and 706 sites of Community importance (SCI) with a combined area of 1659 thousand ha (21.8%);
- 10 328 natural monuments, including: 8523 individual trees, 1471 groups of trees, 130 tree avenues, 473 erratic boulders, 204 rocks, grottoes and caves, and 163 areas under monument protection (346 ha);
- 8924 areas of ecological use, in total 28 682 ha;
- 127 documentation sites with an area of 1151 ha;
- 141 nature and landscape complexes with a combined area of 37 654 ha.

In the State Forests, over 3394 protective zones for endangered species, which were officially approved, comprise a total area of 147 261 ha, of which over 20% is an area of all-year protection. Protected are refuges of birds (3097), mammals (1), reptiles (39), insects (10), plants (5), lichens (251) and other (1).

In the total area of forest stands being under special protection, over 195 811 ha are designated as the seed base, of which 15 544 ha are selected seed stands, 173 804 ha are productive seed stands, 1858 ha are seed orchards or seed crop plantations, and 4604 ha are gene conservation plantations and stands which supply material for further propagation of native ecotypes of forest-forming tree species.

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: 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 those focusing on reintroduction of capercaillie, black grouse, peregrine falcon, lynx, edible dormouse and European bison. Other



LEGEND:

NATURE RESERVES

REGIONAL DIRECTORATES OF THE SF

FOREST DISTRICTS

NATIONAL PARKS

FOREST COMPLEXES

NATURE RESERVES IN POLAND within the territory administered by the State Forests (DGŚF)

programmes focus on in situ and ex situ conservation of endangered species such as wild service tree, smooth snake, hermit beetle, great capricorn beetle, stag beetle, hare, grey partridge and many others. Furthermore, there are animal rehabilitation centres (8), botanical gardens (5) and arboreta (5) run by various forest districts.

Game animals, whose number in Poland is one of the highest in Europe, are indicative of the forest fauna richness of species. Population sizes of main animals 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 2014, the populations of most game in 2015 did not change significantly. There was a noticeable increase only in the size of populations of elk (by 19%), pheasant (by 8%) and hare (by 5%), and a decrease in population of wild boar (by about 7%).

In the last decade, there was an increasing trend as far as the population of most species is concerned. The significant increase has been noted in the population of elk (by 376%), fallow deer (by 110%), mouflon (by 72%), wild boar (by 52%), red deer (by 52%) and roe deer (by 25%). The reverse trend was observed only in the population of grey partridge (decrease by about 18%).

The population of elk has increased by **376%** in the last decade

PROJECTS PARTLY FUNDED BY THE EUROPEAN UNION

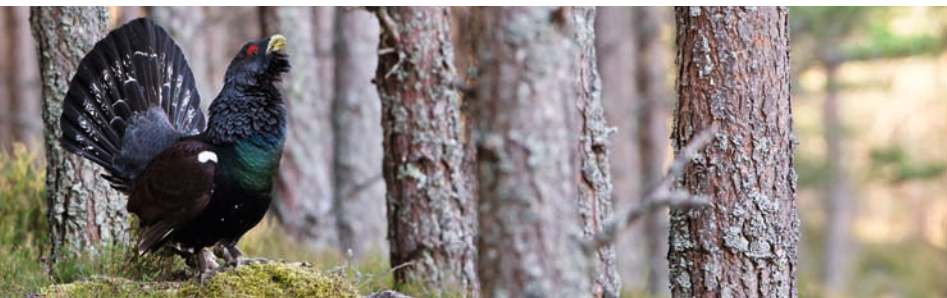
FOREST PROTECTION



In order to protect valuable elements of the ecosystems, the State Forests organisational units carry out numerous projects which are partly financed by national or EU funds (National Fund for Environmental Protection and Water Management, European Regional Development Fund, Life+, Operational Programme 'Infrastructure and Environment'). In 2015, these projects concerned:

- Active protection of lowland populations of capercaillie in the Dolnośląskie Forests and in the Augustowska Forest (RDSF in Wrocław and in Białystok), which comprises active and holistic protection of lowland populations of the western capercaillie (*Tetrao urogallus*) in the area of the Dolnośląskie Forests and the Augustowska Forest;
- Enhancement of protected sites within the provisions of the bird and habitat directives *In harmony with nature: Life+ for the Janowskie Forests* (Janów Lubelski and Gościeradów forest districts), scheduled for the years 2015–2019 and carried out with cooperation of Regional Directorate for Environmental Protection in Lublin;
- Reclamation for environment the degraded and post-military land administered by the State Forests (58 forest districts in a total area of over 30 thousand ha);
- Increasing water retention capacity and counteracting flood and drought in the lowland forests ecosystems (175 forest districts in the whole country);
- Counteracting the adverse effects of the outflow of precipitation water in the mountainous areas. Increasing water retention and preserving streams and the related infrastructure in good condition (55 forest districts in 4 RDSFs).

The State Forests also take actions aimed at integrated programmes such as: *Adapting forests to climate change till 2020* and *Counteracting climate change in the forestry sector till 2020*, which are linked to the priority objectives of the European programmes.



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, continental and maritime. As a consequence of such geographical position, 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. 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).

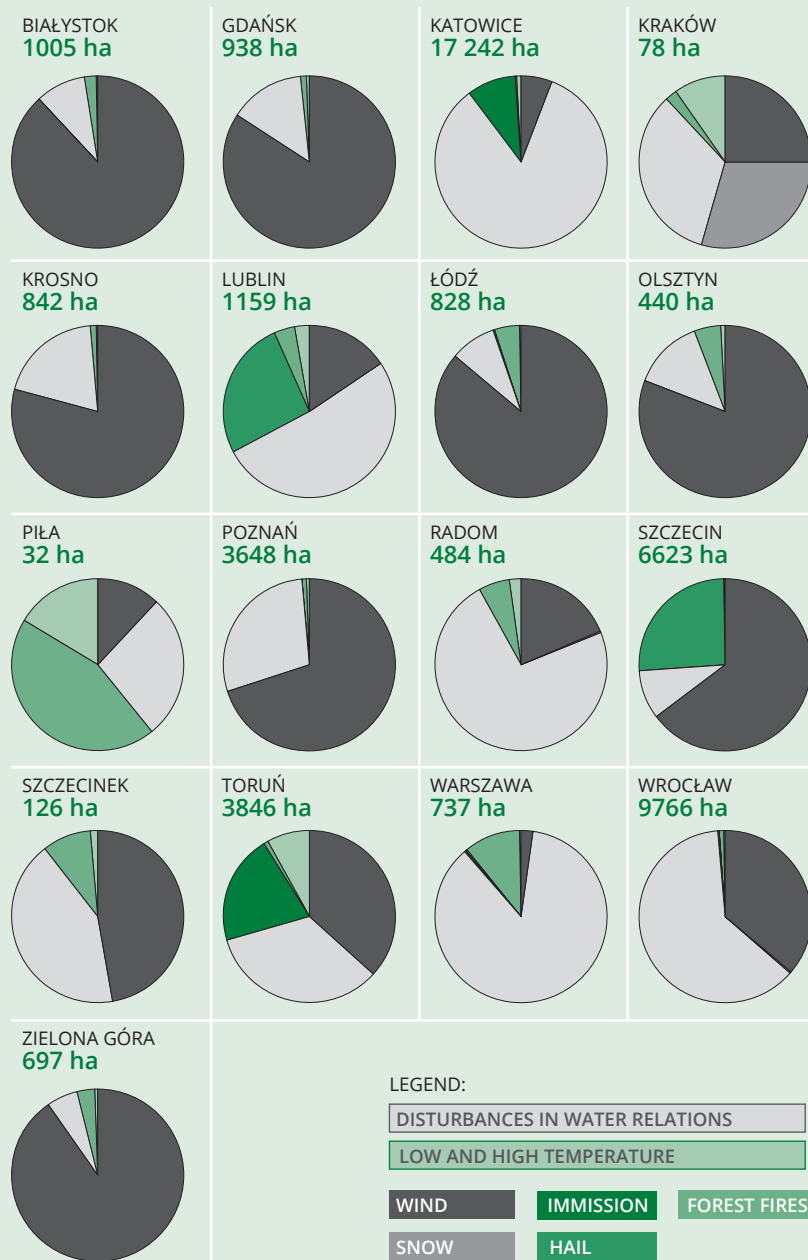
Abiotic threats

In 2015, the greatest natural disaster for the whole country was a strong drought which weakened both coniferous and broadleaved stands and increased their vulnerability to pests and pathogenic fungi. One of the abiotic factors of disastrous nature which affected the level of damage to trees were mostly hurricane winds. In most cases such events were local or, at the most, regional. The total wood mass of broken and fallen trees amounted to 3084 thousand m³ and was approx. by 5% smaller than in the previous year.



In 2015 abiotic damage in the SF was reported by **91%** of all forest districts

Damage to forests caused by at least one abiotic factor was reported by 91% of all forest districts (31.4% reported one factor, 30.5% – two factors, 23% – three factors, 5.8% – four factors, 0.5% – five factors and 0.2% – six factors). The aggregate area of stands in which abiotic factors caused damage in 2015 amounted to 48 492 ha. The largest area was affected by disturbances in water relations, droughts (25 741 ha across 184 forest districts) and strong winds (17 256 ha across 186 forest districts).



AREA OF STANDS aged over 20 years damaged to various degrees by selected abiotic and anthropogenic factors in each RDSF in 2015

Biotic threats

Threats to forests from primary insect pests

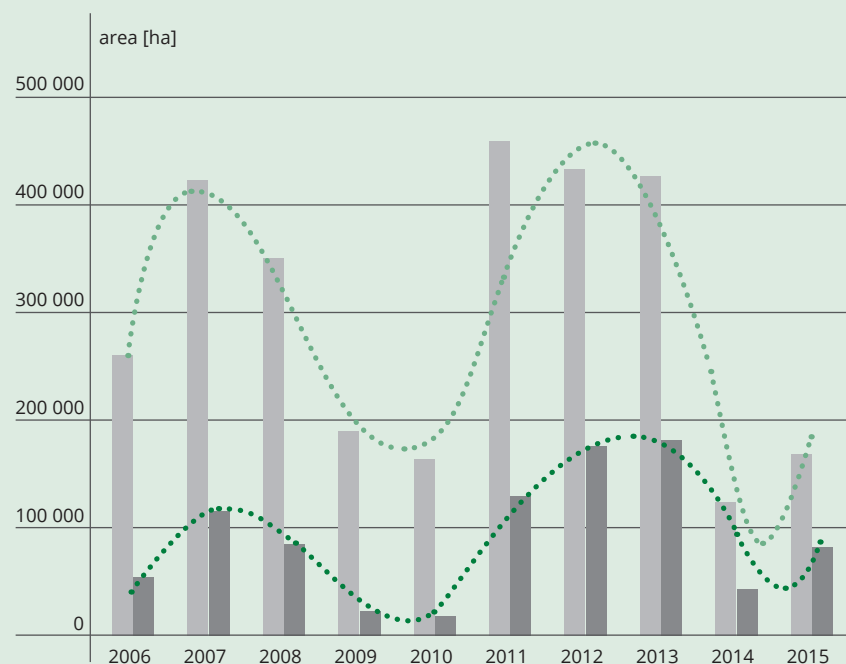
In 2015, the threat to forests administered by the State Forests coming from primary insect pests was low – the total area of their occurrence was 175 thousand ha. However, the cockchafer beetles (imagines) were an exception, because they occurred on nearly 126 thousand ha.

It was necessary to apply control treatment in order to reduce populations of 42 pest species or groups. In 2015, the total area of forest stands subject to this control treatment was approx. 86 thousand ha and was over twice larger than in the previous year.

Furthermore, in 2015, there was a three-fold increase of the total area of broadleaved stands (mainly oak) threatened by folivorous pests, from 46 803 ha in 2014 to 138 409 ha in 2015. There was also a substantial increase, almost seven-fold, in the total area subjected to chemical control treatment against folivorous pests of broadleaves.



In 2015 control treatment was applied on about **86** thousand ha of forests



AREA OF OCCURRENCE AND POPULATION CONTROL of primary insect pests in 2006–2015, showing trend in changes

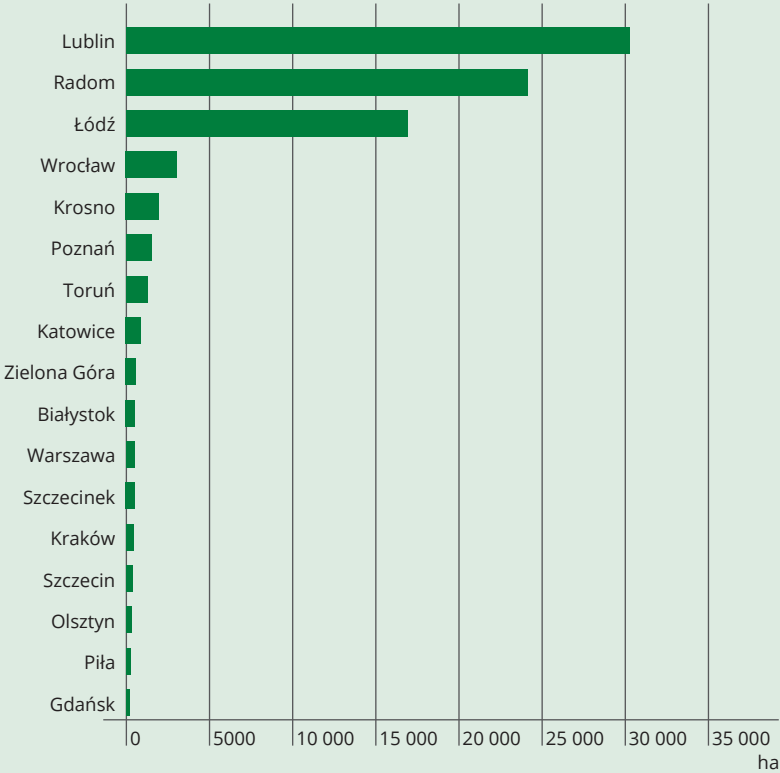
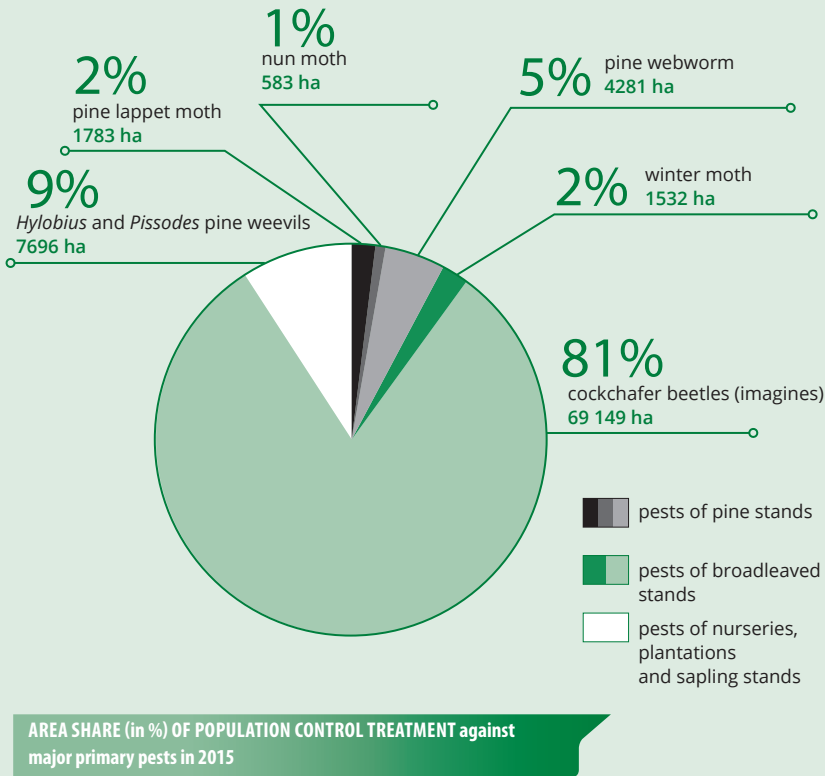
LEGEND:

- OCCURRENCE
- TREND IN OCCURRENCE
- CONTROL TREATMENT
- TREND IN CONTROL TREATMENT

Primary pests attacking older pine stands are usually the major insect pest group mainly because of the fact they occur in the largest area. Moreover, they cause large scale damage and therefore the expenditure incurred on their combat by the State Forests is also very great. In 2015, a low level of threat by this group of insects was noted. In order to control them, the agricultural aviation treatment was applied in the area of 6803 ha.

In 2015, the population control treatment of pests occurring in plantations, sapling stands and pole forests was applied in the area of over 7.6 thousand ha. The major damage was caused by pine weevils: *Hylobius* and *Pissodes*.

The occurrence of many other species/groups of insect pests was also noted, including continually damaging Polish forests root pests of trees and shrubs, and also pests of spruce, larch, fir and Douglas fir. Their economic impact, however, is minor. In nurseries and plantations, the control treatment against root pests of forest trees and shrubs was applied over the area of 40 ha. The combined area of spruce, larch and fir stands to which control treatment for insect pests was applied was 164 ha.



AREA OF POPULATION CONTROL TREATMENT against primary insect pests in each RDSF, in 2015

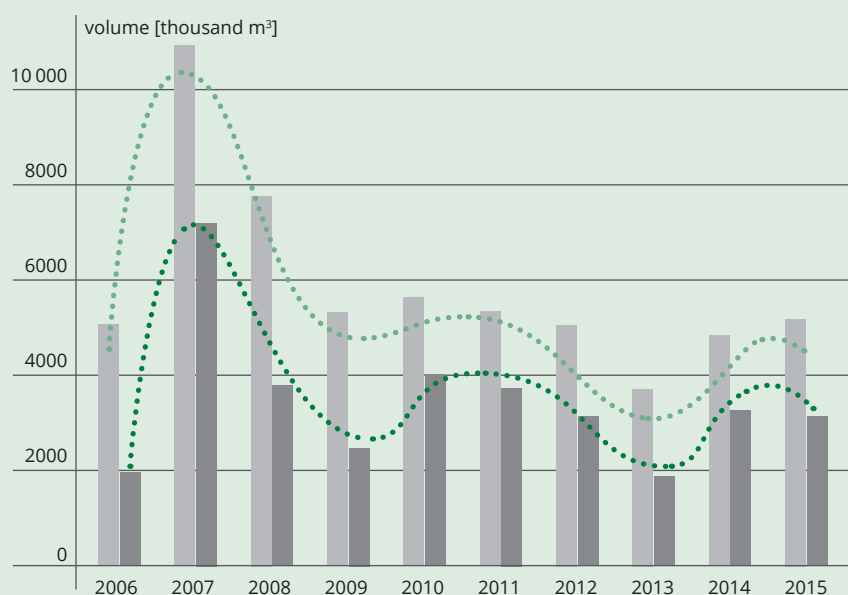




Threats to forests from secondary insect pests

Forests in Poland in 2015 were weakened significantly by the drought. Weather conditions caused fungal diseases, especially those attacking roots, to spread more actively and created perfect conditions for secondary pests to develop. Negative effects of abiotic and biotic factors were already visible in forests in the second half of 2015, however the greatest intensity of damage (increased sanitation cutting, especially deadwood harvesting) will occur in 2016 and probably in the years to follow.

In 2015, the timber harvest resulting from sanitation cutting was 5107 thousand m³, of which 60% were broken and fallen trees.



VOLUME OF TIMBER HARVESTED (thousand m³) in sanitation cutting including broken and fallen trees in 2006–2015, showing trend in changes*

LEGEND:

SANITATION CUTS

TREND IN CHANGES (SANITATION CUTS)

BROKEN AND FALLEN TREES

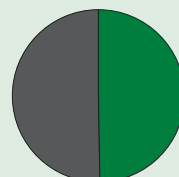
TREND IN CHANGES (BROKEN AND FALLEN TREES)

* In 2012 there was a change in reporting methodology concerning the data on timber volume harvested in sanitation cutting. The data for the years 2006–2011 cover period October to September of the next year while data for the years 2012–2015 cover period January to December of a given year.

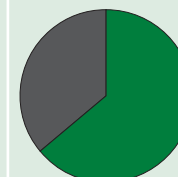
In 2015, coniferous stands were most threatened: 4194 thousand m³ of wood were harvested, of which 57% were broken and fallen trees.

The volume of pine timber felled in sanitation cutting in 2015 was 2236 thousand m³, of which 28% was deadwood. Major secondary pests of pine stands

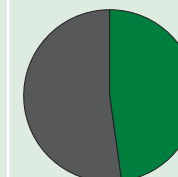
BIAŁYSTOK
399 704 m³



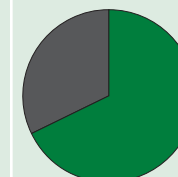
GDĄŃSK
183 650 m³



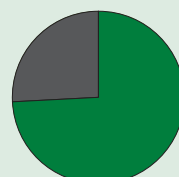
KATOWICE
825 044 m³



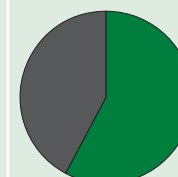
KRAKÓW
185 823 m³



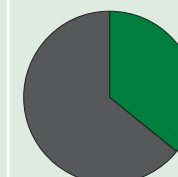
KROSNO
157 590 m³



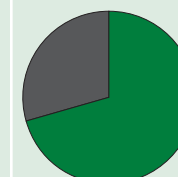
LUBLIN
224 917 m³



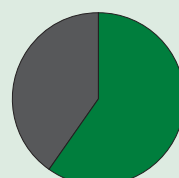
ŁÓDŹ
90 802 m³



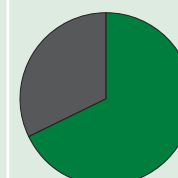
OLSZTYN
423 305 m³



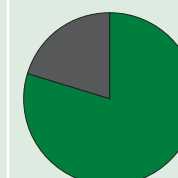
PIŁA
97 956 m³



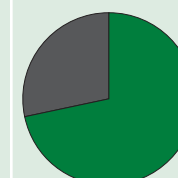
POZNAŃ
210 663 m³



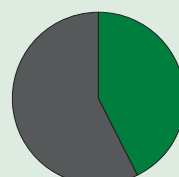
RADOM
140 909 m³



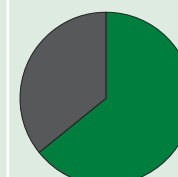
SZCZECIN
414 026 m³



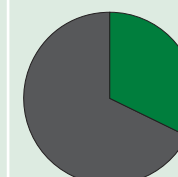
SZCZECINEK
571 148 m³



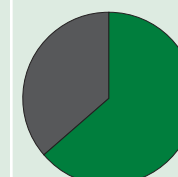
TORUŃ
180 355 m³



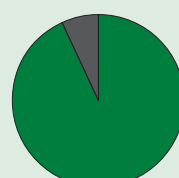
WARSZAWA
72 166 m³



WROCŁAW
744 540 m³



ZIELONA GÓRA
184 693 m³



LEGEND:

DEADWOOD

BROKEN AND FALLEN TREES

VOLUME OF DEADWOOD, BROKEN AND FALLEN TREES harvested in sanitation cutting in 2015 in each RDSF

were steelblue jewel beetle *Phaenops cyanea* and engraver beetle *Ips acuminatus* whose gradations were noted mainly in the area of Lublin RDSF.

The amount of spruce timber harvested in sanitation cutting in 2015 was 1813 thousand m³, of which 63% was deadwood. Main secondary pests of spruce stands in 2015 were the European spruce bark beetle and its companion species: small spruce bark beetle *Polygraphus polygraphus* along with six-toothed spruce bark beetle *Pityogenes chalcographus* and northern bark beetle *Ips duplicatus*.

The size of sanitation cutting in broadleaved stands in 2015 was at 912 thousand m³, of which over 75% were fallen and broken trees.



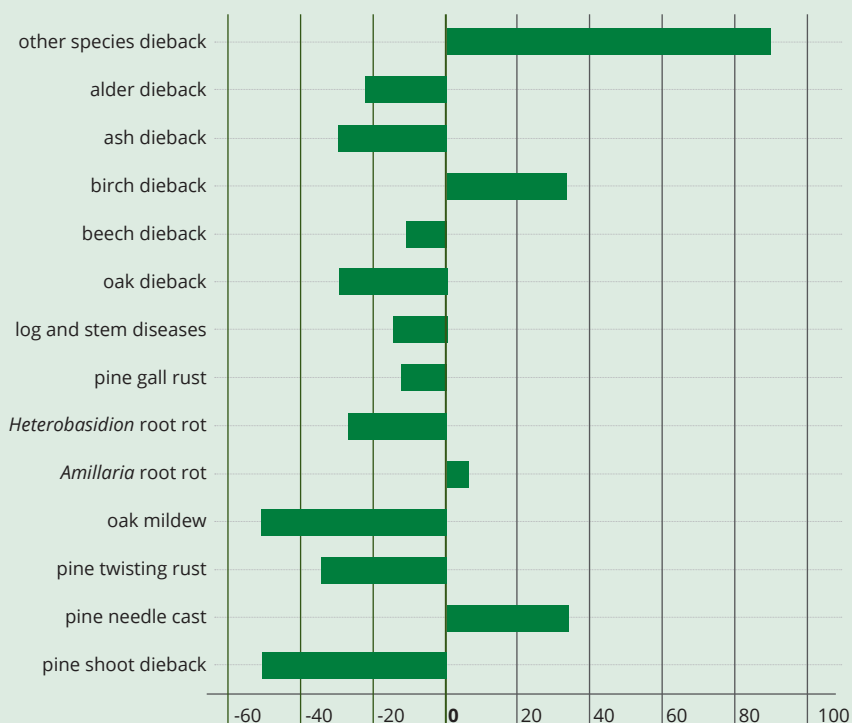
Threats to forests from infectious fungal diseases

In 2015
infectious
diseases affected
172.5
thousand ha
of forests

In 2015, infectious diseases were reported over a combined area of 172.5 thousand ha of stands, a decrease of 35.8 thousand ha (by 17%) as compared with 2014. The most significant changes in the area of occurrence (threat decrease by 50%) concern two diseases of assimilatory apparatus, namely pine shoot dieback and powdery mildew of oak. The acreage affected by the occurrence of pine needle cast increased by 36% and leaf and needle rust by 21 ha.

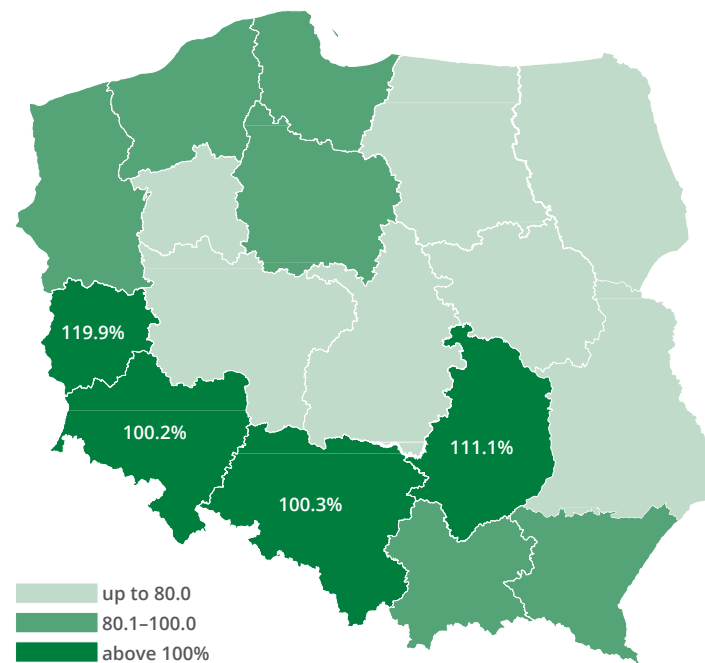
The improvement in health condition of broadleaved stands continued in 2015. Combined area affected by dieback of trees amounted to 7.5 thousand ha (in 2014 it was 10.2 thousand ha). In 2015, the dieback of such species as oak, beech, ash and alder was less intense, however in stands with the participation of birch and other species the dieback increased. In 2015 no health problems of poplar were reported.

Areas affected by root diseases decreased by 26 thousand ha as compared with 2014, while the acreage of damage caused by *Armillaria* root rot increased by 7%, and by *Heterobasidion* root rot decreased by 28%.



CHANGES (in %) IN THE AREA AFFECTED BY INFECTIOUS DISEASES in 2015, in comparison with 2014

Health condition of stands in each RDSF generally showed improvement or no change in comparison with 2014. In any forest district of the State Forests, the size of threatened area did not exceed 10% of the total forest area, which was the result of general improvement in health condition of forests in 2015.



up to 80.0
80.1–100.0
above 100%

CHANGES IN AREAS AFFECTED BY INFECTIOUS DISEASES in 2015, expressed as percentage of the area threatened in previous year

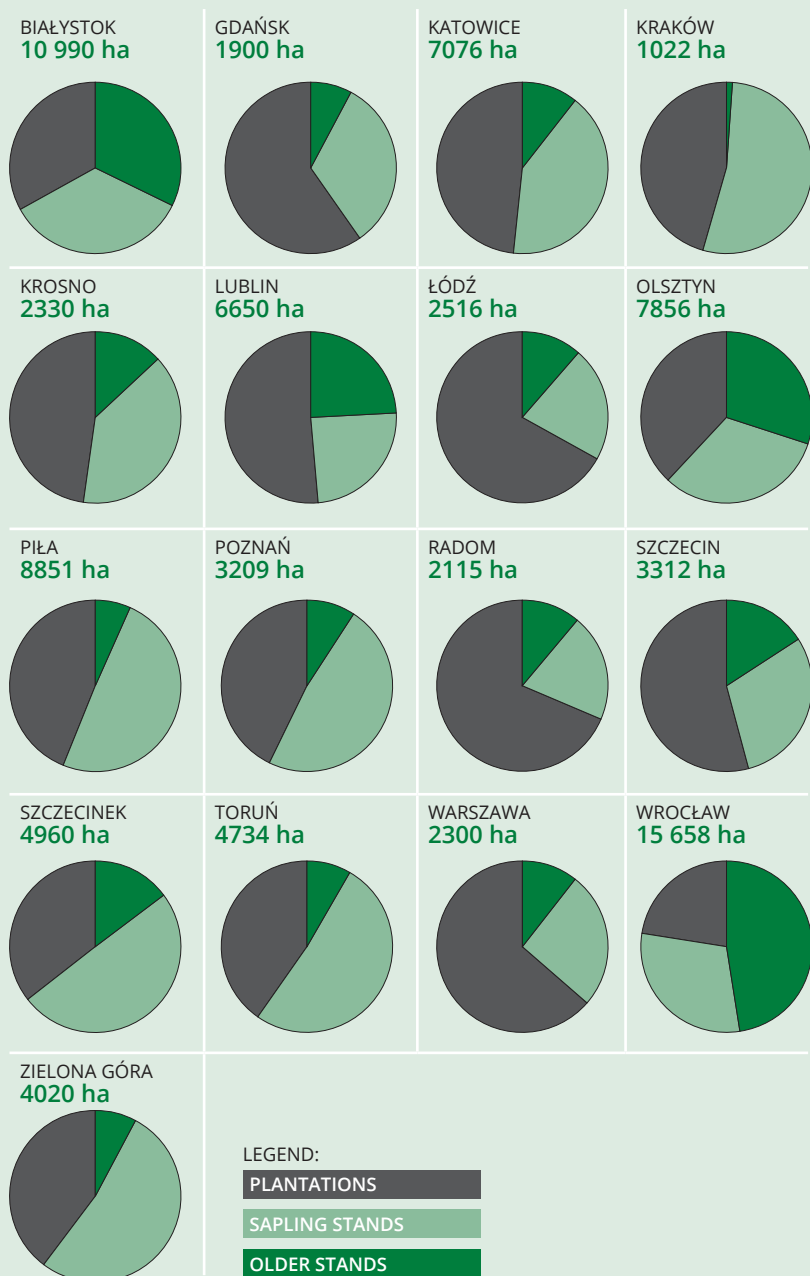
Protective treatment applied in forestry in order to control the spread of infectious fungal diseases is carried out in forest nurseries (mainly chemical methods) and in stands, as and when it is necessary (biological and mechanical methods). In 2015, chemical treatment was used on the combined area of 1.1 thousand ha, protective biological and mechanical treatment on 19.2 thousand ha and 3.2 thousand ha, respectively.





Threats to forests from animals

In 2015, damage to stands caused by game and protected animals was reported in the combined area of 89.5 thousand ha. Additionally, damage within the range 21–40% occurred on 62.8 ha, above 40% then on 26.7 thousand ha.



AREA OF STANDS in each RDSF where damage exceeding 20% was caused by game and protected animal species, in 2015

Damage caused solely by game, including red deer, fallow deer, roe deer, wild boar and hare was reported in 68.3 thousand ha, of which 33.0 thousand ha are plantations, 25.9 thousand ha are sapling stands, and 9.5 thousand ha are stands in older age classes.

Besides damage from game, animal species under various forms of protection were also reported as being harmful to forests, above all elks, beavers and European bison. The greatest damage to forest renewals caused by elks was reported in the area of: Białystok (3.7 thousand ha), Lublin (1.2 thousand ha) and Olsztyn (1.1 thousand ha) RDSFs. The damage caused by beavers was noted in a combined area of 13.0 thousand ha. Similarly to damage from elks, beavers are the most harmful in the north-eastern Poland, in the area of Białystok (3.3 thousand ha) and Olsztyn (2.9 thousand ha) RDSFs.

The injuries to renewals caused by European bison were reported in the total area of 376 ha, mainly in Białystok (269 ha) and Krosno (100 ha) RDSFs, but also in Szczecinek, Piła and Katowice RDSFs, however the areas of such damage there did not exceed 3 ha.

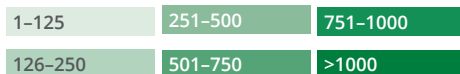
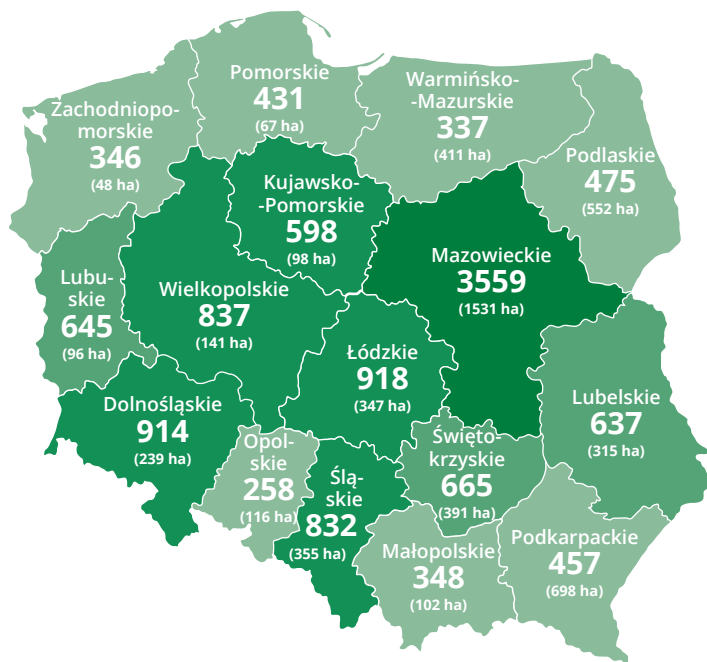
Damage caused by animals was reported on **89.5** thousand ha of forests

Anthropogenic threats

Forest fires

In 2015 in Poland as a whole, 12 257 forest fires were recorded, which is 7012 more than in the previous year; 5510 ha of stands were burnt, which is 2820 ha more than in 2014. The largest number of fires, as in 2014, was in the Mazowieckie province (3559, which is 29% of the total number), the lowest, however – in the Małopolskie (258) province and the Warmińsko-Mazurskie (337) province.





NUMBER OF FOREST FIRES IN POLAND in 2015

In the State Forests in 2015, there were 3732 forest fires (30.45% of all forest fires in Poland) in the area of 878 ha (15.93% of the total), excluding the territories used by the military. The largest number of fires in 2015 took place in Katowice RDSF (531), then followed by Wrocław (465), Zielona Góra (332) and Szczecin (321) RDSFs. Forest fires took the largest area in Katowice RDSF (160 ha), then Warszawa (94 ha) and Wrocław (91 ha). In the State Forests there was one great fire (> 10 ha), resulting in 17.9 ha of burnt forest (Olsztyn RDSF, Forest District Myszyńiec), however in 2014 there were three other fires of quite significant size which covered a total area of 156.9 ha.

In 2015, the average area of a single fire in the forests in all ownership categories amounted to 0.45 ha (by 0.06 ha less than in 2014). In the State Forests, the average area of fire decreased by 0.07 ha as compared to 2014 and was 0.24 ha.

The most frequent causes of fires in the State Forests were arson (40%) and negligence (16%), however the share of fires from an unknown cause amounted to 37% of all fires.

The most combustible month in 2015 was August (33.7% of fires, i.e. 4129), then April (12.9%), June (12.7) and July (12.0%). Most fires (84.4%) happened in the combustible season April–September, however the smallest number took place in May (6.2%) and September (6.9%).

Air pollution

Forest monitoring provides information on major pollutants in the forest areas. The network of intensive monitoring consists of 12 permanent observation plots, located in the following parts of Poland:

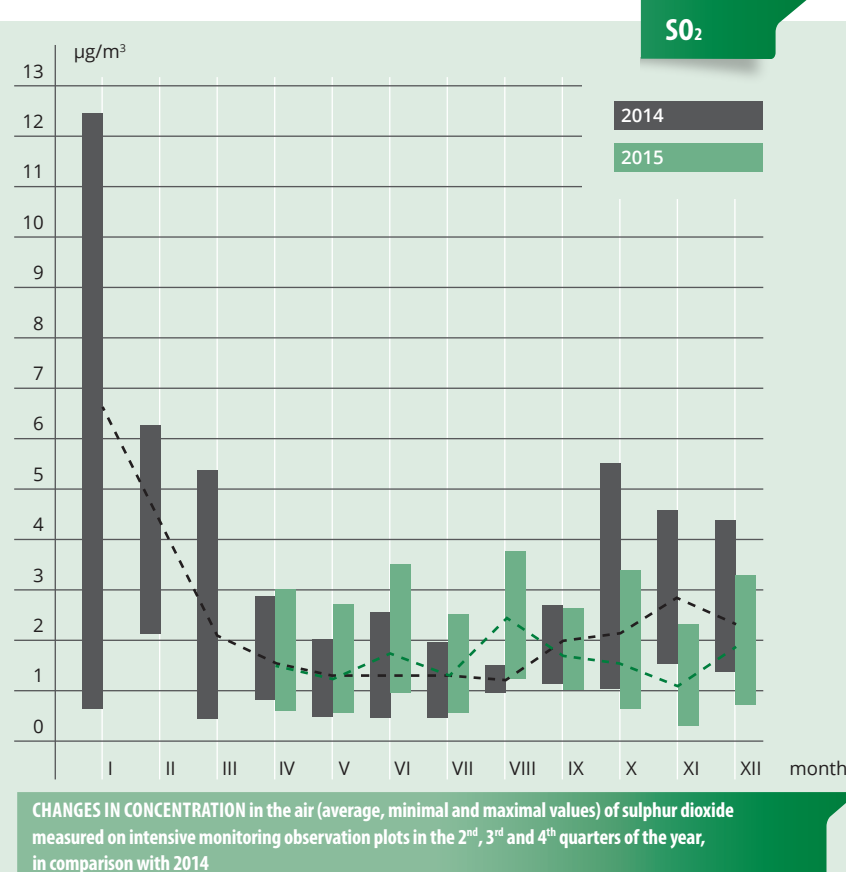
- northern and north-eastern, in: Gdańsk (Gdańsk RDSF), Strzałowo (Olsztyn RDSF), Suwałki (Białystok RDSF) and Białowieża (Białystok RDSF) forest districts;
- central and western, in: Chojnów (Warszawa RDSF), Łąck (Łódź RDSF), Krucz (Piła RDSF) and Krotoszyn (Poznań RDSF) forest districts;
- southern: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

Five plots were located in pine stands, two in oak stands and two in beech stands. Other three observation plots are located in spruce stands.

Average monthly concentration in the air of sulphur dioxide and nitrogen dioxide measured on observation plots, was within $0.3\text{--}3.9\text{ }\mu\text{g SO}_2/\text{m}^3$ (the average $0.9\text{--}2.7\text{ }\mu\text{g SO}_2/\text{m}^3$ during the IP) and $2.3\text{--}20.6\text{ }\mu\text{g NO}_2/\text{m}^3$ (mean values during the IP were $4.2\text{--}14.8\text{ }\mu\text{g NO}_2/\text{m}^3$).



The forest monitoring network comprises
12
permanent plots





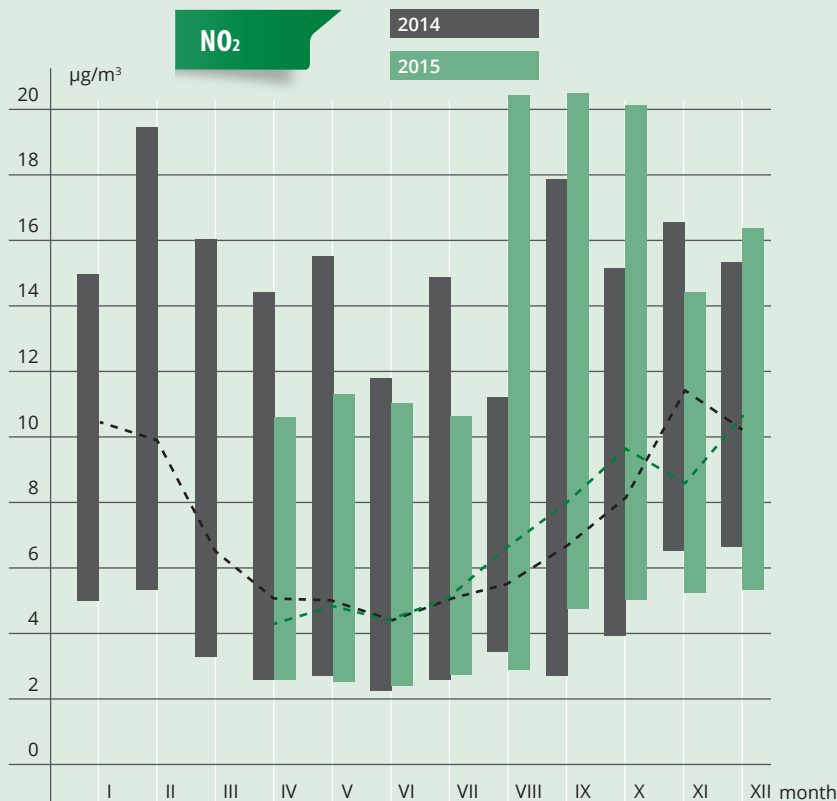
THREATS TO FOREST SUSTAINABILITY

Apart from insect pests, pathogenic fungi and animals, Polish forests are more and more frequently disturbed by various sorts of abiotic factors which seldom may become large-scale natural disasters threatening forests sustainability. Foresters' efforts to reinforce the sustainability of forests, mainly by rebuilding stands to match them with the habitat conditions do not always prevent damage, especially when faced with unpredictable weather anomalies.



The main responsibility for rebuilding forests and maintaining them in good health condition and proper structure falls on the State Forests. In 2015, rebuilding of forest stands was carried out in an area of 6.6 thousand ha, cleanings on 130.8 thousand ha, and thinning on 306.4 thousand ha. Moreover, the stability of stands was reinforced by planting understoreys (0.5 thousand ha) and a second storey (4.1 thousand ha), by local afforestation of gaps (1.0 thousand ha), and by agricultural aviation and water drainage treatment (65.5 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 occurring in the region. It was necessary, therefore, 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.



CHANGES IN CONCENTRATION in the air (average, minimal and maximal values) of nitrogen dioxide, measured on intensive monitoring observation plots in the 2nd, 3rd and 4th quarters of the year, in comparison with 2014

In forests nearly
33%
of precipitation
is acidic

Lower average concentration of sulphur dioxide (below 1.2 $\mu\text{g}/\text{m}^3$ during the IP) than in the remnant regions of the country was recorded in the north-eastern Poland. The highest concentration (2.7 $\mu\text{g SO}_2/\text{m}^3$ during the IP) was noted in Upper Silesia.

Average concentration of nitrogen dioxide, as in previous years, was the highest in the central area of Poland (14.8 and 11.1 $\mu\text{g NO}_2/\text{m}^3$ during the IP), in Upper Silesia and Krotoszyn Forest Districts (9.4 and 8.5 $\mu\text{g NO}_2/\text{m}^3$ during the IP, respectively). In the woodlands of north-eastern Poland and mountain and foothills regions the average concentration of NO_2 was definitely lower (4.2–4.9 $\mu\text{g NO}_2/\text{m}^3$ in the IP).

Pollution is cleared from the atmosphere by means of precipitation and deposition such as rain, snow, drizzle, fog, etc. Acidic precipitation is defined as having pH value below 5.6. During the investigation period (IP) in 2015, about one third of precipitation on intensive monitoring permanent observation plots was precipitation with pH value below 5.5.

Acidic precipitation was almost two-fold frequent in the winter than in the summer. Raised precipitation acidity with mean pH values 5.1–5.6, was noted in southern Poland. In central and western Poland the precipitation acidity was 5.2–6.1, and in northern and north-eastern regions of the country it was 5.4–6.2.

Rebuilding
was carried
out on
6.6
thousand ha
of stands

The Forest Gene Bank Kostrzyca has a stock of 5809 genetic resources relating to 90 forest plant species, both whole populations and individual plants. Of these, 28 species are forest-forming trees and shrubs as Scots pine, Norway spruce, European larch, Douglas fir, black pine, black alder, common (European) beech, Weymouth pine, and ash. The remaining 62 species are of rare and protected plants which are enlisted in the *Polish Red Data Book of Plants*. Resources of the Forest Gene Bank constitute seed batches which have been harvested from the selected seed stands, conservation stands, other stands, as well as parent trees, legacy trees or conservation trees and other individual trees or parts of plants designated for long-term storage in liquid nitrogen.

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 vegetation which grows wildly in the western part of Poland.



THE 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 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 species are selected for scrutiny.

Within the framework of forest monitoring programme, on Level I Permanent Observation Plots the level of defoliation of tree crowns is assessed every year. In 2015, the assessment of the condition of crowns was made on 40 360 trees aged over 20 years which were located on 2018 Level I Permanent Observation Plots. The average defoliation of all species amounted to 21.5%, all coniferous – 21.6%, and all broadleaved – 21.4%. The share of healthy trees (up to 10% defoliation) of all species was 11.9%, and of damaged trees (over 25% defoliation) it was 16.7%. Broadleaved species had larger share of healthy trees (16.2%) and larger proportion of damaged trees (18.4%) than coniferous species (9.6% and 15.8% respectively).

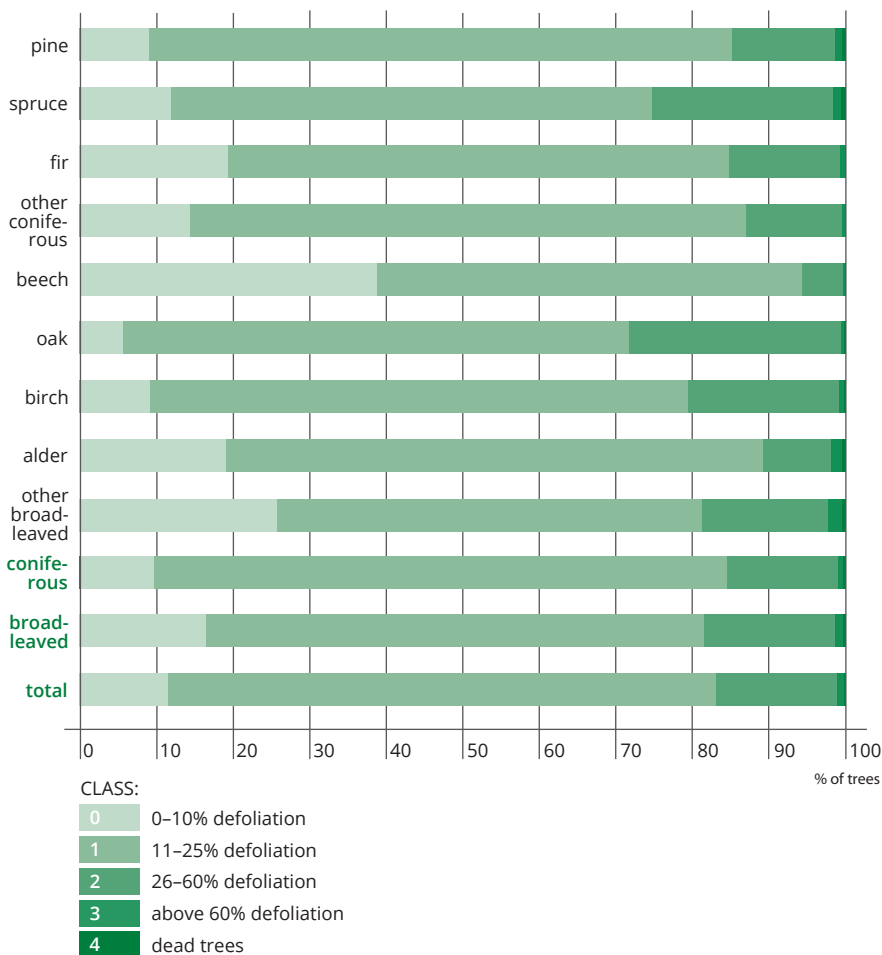
Among coniferous, the healthiest was fir which was marked by the highest proportion of healthy trees (19.5%), low share of damaged trees (15.3%) and the lowest average defoliation (20.0%). The most damaged was spruce which had the lowest share of healthy trees (12.2%), the highest proportion of damaged trees (25.1%) and the highest average defoliation (23.0%).



In Polish forests
11.9%
of trees
are healthy



PROMOTING SUSTAINABLE FORESTRY



SHARE OF MONITORED TREE SPECIES on Level I Permanent Observation Plots by defoliation classes in 2015 (Forest Monitoring)

In Polish forests
beech
is the healthiest tree

Beech occurred to be the healthiest among broad-leaved species, which was evident in the highest proportion of healthy trees (38.3%), the lowest share of damaged trees (5.2%) and the lowest average defoliation (15.7%) in this group of species. The most damaged was oak with the lowest share of healthy trees (5.2%), the highest proportion of damaged trees (28.1%) and the highest average defoliation (24.5%).



In 2015, the State Forests continued with the social campaign "The State Forests. Welcome", directed at informing the target groups that all forests under the State Forests administration are in good hands and effectively fulfil the social, ecological and economical needs of society. The campaign comprised three basic objectives concerning the social awareness of the benefits coming from forests, the significance of sustainable forestry implemented by the State Forests and the positive attitude to forests. A great deal of promotional materials was prepared in order to meet the objectives of this campaign.

"The State Forests. Welcome"
the motto of the SF social campaign in 2015

An important carrier of information and education was an interactive exhibition on the International Day of Forests "FOREST. Poland", which was inaugurated on 20 March, 2015 at the UN headquarters in Geneva. The exhibition was later presented at several other venues, such as the POLEKO Fair and the DREMA Fair in Poznań, as well as at the Centre for Forest Culture in Gołuchów.

Most of the promotional activities were coordinated, on behalf of the State Forests, by the State Forests Information Centre. In 2015, in cooperation with various units of the SF, and other organizations and institutions, there were organized several conferences, workshops, competitions, educational and sports events at national and regional levels, which included among others:

- National Forest Festival under the patronage of the President of Poland, which took place in the Forest District Kaliska (RDSF Gdańsk);
- "Earth Day" – a festivity organized in cooperation with the Foundation for Environmental Education Centre and RDSF in Warsaw, celebrated under the slogan „Let's change sources with energy”;
- "Day of the Polish Forget-me-not" – a national educational festival organised at the Forest Educational Centre in Jedlnia-Letnisko;
- 16th Fair of Timber Industry and Forest Resources Management "LAS EXPO 2015" in Kielce. The exhibition, which was prepared by the State Forests Information Centre and the Kielce Forest District, promoted the sustainable forest management within the framework of the campaign "The State Forests. Welcome";
- "The Great Mushroom Picking" – educational and promotional event in Długosiodło, which was preceded by the information broadcast by the Polish Radio One.

- “Get to know the mushrooms – avoid poisoning” – exhibition devoted to mushrooms and the accompanying photo competition “Forest Inspirations”, organized jointly with the Regional Sanitary and Epidemiological Station in Warsaw;
- “Freedom is in the nature 2015” – the second edition of an event prepared in cooperation with the Ministry of the Environment. Seventeen cycling routes were created within the State Forests;
- “I run because I like FORESTS” – a series of jogging events organized in cooperation with the “I run because I like” Club and the Chojnów Forest District.

One of the most effective ways of promotion and communication are the media, therefore the State Forests used radio and television broadcasts as well as press articles published in print and on the Internet.

The primary source of information about the State Forests and Polish forests in general is the internet. The website provides details about the structure of the organisation, its history, forest management and market and social activities. In 2015, the homepage of the State Forests was visited by 1.34 million unique users. Nearly 4.5 million visits and almost 8.2 million page views were recorded.

The website devoted to the 90th anniversary of the State Forests, which was launched in the previous year, received in May 2015 a golden award in the competition *Columns of the Year*, in a “Digital, an event page” category.

The social portal Facebook is now the most popular tool for communication. The State Forests profile has nearly 260 thousand regular users, at 135 fanpages. The promotion of forests and forestry is also carried out on YouTube. In 2015, the official channel of the State Forests included dozens of film productions on forests, wildlife and forestry. The internet TV channel “Polimaty” produced two films devoted to forests and forest management, which were commissioned by the State Forests. The main section was watched by nearly 190 thousand viewers in the first month.

On the other hand, the educational portal “Las rysia eRysia” recorded 290 thousand visits and 174 thousand unique users. Very popular are also thematic blogs: “Forester’s blog” and “Forest Educator’s Blog”.

An online guide czaswlas.pl is a useful database of tourist facilities provided by the State Forests. In 2015, it was visited by 183 thousand unique users, nearly 223 thousand visits were recorded as well as almost 823 thousand page views.

The State Forests publish and distribute periodicals on forests and forestry, which target various readers:

- “Głos Lasu” – an internal monthly magazine of the State Forests;
- “Echa Leśne” – a quarterly magazine aimed at people who are interested in Polish forests, mainly tourists and forest enthusiasts, teachers, pupils, students and also commercial partners;
- “Biuletyn Informacyjny Lasów Państwowych” – an official publication of the Director-General of the State Forests. In the bulletin are published legal acts (legal ordinances, decisions etc.) related to the forest management in Poland.

In 2015, the State Forests Information Centre carried out a publishing plan which was in line with the promotional and educational needs of the State Forests. In total, 31 titles were published, and 18 publications were prepared for printing in 2016. These were promotional and specialist publications with circulation ranging from several hundred copies to as much as 22 thousand (leaflets).



About
4.5
million
visits to the State
Forests website

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.

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, ecological diversity and genetic diversity.

Broken and fallen trees – trees damaged by being broken or thrown down by wind 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 and structure of restocking; regulating the density of stands and improving the quality of saplings.

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

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.

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.

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.

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.

Imagines – adult insects, the final stage in the process of development of these insects which undergo metamorphosis.

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 loss during working harvest operations.

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.

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.

D

E

F

G

I

M

P

R

S

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 clumps 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).

T

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.

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

V

Volume (thickness) of wood – the amount of wood, measured in cubic metres (m³).

Abbreviations

BP – type of stand (selection structure)

DGSF – Directorate-General of the State Forests

IP – investigation period

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

RDSF – Regional Directorate of the State Forests

SoEF 2015 – *State of Europe's Forests 2015*

SF – the State Forests

PROMOTIONAL FOREST COMPLEXES



The total area of PFCs – 1 273 693 ha

BIALOWIEŻA FOREST

Area – 52 637 ha
Forest Districts: Białowieża, Browsk, Hajnówka

TUCHOLSKIE FORESTS

Area – 84 140 ha
Forest Districts: Tuchola, Osie, Dąbrowa, Woziwoda, Trzebciny

GOSTYNIŃSKO-WŁOCŁAWSKIE FORESTS

Area – 53 093 ha
Forest Districts: Gostynin, Łąck, Włocławek

KOZIENICKA FOREST

Area – 30 435 ha
Forest Districts: Kozienice, Zwolen, Radom

ŚWIĘTOKRZYSKA FOREST

Area – 76 885 ha
Forest Districts: Kielce, Łagów, Suchedniów, Zagnańsk, Skarżysko, Daleszyce

JANOWSKIE FORESTS

Area – 31 620 ha
Forest District: Janów Lubelski

LUBUSKIE FORESTS

Area – 32 135 ha
Forest District: Lubsko

BESKID ŚLĄSKI FORESTS

Area – 39 883 ha
Forest Districts: Bielsko, Ustroń, Wiśla, Węgierska Góra

OLIWSKO-DARŻLUBSKIE FORESTS

Area – 40 907 ha
Forest Districts: Gdańsk, Wejherowo

RYCHTAŁSKIE FORESTS

Area – 47 992 ha
Forest Districts: Antonin, Syców, Forest Experimental Station in Siemianice (University of Life Sciences in Poznań)

BIRCZAŃSKIE FORESTS

Area – 29 578 ha
Forest District: Bircza

MAZURSKIE FORESTS

Area – 118 216 ha
Forest Districts: Strzałowo, Spychowo, Mrągowo, Pisz, Maskulińskie, Research Station for Ecological Agriculture and Preservation of Native Breeds of the Polish Academy of Sciences in Popielno

SPALSKO-ROGOWSKIE FORESTS

Area – 34 950 ha
Forest Districts: Brzeziny, Spała, Forest Experimental Station in Rogów (University of Life Sciences in Warsaw)

BESKID SĄDECKI FORESTS

Area – 32 051 ha
Forest Districts: Piwniczna, Nawojowa Forest Experimental Station in Krynica (University of Agriculture in Cracow)

SUDETY ZACHODNIE

Area – 22 866 ha
Forest Districts: Szklarska Poręba, Świeradów

NOTECKA FOREST

Area – 137 229 ha
Forest Districts: Potrzebowice, Wronki, Krucz, Sieraków, Skwierzyna, Oborniki, Karwin, Międzychód

SZCZECIŃSKIE FORESTS

Area – 61 070 ha
Forest Districts: Kliniska, Gryfino, Trzebież, Szczecin Urban Forests, Educational Centre “Świdwie”

WARSZAWSKIE FORESTS

Area – 52 099 ha
Forest Districts: Drewnica, Jabłonna, Celestynów, Chojnów, Warsaw Urban Forests

DOLINA BARYCZY FORESTS

Area – 42 379 ha
Forest Districts: Milicz, Żmigród

ŚRODKOWOPOMORSKIE FORESTS

Area – 56 614 ha
Forest Districts: Warcino, Polanów, Karnieszewice, Koszalin Urban Forests

KNYSZYŃSKA FOREST

Area – 62 319 ha
Forest Districts: Supraśl, Dojlidy, Krynki, Czarna Białostocka

NIEPOŁOMICKA FOREST

Area – 10 926 ha
Forest District: Niepołomice

BIESZCZADZKIE FORESTS

Area – 69 532 ha
Forest Districts: Stuposiany, Lutowiska, Cisna, Baligród

ELBLĄSKO-ŻUŁAWSKIE FORESTS

Area – 18 827 ha
Forest District: Elbląg

OLSZTYŃSKIE FORESTS

Area – 35 310 ha
Forest Districts: Olsztyn, Kudypy, Forests of Olsztyn Municipality



Promotional forest complexes (PFC) are functional entities established to provide educational activities and to develop the principles of forest management which integrate goals such as nature protection, enhancing environmental functions of forests, sustainable use of forest resources and their participatory management. They were established within the State Forests as part of the national policy on forests and the provisions of the Forest Act. Promotional forest complexes also function as vital scientific centres where knowledge of fully recognised forest environment is used to facilitate interdisciplinary research. This, in turn, informs the improvement of forest management methods and defines the boundaries of economic interference in the forest ecosystems. PFCs provide an alternative to the overcrowded national parks where tourist traffic is regulated by strict rules. They give an opportunity for direct contact with nature (also for the disabled), without many restrictions on access what is very important in education, especially of children and young people.

The State Forests policy on promoting sustainable forest management allowed to create 25 promotional forest complexes in all 17 regional directorates. Their total area is almost 1274 thousand ha.



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