

# Poland's green treasurehouse

Krzysztof Fronczak



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# Foreword



Photo W.S.

*In the past, forests were present over just about all of Poland. In consequence they became a public good whose existence was so obvious to all that it went undervalued. Inevitably, then, tree cover began to decline, making way for agriculture, urbanisation and finally industrialisation. By the 18<sup>th</sup> century, Poland's forest cover had quietly fallen "as low as" 40%. Yet today we take comfort in the fact that it is back over 28%, having already passed its absolute low point. For today – better late than never – our society prizes the functions forests are capable of serving and makes every effort to ensure that the area of Poland under trees continues to increase.*

*But is any statistic really able to convey the civilisational importance of forest? Surely the answer is no. In the past, the forest fed and clothed us, supplied building materials and fuel – it was long the very foundation upon which the economy stood or fell. If forest no longer plays the latter role, are we to take it that its influence over our lives has diminished?*

*Learning from the mistakes of those that have gone before us, we have become wise to the consequences for the natural environment that centuries of deforestation and other kinds of human interference have brought. Successive generations of foresters have added to this knowledge with the experience gained in their daily work. And the Polish contribution here is by no means small – the country's forestry and forest sciences have long won a good reputation for themselves around the world, many times supplying model examples worth following elsewhere. Yet there must be a question mark over whether the undoubted successes of the last 80 years would have been achieved had there not been a permanent, effective, nationwide organizational structure underpinning them, in the shape of the State Forests National Forest Holding.*

*It is often stressed that the SF has a specific organisational, legal and financial system. Quite so, for we differ from the many other organisations managing Europe's forests. The state ownership prevailing in Poland departs markedly from the kind of structure in place in EU countries. At times, people have tried to turn this fact into an accusation – as quite recently, when irresponsible ideas regarding the reprivatisation of Poland's green asset came to the fore. So let us not forget that Polish for-*



*estry owes its present position to precisely the structure that we are referring to. It is the very fact that an integrated organisation operating on a self-financing basis existed that made it possible to lead that organisation in the direction of multifunctional, sustainable forest management in which the protection of the natural environment is put on an equal footing with the economic tasks reflecting the needs of the market. Polish foresters have shown time and again that they are able to perceive and respect the beauty of nature in their country, such that in no way would they allow forestry to degrade or curtail the unique resources that nature represents. No surprise then that the extent to which multifunctional forestry has been put in place in Poland leaves our country standing out against the background of the continent as a whole – and it is not we ourselves that our saying this, but those looking in from outside.*

*The principle of self-finance goes together with the requirement that income and expenditure balance to leave the State Forests firmly among the ranks of business entities operating on the market. But in no way can or does this mean that the State Forests exist to maximise profits. This kind of understanding of the task in hand in fact arose in the two decades between the wars (I refer the reader to a story that can be read in the pages of this book), and in this way the stage was set for forestry of a recognizably modern profile in those now far-off days of the Second Republic. The validity of the theory advanced then is merely confirmed in the present macroeconomic conditions, following Poland's departure along the road to systemic transformation from the early 1990s on.*

*We in Poland have modern forest legislation – including the Forests Act – that is very much geared to the future, not the past. We are implementing the National Policy on Forests approved by the government, and a National Forest Programme is now well on the way to being devised. In pursuing a policy of establishing and managing Promotional Forest Complexes, we are doing something unique on the world scale, setting standards for others to follow. In connection with this we are at the forefront with educating society as a whole about forests, and Poland's young generation in particular. What is also important, we are ready, willing and able to match ourselves against the most severe problems that ever-unpredictable nature can throw at us – destructive gales, fires or floods. Another kind of challenge is posed by integration into the EU – for we are to compete on a community-wide market for timber. Yet I am convinced that – as an organisation with such an impressive output generated through its 80-year tradition – the State Forests will live up to its position and potential, and so find its rightful place in these new conditions too.*

*With best wishes  
Director-General  
of the State Forests*

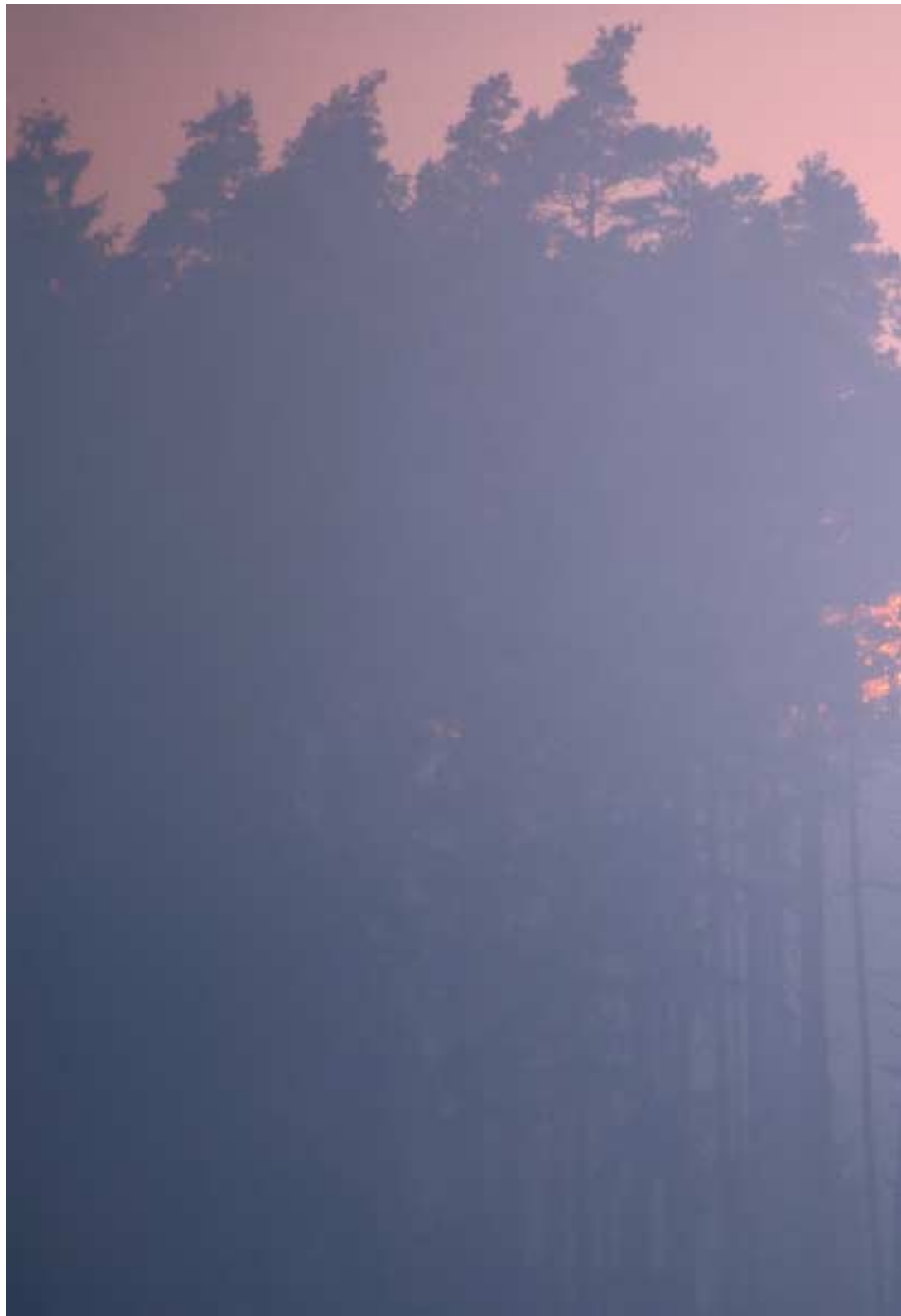
*Warsaw, September 2003.*

Photo G.T.K.



*The legal foundations of the State Forests are to be found – in the context of a Poland reborn after a previous longlasting disappearance from the map at the hands of the Partitioners – in the Regulation of the President of the Republic of Poland of December 30<sup>th</sup> 1924. This called into being a “Polish State Forests Enterprise”, though – if the truth be known – this was neither the beginning nor the end of the process by which the mature administrative structures of the State Forests were created in the Second Republic.*

*Photo G.T.K.*





# The beginnings of the State Forests

The legal foundations of the State Forests are to be found – in the context of a Poland reborn after a previous longlasting disappearance from the map at the hands of the Partitioners – in the Regulation of the President of the Republic of Poland of December 30<sup>th</sup> 1924. This called into being a “Polish State Forests Enterprise”, though – if the truth be known – this was neither the beginning nor the end of the process by which the mature administrative structures of the State Forests were created in the Second Republic.

On February 3<sup>rd</sup> 1917, while the First World War was still being fought, the Division of Forestry of the Central Agricultural Society addressed a memo to the Temporary Council of State of the Kingdom of Poland, which included a plan to organize the State Forests within the Congress Kingdom as then occupied by the Germans.

Nine months before the historic date November 11<sup>th</sup> 1918 (of significance to Poland in that it is from that moment that we measure the existence of the reborn

Republic), “*Mr Józef Miłobędzki was the first forester to be appointed to the state forest service, on March 1<sup>st</sup> 1918, in the post of head of the Forest Department of the newly-established Ministry of Agriculture and the Crown Estates*”. Such a statement is to be read on the now-yellowing pages of the November 1928 issue of the monthly *Echa Leśne* (“Forest Echoes”).

On October 16<sup>th</sup> 1918, the Forest Department was transformed into the Forestry Section, as directed by Jan Miklaszewski. Not quite a

The conference of SF Directors at the Luksemburg Gallery in the Ministry of Agriculture building on November 19<sup>th</sup> 1930





month later – on that very day of November 11<sup>th</sup> 1918 – foresters led by Józef Milobedzki and escorted by the military took out of German hands the seat of the Central Board of Forests, in the form of the so-called Luksemburg Gallery within the Ministry of Agriculture building at 69 Krakowkie Przedmiesocie Street, Warsaw (J. Miklaszewski had in the meantime made it to Lublin, in which the Government of Ignacy Daszynski came into being).

In those first few years, a young forest administration that was still in fact being organised made every effort to cope with the vast array of problems facing it. On August 15<sup>th</sup> 1919, the Union of Polish Foresters (*Związek Leśników Polskich*) came into being. This was an organisation that put in good service as regards the work to rebuild forests in the wake of World War I, only later to become active in their defence against rampant over-exploitation.

The destruction of stands brought about by wartime depravations and a management system bent only on one-off exploitation to meet the needs of the battle fronts near the country resulted in the harvesting of an estimated 60 million m<sup>3</sup>. Indeed, there were many areas in which the War did not end in 1918, as the defence against invaders from the East continued.

As of 1919, state management extended to only 1.24 million ha of stands. The following year brought a gain of a million hectares of forests within what had been the Prussian-partitioned part of Poland, as well as the Eastern Lands. In turn, 1922 saw the forest complexes of Central Lithuania and Upper Silesia come under state management, along with several areas of private land like the Nalibocka and Wiszniewska Forests, the Krotoszyńskie and Włoszakowickie Forests in the Wielkopolska region and other smaller properties. Thus, by the time of the tenth anniversary of Poland's regaining independence, the area of state-owned forests had increased to 2.9 million ha, or close to 8% of the area of the country.

The not-fully-clear future status of Poland's forests as regards ownership ensured that many private owners pursued a chaotic form of management dictated by *ad hoc* profit. Destructive speculation with resources was further inflamed by the 1920 Resolution of Parliament on the Expropriation of Forests, which induced nothing more or less than panic amongst private owners. Forests were sold off for clear-felling willy-nilly, cut under various pretexts, anything as long as timber could be turned into money as quickly as possible. Yet another pretext was the Forest Tribute Act passed on July 1923, which obliged private as well as state forests to offer a supply of wood for the reconstruction of the country. In practice, 30% of the usable timber from annual prescribed cuts was to be handed over for a period of 10 years (or 5 years in the case of forests subject to easements).

The tribute requirement took in some 4 million ha of private forests. The results were forests parceled off abruptly, land leased out, cutting done officially and “on the side”. Fat was only poured on the fire when a motion from the Peasants' Party announced the nationalisation of forests.

The excessive felling and consequent rampant growth in the timber supply led ultimately to the complete collapse of the market for timber in Poland. Prices crashed, hitting rock bottom in May 1926, at only half the pre-War level.

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The headquarters of the State Forests Directorate in Białowieża, 1934

It was in such economic conditions that the state forest administration came to manage a priceless national asset. The scale of the difficulties involved was not marked out solely by a market deprived of the normal rational brakes. For the management of the state's forests also met with many other barriers that it was not always possible to cope with. Not the least of the problems was the fact that the pursuit of forestry management had been shaped by methods the three partitioning powers had bequeathed (methods devised primarily for their own selfish benefit, rather than any greater good). There were thus three parts of the newly-founded Poland in which different, non-complimentary management principles were in force.

Legal regulations failed to keep pace with needs. Bearing this in mind, the Polish State Forests Enterprise was called into being in

1924. The promise here was of a more autonomous state administration over forests that might base its activity around principles binding in civil law. However, as Adam Loret – the subsequent Director of the State Forests – wrote in the 1931 book “Five Years on the Economic Frontline 1926–31” (*Pięć lat na froncie gospodarczym 1926–31*): *“The organisation was not brought into effect in subsequent years and the state-owned forests continued to be administered in manifold ways (...). Thus, in direct linkage with the lack of uniform organisation in the administration was a total lack of organisation to production. Matters of the management of the forest holding, investment, exploitation, demand, production and pricing policy were conceived of differently in what had been the different partitioned parts of the state”.*

In Loret's opinion it was only with the October 1<sup>st</sup> 1926 creation of the post of Extraordinary Delegate for Administration of the State Forests at the Ministry of Agriculture that the major changes so much needed were finally brought in.

In turn, seeing the light of day on March 22<sup>nd</sup> 1928 was the Act on the Management of the State Forests – as a further stage to the settlement of the aforementioned tricky questions. The Act set out principles under which the state's forest holding was to operate, as well as the situations in which forest cultivation was to give way to some other type of land use. Moreover, there was a regulating of the

competences of the different departments when it came to the administration of certain categories of state-owned forest. The result was to put a stop to the further depletion of forest land. Enacted at the same time were the legal principles by which forestry was to work together with other spheres of the national economy.

However, neither the 1924 Regulation nor the 1928 Act were crowned by an organisational process, since each focused on the activity of forest directorates at regional level, and on forest districts. It was via their mediation that the Minister of Agriculture managed this asset, in such a way that the question of management at the central level continued to remain open. A resolution of this matter had to wait for the Regulation of the President of the Republic of Poland dated December 3<sup>rd</sup> 1930, which provided for the establishment of a Central Directorate of the State Forests.

The following of the legal and systemic aspects to the creation of the State Forests in the times of the Second Republic may seem to be of limited fascination from today's perspective. However, it should not be forgotten that it was thanks to them that the organisation's efficient structures came to be discernible from out of the chaos of the historic changes. The law not only brought modern structures into being, it also shaped the market.

Director Lorent ascribed a considerable causative role to the institution of the Extraordinary Delegate for the Administration of State Forests. It was under the influence of this figure that the Ministry of Agriculture departed from the previously widespread system of concessioning for the felling of state forests (as late as in 1926, long-term concessions accounted for more than 2 million m<sup>3</sup> of timber). What is important is that, in withdrawing from this system, the Ministry of Agriculture at the same time adopted a principle that the exploitation of forest by timber buyers was unthinkable, not only on account of the limitations on profitability of the forest holding, but also the losses incurred by nature in the stand. For this reason, the production of raw timber for trade and industry was to be managed by the State Forests – the effects of the policy pursued previously had made themselves only too clear.

For example, in the years 1923–25, some 53% more timber by mass than was accounted for by increment was cut in the country's forests. The clear “leaders” in threatening the continuity of forest by their cutting were the owners of private stands, whose prescribed cuts were being exceeded more than 2 fold. Cutting was also being done – if for other reasons – in the state-owned forests. The 1925 prescribed cut of 8 million m<sup>3</sup> was exceeded by as much as 4 million m<sup>3</sup>, if primarily because of a mass outbreak of pine noctuids in the then voivodships of Poznań and Pomerania.

As of 1923, the forest cover of Poland in its then borders was 23.1%, with 31% of that being in state hands. Some 1596 more major private owners (with at least 500 ha each) accounted for a further 3,255,400 ha of forest. Beyond them were the countless small-scale owners, taking the total for privately-owned forests to 6,108,400 ha. Fourteen years later, and the cover figure had declined to 22.2% (0.9 percentage points less), while the share in state ownership had risen to 38.7% (by

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6.8 percentage points). This period also brought a marked increase in the number of small-scale owners – from more than 24,000 owning 234,800 ha in 1923, to over 464,500 holding 929,600 ha at the beginning of 1938.

Thus, as overall cover nationally declined in the years 1923–1938, the State Forests increased its ownership markedly, while the area of private forest declined, and there was a dramatic decline in the average area per owner. The professional literature from the pre-War period shows that this state of affairs was above all caused by a major financial burdening of the landed estates by the processes ongoing in agriculture.

The consequence of the agricultural reform introduced on the strength of the 1920 Act (as amended 5 years later) was the parcelling of the large landed estates in order that peasants with small amounts of land or no land at all might obtain some. The owners in general designated the lowest-quality forest land for such purposes, having first cleared that land of its trees. Coming at the same time was the ending of easements (which is to say the right of rural people to make use of manorial forests), which had been invoked in the case of 37% of non-state-owned forests. Among other things, this involved the transfer of forests subject to easements to those entitled to the services in question.

The economic difficulties of landowners were further enhanced by the aforementioned forest tribute ushered in by a 1923 Act of Parliament.

In the face of the low level of profitability of forest land, the small-scale owners were not interested in investing. In the publication “Private Forests in the First Decade of the Newly-Independent Poland” (*Lasy prywatne w pierwszym dwu-*

*dziestoleciu Polski odrodzonej*) (see *Las Polski* no. 11 of 1938), the outstanding authority on forestry J. Kloska states that “most of the minor owners merely tolerate forest, taking every opportunity to dispense with it, even if stand clearance is quickly followed by a conversion into wasteland”.

The divergence between the level of management engaged in in private and state-owned forests progressed on account of shortfalls in numbers of professional personnel. Inter-War Poland had only two institutions involved in

The Foresters’ School in Zagórze,  
1930



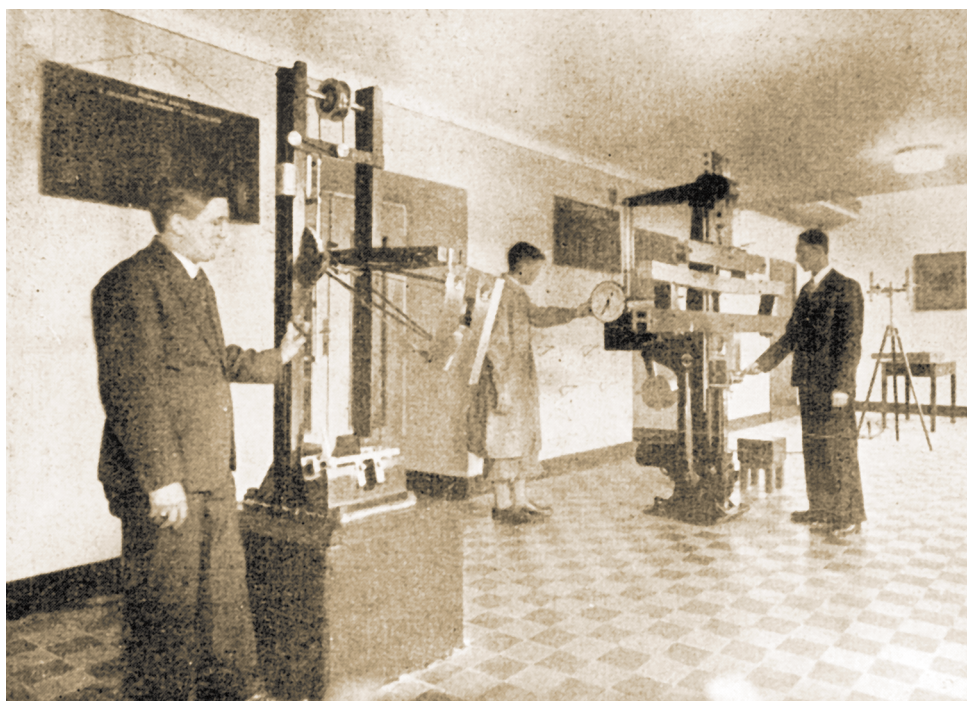


the training of foresters at secondary-school level. The School of Agriculture and Forestry in Białokrynica was part of the renowned Krzemieniecki High School, while a second, the State Agriculture and Forestry Secondary School established in 1924 at Żyrowice near Słonim (in what was then the voivodship of Nowogród), had only produced 295 school-leavers by 1939. Staff were also supplied by the State Secondary School of Surveying and the Forest Industry in Łomża. What was called “lower-level forestry schooling” entailed courses for foresters run near the main forest complexes – in Margonin, Bolechów, Zagórz, Białowieża and Cieszyn.

The Administration of the State Forests of the Second Polish Republic attached great importance to the level of education in the forest services, putting not-insignificant sums into the development of the forest sciences. The landowners did not always perceive such a need, employing small numbers of poorly-trained staff. The aforementioned J. Kloska was one to notice this, as was another great forester of the day, Jagiellonian University Professor Stanisław Sokołowski – in his 1928 volume *Dziesięciolecie Polski odrodzonej* (“The Tenth Anniversary of the Reborn Poland”).

The training in forestry that the period could offer owed much to the State Forests, which did not confine itself to supporting the institutions involved in professional training. In 1930 it brought into being the Experimental Department of the State Forests (the later Forest Research Institute), as an institution playing a major and renowned role in the development of the forest sciences. The SF organised courses and internships for applied training. The growing ranks of educated foresters – from among which a large number of outstanding specialists emerged – is also its service. By the mid 1930s, the State Forests no longer had staffing problems, being thus able to serve as a model for the private forests.

A notable reflection of the processes ongoing in pre-War forest management came in the divergence between the private and public indexes for the share of usable wood in harvested raw timber. A 1938 figure of 68% for the state-owned



The “Physical and Structural Properties of Timber” Laboratory of the State Forests Research Institute, 1935

Adam Loret – Director of the State Forests in the years 1931–1939



forests compared with 56% for the large or medium-sized privately owned stands, and just 25% for the small-scale owners.

Forests were the first to pay the price for the various tax and tribute burdens the landed estates were faced with. The services were offered in exchange for agricultural reform and the buying-off of easements. These burdens were in particular felt by the owners of estates of medium size, though even the great landowners had serious difficulties. This might for example be illustrated by the economic situation of the *ordynacje* – landed estates, which had at one time or another been purchased on the strength of acts of law from the pre-Partition period and were the indivisible and inalienable property of a single family.

Pre-War Poland had 57 great estates, of which the most substantial were in the east. The greatest forest asset was that coming within the 69,000 ha Nieowiesko-Klecka estate in the old voivodship of Nowogród. The Dawidgródecka estate (former Polesie voivodship) in turn had 52,000 ha of forest, while the famous Zajmoski Estate in the Lublin region had 44,000 ha.

The expert opinion “The indebtedness of owners of forest assets in the pre-War period” (*Zadłużenie właścicieli majątków leśnych w okresie przedwojennym*), which was drawn up at the end of the 1990s by Stanisław Zajac, D.Eng., head of the Department of Forest Economics and Policy of the Forest Research Institute makes it clear that only 18 of the estates did not have tax arrears, while the remaining 39 were indebted prior to the outbreak of World War II to the tune of more than 23 million zł (\$4.34M assuming a 1939 exchange rate of \$1 = 5.3 zł). The annual increase in the level of indebtedness as regards state and local-authority taxes on the aforementioned assets was 2.5–3.0 million zł, while the increase in relation to other obligations was of a further 1 mln zł. Thus the arrears in relation to taxes were more than 8 times greater than the level of tax annually. The Pszczyna estate (Cieszyn Silesia) alone had debts exceeding 14 million zł at the time of its 1930s takeover by the Treasury.

### Adam Loret – the first Director

In referring to the State Forests as it existed in the times of the Second Republic, there is no way not to mention the enormous services rendered for the organisation and pre-War forestry in general by Director Adam Loret.

Loret, who was born on December 26<sup>th</sup> 1884, was a student at the renowned Higher Forest School in Lvov, and subsequently at Tharandt near Dresden in Saxony. He specialized in forest management and worked for ten years on the estate of the Branicki family in Sucha near Żywiec.

An activist in the Professional Foresters Union, Loret tied his career to the state forest administration of the independent Poland. By 1925 he had become Director of the State Forests in Warsaw, and the following year he was appointed the Delegate Extraordinary for the Administration of the State Forests. In October 1931 he took up the post of head of the SF Central Directorate, before finally becoming the organisation's first General Director. He was in this position from February 1934 until the tragic events of World War II began to unfold.





It was very much thanks to A. Loret that the State Forests were integrated and then organized in terms of structure. His efforts bore fruit in 1927, with the issuing of the aforementioned Regulation of the President on the management of state forests. In that same year, Loret published his own programme for the reform of forest management entitled “Main Guidelines for the state forest holding”. He took charge of the inventorying of forest resources, brought an end to the system of concessions for private enterprises exploiting forests and worked on management plans. He was the co-organiser of the timber industry in its modern form, and it was thanks to his efforts that the Polish Timber Agency *Paged* came into existence. This involved itself in the export or passage along the coast of timber, with a base in Gdynia. Loret presided over the industry's further development, with the state sawmills coming into existence serving as examples of modern outfitting with equipment and the attainment of high standards in the processing of wood. Director Loret took the State Forests down the path towards commercial viability, meaning that the main measure of success was not to be purely economic – though profit remained subordinated to the principles of the forester's art, which might never be undermined.

The “Paged” timber quay  
at the port of Gdynia, 1937



An SF-run sawmill in Augustów,  
1938

Economic requirements did not stand in Loret's way when it came to his decision to preserve naturally-valuable forest resources. Who can say whether it is not Loret himself whom we may thank for the continued existence of the Białowieża Primeval Forest? It was after all the State Forests that in 1921 set up a "Reserve" forest sub-district, becoming a full District in 1924. This accounted for most of the then District Directorate of the State Forests in Białowieża. The "National Park in Białowieża" followed in 1932, though it remained under the administration of the State Forests.

Let us also recall that, in 1924, the Polish Government entered into an agreement with the British European

Century Timber Corporation, which granted it a 10-year concession for the cutting (or as it in fact turned out the absolute ransacking) of 7.2 million cubic metres of timber from the Białowieża Forest and stands along the River Neman. In May 1929 – thanks as much to the protests of foresters as anybody else – the administration decided to break off the agreement, even though this meant handing over compensation. Centura – as it was called in Polish – had nevertheless managed in five years to deprive the Forest of some 1.65 million cubic metres of timber; devastating stands in the process, and quite often operating by way of clear-cuts over a hundred hectares. The areas in question (totaling 8000 ha) had frequently been left unrenewed by the British firm, and foresters have continued grappling with the effects of those activities up to the present day.

The last days of the first (and simultaneously the only) Director of the Second Republic's State Forests are not fully known. In September 1939, Adam Loret joined his closest co-workers in evacuating from Warsaw, taking the SF archive along with him. The direction he chose was eastwards, via Siedlce to Pinsk. On September 17<sup>th</sup> 1939 the column of cars in which he was riding was brought to a halt at Naliboki, west of Pinsk, by a Soviet tank unit. It was there that the Director's colleagues saw him for the last time, the supposition being that he was murdered at Kuropaty.





Adam Loret at his desk

It was in the forests of the Naliboki District that a box containing the SF archives was buried. It was never rediscovered, and the likelihood is that the NKVD came across the site soon after.

Adam Loret, who is with good reason regarded as the architect of the State Forests' economic organisation (though there is no shortage of voices claiming that his

jesti „Naliboki” „przyjacieli” nie do tego, by  
ochronie lasow w Polsce przypisać nie-  
tylko ekonomiczne, lecz i kulturalne, ale i  
moralne znaczenie - to  
jego domowe zadanie wychowawcze  
być musi

Loret

Director Adam Loret on Forest Day 1937: “If ‘Forest Day’ leads to a situation in which the protection of forests in Poland is not just something required by the Acts in force, but also a conscious attitude on the part of society, then its main educational task will have been achieved”, 1937

***Adopted by the Council of Ministers on June 23<sup>rd</sup> 1995, the National Programme for the Augmentation of Forest Cover (Krajowy program zwiększania lesistości) assumes that a cover of around 30% will have been achieved by 2020, and as much as 33% by 2050. This means that c. 700,000 ha more will have had to be planted by the first date (including 100,000 by way of natural succession) and a total of 1.5 million ha by 2050. The scale of the undertaking is thus much greater than what was achieved in the period 1945–70.***

professional career owed much to his political connections with the Piłsudski camp) chose as his life's credo words included in the publication *Las Polski* ("Polish Forest") in 1929, to the effect that: "The significance of the forest holding is not confined solely to the economic side of our nation's life. The forest has many other properties indispensable for the country, mentioning just to begin with its influence on climate, humidity and soil protection, health, etc. Only the state as owner is in a position – through the rational management of forests – to bring out all the economic, natural and cultural benefits for the country accruing from them. For the state may be that kind of capitalist that can shift the matter of the profitability of his capital *sensu stricto* further down the list of priorities. For the state is not something whose existence is measured in relation to the length of a human life, but is rather called upon to care for both the today and the tomorrow of its nation's existence".

Soon after the War's end – still in 1945 – the boundaries of Poland were set by the victorious powers and shown to encompass a forest cover equal to just 20.8%. Statistics do not give the full story, however. The impoverished green asset took on a yet sadder aspect when account was taken of the limited biological diversity of stands, changes in the landscape, soil erosion and the distortion of water relations over major areas of the country in its new shape. Foresters were thus faced with the massive task of changing this state of affairs for the better. They took it on by making huge efforts and sinking into it substantial resources, though noteworthy effects were certainly obtained. The years 1945–1970 saw steady SF reafforestation work on nearly 1 million ha of land, taking the cover in Poland back up to 27% by the end of the period. (Those interested in the history of forestry during the existence of the People's Republic of Poland should reach for the monograph by Professor Józef Brody entitled "The State Forests in Poland in the Years 1944–1990" (*Lasy Państwowe w Polsce w latach 1944–1990*, as published in 1997 thanks to the efforts of the Forest Culture Centre (*Ośrodek Kultury Leśnej*) in Gołuchów in 1997).

Today, forest cover has crept up further – to c. 8.89 million ha, or 28.4% of the country. Of course, the latter figure bears little relation to those noted from region to region, and indeed the highest values are to be found in the voivodships of the north-west, while below-average cover is present in central Poland (Fig. 1 and 2.)

Adopted by the Council of Ministers on June 23<sup>rd</sup> 1995, the National Programme for the Augmentation of Forest Cover (*Krajowy program zwiększania lesistości*) assumes that a cover of around 30% will have been achieved by 2020, and as much as 33% by 2050. This means that c. 700,000 ha more will have had to be planted by the first date (including 100,000 by way of natural succession) and a total of 1.5 million ha by 2050. The scale of the undertaking is thus much greater than what was achieved in the period 1945–70. It is true to say that the National Programme encompasses afforestation of both Treasury-owned and private land, but its implementation nevertheless falls mainly upon the shoulders of the State Forests, which is responsible, not only for coordinating the unprecedented effort, but also for financial and substantive aspects.



Fig. 1. The distribution of forests in Poland (DGLP)

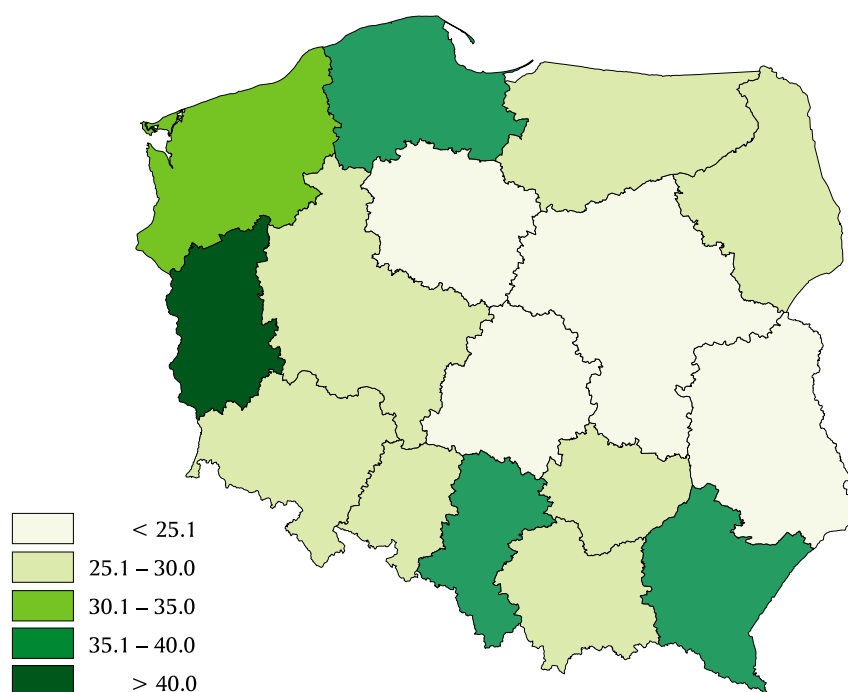


Fig. 2. Poland's forest cover by voivodship in per cent (IBL)



*In legal terms, the State Forests is an organisational unit of the state that does not have legal personality and is representative of the Treasury where the assets under its management are concerned. It operates on the principles of financial self-sufficiency and is characterised by a specific legal-organisational and financial system.*

*Photo G.T.K.*









# The letter and spirit of the law

The State Forests National Forest Holding (to give it its full name) is engaged in the management of more than 7.5 million ha of land (of which almost 7.2 million ha is forest). This is close to one-quarter of the entire country. Furthermore, the stands under SF control as of the beginning of 2002 represented 78.3% of the national total by area.

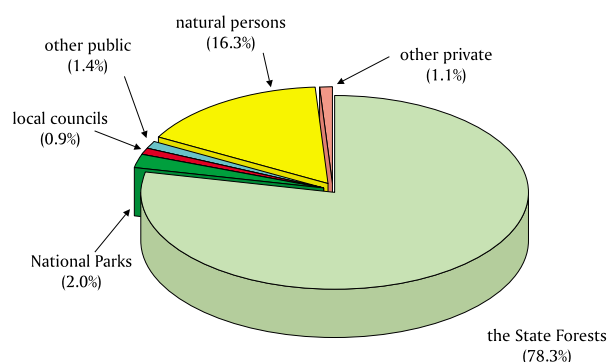
As Poland is a country in which a significant amount of the remaining forest is in public-sector (if not State Forests) hands, taking the total to 82.6%, there can be no doubt that the State Forests occupies the leading position in the country from this point of view. What is more, there have been no more major changes to the ownership structure for many years now, with the only noticeable difference being the rise in the area of the country's forest included within National Parks – from 1% in 1985 to 2% in 2001 (Fig. 3).

Thus the State Forests manage all Treasury-owned forests that are not in National Parks, the property of the Treasury Agricultural Property Agency or made use of on the basis of perpetual leases. It is in these circumstances that the organisation is involved in forestry, the management of land and other real estate and the management of mobile assets associated with the management of forests.

In legal terms, the State Forests is an organisational unit of the state that does not have legal personality and is representative of the Treasury where the assets under its management are concerned. It operates on the principles of financial self-sufficiency and is characterised by a specific legal-organisational and financial system.

Specifically, the legal bases underpinning SF activity are the Forests Act of September 28<sup>th</sup> 1991 (consolidated text in the *Dziennik Ustaw* Official Journal of Laws 00.12.136 of February 23<sup>rd</sup> 2000), the Regulation of the Council of Ministers of December 6<sup>th</sup> 1994 on particular principles of financial management in the State Forests, the Nature Conservation Act of October 16<sup>th</sup> 1991 (as amended February 2<sup>nd</sup> 2001, consolidated text of July 2<sup>nd</sup> 2001), the Act on the designation of agricultural land for afforestation of June 8<sup>th</sup> 2001, and the Act on the pres-

Fig. 3. Ownership structure of forests in Poland (GUS)





ervation of the national character of the country's strategic natural resources of July 6<sup>th</sup> 2001.

The Agricultural and Forest Land Protection Act of February 3<sup>rd</sup> 1995 provides for restrictions on the designation of such land for other purposes, thereby protecting against degradation or devastation, as well as against damage to stands and forestry. Matters broadly linked with environmental protection, including the preservation of valuable ecosystems, biological diversity and the natural balance (and hence also the protection of forests and areas of planted trees and the need to continue with afforestation as nature-related considerations require) are the subject of provisions in the Environmental Protection Law Act of April 27<sup>th</sup> 2001. In turn, the Act of June 7<sup>th</sup> 2001 on forest reproductive material transposes into Polish legislation the EU requirements as regards trade in such material. In accordance with Article 60 therein, this Act enters into force on the day of Poland's accession to the EU.

Statutory provisions are augmented by a great many executive regulations delegated to the Acts and taking the form of either Ministerial Regulations or Orders. The latter include Order No. 50 of the Minister of Environmental Protection, Natural Resources and Forestry of May 18<sup>th</sup> 1994 on the conferment of a Statute upon the State Forests National Forest Holding. This was issued by the Minister proper in matters of the environment and forestry (currently the Minister of the Environment). This Minister is charged with the exercising of supervision over the State Forests.

In forests not owned by the Treasury, supervision over forest management is exercised by the voivod (provincial governor) or *starosta* (head of county-level administration). The first of these organs of the state administration may confer supervisory powers on Directors at the SF Regional Directorates, while the latter may do the same with the Forest Inspectors heading Forest Districts.

The scope of the tasks falling upon the State Forests is mainly shaped by the Forests Act, as well as by the guidelines contained in the National Policy on Forests adopted by the Government in April 1997 (as



Pine-spruce habitat in the Augustowska Forest (W.S.)

The main source of income of the State Forests is the production and sale of timber (W.G.)

**Art. 6. 1.** Terms used in the Act shall be defined as follows:

- 1) forest management means forestry activity as regards management, protection and silviculture, the maintenance and augmentation of forest resources and plantations, game management, and the harvesting – other than by purchase – of timber, resins, Christmas trees, stump wood, bark, needle litter, game animals and the fruits of ground cover, including with the sale of these products and the achievement of non-productive forest functions;
- 1a) sustainable forest management means action to shape the structure of forests and their use in a manner and at a rate ensuring the continuous retention of their biological riches, high productivity and regenerative potential, their vitality and their capacity to meet – now and in the future – all important protective, economic and societal functions at local, national and global level, without harm being done to other ecosystems (...).



an expression of the political will of the state in regard to forestry). The lead principle remains the pursuit of sustainable forest management – a concept explained unambiguously in Article 6 of the Forests Act.

The State Forests honours its commitment to sustainable development in line with the forest management plan – a document drawn up every ten years for each Forest District. The plan sets out particular tasks and objectives for particular parts of a forest, as well as means by which these may be implemented and attained.

An element of the forest management plan is the nature conservation programme thereto, which sets out the methods by which forests, their genetic resources and valuable landscape features are to be protected, and needs as regards the development of science accommodated. Rational forest management serves in the protection of soils and land prone to destruction or damage, as well as that which is of special public significance. It also helps to ensure the protection of surface waters and those lying at greater depth in the ground.

The State Forests engage in ongoing monitoring work on the state and status of forests in their care, with data on cover and resources being updated as necessary. The tasks of the forest services include the continuous tracing and forecasting of the situation as regards fire threat and the occurrence of pests and infections.

From almost its very earliest days, the State Forests has financed research work serving progress in the fore-

stry sciences and ensuring that forest management is conducted on a scientific basis. A major role in this has been assigned to the Forest Research Institute.

The functioning and development of the State Forests are subject to the rigours of self-financing. The main source of SF income is the production and sale of wood (along with the raw by-products of forest use) as the derivative of the productive function in forest management. The need to be self-financing ensures that the State Forests is a business entity subject to the rules of the market economy. However, this does not mean that its actions can resemble those of other enterprises on the market in aiming first and foremost at a maximization of profit. In line with the specific nature of the area of activity that forest management represents (in the sense that economic and non-economic criteria come very sharply together there), the overriding goal of its organisation continues to be

**Art. 7.** 1. Sustainable forest management is pursued in line with a forest management plan or simplified version thereof, with account being taken of the following objectives in particular:

- 1) the retention of forests and their favourable impact on climate, air, water, soil and living conditions for humans and their health, as well as on the balance of nature,
- 2) the protection of forests, especially those stands and ecosystems constituting natural fragments of the country's heritage or those that are especially precious with regard to:
  - a) the preservation of natural diversity,
  - b) the preservation of forest genetic resources,
  - c) valuable features of the landscape,
  - d) research needs,
- 3) the protection of soils and of areas especially exposed to pollution or damage, or of special significance to society,
- 4) the protection of surface and groundwaters and retention in drainage basins, especially on divides and in areas from which aquifers are supplied,
- 5) the production of wood, raw materials and silvicultural byproducts, on the basis of rational management.

the balancing of income and expenditure, which is at the same time to serve in the harmonious shaping of the multifaceted functions of the forest, not merely the functions of an economic nature. It is worth noting that Article 7 of the Fo-

**Art. 8.** Forest management is pursued in accordance with the following principles:

- 1) the general protection of forests,
- 2) the sustainable maintenance of forests,
- 3) the continuous and sustainable use of all forest functions,
- 4) the enlargement of forest resources

*The functioning and development of the State Forests are subject to the rigours of self-financing. The main source of SF income is the production and sale of wood (along with the raw by-products of forest use) as the derivative of the productive function in forest management. The need to be self-financing ensures that the State Forests is a business entity subject to the rules of the market economy.*



***The Forests Act is usually thought of as the foundation upon which modern-day Polish forestry stands. This is justified, in that this very modern law is the first to unambiguously put the productive, environment-creating and societal functions of forests on an equal footing. As such it follows in the footsteps of the Polish Policy for the Protection of Forest Resources (Polska polityka ochrony zasobów leśnych), which was devised and brought into effect in 1994 and has found expression inter alia in the Promotional Forest Complexes (of which there are currently 13).***

rests Act only mentions timber production at the end of a quite long list of objectives focusing on sustainable forestry.

Equally indicative is Article 8 of the Act, which is devoted to the principles underpinning the pursuit of forest management.

The Forests Act is usually thought of as the foundation upon which modern-day Polish forestry stands. This is justified, in that this very modern law is the first to unambiguously put the productive, environment-creating and societal functions of forests on an equal footing. As such it follows in the footsteps of the Polish Policy for the Protection of Forest Resources (*Polska polityka ochrony zasobów leśnych*), which was devised and brought into effect in 1994 and has found expression *inter alia* in the Promotional Forest Complexes (of which there are currently 13). The Complexes are areas in which the new model of sustainable, multifunctional forestry pursued by the State Forests is in place. They thus constitute an example of such management for Polish forests in general, and are at the same time an example of the “open door” policy addressed to society at large, including in particular Poland's younger generation.

The amended version of the Forests Act adopted by Parliament in 1997 markedly broadened the tasks set before forestry as regards the conservation of natural resources. These trends gained their ultimate fixing and advocacy in the National Policy on Forests (*Polityka leśna państwa*), which identified both new tasks and prospects, including for the State Forests.

It is clear that forest-related subject matter impinging upon and regulating the way in which the State Forests functions is also present in a host of other legal acts and documents. Undoubtedly to be included among these are the Nature Conservation Act of October 16<sup>th</sup> 1991 (as amended February 2<sup>nd</sup> 2001), as well as the Regulations of the Minister of the Environment thereto (e.g. the Regulation of August 14<sup>th</sup> 2001 on the determination of those types of natural habitat that are subject to protection, or the two Regulations issued in September 2001 on the determination of lists of plant and animal species enjoying species protection).

Foresters (and not only foresters) are obliged to protect nature in line with the National Environmental Policy (*Polityka ekologiczna państwa*), which was adopted by the Government in 1991 and which holds that forest is an exceptionally valuable factor underpinning the ecological balance of the biosphere. As such, it is imperative that this be retained in a good condition, with biological resistance being enhanced, the gene pools of the flora and fauna preserved, and natural multifunctional forest communities shaped. Adopted in June 2000, the Second National Environmental Policy goes further in expounding the environment-creating functions of forest, which it recognises as “an essential, if not a principal, factor in the ecological balance and a habitat for the majority of wild plants and animals (...), as well as a main refuge for the natural heritage of Poland preserved down to the present day”. Proceeding on such assumptions, the document accepts among its priorities the protection of forest ecosystems, the renaturalisation of forest areas (e.g. by introducing native species of tree and shrub into conifer monocultures) and the protection of forest wetlands and ob-



jects of particular natural value. The National Environmental Policy at the same time affirms an inviolable principle that the stands of exceptional importance from the natural point of view see biodiversity conservation take priority over the economic benefits accruing from the harvesting of timber.

Forest-related subject matter is also to be found in other legal regulations dealing with environmental protection and management, including the Hunting Law Act of October 13<sup>th</sup> 1995 (as amended on January 10<sup>th</sup> 1997). Important provisions connected with forest management are also contained in the Water Law Act of July 18<sup>th</sup> 2001 (with later amendments).

State Forests objectives and tasks also follow on from the many international conventions adopted by Poland. While it is true that our forests account for only 0.2% of the world's resources (less than 5% of those in Europe), the State Forests – as the principal manager of the native stands – plays an active part in shaping and as far as possible implementing global policy on forests. Included here are aspects decided upon at the 1992 Earth Summit (UN Conference on

Adopted by the Government in June 2000, the *Second National Environmental Policy* lists among its priorities the protection of wetlands within forests. Here: riparian stands along the River Perebel in the Białowieża Forest (P.F.)

***Recalling that the Act entered into force at the beginning of 1992, and hence half a year before the Earth Summit, we come to the inescapable conclusion that Polish forest legislation has kept pace with, or even anticipated, the initiatives emerging in the international arena. Poland can thus be thought to be among the leaders when it comes to the pursuit of modern forest management on the basis of the best world models.***

the Environment and Development). Forest issues were also touched upon in Chapter 11 (in particular) of ***Agenda 21***, as well as of course in the ***Forest Principles*** agreed and adopted at Rio.

The preamble to the Forest Principles makes it abundantly clear that forests are an essential element in economic growth whose existence is also a precondition if all forms of life on earth are to be maintained.

Governments enjoy the sovereign and inalienable right to use, manage and exploit forests in their hands to meet the developmental needs of their countries, albeit in accordance with their national policies, law and sustainable development principles, as Point 2b states. However, the taking of any action whatever in regard to the management, protection and ecologically-appropriate use of forest resources should take the fullest possible account of the economic and non-economic value of goods and services, as well as calculating the environmental costs and benefits of such decisions (as in point 6c of the Principles). In turn, forest law should serve in the protection of forests representative of particular valuable features; natural (primary or old-growth) forests; and forests of particular cultural, spiritual or historical value or that are otherwise important to a nation (as in point 8f of the Principles).

The Convention on Biological Diversity, signed at the Earth Summit in the name of the Polish Government by the then Minister of Environmental Protection, Natural Resources and Forestry, was ratified by Parliament in 1995.

Of major significance for Polish forestry are Resolutions I, II and III of the Ministerial Conferences on the Protection of Forests in Europe (Strasbourg 1990, Helsinki 1993, Lisbon 1998). The Conference held in the Finnish capital set in train the so-called “Helsinki Process” – efforts to formulate criteria for and indicators of sustainable forest management and to engage in the due propounding of non-productive forest functions. Poland signed the European Declaration in this matter, which holds that sustainable forest management denotes: *“stewardship and use of forests and forest lands in a way, and at a rate, that maintains their biodiversity, regeneration capacity, vitality and their potential to fulfil, now and in the future, relevant, ecological, economic and social functions, at local, national, and global levels, and that does not cause damage to other ecosystems”*.

It may be noted that a wording almost exactly the same is to be found in Article 6 of the 1991 Forests Act as cited above. Recalling that the Act entered into force at the beginning of 1992, and hence half a year before the Earth Summit, we come to the inescapable conclusion that Polish forest legislation has kept pace with, or even anticipated, the initiatives emerging in the international arena. Poland can thus be thought to be among the leaders when it comes to the pursuit of modern forest management on the basis of the best world models.

The convening on April 28<sup>th</sup>–30<sup>th</sup> 2003 of the Fourth (Vienna) Ministerial Conference represents a further stage to cooperation over which Poland is playing an active part. Another manifestation of this activity is the fact that the next Conference will be taking place in Poland.





SF activity also makes reference to the provisions of the so-called Kyoto Protocol of 1997, which obliged Poland to act with a view to increasing amounts of atmospheric carbon fixed in order that the enhanced greenhouse effect might be reined in. A role that is hard to overestimate has thus been conferred upon the State Forests organisation.

It is hard to say just how many domestic regulations have direct or indirect application when it comes to matters of forest management, and hence to State Forests activity. Internationally, there are more than 100 agreements to which Poland is party in the fields of environmental protection and the utilisation of natural resources (forests) alone. In no way can each be given even the most limited attention here. Furthermore, Poland's accession to the EU will surely bear fruit in further legal conditioning and solutions.

Forests play an inestimable role in efforts to intensify the take-up of carbon from the atmosphere and hence limit the greenhouse effect. Here: afforestation in the voivodship of Kujawy-Pomerania (S.W.)

*A three-tier structure comprises the Directorate-General of the State Forests, Regional Directorates of the State Forests (of which there are 17) and Forest Districts (435). This structure is augmented by other organizational units also not possessing legal personality.*

*Photo P.F.*







# Three tiers to the structure

Almost half of all SF employees are members of the Forest Service (A.R.)

Under the Forests Act, and particularly Article 32 thereof, the State Forests are the state organisational unit lacking legal personality that represents the Treasury in regard to the assets it manages. Its three-tier structure comprises the Directorate-General of the State Forests, Regional Directorates of the State Forests (of which there are 17) and Forest Districts (435). This structure is augmented by other organizational units also not possessing legal personality.



The State Forests are headed by the Director-General thereof (as appointed or dismissed by the Minister proper in matters of the environment – currently the Minister of the Environment), with the assistance of Regional Directors of the State Forests, who in turn serve as the immediate superiors of the Forest Inspectors at District level.

The opinion-giving and advisory body in respect of the Director-General is the *Kolegium* thereto, whose members are appointed from within scientific circles, as well as from among the Regional Directors, Forest Inspectors and heads of Department, foresters in general and other groupings.

The respective executive bodies of the Director-General and the Regional Directors are the General Directorate of the State Forests and the Regional Directorates of the State Forests.

The Forest District is, however, the fundamental SF organisational unit. The Forest Inspectors running them enjoy some autonomy in the pursuit of forest management in their Districts, albeit operating on the basis of the fo-

rest management plan. As such, they are also answerable for the state of the forest in their area. Forest Districts are in turn divided into ranges and sub-districts.

The SF comprises more than 26 Departments – units again lacking legal personality – of regional reach, and 5 of national reach. These engage in the activity essential if the State Forests is to achieve its tasks in and beyond forest management. They in particular focus on the transport and forwarding of timber; the running of timber stores and yards, the management of fish ponds, work in renovation and construction and other services. In addition, distinct organizational units are involved in teaching, training and editorial activity, as well as looking after social, recreational and existential needs of employees.

Forming an integral component part of the General Directorate are 9 Forest Protection Teams and 11 SF Inspection Regions (Fig. 4).

The State Forests is one of Poland's largest employers, with some 28,000 employees as of the beginning of 2003. The overwhelming majority work at the Forest District level and around half are members of the Forest Service.

When it comes to this Forest Service, the Forests Act 1991 provides that the members thereof are employees involved in the management and protection of SF-administered forests. Their tasks also include the combating of crimes and offences damaging forests and other duties in regard to the protection of property. The latter tasks fall upon Straż Leśna, the Forest Guard, which operates as a kind of “forest police” whose entitlements are as set out in Article 47 of the Forests Act.

The Forest Service supervises forest management in Treasury-owned forests. Where forests are not state-owned in the meaning of the Act, the task of supervision may again be conferred upon the Forest Service by a voivod (provincial governor) – in which case it is the Directors at the Regional Directorates that are involved, or by a starosta (head of county-level administration in the powiat). In each case, the necessary financing is proffered.

The Forests Act imposes particular requirements in regard to candidates for the Forest Service. They must have impeccable reputations, not have been punished for a crime, be Polish citizens, be over 21, be in possession of full civil en-



Fig. 4. The organisational structure of the State Forests



titlements and enjoy good health. They must also have the appropriate professional qualifications and are employed full-time.

As they perform their tasks, employees of the Forest Service make use of the particular legal protection afforded – in accordance with the Criminal Code – to public functionaries. They are obliged to wear a uniform while at work, with this bearing rank insignia of the kinds noted in the other uniformed services.

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\*       \*

In the 1990s, a far-reaching restructuring of employment involved the transfer of more than 70,000 full-time posts from the State Forests to private firms rendering forest services – an undertaking without precedent on the national scale. This was done by the State Forests off its own bat, and – more importantly – was achieved calmly, with the agreement of crew, with no strikes and with funding from assistance programmes of the central government.

Action taken with a view to further limiting employment continues, albeit at more limited intensity. This complicated task has as its aim both the adjustment of the number of employees to the real scope and burdensomeness of tasks, and the rationalisation of employment structure within the State Forests (i.e. a reduction in the number of white-collar posts).

The strategy for the State Forests over the next few years seeks to continue with the elimination of the clear disproportions at both the level of the Forest District (where areas may for example range between a few thousand hectares

and 10–20 thousand) and the sub-district, and at the level of employment therein. This matter was behind the establishment of a special team within the State Forests tasked with the devising of a comprehensive concept of changes, including objective criteria to correspond with the organisation, area and level of staffing in a standard Forest District and sub-district. It was established that an average Forest District from the point of view of difficulty of management should employ 16–17 people (in management, offices and the Forest Guard) and cover 18–20,000 ha. In the optimal

A field-based silvicultural meeting (W.G.)



model for a two-person sub-district, the area of land per employee should be 800–900 ha. In turn, the privatisation of forest work will ultimately allow for the solving of the employment problem in blue-collar posts (most Forest Districts finally finished with this in recent years).

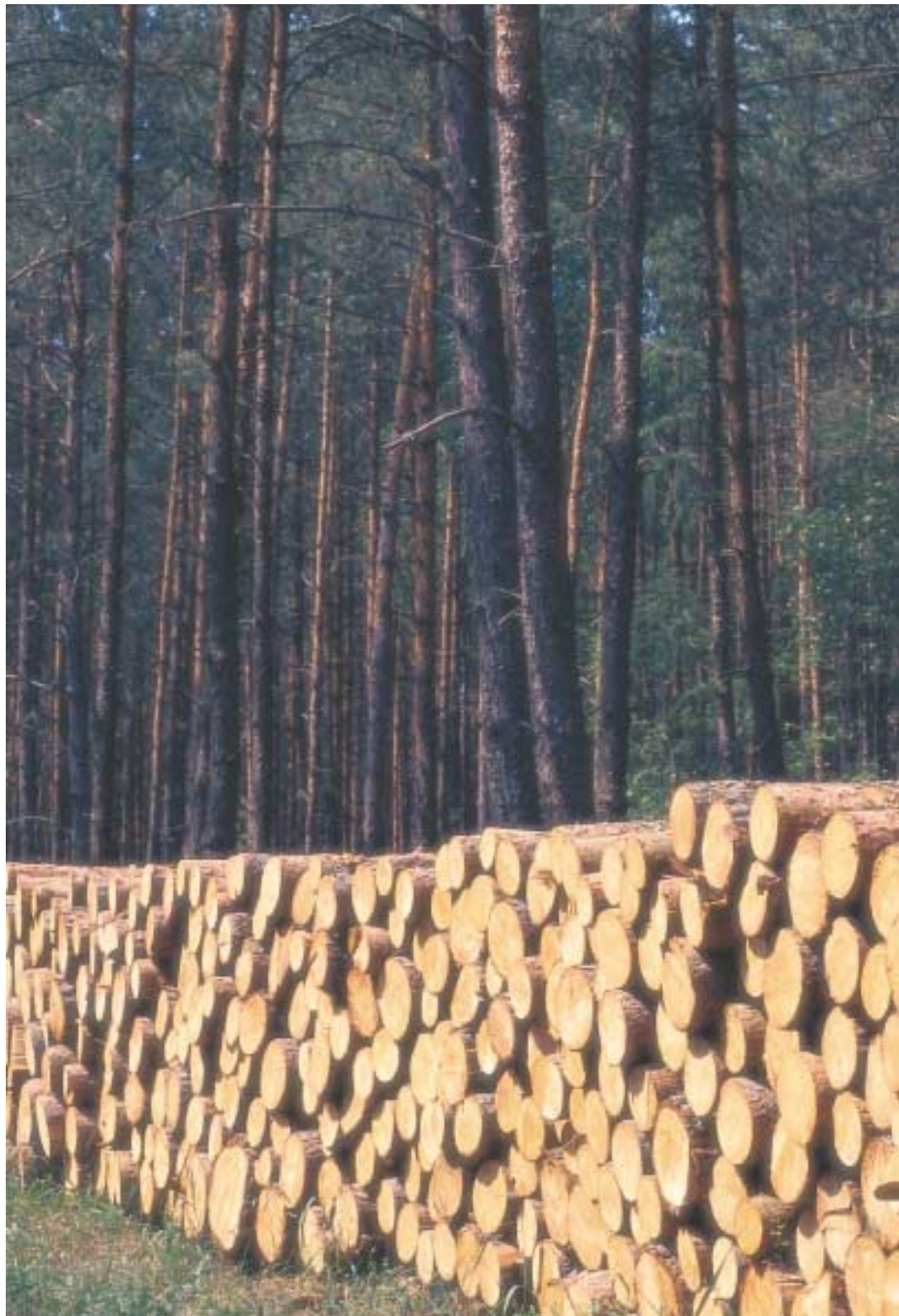
The rationalisation of employment remains one of the basic conditions if the hitherto-existing, efficient, three-tier structure to SF management is to be retained, along with the principle of self-financing. This is indispensable if for nothing else than that personnel costs are still the dominant factor in the cost structure of SF activity. A far-reaching restructuring and establishment of a close link between work and pay requires an increasing share of overall costs to be taken by remuneration. As one small illustration of this: the average remuneration of a single SF employee in 2001 required the sale of around 30 m<sup>3</sup> of timber; the relationship had increased almost threefold over the previous five years.

The programme under discussion has become a subject of wide-ranging discussion in professional forestry circles. It is assumed that changes in the extents of Forest Districts and numbers employed in sub-districts will have ended by 2005, albeit with the reduction in staffing levels being preceded by the enlargement of organisational units. Since restructuring is by its very nature an ongoing process, it will not of course end in 2005, and will not either be confined to the aforementioned changes. This is the only undertaking which is to serve in an improving of the whole economic and financial system of the State Forests. With Poland's accession to the EU in prospect, this is an important element in cost-optimisation policy, preparing the State Forests for the competitive EU market and the managerial rules applying there.

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*The State Forests National Forest Holding is a specific business entity whose operations and development are based on the self-financing principle. In other words, the State Forests must by its own efforts come up with the means needed for the day-to-day financing of its activity and development.*

*Photo W.L.*







# The fundamentals of the forest economy

In accordance with the Forests Act 1991, in running the State Forests, the Director-General represents the Treasury in operational relationships entered into under civil law. The D-G initiates, coordinates and exercises supervision over the activity of the Regional Directors at Regional Directorates, as well as the heads of other SF organizational units of national reach. Tasks include the organisation and coordination of undertakings to protect forests, engage in their rational management and develop forestry. He or she organizes management planning in forests and forecasting as regards forestry matters, as well as supervising and coordinating the training of staff in forestry, and popularizing information on forests. He or she also initiates, supports and finances research in forestry, as well as encouraging the practical takeup of its attainments.

The Director-General is charged with making up for any financial shortfalls arising in given Forest Districts or Regional Directorates as a result of the different conditions in which they engage in forest management. He or she organizes joint undertakings by the different SF organisational units, as well as pursuing staffing policy (by appointing or dismissing his/her deputies – in this case in agreement with the Minister of the Environment – and by appointing/dismissing the Regional Directors and heads of the organizational units of national reach).

A model for tasks of a similar structure, albeit with scope and competences relating to the regional level, is in force when it comes to the actions of the Directors within the Regional Directorates.

Those involved in heading the Forest Districts, i.e. the Forest Inspectors, engage in the independent day-to-day pursuit of forest management, representing the Treasury in relationships entered into under civil law in the course of their activity, and are direct managers of the Treasury-owned forest, land and property assets put in their charge.

In accordance with the Forests Act, the State Forests is obliged to draw up an annual report on the state of forests, as well as a financial and economic report. The report goes to the Council of Ministers, which passes it on to Parliament, along with a report on implementation of the National Programme for the Augmentation of Forest Cover.

Under the Forests Act, the State Forests is obliged to draw up an annual report on the state of forests in Poland



The State Forests obtains grants from the central budget in respect of the tasks conferred upon it by the governmental administration. These include: the purchase of forests and land for afforestation or reclamation, undertakings in line with the National Programme for the Augmentation of Forest Cover; the running of periodic large-scale inventories of forests, the provision of updates regarding the state of forest resources, the devising and implementation of nature conservation plans for reserves under SF management, and the funding of the public's enlightenment on matters connected with forest (including via the creation and operation of Promotional Forest Complexes and nature/forest trails). Alas, it is usual for the size of the grant to fail to correspond with the magnitude of these assumed tasks, all the more so as the means transferred decline year after year. Recent years have seen some undertakings – like public education, the running of PFCs and the devising of conservation plans – financed perforce from SF own means, in the face of a failure on the part of the budget to transfer any funds whatever for the implementation of these tasks.

In accordance with Article 56 of the Forests Act, a Forest Fund is in operation within the State Forests, with a view to this “constituting a form by which funding for purposes indicated in the Act may be managed”. The Fund is at the disposal of the Director-General of the State Forests.

The Forest Fund *inter alia* comprises:

- the basic allocation calculated in relation to the value of timber sales, and debited from the costs of Forest District activity;
- due payments, fines and fees in relation to the excluding of forest land from production;



Means from the Forest Fund are designated for scientific research among other things (M.F.)



***The Forest Fund is a particular kind of mechanism by which to even out the economic changes of the different Forest Districts, offering support to those for which, on account of objective factors beyond their control (industrial damage, degraded or distorted habitats, the particular nature of the stands – e.g. with a major part of forests being protective, etc.) are not able to obtain the kind of good economic results that would assure their proper operations and development.***

- due payments resulting from damage done to stands by industry, through the premature felling of stands under the Agricultural and Forest Land Protection Act or as a result of fires, mining or geological work;
- grants in aid, excluding the targeted funding from the central budget for tasks commissioned by the governmental administration.

The size of the basic allocation charged to Forest Districts is established annually by the Minister of the Environment, at the request of the SF Director-General, who may in turn determine the size of the allocation for the different Regional Directorates. It is the Regional Directors who work out how much should go to the different Forest Districts.

The Forest Fund is a particular kind of mechanism by which to even out the economic changes of the different Forest Districts, offering support to those for which, on account of objective factors beyond their control (industrial damage, degraded or distorted habitats, the particular nature of the stands – e.g. with a major part of forests being protective, etc.) are not able to obtain the kind of good economic results that would assure their proper operations and development. The Fund at the same time serves a very important stabilizing function, serving as a solution to economic problems arising in different organisational units.

#### **Art. 58.**

1. The Forest Fund is designated for Forest Districts, with a view to short-falls arising in the implementation of tasks in forest management being made good.
2. Means from the Forest Fund may also be allocated to:
  - 1) joint undertakings of SF organisational units, in particular as regards forest management,
  - 2) scientific research,
  - 3) the creation of the infrastructure necessary for the pursuit of forest management,
  - 4) the devising of forest management plans,
  - 5) work associated with the assessment and forecasting of the state of forests and forest resources,
  - 6) other tasks in forest management.
3. Means from the Forest Fund referred to in Article 57, para. 1a are designated for the afforestation of land not in Treasury ownership, and for the purposes set out in para. 2, points 1 and 6, in forests under National Park management.

The objectives and tasks to which means accumulated in the Forest Fund may be assigned are as detailed in Article 58 of the Forests Act.

At this point, there would seem to be a need for several more comments. Income from fees and fines for premature felling or the excluding of land from forest production is – in accordance with Article 57 of the Forests Act – designated





for the afforestation of private land, and for actions linked to nature conservation or forest management in National Parks. In line with this provision, the State Forests makes an annual transfer from the Forest Fund of some 6-8 million zł for the afforestation of private land. This legal mechanism ensures that somewhere in the region of 10-20,000 ha of forests have appeared on private land, while the money from fees and fines in connection with the reduction in usable forest areas goes on the creation of new forest, sometimes in a completely different part of the country.

The Forests Act 1991 and Regulation of the Council of Ministers of December 6<sup>th</sup> 1994 on detailed principles of financial management in the State Forests define unambiguously the framework for the organisation's financial and economic activity. Operational assumptions are also contained in numerous pieces of delegated legislation issued by the Minister of the Environment, as well as in Ordinances of the SF Director-General. Any more precise discussion of these would go beyond the limited possibilities of this publication, but it is neverthe-

If development of the ecological and societal functions of forests is to be possible, the forest must also serve its productive functions. Here: the use of a timber harvester (J.D.)



Hardwood logs ready for transport  
(P.F.)

less worth paying attention to at least some aspects of the legal circumstances of the State Forests, as these impact upon daily practice in the managerial environment.

In the first place, the State Forests National Forest Holding is not – as it is often mistakenly perceived to be – an enterprise in the meaning of the widely binding economic legislation. Nor does it have legal personality. However, it is – let us repeat again here – a specific business entity whose operations and development are based on the self-financing principle. In other words, the State Forests must by its own efforts come

up with the means needed for the day-to-day financing of its activity and development. In the organisation's post-War history there has only been once – in 2001 – when an overall balance sheet was found to be in the red.

The basic aim of the activity of the State Forests as an economic entity is not, however, the maximisation of profit, but the balancing of income and expenditure with a view to all forest functions being shaped harmoniously. Thus, compliance with the principle of self-financing in the present and foreseen macroeconomic conditions and corresponding legal, organisational and financial system remains one of the basic “life” problems of the organisation.

There is every indication that the problem will only grow with society's expectations that there be ever greater emphasis on the non-productive functions. However, forest must offer productive functions if the achievement of the others is to be possible to support financially. Unfortunately, this plain fact is not always appreciated in certain opinion-forming circles (including environmental NGOs). While in the public mind the harvesting of timber is most often associated with a threat to the permanence of forest ecosystems, debate as to the sources of funding in a forestry with limited productive functions mostly proves to be unconstructive or downright sterile (especially when it comes to the indicating of possible external sources of funding the non-productive sphere, which does after all require the bearing of defined costs).

A second matter which needs stressing is the status of the State Forests as an entity administering Treasury assets. It needs to be repeated with emphasis that these are not assets that are SF-owned, but merely managed – in accordance with the Act. Here we have a source of many misunderstandings, especially where different types of investment undertakings come into play, as well as pro-





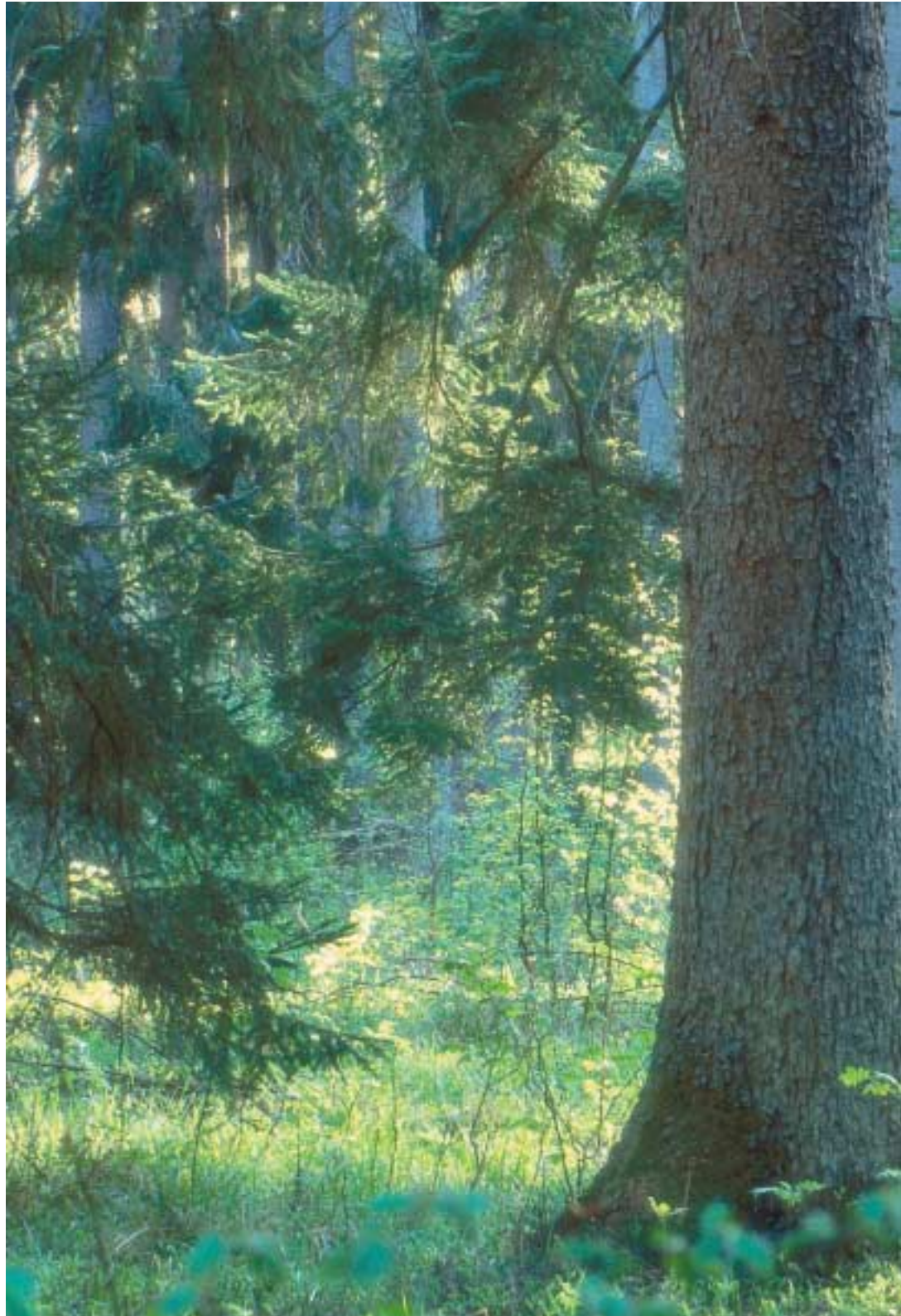
posals or full-blown demands that the State Forests hands over forest land for the purpose. It would be possible to cite here a long list of cases in which investors exert a pressure quite divorced from reality on the State Forests, in the hope that, in making use of resources that are not its own but merely conferred upon it for management, it will meet this or that (often quite fantastic) need. Thus a law in force with the rank of an Act seems to represent *terra incognita*, for no very obvious reason.

The State Forests is not the owner of the Treasury's forest assets, only the manager of them (P.F.)

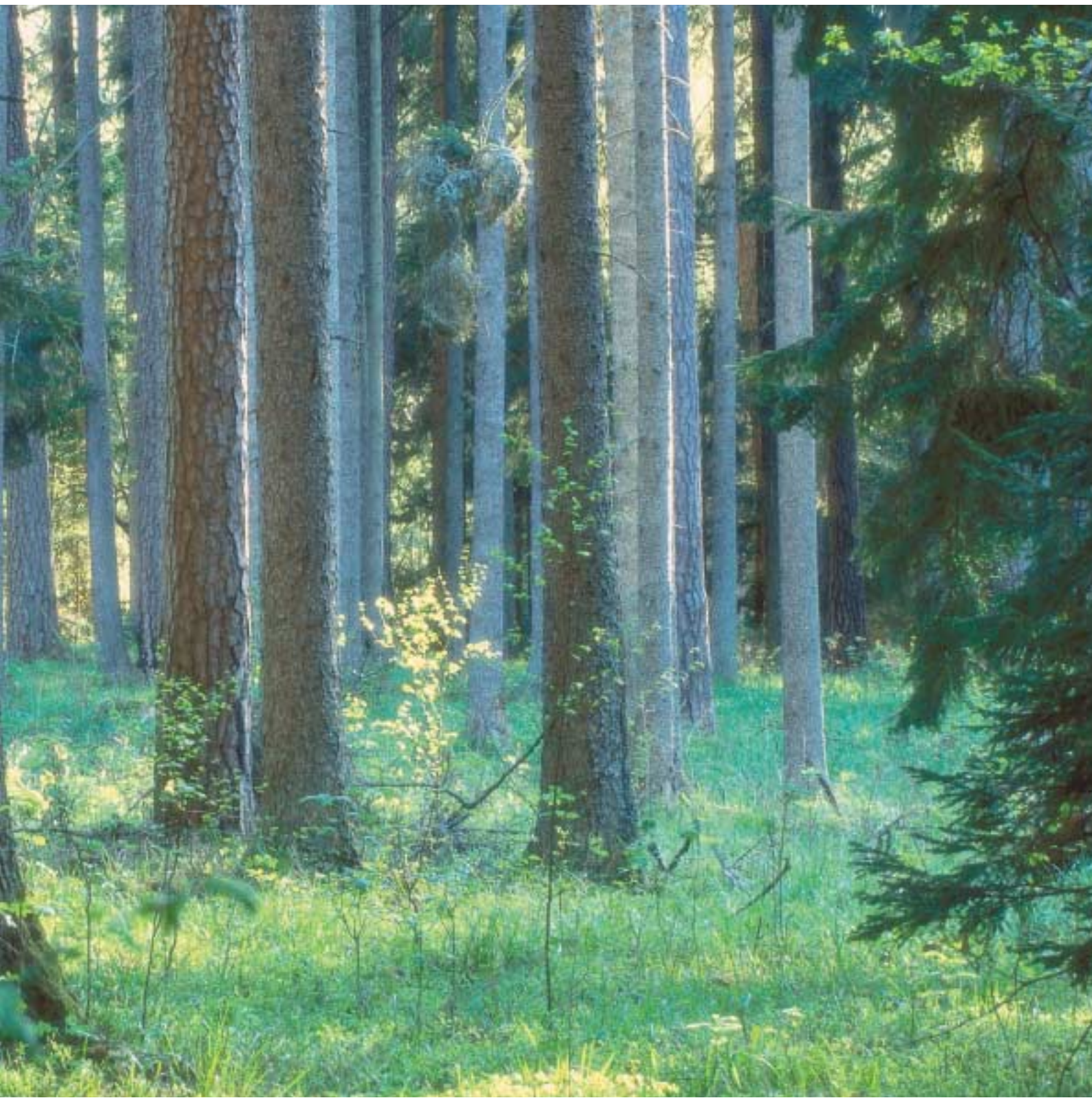


*If the estimation is made in line with international standards, the timber resource of Poland rises to 1.9 billion cubic metres, a volume that leaves the country third in its region after Germany and France.*

*Photo W.S.*







# A green treasurehouse

The balance at the beginning of the 21<sup>st</sup> century revealed that all Poland's forests (under all kinds of ownership) cover 8.89 million ha. The figure rises to a round 9 million ha when account is taken of land otherwise associated with forest management. This places Poland in the group of countries with the region's largest areas of forest (after France, Germany and Ukraine).

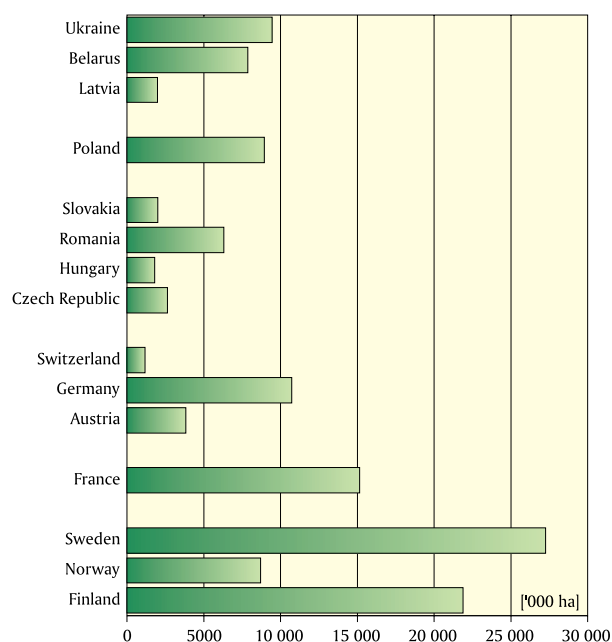
However, the *Temporal and Boreal Forest Resource Assessment 2000* standard, relating forest cover to land area only (excluding inland waters), makes it clear that the absolute level of forest cover in many countries does not go hand in hand with species diversity. Higher forest cover is mainly characteristic of countries with a large share of land unsuitable for other kinds of use, e.g. marshlands and mountains (as in Slovakia, the Nordic countries and Austria). Taking into account such conditioning measured in line with the TBFRA 2000

standard, the forest cover of Poland – of 29.9% – is close to the Central European average (Figs 5, 6).

On the parts of the European mainland at our latitudes, the natural vegetation formations are broadleaved and mixed forests. However, the dramatic civilisational progress taking place down the years led not only to widespread deforestation, but also to far-reaching changes in a “natural” environment that had often in fact been more than a little influenced by the forest management carried out in the past.

It was as early as in the 17<sup>th</sup> century that there began a process of intensive exploitation of forests by clear cutting and artificial renewal with the species most profitable from the economic point of view, i.e. Scots pine in the lowlands and spruce in the uplands and mountains. The result in today's Poland is a 30% forest cover that sees coniferous species account for 66.6%, while broadleaved stands cover 15.4% and mixed stands 18.0% (in line with the TBFRA 2000 standard). From this point of view we differ little from other European countries in terms of the structure, which is in fact very similar to that in Scandinavia, for example.

Fig. 5. The total area of forest (TBFRA)





A feature of Poland's forest is an excessive fragmentation conditioned historically by economic development through the centuries (of a kind that can be seen in many European countries). Forest Districts administer 28,000 forest complexes, among which more than 6000 cover less than 5 ha. The process has gone even further in private forests, whose mean area is of c. 1.3 ha. This very much complicates forest management, exerting an upward pressure on the costs of its pursuit.

Poland's forests have mainly been retained on the poorest soils, while the best now sustain agriculture. At the same time, soil quality (fertility and humidity) combines with geographical and climatic conditions to determine differentiation into habitat types, which in turn have direct influence on the species composition and structure of the stand, the undergrowth and the herb layer.

In total, from the silvicultural point of view, Poland has been found to support some 15 habitat types of lowland forest, 3 upland and foothills types and 7 montane types. Economic activity differs in line with the needs of each habitat category, with stand species composition being determined accordingly, for example. In simple terms, it may be said that we are dealing with two basic types of forest ecosystem: coniferous and broadleaved forests. While the former have conifers (above all Scots pine) as the forest-creating species, the latter are mainly mixed stands in which the share of broadleaved species is high, or else they are purely broadleaved.

When it comes to areas occupied, it is the low-fertility coniferous forest habitats that prevail (accounting for 59.9% of all stands). These mainly occupy highly-acid soils. The main species creating this kind of forest in the lowland is Scots pine.

In contrast, broadleaved forests are mostly on fertile or very fertile soils that are not too acid. Their vegetation is rich overall, while the main stand-forming species are pedunculate oak, beech, fir, alder and ash, as well as many admixture species. On the flood terraces in river and stream valleys where water levels fluctuate markedly, the alluvial soils formed from river sediments support riparian forests, above all stands with alder and ash. Rich marshy peats have alder forest in a fertile habitat dominated by black alder with an admixture of pubescent birch and ash. Broadleaved forest habitats account for 41.1% of the forest area, of which 3.9% comprises alder carr and riparian forest. (Fig. 7)

As has been mentioned, it is coniferous species that dominate in Polish forests. According to domestic standards (rather than TBFRA 2000), these acc-

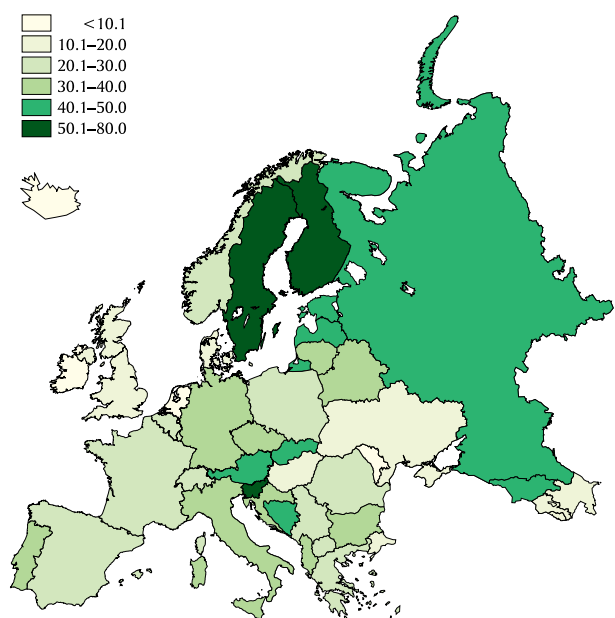


Fig. 6. Forest cover in European countries in per cent (TBFRA)

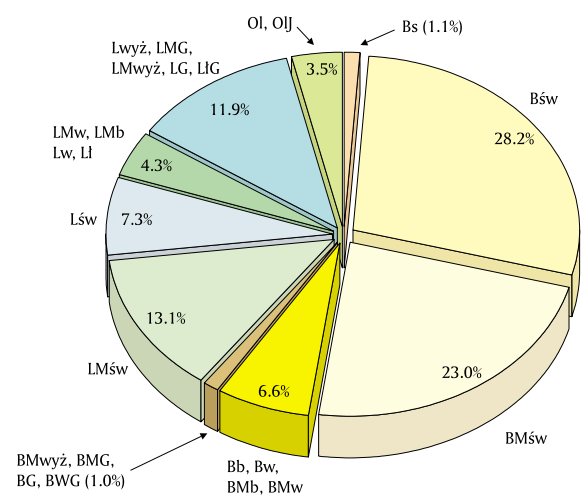


Fig. 7. Share by area of forest habitat types in the State Forests, National Parks, private and gmina-owned forests (BULiGL, GUS)



Poland is dominated by low-fertility coniferous forest habitats (59.9% of the forest area) which occur on very acid soils. Here: pine forest in Spala Forest District (W.S.)

ount for 76.3% of the forest area, with the dominant species being pine (accounting for 68% together with larch), though the proportion ranges from 25.6% in Małopolska voivodship to as much as 88.1% in Lubuskie. It is worth knowing that pine is a species which has formed many valuable ecotypes in Poland, like the Taborska or Augustowska pines.

In the mountains of the south it is spruce that plays the biggest role within the species balance in the west, while spruce is present with an admixture of beech in the east. (Fig. 8)

Activity is being pursued consistently by the State Forests with a view to the species structure of Poland's forests being changed. Major changes have indeed been made since the Second World War. Forests are more diversified biologically, *inter alia* thanks to a near doubling of the share of broadleaved species (albeit an increase smaller than the habitat structure might allow), as well as an increase in the share of trees older than 80. A preference for broadleaved species in the course of afforestation and restocking, the reintroduction of native species best suited to a given habitat, the exposing of the natural broadleaved undergrowth in the course of the felling of old trees and the leaving of the gaps for natural renewal – all have brought very measurable benefits to forests, as well as to forest management. Within the framework of implementation work on the “National Programme for the Augmentation of Forest Cover” alone, the share of all planted saplings that are broadleaved reaches 60%. Monocultures of uniform age and height structure and of limited resistance to different kinds of damage, to industrial pollution and to invasions of pest insects and pathogenic fungi have ceased to be the ideal in modern forest management.

Trees of middle age prevail in Poland's forests. Classes II and III – which take in just such trees (aged 21 to 60) – account respectively for 22.9 and 23.4% of the forest area (Fig. 9). The age structure – particularly of forests managed by the State Forests – is ever closer to the desirable one. It is assumed that given stand age classes (with 20-year time intervals) should each account for around 20% of the total area. In the work towards such a state of affairs there is most to be done with the 1–20 age class (which represents 13.3% of the total forest area) and the 61–80 year class (17.8%). Shortfalls among the youngest stands will be made good through the afforestation of ex-agricultural land and the restocking of areas that have previously held the oldest stands. In contrast, the share taken by stands in age class 61–80 will increase with successive entry into the higher age category of the nearly 23% of the country's stands that are currently in the age class 41–60.

Stands more than 100 years old account for only 8% of the forest area, though those over 80 are steadily increasing in number. It is enough to note that these occupied 900,000 ha in 1945, only to have extended over 1.5 million ha by the beginning of the 21<sup>st</sup> century (at which time the average age of stands administered by the State Forests was 58 years, cf. 40 years for private forests).

Overall, the forests managed by the State Forests are ageing – a phenomenon including “the natural course of things” in nature that is from all points

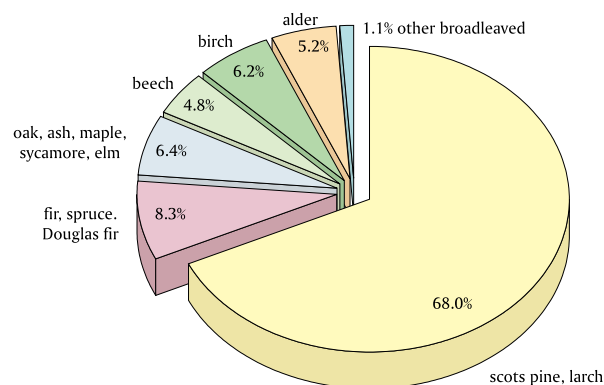


Fig. 8. The share by area of dominant species in the State Forests, National Parks, private and gmina-owned forests (BULiGL, GUS)

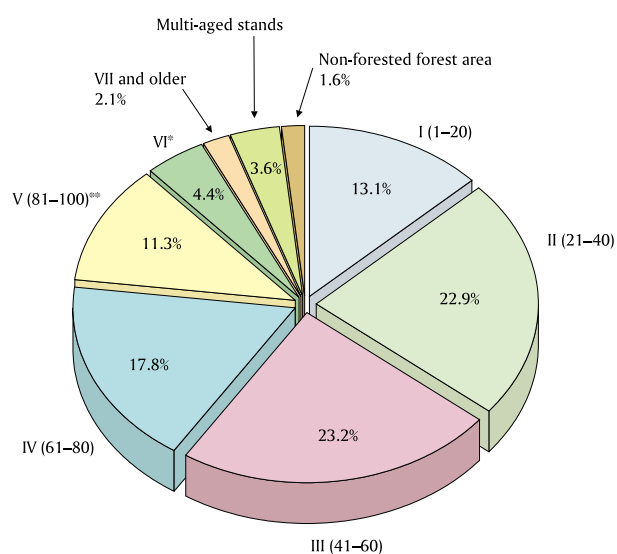


Fig. 9. The areal structure of stands by age class in the State Forests, and in private and gmina-owned stands (BULiGL)

\* SF only

\*\* in the case of private and gmina-owned forests also older ones



***The State Forests do not bear witness to the phenomenon of exploitation beyond the capacity of the stand. The 21<sup>st</sup> century opened with the SF taking just around 55% of the ongoing increment of timber biomass characterizing its standing resources. Furthermore, a considerable proportion of the timber taken away from forests was actually in the form of branches broken off by wind, rain or snow, or else sticks and branches removed in the course of sanitation measures.***

of view desirable. It is true that the so-called technical maturity (and hence the age qualifying for cutting) of trees in our conditions is mostly reached half way or even one-third of the way through the life of a tree, but older (even very old) specimens play an important role in the forest. With time there is an increase in the number of animals, plants and microorganisms, which are supplied with food, shelter and suitable living conditions. Thus, old trees and individual fallen specimens – with many holes, subject to decay or even entirely dead and thoroughly rotten – are treated by foresters as an important element of the biocoenosis. In modern sustainable and multi-functional forest management carried out on ecological bases this is one of the prized elements.

The increase in the area of old stands is a positive effect of the limitation of final felling. The timber resources of the State Forests are also increasing. 1967 brought the first full SF inventory, while that at the beginning of the 21<sup>st</sup> century revealed the presence of 1.48 billion cubic metres gross of merchantable timber. If private and gmina-owned forests are added in, the national total is estimated to be c. 1.73 billion cubic metres. For comparison, in 1946, the standing timber resources of Poland were of an estimated 900 million cubic metres.

If the estimation is made in line with international standards, the timber resource of Poland rises to 1.9 billion cubic metres, a volume that leaves the country third in its region after Germany and France.

The greatest (more than 50%) share of timber resources is taken by stands aged 41–80. Almost 70% of the resource in the State Forests is in the form of Scots pine (as compared with a 55% role for this species in private and gmina-owned forests).

And one further presentation that says much about SF management of the national asset conferred upon it: from January 1981 to January 2001, the forests managed by it saw an increment in merchantable timber of c. 890 million cubic metres gross. As some 502 million cubic metres were harvested in the period, that means that stand resources increased by 388 million cubic metres (or the equivalent of around 44% of the total increment). In a nutshell, a major part of the increment in the mass of timber is not harvested by foresters, but rather lives on as a green asset for the country.

The State Forests do not bear witness to the phenomenon of exploitation beyond the capacity of the stand. The 21<sup>st</sup> century opened with the SF taking just around 55% of the ongoing increment of timber biomass characterizing its standing resources. Furthermore, a considerable proportion of the timber taken away from forests was actually in the form of branches broken off by wind, rain or snow, or else sticks and branches removed in the course of sanitation measures. And it is not enough to explain this situation in terms of poor trading conditions shaped by the recessions on the national and international timber markets in the late 20<sup>th</sup> and early 21<sup>st</sup> centuries. Rather, the timber resources of Poland's forests are simply subject to rational management that ensures their constant quantitative and qualitative development. This is not merely because



the overall area of forest is increasing, being also a result of a steady limitation of harvesting.

Poland's timber resources are growing and are estimated to have reached 1.73 bn m<sup>3</sup> overbark today, of which 1.48 bn m<sup>3</sup> is in the State Forests. Here: a pine stand in the Lower Silesia Forest (P.F.)

*Forests serve diverse functions, either naturally or as a result of added-on human activity. Overall, these functions can be grouped as the ecological or protective, the productive and the societal.*

*Photo G.T.K.*







# Benefits from the forest

The basic task of forest management are to strive to retain the permanence of forests, to increase forest resources and continuity of use. This could be assumed to concern forests put to economic use only – nobody who would like to draw longlasting economic benefit from forest is going to allow for the kind of neglect that could lead to the exhaustion or extinction of the very source of present and future income. In other words, for purely material reasons if nothing else, the forest is worth taking care of. Clearly though, this approach is not on its own enough in the present climate of opinion.

The model widely accepted now is that of the multifunctional forest, which assumes that biologically-healthy forest ecosystems with a species composition corresponding with habitat and under rational use, will ensure the sustainable serving of all of the natural functions of forest. In this way we go far beyond the mere supplying of timber.

Forests serve diverse functions, either naturally or as a result of added-on human activity. Overall, these functions can be grouped as the ecological or protective, the productive and the societal.

The ecological (protective) functions show themselves in the favourable influence that forests exert on the global and local climate; the composition of the atmosphere; the regulation of the water cycle in nature; the counteraction of floods, avalanches and landslides; the protection of the soil against erosion and the landscape against steppification; the safeguarding of the biological potential of large numbers of species and ecosystems, as well as of the diversity of the landscape and better conditions for agricultural production.

The productive (economic) functions entail a continued capacity on the part of a forest to produce biomass. In this way the ongoing harvest of timber and non-timber raw materials (including in hunting) is provided for, along with income from the sale of goods and services and support via tax for the central and local governmental budgets.

In serving societal functions, forests shape favourable health and recreational conditions for society, create and enhance a labour market, serve in national defence, and safeguard the development of culture, science and the public's education in matters environmental. This aspect takes on particular significance within the framework of sustainable multifunctional forest management.

***The model widely accepted now is that of the multifunctional forest, which assumes that biologically-healthy forest ecosystems with a species composition corresponding with habitat and under rational use, will ensure the sustainable serving of all of the natural functions of forest.***





The significance of the forest to society may be assessed in various ways. For some a forest means tourism and recreation, a place for direct contact with nature and uniquely valuable cognitive features. For others that very tourism and rest and recreation provide a means of earning income – as not only with travel agencies, but also the ever-more-popular agritourism. The State Forests itself has a by-no-means limited tourist base, available not only to hunters. The unique beauty of Polish nature also attracts more and more visitors from abroad.

For around 30,000 Poles, the State Forests represents a place of work. Several tens of thousands live off the services rendered in the name of forestry (in afforestation, tending, harvesting, etc.). Large numbers add to their income seasonally by collecting and selling the fruits of the forest floor. And forest is of

The ecological (protective) functions of forests include the counteraction of floods, avalanches and landslides. Here: forest in the Sudety Mountains (G.T.K.)





The State Forests is a place of work for around 30,000 Poles.

Here: work in the forest nursery of the Głęboki Bród Forest District (W.Ł.)

economic significance to society in another way, as the State Forests transfers to gminas more than 80 million zł a year in forest tax. For many gminas, and most especially the ones less well-blessed – this a major component of the budget. A quite separate issue is the impact of the State Forests on the macro-scale socioeconomic development of the country.

Forest management's taking into account of societal and ecological (or so-called “non-productive”) functions is something that has found expression in the designation of forests as protective from 1957 onwards. In many areas, as for example around cities and industrial centres (or more widely in areas impacted upon by industry) or in the mountains, it is the protective function that actually prevails. However, protective status is

also conferred upon stands around health resorts and spas, those along rivers and the sea coast and those surrounding the sources of rivers and streams, those on divides and dunes, those threatened by soil erosion and those of significance to the defence and security of the country. Such a status is also assigned to forests on account of their landscapes, high silvicultural quality (as in seed stands) or valuable features from the didactic and scientific points of view.

The list of protective functions is thus very long, and each has its particular social implications. Protective forests can be said to fulfill the societal functions above all, with timber harvesting not expected to interfere with them.

In relation to the type of function they perform, protective forests are sites in which particular principles of forest management find application. Clear-cutting is restricted, the species composition is adjusted to the functions served and certain forms of recreational management are permitted (as around the large agglomerations), etc.

The total area of protective forests in Poland (as at the end of December 2001) was 3,290,000 ha, or as much as 47.3% of the total forest area. Water-protecting forests cover 1,330,000 ha, those in areas damaged by industry 635,000 ha, those around cities 628,000 ha and those protecting soils some 339,000 ha (Fig. 10).

The last two centuries have brought a c. 30% increase in the concentration of carbon dioxide in the Earth's atmosphere. The global climatic changes to be observed ever more clearly are associated with this, in the view of scientists. The provisions of international conventions, notably the UN Framework Convention on Climate Change adopted in 1992 and the 1997 Kyoto Protocol to it require our country to act with a view to intensifying the sequestration of carbon from the atmosphere and thereby counteracting the enhanced greenhouse effect. This represents a further forest function that it would be hard to overestimate.

Where the cycling of carbon is concerned, soils represent a significant reservoir. The resources of carbon compounds in soils worldwide are greater than those in the atmosphere and biomass of terrestrial ecosystems taken together. Forests play a particular role in this balance, accumulating through the absorption of carbon dioxide, but also acting as a source of its emission. Taking things globally, the biomass of forest ecosystems contains over 80% of the carbon resources held by vegetation. In turn, forest soils have some 70% of all the organic carbon present in world soils. It is thus in the protection and development of forest ecosystems that a Western civilisation troubled by its current situation seeks an antidote for ever-more-distinct climatic changes.

Polish forests at present sequester enough to compensate for around 6% of the carbon dioxide the country emits, and for nearly 10% of its greenhouse gases in general. This is a situation incomparably less favourable than in, for example, Sweden, where forests take up the equivalent of 88% of the carbon dioxide the country emits. An improvement in the Polish situation is currently being looked for in an increase in the area of forest and in the afforestation of formerly agricultural land, as well as in the restocking of forests with a major share of fast-growing species. While maintaining the permitted annual increment, there are some opportunities for gradually increasing the use made of forest and hence optimizing silvicultural measures with a view to increasing standing resources. The use of wood as fuel also offers possibilities, since this re-releases only as much carbon as it has earlier taken up (unlike fossil fuels which put back carbon that has been out of circulation for millions of years).

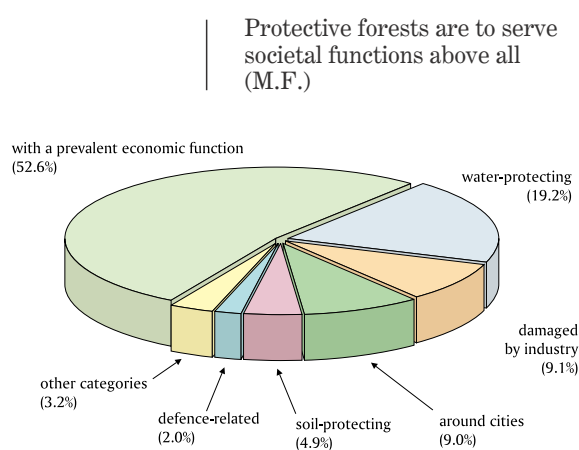
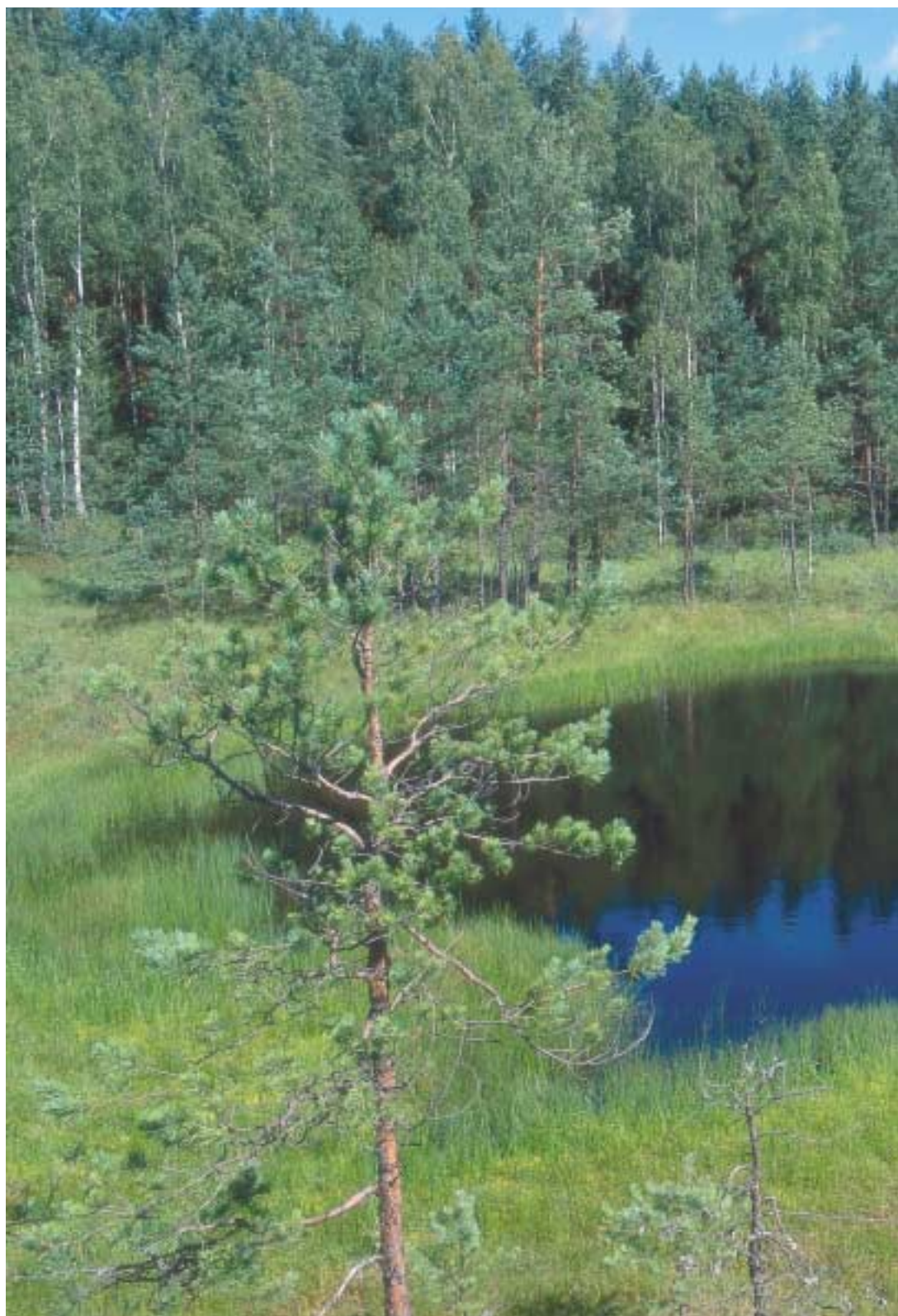


Fig. 10. The share of protective forests in the State Forests (DGLP)



*On land managed by the State Forests it is possible to find most of the most precious creations of nature accounting for Poland's uniquely valuable natural features. These also determine biological diversity, create the most attractive landscapes and offer living conditions for valuable and sometimes endangered species of flora and fauna.*

*Photo G.T.K.*







# Ecological bases

Ecodevelopment (a Polish term predating, but much reminiscent of, sustainable development) describes the human activity striving to use nature's resources in a rational and responsible manner that guarantees their preservation for future generations. There can be few if any professions whose members perceive as well as foresters do the long-term interdependence between humankind, human civilisation as it impinges upon nature and nature itself.

The ecological bases to forestry management are set out in the aforementioned Articles 7 and 8 of the Forests Act. A further development of these can be found in the *National Policy on Forests* adopted by the Council of Ministers in 1997. This designates the long-term objectives and priorities which need to be attained by forestry, among them a de novo devising or else thorough amendment of the principles and instructions in force to that time in the pursuit of forest management. This reflected the 1997 amendment of the Forests Act, as well as the *Guidelines of the Minister of Environmental Protection, Natural Resources and Forestry on the improvement of forest management on ecological bases*. One of the results was the drawing up of Forest Protection Instructions, which came into effect in the State Forests at the beginning of January 2000. Similar importance was attached to the introduction of *Silvicultural Principles and Principles in the Utilisation of the Multifunctional Forest, Forest Management Instructions, Forest Protection Principles and The Forest Code*.

On land managed by the State Forests it is possible to find most of the most precious creations of nature accounting for Poland's uniquely valuable natural features. These also determine biological diversity, create the most attractive landscapes and offer living conditions for valuable and sometimes endangered species of flora and fauna. No surprise then that one of the basic assumptions to the *National Policy on Forests* is that biodiversity in forests should be protected and enhanced. Early experience is showing that action with this aim is mainly being taken in practice in the State Forests and National Parks. The activity in private forests is sporadic, and mostly confined to some enrichment of the species composition of what is grown. It is not known whether this reflects the marked fragmentation of the stands in question, inadequate financial incentives or simply

***No surprise then that one of the basic assumptions to the National Policy on Forests is that biodiversity in forests should be protected and enhanced. Early experience is showing that action with this aim is mainly being taken in practice in the State Forests and National Parks.***



a failure to understand that biodiversity may at the same time represent an opportunity to draw more benefit from a forest.

Within the State Forests, the protection and enhancement of biological diversity is ongoing at all three recognised levels, i.e. the ecosystemic (as ecosystems are preserved), the genetic (as genetic resources are preserved) and the species-related (as efforts are made to ensure the survival of the full range of forms).

In regard to the first of the aforementioned levels, the State Forests has brought under protection more than 1100 Nature Reserves with a total area in excess of 100,000 ha. But this is not all, as the protection of ecosystems outside of Reserves is practised and perfected in 13 Promotional Forest Complexes, and indeed in all Forest Districts in stands that are close to their natural state, on the basis of the aforementioned *Guidelines on the improvement of forest management on ecological bases*.

State Forests land also has c. 10,000 legally-protected Monuments of Nature, along with 8700 Areas of Ecological Utility covering more than 28,000 ha. Nearly 16,000 fragments of forest of near-natural character have been identified, while one million ha of land within forests have been recognised as of ecological importance (including 960,000 ha of wetlands and 76,000 ha of dunes).

The systemic mechanism by which biodiversity conservation and enhancement are supported involves the *Nature Conservation Programmes* which have been required as compulsory elements in forest management plans since 1998. The overwhelming majority of Forest Districts went into the 21<sup>st</sup> century with such a plan in place, while the remainder had work on such documents in an advanced state of preparation.

An expression of the care for and interest in ensuring the genetic (and attendant species-related) permanence and biological diversity of forests comes in the 16,600 ha of Plus Seed Stands that are the subject of special attention.

The Temporary Seed Stands cover as much as 230,100 ha, while Preservation Stands occupy 2700 ha. On top of that, the State Forests has designated 8100 Plus Trees and has established 1100 ha of seed plantations and 700 ha of Seedling Seed Orchards. All of these resources represent at present the sole source from which the highest class of reproductive material for all the country's forests (public and private) can be obtained.

Valuable and diverse genetic material – apart from being protected and preserved in the natural forest environment – has also for several years now been subject to collection and preservation for the future in the form of seeds and plant parts at the Forest Gene Bank in Kostrzyca near Jelenia Góra (of which more later).



The protection and enhancement of biodiversity takes place, *i.a.*, in the Reserves located within the SF holding. Here: Dęby Wilczkowskie Forest and Floristic Reserve not far from Szczecinek (W.Ł.)





A sign of the species richness to the fauna of Poland's forests are its game animals, whose populations are among Europe's largest. Here: a red deer (I.D.)

The State Forests also take care of fauna. 2730 protective zones have been delimited around the forest-located nests of rare birds. These zones in total account for nearly 175,000 ha, with strict protection measures extending over almost 42,000 ha of that.

A manifestation of the species richness of the fauna lies in the game animals, whose numbers are higher in Poland than almost anywhere else in Europe (in parenthesis it needs to be added that excessive populations of ungulates do actually pose a persistent threat to forests).

The highest form of nature protection available in Poland is the National Park. It is worth noting that, within the total area of the National Parks, over 60% is taken by forest. The total area of National and Landscape Parks plus Areas of Protected Landscape increased by 3.2% in the years 1980–2000, to reach 32.7% of the total area of Poland (10,200,000 ha in 2001). The increase in the area of forest involved was of 5.5% – to 49.8% of the area of forest in Poland. The State Forests has long been an active participant in this important national programme, successfully implementing it in the national asset conferred upon it for management.

The principles for increasingly environmentally-friendly forestry set out in the *National Policy on Forests* recommend, *inter alia*, that advantage be taken of the natural self-regulatory processes ongoing in nature, e.g. natural renewal, with a simultaneous curbing of clear-cutting and the artificial restocking of stands. An enrichment of forest structure (introduction of understoreys) represents another way in which higher biodiversity is being worked for. In turn, the ad-

justment of the species composition in newly-planted forests to the habitat conditions there is something that favours the emergence of richer natural systems in which the silvicultural risk becomes more dispersed, such that the natural resistance of the ecosystem to different kinds of threat is increased.

The principal of the reconciling and optimisation of all forest functions, and most especially the idea of the conservation and supporting of biological diversity, was brought into forestry practice by Ordinance 11 of the Director-General of the State Forests dated February 14<sup>th</sup> 1995 on the improvement of forest management on ecological bases. This required foresters to proceed with silvicultural and protective measures in such a way that the biodiversity of forests might be retained, while productive resources were also sustained, and attention paid to the state of health and vitality of forest ecosystems. The Ordinance also stresses the need for soil and water resources in forests to be protected and the role played by forests in the global carbon balance enhanced.



The Ordinance – and its later amendment (via Ordinance 11A of May 11<sup>th</sup> 1999) obliges foresters to pursue sustainable forest management in a way that respects the laws governing nature. Both mark a decisive and final departure from the model of the so-called “normal forest” formulated as long ago as in the 19<sup>th</sup> century and assigning top priority to timber production. While it is true that the 19<sup>th</sup>-century ideas were not omnipresent in post-War Polish forestry, it is possible to cite a number of examples of undertakings of the previous system that ended in fiasco. An example might be the attempts at the “enforced” afforestation of drained marshlands, the introduction of forest into habitats alien to it, etc. Ordinances 11 and 11A bring an end to such practices, prohibiting in state-owned forests the undertaking of management activity that is unfavourable from the natural point of view.

The basis for the planning and subsequent practice of forest management on ecological foundations is the division of the country into nature-and-forest regions, making reference to a division into 8 provinces, 5 districts and 149 identified mesoregions. This division reflects an analysis of natural conditions for the

Ordinances nos. 11 and 11A of the SF Director-General prohibit economic activity unfavourable from the natural point of view, *inter alia* the draining of marshland. Here: alder forest in Rajgród FD (G.T.K.)



Among other things, management on ecological bases means leaving some old trees with holes, rotting or even dead trees, in order to increase the diversity of the habitat (P.F.)

growth and development of vegetation cover. The highest level (of the province) denotes the natural ranges of the concentrated or dispersed occurrence of such species as spruce, fir and beech.

In the mid 1990s, all the Forest Districts of the State Forests became involved in the so-called extraordinary natural inventory. This supplied data on the biological diversity of forests, the presence and populations of rare and endangered plant and animal species and the quality and extent of ecosystems, habitats and individual natural objects. The analytical material needed in making an assessment of the threat facing the different component parts was gathered, and preparations made as regards possible remedial measures. Such a natural valuation is being renewed steadily within the organisational units of the State Forests.

As has been mentioned, the management of forests on an ecological basis requires that the natural habitat conditions should determine the species composition of stands. The species composition of plantations is already set on the basis of habitat classification and the fertility of the soil. Biodiversity conserva-





tion also relates to successive stages in the life of a forest – the same conditions (habitat and soil) apply as renewal and restocking take place.

Management on ecological bases also means a limitation of the size of the timber harvest to meet the needs of silviculture and protection, the leaving of parts of old trees and trees with holes, trees that are decaying and even old trees, the introduction of admixture and biocoenotically-valuable species bringing about a biological diversification of the forest and the use of such technologies in forestry work as will allow damage in the surrounding forest environment to be minimised.

Forest utilisation by way of complex felling is now finding favour, especially where this puts in place the most favourable conditions for forest restocking (including via natural renewal). The maximum area for a clear-cut has been limited to 6 ha and cutting over large areas has now become a rarity. For years now there has also been a decline in the area clear-cut in a year – from c. 43,000 ha in 1980 to 25–30,000 ha in the last years of the 20<sup>th</sup> century.

Even on cut-over areas, it is normal to leave groups of healthy trees – amounting to c. 5% of the total – for them to die a natural death.

The enhancement of biodiversity is also served by the steady pursuit of stand reconstruction in the State Forests through the adjustment of their species composition to that proper for the habitat, as well as to changing environmental conditions (e.g. those resulting from harmful industrial or transport emissions). The stands reconstructed are those with uniform species composition that are damaged or destroyed.

So-called “stations” are now being established in forests as places particularly attractive to birds, the natural allies of foresters in the fight against insect pests. Of similar significance is the introduction of an understorey and of shade-tolerant woody and shrubby species which at the same time protect soil against desiccation and the excessive growth of the herb layer. The introduction of shrubs whose habit allows for the safe nesting of birds combines with the mounting of nestboxes or breeding “pockets” in encouraging the feathered friends of the forest.

What have come back into favour are the trees and shrubs once expunged to meet the needs of a management that focused on timber production. Using various admixtures, foresters are bringing in rare and endangered species, including wild fruit trees.

A widespread problem for Polish forestry is the intensifying water deficit. In many forest areas the level of ground waters has fallen dramatically in recent



Putting up nestboxes is one of the ways foresters help out their feathered friends (M.F.)



The “National Programme for the Augmentation of Forest Cover” anticipates an increase in the share of the country that is forest, mainly through the afforestation of agricultural land unsuited to that purpose (W.P.)

years. For this reason, the State Forests is making every effort to restore the traditional role to the so-called “small-scale retention”. The years 1998–2001 saw some 743 small reservoirs (covering a total of 930 ha) either reconstructed or put in place. Mid-forest reservoirs and small bodies of water, as well as damming structures (of which some 500 objects were reconstructed and built) serve many tasks – from improvement of the water balance in soils, through the supply of water to wildlife, up to the enlargement of reserves of water to be used in fire control.

The afforestation planned for the next half-century, or else already carried out, within the framework of the *National Programme for the Augmentation of Forest Cover* will certainly have an impact, not only in increasing the green area of stands, but also in changing the face and internal species structure of Polish forests. The binding principles and environment-friendly bases of sustainable forest management will without doubt leave their mark on the great undertaking. While it is true that the *National Programme* takes in all Poland's forests irrespective of ownership status, there can be no doubt that the tasks set out there are first and foremost addressed to the State Forests (Fig. 11).

As has already been mentioned, the *National Programme* anticipates an increase in the share of Poland taken by forest from the present 28.4% to 30% in 2020 and 33% in 2050. This is mainly to happen through the afforestation of agricultural land that is not very suitable (in the sense of economically viable).

A forest designation for land on which agriculture does not pay is justified from all points of view. This reflects both the need to increase the role of forest in environmental protection (*inter alia* through water retention, the prevention of soil erosion and steppification, the counteraction of the enhanced greenhouse effect through forests' fixing of carbon dioxide), as well as the need for the spatial order to be maintained as land is used and the landscape shaped. To put it another way, forest is able to replace all the patches of abandoned agricultural land with a benefit for nature, but also for society, which will be able to draw future advantage from its resources.

The years 1986–1993 saw 3900 ha of ex-agricultural land and wasteland afforested annually. Thanks to means from the budget and a loan from the European Investment Bank it has proved possible to increase the amounts of land afforested steadily since 1994, when c. 9400 ha were planted. By 1998 – when the *National Programme* was in force, the figure was 10,600 ha, and by 1999 – 12,400. 13,000 ha were afforested in 2000 and 11,400 ha in 2001 (Fig. 12).

The years 1995–2000, coinciding with the implementation of Stage I of the *National Programme*, saw the afforestation of a total of 111,300 ha of land, including 70,100 ha of state-owned land and 41,200 ha of land in private hands. This represented implementation of programme assumptions to the tune of 111%. Initially, it was possible to note a clear disproportion between the afforestation of state-owned and private land – to the benefit of the former. However, from 2000 on, a very considerable involvement on the part of the Forest Fund made it possible to encourage the owners of private land to become involved.

A major re-evaluation of attitudes on the part of the latter group of owners was brought about by the entry into force of the Act of June 8<sup>th</sup> 2001 on the designation of agricultural land for afforestation. For many, the monthly equivalent payment for excluding land from agricultural production and its replacement by forest plantations was a more favourable solution, such that from early 2001 it was possible to note a withdrawal of owners from previously-made declarations on afforestation (in their expectation that the equivalent under the new regulations might be obtained). The rate of afforestation was also influenced by shortfalls in the state budget, which is the source of grants for the *National Programme*, as well as by the difficult economic and financial situation of the State Forests.

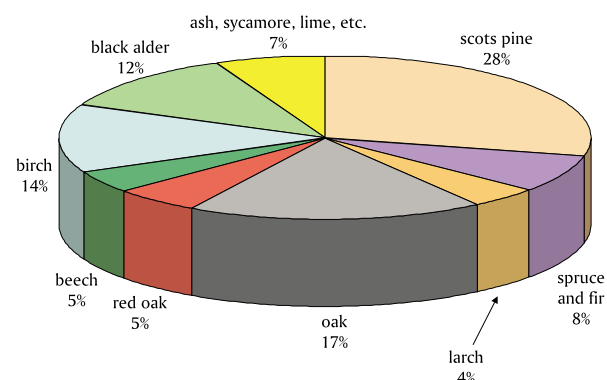


Fig. 11. Species composition of afforested areas within the State Forests National Forest Holding (IBL)

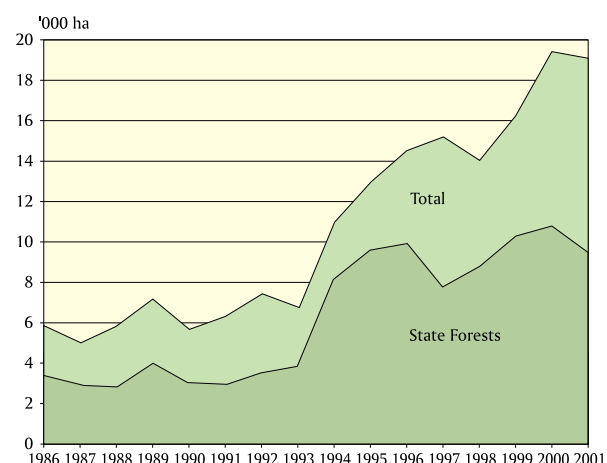


Fig. 12. Levels of afforestation in Poland, 1986–2001 (GUS)



*The long-term aspects to forest utilisation extend beyond the wishes of the State Forests alone, being an element in the policy on forests of the country as a whole. In accordance with the Forests Act, any increase in the timber harvest of a Forest District beyond that detailed in a plan may only take place where there is damage or a natural disaster.*

*Photo P.M.*







# Forest utilisation

The use of forests as a renewable resource of raw timber is dictated, not only by the demand for wood – assured by the economic conditions in which forestry is pursued – but also by the principles regulating the structure of forest resources. The basis underpinning the level of use which can be made is the principle that forest should be able to persist and experience an enhancement of its resources.

The amount of (gross merchantable) timber to be harvested in a Forest District is determined precisely as the resultant of the prescribed-cutting plan established for a 10-year period. What this gives is the planned maximum amount of timber that may be taken from mature stands ready for renewal. In turn, the amount that might be obtained in the so-called utilisation via pre-final felling – in the course of sanitation measures – can only be judged approximately, being subject to correction over time, in line with the needs of silvicultural and sanitation measures.

For statistical purposes, we accept that the annual possibilities for harvesting timber in the State Forests equal one-tenth of the prescribed final cut and planned pre-final-felling utilisation in all of the SF Forest Districts. A quantity formulated in this way is of use in comparative analysis, but needs to be treated as nothing more than an estimate. There is no way this should be identified with the mandatory annual norm for the State Forests as a whole, above all because of the approximate way in which the magnitude of the use made before the final felling is determined, as well as of the obviously variable condition forest finds itself in from year to year.

Guidelines for modern, sustainable and multifunctional forest management – within which the taking of wood represents only one element – are formulated at the stage of the forest management plan. Devised for a ten-year period in accordance with Chapter 4, Articles 18–25, of the Forests Act, in the case of Treasury-owned forests, or else in a simplified form in other cases (including that of the forest owned by the Treasury Agricultural Property Agency), the plan is the binding document throughout the State Forests and in individual Forest Districts. It is approved at the very high level of the Minister of the Environment.

As applied to the fundamental organisational units of the State Forests – i.e. the Forest Districts – the management plans contain a periodic assessment of

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#### **Art. 18. 4.**

The forest management plan provides, in particular:

- 1) a description of the forest, and of land destined for afforestation, including:
  - a) a presentation of the areas of forest, land designated for afforestation and protective forests,
  - b) a presentation of the area of forest with forest vegetation (planted), by species of tree in the stand, age class, stand quality class and forest function,
- 2) an analysis of recent forest management,
- 2a) a nature conservation programme,
- 3) a determination of tasks, including those concerning in particular:
  - a) the amount of wood to be harvested, determined by the annual allowable cut in final and pre-final felling),
  - b) afforestation and restocking,
  - c) the tending and protection of forest, including protection against fire,
  - d) game management,
  - e) requirements as regards technical infrastructure.

The transport of timber harvested within Dąbrowa FD (Z.Ś.)

the state of the forest over the areas they encompass. The qualitative description includes an inventorying of soils and habitats, a valuation of forest functions and a setting-out of management indications as regards the 10-year planning period.

The management plan contains an assessment of forest management to date, but also designates strategic management objectives, describes the choice of appropriate measures by which to regulate timber resources with a view to maintaining continuity of existence and use, and takes account of the different functions served by the forests in the given District. An element is the medium-term framework plan of forest management, which lists the undertakings to be engaged in over the ten years.

Forest-management tasks also include the large-scale inventories that are a starting point for the periodic assessment of the state of a forest and the forecasting of the development of timber resources nationwide. The detailed principles upon which forest management plans are devised and inventories of the status of forests carried out are as defined in the Regulation of the Minister of Environmental Protection, Natural Resources and Forestry of December 28<sup>th</sup> 1998.

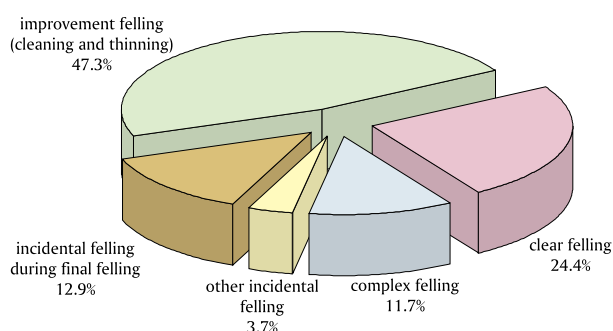
As can be seen, the long-term aspects to forest utilisation extend beyond the wishes of the State Forests alone, being an element in the policy on forests of the country as a whole. In accordance with the Forests Act, any increase in the timber harvest of a Forest District beyond that detailed in a plan may only take place where there is damage or a natural disaster. Anyone wishing to formulate an opinion on the way the State Forests uses forests should bear this plain fact in mind.

The years 1981–2001 saw the State Forests use just under 83% of the harvesting possibilities afforded it by prescribed final-cutting plans. In contrast, utilisation by way of pre-final felling – always detailed in an approximate way in forest management plans – was at a level of 134.6% of what had been anticipated (on average). The corresponding figures from year to year varied, from 102.7% in 1990 to as much as 213.6% in 1983.

The scope of the necessary work being done in forests in line with the sanitary condition at any given time has a natural influence on the amount of timber

harvested in an ad hoc manner. While the maintenance or restoration of stands to a satisfactory state of sanitation yielded 3,700,000 cubic metres of timber in 2001 (or 15.7% of the total harvest), the comparable figure for 1983 was 16.8 million m<sup>3</sup> (or as much as 73.5% of the total harvest). It is not without good reason that the guidelines of forest management plans in regard to utilisation via pre-final felling are little more than estimative. Of decisive importance in reality are the need to remove dying timber, waste-wood and windthrown trees or branches, whether these have arisen through natural processes, or reflect the possibly manmade impacts of pest out-

Fig. 13. The SF harvest of merchantable timber by types of utilisation



breaks, disasters, disturbed water relations, pollution and weather anomalies (Fig. 13).

The timber-harvesting techniques applied in the State Forests are just one more manifestation of the spread of principles of modern forest management that are environmentally-based. For years now it has been possible to observe an emphasis on the use of complex felling in the place of the less-complicated and cheaper clear-cuts that denote the complete removal of forest over large areas. While the latter still extended over c. 42,000 ha in 1992, that figure was down to just 26,000 ha by 2001 (giving only 24.4% of the total harvest) (Fig. 14).

The complex method of felling denotes the maintenance of both the existence of forest and continuity of forest processes, in that a stand at least partially retains the character it had had previously, with fragments of the mature stand, or even individual trees, being left to favour natural succession. These introduce a differentiated age and layer structure to the renewed forest and maintain water relations suitable for it, to the benefit of renewal, and later a better condition and resistance on the part of the future forest to stress-generating factors. However, far greater outlays of money and labour are needed, with well thought-out and careful removal of timber; sometimes even involving special multi-purpose machinery and equipment allowing the damage done in the forest ecosystem during harvesting to be cut to a minimum.

Analysis of the sizes of timber harvests in recent years offers justification for the claim that the process of forest use in SF-managed areas is stable in character. It is true that an increase in the level of the harvest per hectare has been observed in recent years, but this does not pose a threat to forests. The timber resources of Polish forests are used in a rational manner, ensuring their steady quantitative and qualitative development. Indicators regarding the utilisation of timber in Poland do not depart from the analogous figures in European countries with similar natural conditions. This does not negate the fact that the overall intensity of utilisation has been declining steadily and has for some years been among the region's lowest.

Specialists, especially those from outside forestry, generally consider that the ratio of increment to harvest offers an indication of sustainable development (recall that the State Forests currently harvests c. 55% of the annual increment in standing volume of timber). Nevertheless, the index in question should not go entirely uncriticised, since it is in large measure a consequence of the age structure of a forest at a given time. At the moment, for example, there is a large share of stands with large increments of which there is relatively limited utilisation. The trading conditions on the market are also a major factor. As time passes, these kinds of conditioning – being dynamic in character – will change, as will the index referred to, but this will definitely not mean that a level

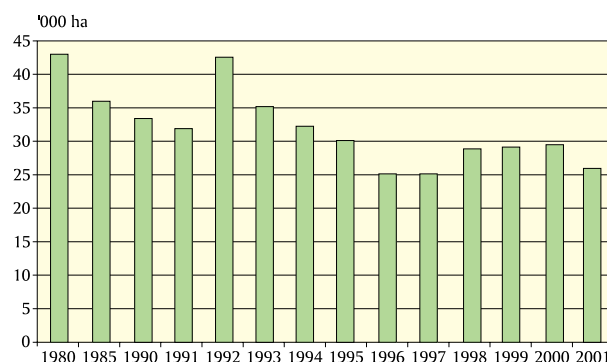


Fig. 14. The areas ('000 ha) of clear-cuts in the State Forests in the period 1980–2001 (GUS, DGLP)





An increase in a Forest District's harvest beyond the level permitted in the management plan can only take place where damage or a natural disaster has occurred. Here: making good the gale damage in Drygály Forest District (S.Z.)

much above today's 55% need be associated with ruthlessly-exploitative forest management.

Specifics of Polish forestry include a level of harvesting of deadwood that is higher than other countries in the region. Indeed, the amounts of this kind of wood taken in Poland in some cases exceed the entire output elsewhere. This reflects the general sanitary condition of our country's forests, and is also evidence of the threat posed to the forest environment here – notwithstanding the efforts made recently by industry, which have had a noticeable pro-environmental impact.

An unequivocal confirmation that the sustainable and multifunctional forest management engaged in by the State Forests is in line with world trends lies in the fact that most of the country's forests are in possession of a certificate attesting to good management in line with Forest Stewardship Council standards.

The FSC is an international NGO founded in 1993 in Toronto (Canada), with a Secretariat in Oaxaca (Mexico). Its members are environmental NGOs, organisations representing forestry and the timber industry, trades unions, certification organisations and natural persons. The FSC has almost 500 members in 57 countries, and it receives strong support from the World Wide Fund for Nature (WWF) and other NGOs.

The FSC Certification system comprises a package of standards (the so-called 10 Principles) and several tens of detailed criteria, an international accreditation programme, a certificate checking on the origin of a product, a trademark that can be applied in marketing products from certified forests and an assistance programme.

The process of certifying forest management in Poland began in 1996. It was initiated by the Regional Directorates of the State Forests at the initiative of exporters of wood products, from whom purchasers abroad were beginning to seek certification. It thus became a marketing tool for them, a way of showing that the products offered – and ways in which they were obtained – are in line with the interests of the forest environment as broadly conceived. All this has an obvious link with the expectations and growing ecological awareness of the societies in developed countries – which are, after all, the biggest consumers of timber industry products.

The conferment of the FSC Certificate on the State Forests, by the Société Générale de Surveillance (SGS) is a confirmation that the management engaged in respects all (productive, environmental and societal) functions of forests. By the beginning of 2003, a decided majority of individual SF Regional Directorates were in possession of the FSC Certificate, while its obtainment by the other Directorates is only a matter of time. This is all the more justified by the fact that the State Forests as a whole already meet the requirements of the FSC Certificate in practice, such that the stamp thereupon does little more than confirm the existing state of affairs.

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*Game management does not just lead to hunting. Among the primary objectives of hunting, the Hunting Law Act mentions the protection, preserved diversity and management of populations of game animals, in accordance with nature conservation requirements.*

*Photo W.S.*







# Not just hunting

Game animals are a sign of the species richness of the forest fauna. Their numbers in our forests make Poland one of the foremost European countries in this respect. Wildlife (not only game) represents an integral part of the forest ecosystem and resembles other components in being subject to rearing and protective measures. After all, is it possible to imagine a vibrant forest without its inhabitants?

Wildlife management is regulated by provisions of the Hunting Law Act of October 13<sup>th</sup> 1995, as well as numerous executive regulations issued by the Minister of Environmental Protection, Natural Resources and Forestry.

Poland has more than 5158 hunting districts managed by associations of hunters. The greater part of them (4779) are leased by hunters' circles affiliated to the Polish Hunting Union (*Polski Związek Łowiecki*) – an organisation provided with its authorisation to make use of such hunting grounds by the Hunting Law Act. The basic form of lease is a ten-year contract entered into between the circle and the voivod or RDSF Director appropriate to the given area. In the remaining 379 districts, game management is directly in the hands of the Forest

District, or else of the Treasury Agricultural Property Agency, scientific research units or the Central Board of the PZL.

Among the primary objectives of hunting, the Hunting Law Act mentions the protection, preserved diversity and management of populations of game animals, in accordance with nature conservation requirements. The Minister of the Environment takes account of these assumptions in designating closed seasons for game animals.

The State Forests run Game Rearing Centres (OHZs), covering some 1.8 million ha, of which 1.17 m is forest. These are hunted over by hunters from at home and abroad, with the income they generate going to cover the costs of game management.

An important part of game management is supplementary feeding in winter (P.F.)



Some 304 ha of agricultural land are in cultivation in the OHZs, for hunting purposes. The grain and root crops they provide are a source of winter supplementary feeding for herbivores. In addition, forest clearings and edges are provided with hunting plots on which the most prized foods are grown (oats, potatoes, beets, cabbage, Jerusalem artichokes and legumes). Some are also planted with different kinds of willows, or with lime, oak and rowan, in order to supply animals with stem forage. The basis task of these forest “diners” is to keep animals in the forest, and hence prevent damage on nearby cultivated fields.

Game management does not lead only to hunting, as an important element is supplementary feeding in winter. It is true that research indicates this is only a necessity (in our climate) during very snowy and frosty winters and for around 21 days in early spring, but – if the need arises – the State Forests are always ready to swing into action with help.

In every case, supplementary winter feeding should reflect a reliable assessment of the situation, since decisions not thought through may do more harm than good to the inhabitants of the forest, according to foresters. For these reasons also, the focus is usually on making natural feeding grounds available, rather than on the seemingly simple but actually extremely labour-intensive and by no means cheap process of collecting and then laying out fodder in the forest (thousands of tonnes are involved in the OHZs alone). For this reason, in snowy winters, foresters try to remove snow from bilberry patches (for deer) and “winter corn” (for roe deer, hares and partridges). Also left out in the forest are trees, e.g. pines cut in the course of tending measures, which are nibbled at by red deer (forming more than half of their winter menu). Aspen is also cut and left in the forest, its bark and stems being a good source of water. This is what foresters in Białowieża do, in order to feed the European bison capable of doing the greatest damage to forests in winter and early spring when bark and stems are the main food. The di-



Hunters associated into hunters' circles manage more than 5185 hunting districts (W.Ł.)





A feeder for forest game (A.W.)

tribution of salt licks in different places also satisfies animals' demand for minerals.

Foresters also organise browsing plots – areas of around a hectare on which the trees and shrubs most enthusiastically browsed are planted. Wild fruit trees are planted here, but generally only made available to game as they are producing fruit. Where necessary, the meadows or pastures on forest clearings are mown, or long-term crops of legume mixtures planted.

Game animals pose a constant threat to early plantations and young stands (the scale of this phenomenon and means of preventing it are described in the chapter “What threatens our forest?”). Each year damage is also done to several thousand hectares of crops (on account of this, in 2001 alone, the State Forests paid farmers some 7,400,000 zł in compensation). For this reason too, rational game management and control of animal numbers within a balanced forest eco-systems is of great importance to the State Forests.

Species	Take	Population
Moose	–	275
Red deer	7 926	26 925
Fallow deer	740	3 100
Roe deer	12 623	54 002
Mouflon	227	791
Wild boar	13 004	16 308
Hares	451	14 707
Pheasants	116	3 372
Partridges	213	5 878
Foxes	4 189	10 654
Ducks	1 883	14 788
Geese	373	4 144

Numbers and takes of game animals in the SF in 2001

*SF-managed areas include in excess of 1100 Reserves. Let us then recall that there are around 1300 Nature Reserves in Poland as a whole.*



*Photo G.T.K.*





***While the National Parks are under separate jurisdiction, they are often no more or less than specific kinds of enclave on the forest map of Poland. Invariably they border on to State Forests land, ensuring that the SF and the National Parks are required to cooperate over the growing, protection and management of forests, and over hunting. After all nature has no respect for administrative boundaries.***

## Important centres of conservation

The forms of nature protection provided for in law and applied on State Forests Land are Reserves, Landscape Parks, Areas of Protected Landscape, Monuments of Nature, Documentation Sites, Areas of Ecological Utility and Nature and Landscape Complexes.

It has already been noted that SF-managed areas include in excess of 1100 Reserves. Let us then recall that there are around 1300 Nature Reserves in Poland as a whole.

While it is true that the National Parks (of which there are 23) may not by law be administered by the State Forests, it is nevertheless impossible not to recall the major role that the SF played in their establishment. This is how it was with Poland's first National Park at Białowieża, for which the idea came before the Second World War from the State Forests (which ran the place until the War broke out). The Białowieński NP is thus on land handed over by the State Forests, as is Babiogórski NP in southern Poland. The beginnings of the Tatra Mountains (Tatrzański) NP, as well as the 1980s onset of work on Lake Wigry (Wigierski) NP, also owe much to SF activity over many years in protecting Poland's most valuable forest ecosystems.

While the National Parks are under separate jurisdiction, they are often no more or less than specific kinds of enclave on the forest map of Poland. Invariably they border on to State Forests land, ensuring that the SF and the National Parks are required to cooperate over the growing, protection and management of forests, and over hunting. After all nature has no respect for administrative boundaries. Finally, it is a characteristic fact that the managerial staff of the Parks are in the main graduates of forestry faculties that mostly have a spell of work with the State Forests behind them.

The highest form of the areal protection of nature in the State Forests is the Nature Reserve. Nature Reserves are areas in which ecosystems, habitats, certain species of plant or animal or features of inanimate nature are preserved in a natural or near-natural state, ensuring that they are of particular natural, cultural, landscape or scientific value. The decision to recognise such an area as a Reserve is taken by the voivod, who determines territorial extent (with a buffer zone as necessary), particular goals of protection, relevant limitations, bans and orders and the identity of the body to exercise direct supervision over the Rese-

rive. It is worth noting that foresters are very often the initiators seeking recognition of areas as Reserves.

It is possible to draw a distinction between **Strict Reserves**, in which passive protection is applied (with all natural processes proceeding spontaneously, free of human interference), and Reserves enjoying partial protection, in which measures of an active nature are taken (provided that these lead to the retention of whatever the object that is subject to protection may be).

Poland has slightly over 100 Strict Reserves covering a total of 4700 ha. In spite of appearances, this type of protection – though often acclaimed – cannot take in too many areas. Changes in the natural environment down the centuries at the hand of man have proceeded so far that leaving shut-off areas to their own devices will not of itself bring about the desired aim. Even if a Strict Reserve is left entirely free of direct human interference, it will – alas – never be possible to exclude the negative influence from the surroundings (even those at great distance), which will inevitably undermine the natural configuration of forces whose preservation is after all what is being aimed at. For this reason, the Strict Reserves need to be the subject of constant monitoring and scientific analysis.

In the Reserves under partial protection – where the rigours are slightly different and protection focuses on a selected natural object, forms of human support are tolerated. It is, for example, allowed for stands to be reconstructed – at least to a limited extent, for mowing or livestock grazing to take place and for water relations to be restored actively. If measures do not threaten the object under protection, it is also possible for limited management activity and felling to be carried out. Often it is the rational cutting of selected trees – and especially those alien to the habitat – that opens the way for natural succession and the expansion of native species that had previously been suppressed. All of this serves in the preservation and development of a diverse, well-developed stand structure.



Several of the National Parks were established on land handed over for the purpose by the State Forests. Here: marshy birch forest by Lake Wigry in Wigierski NP (W.Ł.)



*The areas administered by the State Forests also play host to Landscape Parks – areas that are protected on account of their valuable natural, cultural and historical features. These relatively large areas under management show in practice how activity of this kind can be reconciled with nature conservation. This is also true of the forest management carried out in the Parks.*

The Reserves under partial protection have protection plans devised for 20-year periods, whose provisions must be taken account of in local physical development plans. The protection plans in place for Reserves on State Forests land are the responsibility of foresters themselves (in accordance with Article 54 of the Forests Act). Work is commissioned from them by the voivod, and costs resulting from the implementation of such plans should be supported by grants from the state budget.

The distribution of the 1100 Nature Reserves on SF land is not even. Most are present in the north-east and in Central Poland. Their area varies between well under a hectare and several thousand.

The commonest kind of Reserve is – not surprisingly – the Forest Reserve, the type accounting for more than half of the total. One of the largest (covering more than 1700 ha) is the Kurińskie Marsh Reserve in the Augustowska Forest (Forest Districts of Augustów and Piaska), which protects an extensive area of marshy forest and fragments of fresh coniferous forest. Rare plants to be met with here are marsh tea, clubmosses and sphagnum mosses, while the fauna includes cranes, moose and wolves.

Forest is not the only subject of special care on the part of the State Forests. Protection also takes in **whole peatland ecosystems**, for example, with their numerous species of protected plant and animal, and the lakes or ponds in the middle of forests. There are many **Floristic Reserves**, which most often encompass meadows and peatlands within forests, in order that the endangered and rare plant species – above all – might be protected. There are also **Faunistic Reserves**, in which breeding colonies and nesting sites for such birds as herons, cormorants, black storks, white-tailed eagles, lesser spotted eagles and eagle owls are protected. Elsewhere, the main subjects of protection may be European bison, beavers, the European pond terrapin or even rare species of butterfly or beetle.

In the **Reserves for inanimate nature**, foresters extend special care to post-glacial landforms, rocks, erratics, caves and springline areas. In turn, the preservation of (more or less forested) landscape-scale structures of an exceptional nature is achieved in **Landscape Reserves**.

The areas administered by the State Forests also play host to **Landscape Parks** – areas that are protected on account of their valuable natural, cultural and historical features. These relatively large areas under management show in practice how activity of this kind can be reconciled with nature conservation. This is also true of the forest management carried out in the Parks.

Landscape Parks are called into being by the voivod. In force within them are protection plans drawn up for 20-year periods and approved by voivods. Where a Park lies within an SF-administered area (and this is in fact the case for all of them), the tasks linked with nature conservation are conferred upon the Forest Inspector, who works in line with the protection plan – as taken account of in the forest management plan of the Forest District.



Still another form of nature protection in SF-administered areas is the **Area of Protected Landscape**. Here the tasks are, i.a. to preserve the linkage between areas subject to more rigorous forms of protection like National Parks, Reserves and Landscape Parks. To put it another way, they are their own kind of ecological corridor stretching between more or less isolated ecosystems (most often of forest), and thereby allowing for the migration of animals among other things. The significance of the Area of Protected Landscape is not confined to this, however. Areas are given the specific status because of the exceptionally valuable landscape features they include, as well as the diverse ecosystems predisposing them for the development of tourism, rest and recreation. This status is to forge a permanent link between the maintenance of these valuable features and the relative ecological balance.

Areas of Protected Landscape are called into existence by voivods or gmina councils. They are taken account of in planning studies and in forest management plans. Protection plans are not drawn up for them, however.

The Nieznanowo Forest Reserve within Hajnówka Forest District and the Białowieża Forest (P.F.)



The “Loving Couple” is a Monument of Nature near Krutyń, within the Mazurski Landscape Park (P.F.)

**Monuments of Nature** represent the oldest form of nature protection. They are separate forms of animate or inanimate nature (or assemblages thereof) of particular scientific, cultural, historical/remembrance-related or landscape value. Specimen trees and shrubs are so nominated, along with springs, waterfalls, landslides, rocks, ravines, glacial erratics and caves. In Poland there are more than 33,000 Monuments of Nature in total, among which the great majority are in fact single trees.

State Forests land includes almost one-third of Poland's Monuments of Nature, and such a status has been assigned to c. 8000 of its individual trees. Other objects of the kind may be groups of trees or elements of inanimate nature.

It is true that the protection of Monuments of Nature is mostly of a passive nature, though the old trees can require careful tending and conservation.

A new form of nature protection ushered in by the Nature Conservation Act 1991 is the **Area of Ecological Utility**. In the meaning of the Act, this is a residual part of an ecosystem worthy of protection on account of its significance for the preservation of unique genetic resources or types of environment. It represents an augmentation of the system of protected areas formed by National Parks and Reserves, being of service in the protection of local biodiversity.

More than 8700 Areas of Ecological Utility have now been established on land administered by the State Forests. These cover a total area of 28,000 ha. It is thus clear that this type of protection is above all linked to small areas, albeit ones of a high degree of naturalness, like marshes in forests, peatlands, meadows and blanks, oxbow lakes, ravines and gullies.

**Documentation sites and Nature-and-Landscape Complexes** are yet other new forms of protecting nature brought into being by the State Forests. The first it is true concern objects of inanimate nature, like the places of occurrence of geological formations, fossils or mineral formations, as well as fragments of exploited or worked-out quarries, but are nevertheless represented by 33 examples on State Forests land. Of these, no fewer than 13 are within the Katowice SF Regional Directorate.

Created by decisions of a voivod or resolutions of a gmina council, the Nature and Landscape Complexes are in turn to offer a means by which to protect exceptionally valuable fragments of the natural and cultural landscape with a





view to their valuable aesthetic features being retained. Those knowledgeable in this matter note that the provision involved is interpreted ambiguously, such that it has proved equally possible to invoke it in protecting both harmonised ecological systems in a forest landscape and agricultural ones, e.g. palace/manor complexes with surrounding parks, gardens, lakes, ponds or woodland complexes.

60 Nature and Landscape Complexes have so far been created within the State Forests, the greatest number in the Łódź Regional Directorate.

The State Forests have unquestioned achievements in the protection of animal species. For example, before the War it made a notable contribution to the work to save the European bison. However, it also has to its credit a host of less-spectacular everyday undertakings that taken together are perhaps just as

The State Forests has undoubted species conservation achievements to its name, including the saving of the European bison (P.F.)

The State Forests has long participated in the programme to inventory and protect the wolf (G.T.K.)



important. One example might be the setting-up of artificial breeding places and “stations” supplying birds with safe places to reside and breed. Nestboxes and feeders are not hard to come across in Poland's forests. Anthills are fenced off, in turn, so that wild boar do not destroy them. Of course, nobody is saying that – in helping birds and beneficial insects – foresters are not at the same time helping themselves. Birds are after all their allies in the fight against insect pests, while ants are the dustmen (or rather women) of the forest. The hayracks and other feeders present in forests provide winter grazing for herbivores, including European bison. But this is as good for the forest as it is for them, since it prevents them from browsing and trampling on young plantations.

The State Forests has long taken part in the programme to inventory and protect the wolf and the forest grouse species.

Sometimes all that is needed is work in harmony with the forces of nature. Here is an example. In 1995 the Jedwabno Forest District (Olsztyn SF Regional Directorate) took on from the Army some 2404 ha of the “Muszaki” military training grounds, in the expectation that these would need extensive “renaturalisation”. As it turned out, the District was able to apply to the authorities in the then Olsztyn voivodship – as early as in January 1996 – for the recognition of 1640 ha of the site as one of the aforementioned Areas of Ecological Utility. For years, except at the times of actual manoeuvres, there had been nothing to disturb the peace. The results – the Olsztyn region's largest lek for black grouse; roosting cranes and numerous other protected birds; wintering white-tailed eagles; wolves putting in an occasional appearance; and otters and beavers present from the mid 80s as military activity began to go into decline. The decision was taken to leave the area to the forces of nature and the effects were rapid. Beavers brought about a raising of the water table (the armed forces had previously drained the many peatlands and bogs with a network of ditches), thereby improving habitat conditions for nearby tree stands, especially of birch. The dieback of spruce which had been observed in the area came to a halt. Aquatic insects like dragonflies appeared, cranes bred and the black grouse found the

conditions so ideal that they colonized permanently. This is just one piece of evidence that there are many ways of working for biological diversity in the State Forests.

The State Forests plays a role in national programmes to reinstate the peregrine falcon, roller and European pond terrapin. It cooperates with Wolinski National Park in reintroducing the eagle owl, in the return of the lynx to Kampinoski National Park near Warsaw, and in the restoration of the Apollo butterfly to the Sudety Mountains. It works to protect the European bison actively, as well as within the framework of the national programme for the conservation of bats. It also protects nest sites for white-tailed and lesser spotted eagles, black storks and eagle owls.

There is of course no way of discussing in brief even the most valuable and interesting natural objects that are subject to protection and present on land managed by the State Forests (those interested should rather resort to a rich literature, including Dorota Zawadzka's book – published by the SF Information Centre – entitled *Ochrona przyrody w Lasach Państwowych* ("Nature Conservation in the State Forests"). It is from the latter that some of the data presented here have been taken. The multiplicity and exceptional character of these naturally and scientifically valuable features combine with the fact that many are actually the result of SF initiatives and efforts since its earliest days to make it clear that our organisation pays the greatest attention to this kind of issue.

***The State Forests plays a role in national programmes to reinstate the peregrine falcon, roller and European pond terrapin. It cooperates with Wolinski National Park in reintroducing the eagle owl, in the return of the lynx to Kampinoski National Park near Warsaw, and in the restoration of the Apollo butterfly to the Sudety Mountains.***



*Three categories of threat are posed to the forests of today. There are **abiotic threats** (the result of the action of factors in inanimate nature, e.g. the climate), **biotic threats** (arising thanks to the impact of living organisms) and **anthropogenic threats** (brought about by human activity).*

*Photo Z.Ś.*





# What threatens our forest?

## Under constant stress

Poland's forests are amongst Europe's most threatened. This reflects a number of mutually-augmentative factors together ensuring that the health condition of our forests is far from ideal. The forest can be said to be living under constant stress. The periodic appearance of even one factor capable of inducing such stress (a mass outbreak of pests, a drought, fires or epiphytoses) may lead to a breakdown of the natural biological resistance of forest ecosystems, with catastrophic consequences.

Forestry draws a distinction between three categories of threat posed to the forests of today. There are **abiotic threats** (the result of the action of factors in inanimate nature, e.g. the climate), **biotic threats** (arising thanks to the impact of living organisms) and **anthropogenic threats** (brought about by human activity).

Abiotic threats are first and foremost conditioned by the geographical location of Poland. Forever meeting over Polish territory are the influences exerted by the oceanic and continental climates. This results in frequent weather anomalies like large variations in temperature, sudden ground frosts (even in late spring), periods of abundant or extreme rain or snow, sudden floods and long-lasting droughts, gale-force winds, etc. Overlapping with these are soil properties such as humidity (a low level of groundwaters) and fertility (especially on sandy and formerly agricultural soils), as well as physiographic conditioning (in mountain areas).

Forests suffer from outbreaks of pest insects and fungal diseases which occur in great variety and at differing intensities. It has been clear for some years that the period between the most serious outbreaks is on the decline. New ones are appearing and the areas of occurrence are expanding. The state of health of species of broadleaved trees is deteriorating – a problem since these were previously considered relatively resistant to industrial pollution. Alas, the last decade has been marked by an activation of new and hitherto little-known insect and fungal pests, which were not considered to have done more major damage in the past.

In Polish forests, the greatest damage is done by the cyclically-present folivorous pests feeding on pine stands (e.g. the nun moth, pine sawflies, pine

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Abiotic	Biotic	Anthropogenic
1. Atmospheric factors <ul style="list-style-type: none"> <li>• weather anomalies <ul style="list-style-type: none"> <li>– warm winters</li> <li>– low temperatures</li> <li>– late frosts</li> <li>– hot summers</li> <li>– heavy snow and hoar frost</li> <li>– gales</li> </ul> </li> <li>• thermal/humidity-related <ul style="list-style-type: none"> <li>– low humidity</li> <li>– floods</li> </ul> </li> <li>• wind <ul style="list-style-type: none"> <li>– prevailing direction</li> <li>– gales</li> </ul> </li> </ul> 2. Soil properties <ul style="list-style-type: none"> <li>• humidity-related <ul style="list-style-type: none"> <li>– low water table</li> </ul> </li> <li>• fertility-related <ul style="list-style-type: none"> <li>– sandy soils</li> <li>– ex-agricultural soils</li> </ul> </li> </ul> 3. Physiographic conditions <ul style="list-style-type: none"> <li>• mountain conditions</li> </ul>	1. Stand structure <ul style="list-style-type: none"> <li>• species composition <ul style="list-style-type: none"> <li>– prevalence of coniferous species</li> </ul> </li> <li>• non-concordance with habitat <ul style="list-style-type: none"> <li>– coniferous stands in broadleaved habitat</li> </ul> </li> </ul> 2. Insect pests <ul style="list-style-type: none"> <li>• primary</li> <li>• secondary</li> </ul> 3. Infectious pathogenic fungi <ul style="list-style-type: none"> <li>• leaves and stems</li> <li>• trunks</li> <li>• roots</li> </ul> 4. Excessive presence of herbivores <ul style="list-style-type: none"> <li>• large mammals</li> <li>• rodents</li> </ul>	1. Air pollution <ul style="list-style-type: none"> <li>• power supply</li> <li>• municipal management</li> <li>• transport</li> </ul> 2. Water and soil pollution <ul style="list-style-type: none"> <li>• industry</li> <li>• municipal management</li> <li>• agriculture</li> </ul> 3. Land conversions <ul style="list-style-type: none"> <li>• mining</li> </ul> 4. Forest fires
		5. Damage <ul style="list-style-type: none"> <li>• poaching and theft</li> <li>• excessive recreation</li> <li>• mass collection of forest-floor products</li> </ul> 6. Improper management <ul style="list-style-type: none"> <li>• excessive adherence to plans</li> <li>• Overutilisation</li> <li>• abandonment of tending</li> </ul>

Stress factors impacting upon the forest environment

lappet moth, pine looper moth and pine webworm. The greatest outbreaks of primary (leaf-eating) insect pests occurred in the years 1979–1984 and 1992–1994. Trees damaged and weakened (*inter alia* by the impacts of pollutant emissions) are attacked by secondary pests like the spruce bark beetle and the blue pine wood-borer), which feed in timber. These made a particular impact on stands in the years 1981–1985 and 1993–1994. There was also an unprecedented activation of insects that had hitherto been a marginal presence (like the fox-coloured sawfly European pine shoot moth and the *Brachyderes incanus* beetle).

The range of occurrence of pest insects and number of species thereof increased markedly in the years 1961–1990. While there were mass outbreaks of 38 species between 1961 and 1970 (with 20 combated comprehensively), and while these effected destruction over c. 600,000 ha, the years 1981–1990 saw mass outbreaks of 56 species, of which 46 were serious enough to necessitate rescue action – over no fewer than 7 million-plus hectares.

In broadleaved stands, the most serious damage is in turn done by the oak tortrix moth and geometer (for example, measures to protect forest against them were taken over 1879 ha in 2001). Chafer beetles are also capable of posing a serious threat (having to be combated over as much as 2,200,000 ha in 2001), as



The biggest damage to Polish forests is that done by folivorous pests – such as the nun moth – feeding in pine stands (S.K.)

are their grubs in the soil, which destroy root systems in nurseries, plantations and reafforested ex agricultural land. Weevils also feed in plantations.

For years, the stands most endangered by pest insects have been those of northern Poland (the western Mazurian Lakeland), the north-west (the forests of the Pomeranian and Wielkopolska Lakelands) and the south (the Sudety Mountains, Opole-Silesia and the High Beskids) (Fig. 15).

Since 1946, the State Forests has been involved in the consistent devising of “Assessments of the Occurrence of the More Important Pests and Infectious Diseases and Forecasts of their Appearance”. These are short-term forecasts helping to ensure that remedial measures are taken in a timely fashion, such that protection against – and the combating of – harmful forest insects is achieved efficiently.

Just as with insect pests, so the threat posed by **infectious fungal diseases** has also increased steadily in recent decades. It is sufficient to note that, while the damage done by them was noted over some 100,000 ha a year at the end of the 1950s, the figure was in excess of half a million ha in the years 1992–95, and had exceeded 740,000 ha by 2001. Fungal infections manifest themselves, *inter alia* in the dieback of pine shoots, in root rot, and in attacks on such broadleaved species as oak, beech, birch, ash and poplars. However, constant monitoring is making clear that, while the threat from pathogenic fungi – especially those attacking the root system – is being maintained at a high level on formerly agricultural land, the dynamic to the increase in

this type of threats to forest as a whole is not. This reflects both the efforts of foresters to improve the condition of forests and a general decline in vulnerability having its origins in reduced levels of industrial pollution.

**Serious damage** to forest ecosystems, above all in the younger stands of age class I and in the early plantations aged 1–10 and 11–20 years, is done by **game animals**. These pose a constant

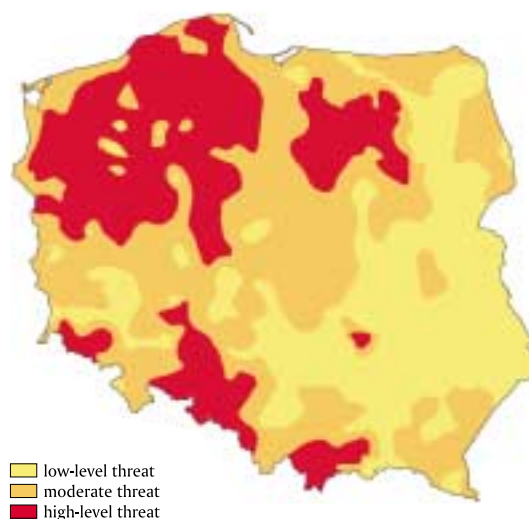


Fig. 15. Zones of threat to Poland's forests posed by primary and secondary insect pests (IBL)

threat, especially where numbers ensure that a forest can no longer satisfy gluttonous appetites. It is estimated that up to 7% of the trees in the young and older plantation stages fall victim to browsers. Damage in excess of 20% is noted on c. 5000 ha of the seedling stands and c. 7000 ha of the sapling stands. In these circumstances it becomes necessary to engage in the costly safeguarding of trees against browsing and tapping.

The State Forests is thus involved with a range of protective measures against herbivores involving, for example, the placing of guards, application of repellants (chemical agents discouraging herbivores from browsing young shoots), etc. Nearly 100,000 ha of forest a year are involved (with more than 10% being stands of age class I). In protecting young forests from game, the State Forests reaches, not only for chemical and mechanical means – which can prove ineffective. It also fences off many hectares (over 31,000 in 2001). The work is unfortunately undone, not only by animals in search of food, but also by certain people rather lacking in imagination.

**Anthropogenic threats** to forests result mainly – though certainly not only – from the pollution of the atmosphere by emissions of sulphur dioxide and oxides of nitrogen, as products of the combustion of fossil fuels in industry, power supply, households and transport by land, sea and air. In turn, the main source of emissions of ammonia to the atmosphere, waters and soil remains agriculture. Extractive industries bring about dramatic losses of ground-water and consequent drying-out of stands, or else have the opposite effect, with water filling depressions in the land created unexpectedly by subsidence. Moonscapes created by the dumping of industrial wastes of not-fully-known chemical composition, spoil heaps forever yielding toxic dust, and rivers and streams poisoned by discharged mine-waters – this is frequently the landscape that Poland's declining heavy industry has left behind it. Finally, there are the tourists and berry- or mushroom-pickers who still fail to appreciate the asset forests represent.

Yet even this list is a far from exhaustive one when it comes to the listing of the threats to forests posed by people – to say nothing of the particularly direct threat posed by (and economic losses incurred through) the activity of those lovers of other people's property – the timber rustlers and poachers.

Measures to protect against game animals in the State Forests take in almost 100,000 ha a year. Here: a spiral guard safeguarding the tip of the stem (G.T.K.)







Schoolchildren participate in the “Tidy the Forest” campaign (M.F.)

Acidifying gaseous pollutants initiate a wide range of disease processes in forests, in extreme cases even leading to total die-off. Nitrogenous compounds give rise to eutrophication, which is to say an over-fertilising of ecosystems that changes vegetation cover to the benefit of those species better able to compete where availability of nitrogen is high.

Fortunately, the period since the late 1980s had brought a continuous, step-by-step decline in emissions of the main air pollutants. Studies made over forest areas in the last 5 years of the 20<sup>th</sup> century confirm the trend. Equally, the recent period resembles those of the past in seeing above-average emissions of sulphur dioxide and oxides of nitrogen in the south of the country.

### Trees lose their leaves

A measure of the health status of forests is the level of damage done to leaves of trees, considered scientifically in relation to the reduction in the assimilatory surface area, and popularly in terms of the “defoliation index”. This is in turn related to standards for healthy trees in the given habitat and climatic conditions.

Systematic assessments of the level of damage in forests have been in progress within the framework of State Monitoring of the Environment since 1989. Since 2001, the impairment of the assimilatory apparatus has been checked in regard to some 24,000 trees growing on around 1200 permanent observation plots designated in pine, spruce, fir, oak, beech and birch stands. This has given a mean defoliation index for the country as a whole of 2.73. There has been a fall in the proportion of trees in which there is greater than 25% defoliation, though all species are not doing equally well. The condition of oak and pine stands has improved a little. For years, the most limited damage to conifers was that affecting pine, while fir was hardest hit. Among the broadleaves, in turn, it was oak stands that were worst defoliated (though still less badly than those with fir), while beech was least affected (to an even lesser extent than pine). (Fig. 16)

While the observed steady improvement is welcome, comparison of levels of damage observed in Poland with those recorded elsewhere in Europe (on the basis of the 2001 EU/UN-ECE report on damage to Europe's forests) show that the level of damage in Poland is still one of the highest to be noted. In the climatically-similar countries of the Sub-Atlantic Region, only the Czech Republic has trees in a clearly worse state (though Slovakia's problem is similar to that of Poland). If countries with somewhat different climatic conditions are also taken

into account, then we find that greater damage is to be noted in Ukraine, Italy, Moldova and Bulgaria. Moreover, it can be seen that Poland's neighbour countries to the east and south resemble us in having an exceptionally low (less than 20%) share of trees in class 0 (no defoliation), when the situation is looked at from the perspective of the continent as a whole.

### The forest burns fast

Forest fires may be looked at equally as abiotic, biotic and anthropogenic threats. Aspects in each of these areas exert an influence on the frequency and scale of such disasters.

3000–8000 ha of Polish forests are hit by fire each year. In the period 1992–2001, fires broke out as many as 84,000 times (46,000 times in the State Forests). Some 54,500 ha of forest fell victim to the flames in this period.

Our forests may be considered Central Europe's most flammable, in connection with the species composition and age of stands, habitat type and the productive and non-productive functions served. Vulnerability to fire is favoured by the high (c. 60%) share taken by coniferous (mostly pine) forest habitats, and the domination exerted by pine itself. The soil cover present in pine stands ensures that even a small fire will easily convert into one that is hard to extinguish, spreading rapidly in the wind and affecting stands from top to bottom.

Likewise, the conditions most favourable to the outbreak and spread of fire are those present in age classes I–III (i.e. stands up to 60 years old). These stands are in the decided majority in Poland.

The threat due to fire is intensified by the long-term consequences of industrial emissions and the more immediate effects of successive outbreaks of insect pests or fungal diseases, since these defoliate crowns, encourage root dieback and treefall and leave the dry brushwood on the ground in an ideal condition for catching fire.

Furthermore, the fire threat is obviously very much determined by climatic conditions. It is meteorological conditions, especially those related to precipitation, which set the limits of the forest-fire season (in Poland's case between March and October).

Taking account of stand species composition and age, climatic conditions, geographical location (proximity to industrial centres and urban agglomerations) and the actual frequency with which fires were observed, the Forestry Research Institute produced a 1970s categorization of the potential fire threat to Poland's forest areas. The Forest Districts were assigned to either category I (a high level of threat), II (moderate) or III (low). Assessments have been ongoing since, with account on a day-to-day basis being taken of air humidity and the humidity of the litter layer (as impacted upon by the improvement due to precipitation). Fore-

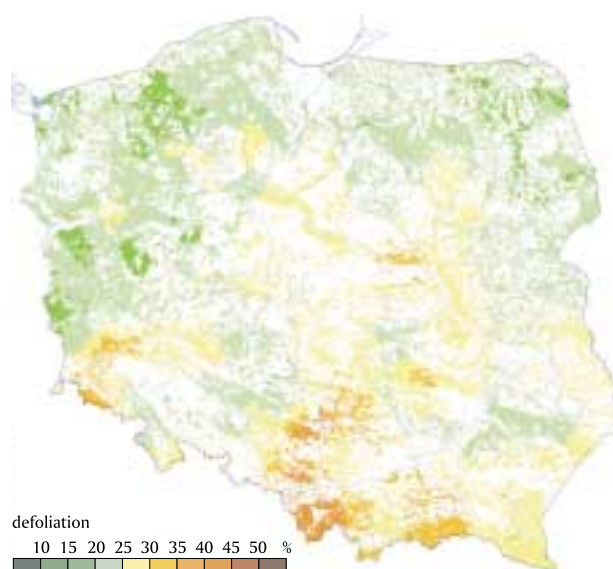


Fig. 16. The 2001 level of damage to Poland's forests as based on defoliation assessments



3000–8000 fires break out each year in Poland's forests (B.U.)

casts generally relate to several Forest Districts at a time, with Poland being divided into 34 such forecasting zones. A forecast is then made each morning, using satellite imagery and data from the European and national synoptic networks. The forecasts are transmitted to all Forest Districts in the different zones, as well as to the relevant Fire Brigade headquarters. Where necessary, warnings are also made available to radio and TV stations. (Fig. 17).

The average size of a State Forests forest fire in the 1990s was 1.28 ha. However, 1992 was an exceptional year with its catastrophic fires in the Forest Districts of Rudy Raciborskie (Katowice RDSF) and Potrzebowice (Pila RDSF), where thousands of hectares were consumed. This took the average fire size for that year up to as much as 3.58 ha. In comparison, the mean figure for 2000 was down to "just" 0.35 ha (though this still meant that a total of "as much as" 1767 ha still went up in smoke. The respective figures for forests under all types of ownership were 0.56 ha and 7013 ha, while the number of fire events in the year was 12,500.



Alas the main cause of forest fires remains as ever (in 50% of cases on average) deliberate arson or else lack of care and thoughtlessness (as with the burning of meadows next to a forest).

The decline in the area affected noted for many years now is a testament to the ever greater capacity to nip fires in the bud, before they assume their full destructive force. This is the result of an ever more effective system by which fires are detected in the State Forests. This comprises an observation network of several hundred watchtowers, including some outfitted with closed-circuit TV, as well as aerial patrols involving several tens of planes and helicopters at the times of biggest threat, taking off from forest airbases). An important element in the system is a well-developed communications network. The State Forests also has its own firefighting units.

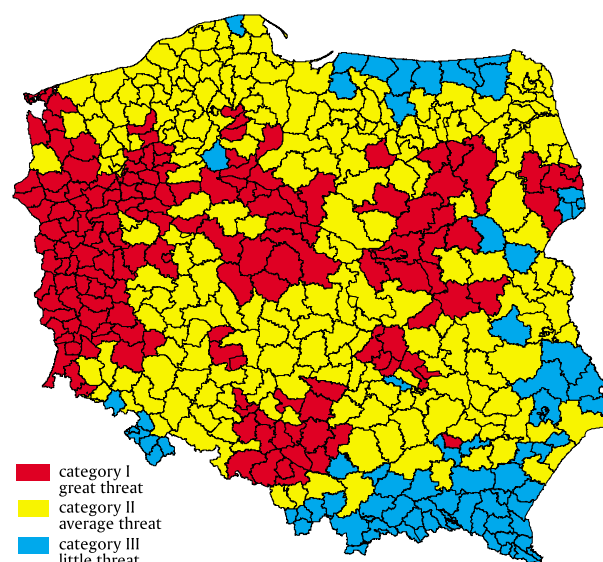


Fig. 17. A map of the Forest Districts with a breakdown by categories of fire threat (IBL)

*Crisis phenomena in forests, including the mass dieoff of stands, large fires, the damage done by gales and devastating floods, all offer support for the contention that the kind of integrated and durable organisation that the State Forests represents is best suited to coping with the severe challenges that unpredictable nature can pose.*

*Photo W.L.*









# Facing up to catastrophes

## In the Sudety Mountains

The death of Sudety forests has been ongoing for many years now, and has assumed a frighteningly progressive character. It has entered the professional literature as an example of human shortsightedness, a perfect illustration of the catastrophic consequences of unceremonious human intervention in the natural environment and disturbance of the balance in forest ecosystems. The almost clinical case is the ecological catastrophe in the Izerskie Mountains.

As early as in the 14<sup>th</sup> and 15<sup>th</sup> centuries, the Sudety Mountains had also developed pastoralism, mining and iron-working, later linenmaking and papermaking. The forest supplied fuel and building materials. Commencing in more easily-accessible areas, deforestation gathered pace rapidly. However, a real moment of truth came with the 18<sup>th</sup> century, when over-exploitative utilisation gave way to planned intervention with stand species composition and structure. In place of clear felling in natural mixed stands, spruce monocultures were brought in. The fast-growing spruce met the needs of the developing economy better than other species. The area of upland pastures also grew – by the first half of the 18<sup>th</sup> century they accounted for 30% of the area of the Karkonosze Mountains. A method of management applying the so-called trail fellings of widths 15–20 m was taken up, with seed-producing spruce, beech, fir and ash being left. The method did not favour natural renewal, however, mainly as a consequence of the strong mountain winds. The solution was thus to bring in still more spruce, with the lack of local seed resulting in imports of material from throughout Europe (from 1880 onwards, it was seedlings that were planted, rather than seeds). The process of expelling the native species adapted to the difficult mountain conditions was thus ongoing, with their place being taken by alien populations not as well-suited to these areas.

From 1914 on, the only means by which forestry was pursued in the Sudety Mountains was the clear-cut, with stands renewed artificially through the planting of young spruces. And while, from that time on, varieties of alien origin were excluded, the even-aged spruce monocultures introduced by the hand of man came to dominate the area almost entirely. The last sentence to be passed on the Sudety forests came from industry in more contemporary times. This time the threat was posed by air full of sulphurous and nitrogenous compounds,

***The death of Sudety forests has been ongoing for many years now, and has assumed a frighteningly progressive character. It has entered the professional literature as an example of human shortsightedness, a perfect illustration of the catastrophic consequences of unceremonious human intervention in the natural environment and disturbance of the balance in forest ecosystems.***



sooty particulates, acid rain, etc. It soon became clear that the distorted Sudety stands were defenceless in the face of such agents of destruction.

As the centuries passed, the Sudety landscape had become increasingly bereft of mixed stands, as well as of the single-species stands with a 30% share of spruce but still major admixtures of fir, beech, sycamore, ash, elm, birch and rowan – i.e. healthy forests capable of self-renewal. The mountains became covered with a forest that was more than 90% spruce – often with trees of unknown origin and by the nature of things largely unresistant to the impacts of external factors. The consequence had to be a degradation of forest habitats on an ever greater scale, over ever greater areas and occurring with ever greater frequency. These took the form of catastrophic damage done by wind, snow and insect pests.

The greatest crisis was that inflicted upon the Western Sudety Mountains, wherein the prevailing wind direction left stands vulnerable to inputs of airborne pollutants from industry in the Czech Republic (previously Czechoslovakia)

The ecological disaster in the Sudety Mountains – a consequence of unrestrained human interference in the natural environment (G.T.K.)

***The saving of the forests in the Izerskie and Karkonosze Mountains became a matter of honour for the whole of Polish forestry. Those taking place in the effort were not merely the local SF employees. Several tens of forest districts throughout the country offered help, as did the Polish Army and the country's youth.***

and the south-eastern part of Germany (ex-GDR), as well as the power-plant complex of the so-called “Black Triangle” near the meeting-point of the borders between the above two countries and Poland. The spruce forests of the Western Sudety Mountains began to die off in waves. Suffice it to say that, following two years of drought, the 1984 timber harvest from the damaged stands was more than 5 times as great as that assumed in the annual cutting plan for Owieradów Forest District, and three times as great as that designated for Szklarska Poręba Forest District. Equally, in the first half of the 1980s, the harvest in these two Districts had derived entirely, or almost entirely, from sanitation felling.

Stands over almost a quarter of Szklarska Poręba FD's 13,200 ha of forest land began to die off. For years they suffocated in an atmosphere polluted by industry. Insect pests like the larch budmoth, web-spinning sawfly or spruce bark beetle did the rest. The whole Forestry District is classed within the group of protective forests. But what of it, if  $\text{mg/m}^3$  concentrations of sulphur dioxide, sulphates, nitrates and particulates were respectively 2, 3, 4 and 5 times the standards set for specially-protected areas. Rain of even pH 2.2 fell here – acid capable of eating into the needles and leaves of trees. Degradation of surface and ground waters went hand in hand with this. Soils were acidified too, and there is no shortage of opinions holding that this will remain the case for several hundred years, though the optimists say it might just be a question of several decades. Plants go short of potassium, calcium and magnesium (as there is only half as much now as there was in the years before the disaster), as well as of phosphorus in forms that can be taken up easily (now characterised by a 75% short-fall).

In the years 1980–1988, the mass dieoff of trees and stands in the Western Sudety Mountains (Izerskie and Karkonosze ranges) resulted in a need to remove forest over some 15,000 ha (with a yield of as much as 4.6 million  $\text{m}^3$  of timber). In turn, 1993–1995 brought a mass dieoff of spruce forest in the Central Sudety Mountains (Kłodzko Basin) requiring the removal of 3.5 million  $\text{m}^3$  of dead standing wood. Earlier the Sudety Mountains had come through an outbreak of the spruce bark beetle (necessitating removal of 900,000 cubic metres of timber in the years 1946–1951), catastrophic gales of 1955 and 1966 (requiring the removal of 500,000 and 1,500,000 cubic metres of timber respectively), and a serious outbreak of the larch budworm over 32,000 ha in the years 1977–1982. In 1997, the Sudety and later all of Lower Silesia and the Oder basin were hit by unprecedentedly heavy rainfalls and flooding. A year later, high waters again returned to the Zdroje Forest District in the Kłodzko Basin. Together these two disasters cost the Forest Districts in the Sudety region some 66 million zł. And these are just some of the problems.

The saving of the forests in the Izerskie and Karkonosze Mountains became a matter of honour for the whole of Polish forestry. Those taking part in the effort were not merely the local SF employees. Several tens of forest districts throughout the country offered help, as did the Polish Army and the country's youth. Also mobilized were the scientists of schools of agriculture, the Forestry



Research Institute, the Forest Gene Bank in Kostrzyca and the modern containerized forest nursery in Onielka Forest District.

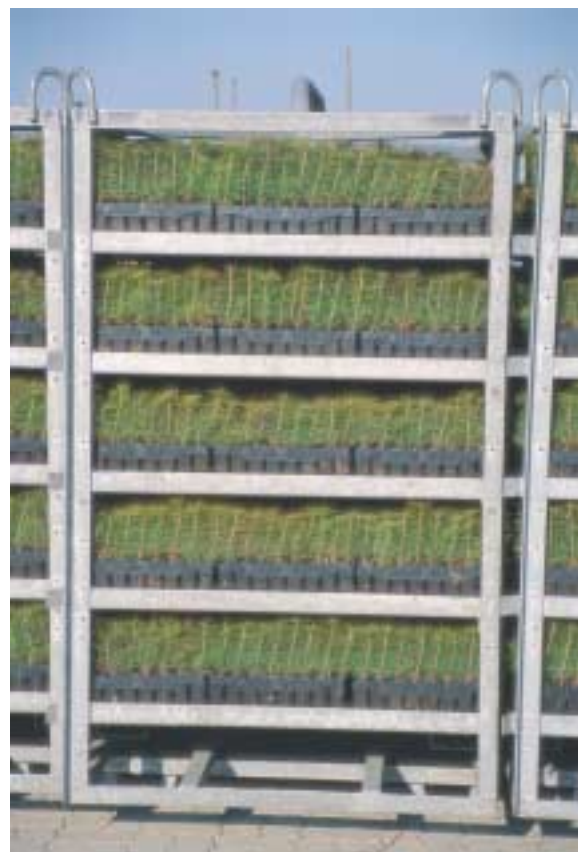
Effective renewal over the extensive deforested areas had as its aim protection against erosion, degradation and acidification. A further intention was a rapid reconstructing of stands in the direction of an increased share in the species composition of broadleaved species and larch. In the years 1981–1997 alone, renewal took in a total of more than 17,000 ha. In many cases it was necessary to reconstruct whole forest ecosystems, adjusting them to changes in the local microclimate and habitat, choosing appropriate species, arrangements of trees, forms of mixture, etc. Being implemented within the framework of this work is a programme for the reinstatement of the Sudety ecotype of the fir (i.e. the so-called Hercynian fir). This is a very sensitive form which was the first loser in the battle with industrial emissions – to such an extent that it almost disappeared from the Sudety landscape.

The share of fir in the Sudety stands is just over 3% at present, and it is estimated that it should be around 18%. Bearing in mind the shortage of seed material, special care has been taken to preserve the best specimens of this species. For example, in 1998, 113 surviving firs were selected within Szklarska Poręba Forest District, such that a 7-ha seed plantation might be established in 2001, within Kamieniecka Góra sub-district. A major role in the entire effort is being played by the Forest Gene Bank in Kostrzyca.

In the course of the restocking work, the larch has made its reappearance in the Sudety Mountains, along with such broadleaved species as beech, alder, rowan and birch. The native spruce has not been forgotten either.

The higher one ascends, the poorer the species composition. In order to reduce the risk attendant in silviculture, larch has been introduced to the spruce zone at altitudes of 900 to 1100 m a.s.l. This reflects a relatively great resistance to atmospheric pollutants on account of the species' deciduous habit. The species may also play a stabilizing role in the stand, protecting it against the effects of high winds. In extreme conditions, the dwarf mountain pine is being tried out, while broadleaved species are confined to the birch and rowan only. In turn, the lower one goes, the richer the species composition. Beech, sycamore and various admixtures go in in the better habitats, while the fir is also being reinstated.

Game animals also make their presence very much felt to the foresters in the Sudety Mountains. Plantations are protected against deer using guards, chemical protectants of saplings (repellants) and fencing. However, even mice are able to do major damage – for example causing losses over 1200 ha in the Szklarska Poręba Forest District in 1990.



The container nursery  
in Śnieżka Forest District (W.G.)

***The big fire came back to Potrzebowice on August 10<sup>th</sup>, just a little after four o'clock in the afternoon – thanks to the damaged brakes on one of the carriages of a train traveling along the busy main line. Just under two hours later, the flames were already raging four kilometres from the track. The first 1000 ha of forest was lost in an hour.***

It emerges that planted trees also need to be protected against ground frosts (again by special guards). This reflects the specific and very severe microclimate that develops over more extensive deforested areas – on July 23<sup>rd</sup> 1996, a near-ground temperature as low as  $-10^{\circ}\text{C}$  was noted in the mountains. Even spruce of native origin froze in these conditions. The further peculiarities of deforested areas include unconfined winds and high-speed blizzards that pile snow on the nearest stands. A water shortage may also be tangible in summer (as the lack of old trees limits the raising of water from the depths via well-established root systems) – rainwater runs off excessively into valleys, raising the threat of flood there.

Over large areas it has proved necessary to revitalise the soil by treating it with magnesium-rich dolomitic limestone. The success achieved with plantations has improved markedly as a result.

From 1996 onwards it has been possible to observe a clear slowing of the rate of forest dieback in the Sudety Mountains, and an improvement in the state of sanitation. This has been a reflection of pro-environmental investment by industry reducing poisoning of the atmosphere on the one hand, and of the value of the huge efforts made by foresters on the other.

Nevertheless, some 10,000 ha of Sudety forests remain in the zone of major threat, while as much as 180,000 ha of stands are moderately or somewhat threatened. The situation is still bad in many places, but foresters are doing everything in their power to ensure that future generations are able to hear the wind blowing through the Sudety trees.

### **In Potrzebowice**

Fire brings instant death to the forest and the exceptionally hot and for this reason dry year of 1992 is etched into the memory of foresters from the Notecka Forest. When fire broke out there in the June of that year – and destroyed 571 ha of forest in Wronki and Potrzebowice FDs (Pila Regional Directorate), nobody suspected that it was just a foretaste of what was to come.

The big fire came back to Potrzebowice on August 10<sup>th</sup>, just a little after four o'clock in the afternoon – thanks to the damaged brakes on one of the carriages of a train traveling along the busy main line. Just under two hours later, the flames were already raging four kilometres from the track. The first 1000 ha of forest was lost in an hour. Trees burnt, and the etheric oils released by conifers also burst into flame. If the fire had continued to spread forward at such a rate it would only have taken 10–20 hours to destroy the whole of the Notecka Forest – considerably more than 100,000 ha. Firemen found themselves helpless, but nature came to the rescue. A storm with torrential rain that had been awaited for weeks put out the flames a little after midnight on the first day.

Nevertheless, eight hours of fire had brought about the destruction of some 5600 ha of state-owned forests and c. 300 ha of private ones. Several hundred buildings had been lost in what was perhaps the fastest-moving fire in the history of post-War Europe. Fortunately – almost miraculously – no one died.



The fire site in Potrzebowice needed renewing from scratch. In removing the effects of the catastrophe, a role was played by each of the Forest Districts making up the Pila SF Regional Directorate. The planned cuts there were abstained from and the damaged area divided into sectors whose restoring to order (removal and sale of timber and renewal) were assigned to the different Forest Districts. There were times when several thousand people were working on this at any given time. Over 10 months, nearly a million cubic metres of timber were removed from the site (which is to say almost as much as had been harvested throughout the Pila RDSF in the course of a year).

With a view to the upcoming forest being of greater diversity than its predecessor in terms of species composition, the decision was taken to leave all trees, shrubs and even lichens showing even the most limited signs that they might survive. The individual trees or small surviving fragments of forest were to serve as ecological niches and to offer a refuge for animals. It was, however, a mistake to count on the forces of natural renewal over such an extensive area. It is true that several hectare-sized experimental plots were marked out on the fire site,

The great fire in Potrzebowice arose thanks to the railway (A.)



Potrzebowice just  
after the fire... (J.D.)



...and with eight years  
of restocking work behind it  
(T.Z.)



and left to the forces of nature, and it is also true that the first self-sown trees appeared rather quickly in the immediate vicinity of the surviving forest edge. Nevertheless, the process of natural renewal in the area burnt over to some depth would have taken several tens of years even so.

As has been noted, the concept for restocking the burnt-out part of the Notecka Forest assumed a change in species composition. Prior to the fire, the affected areas (like the Forest as a whole) had been dominated by Scots pine. Bearing in mind that the area is natural habitat for pine, it was necessary to leave it with such a role, and indeed it does continue to prevail over 68% of the stand. Nevertheless, the aim has been to give the remaining 32% over to broad-leaves. This offered an increase in the biodiversity of the stands, with attendant strengthening of natural resistance, not only to fire threat, but also to outbreaks of insect pests (it needs to be mentioned here that as much as 80,000 ha of the Notecka Forest had to be cut down more than 70 years ago, on account of a catastrophic mass outbreak of the pine noctuid moth). No fewer than 80 million seedlings were planted in the course of the restocking effort.

The disaster-hit area is now the subject of a drawn-up and implemented concept of fire protection. The renewed forest is separated by special firebreaks designed to prevent spread from one section to the next, and hence to limit any future fire to a maximum of 1000 ha. Railway lines in particular have come to be associated with especially wide firebreaks – once bitten, twice shy.

In relation to this, the fire in Potrzebowice did have its judicial epilogue, as the SF turned to the perpetrator PKP-Polish Railways for damages. Four years after the catastrophe it was estimated to have brought losses of 50 million zł (at current prices, including interest). A court case unprecedented in the history of Polish law is still in progress, though October 22<sup>nd</sup> 2002 brought the signing of a partial settlement under which the railways agreed to pay out 20 million zł.

### **In Rudy Raciborskie**

The fire in Rudy Raciborskie (for this is what it has come to be called recently, even though it in fact affected the Forest Districts of Rudy Raciborskie, Rudziniec and Kędzierzyn) was one that broke out on August 26<sup>th</sup> 1992. It resembles the fire in Potrzebowice in also having broken out following the movement of a train through the forest. It has now entered the history books as one of the greatest catastrophes in the history of Polish forestry. In the documented history of Upper Silesia it was a tragedy without compare. It lasted 18 days in total, though the entire rescue action extended over almost four weeks. Here again, it was nature that ultimately came to the firefighters' rescue, as rain began to fall at last on September 1<sup>st</sup>.

The burn affected some 9062 ha of forest (4480 in Rudy Raciborskie FD, 2352 ha in Rudziniec and 2230 ha w Kędzierzyn). The fire perimeter was over 100 km long.

At its peak, the firefighting activity occupied 859 sections of the Fire Brigade (4700 people), along with 3200 soldiers, 650 members of the police force, 1220

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The fire at Rudy Raciborskie was one of the greatest catastrophes in the history of Polish forestry (A.)

members of the Civil Defence and 1150 employees of the forest services. 24 planes and 4 helicopters doused the flames, while tens of heavy tractors were in use, 36 railway water tanks, SF own fire appliances, etc.

Two firefighters lost their lives in the flames and the clean-up operations subsequently also took their toll of human life.

The direct action to put out the flames cost an estimated 6.5 million zł (at today's prices), of which 1,200,000 fell upon the State Forests. Losses to stands may have been of as much as 35,460,000 zł, including 1.31 million in technical infrastructure.

Economists measure the losses in terms of millions of dollars, but naturalists see this as the extermination of an entire world of flora and fauna. Water relations – of which the forest is the main regulator – will be changed for years. The fire site became a steppe – two years after the cataclysm, the daily view was of tens of whirlwinds making their way across the open landscape, whipping up dust and ash from the ground. The huge deforested area offered no resistance to the strong and constant winds blowing over the incinerated land surface.



The surface (humus) layer of soil was entirely destroyed. Shortly after the fire there was a period over which the whole surface was covered by a 20–30 cm “fur” of glowing humus, in places attaining a depth of as much as a metre.

The forest no longer protected the soil against the degradation caused by industrial emissions. The next stage was thus the acidification of soils, manifesting itself in the unchecked expansion of tall grasses offering ideal fuel for further fires.

Damaged trees are in turn easy prey for pest insects, and their natural enemies in the form of birds could not easily find a place to live in the new conditions. So as not to resort to chemicals, while at the same time protecting every healthy tree that had managed to survive, foresters took up exceptional measures, taking bark samples from each individual tree, and removing those found to be under attack from insects. Single dead trees were left, however, as perches for the birds of prey anticipated as allies in the fight against the anticipated mass appearance of small mammals.

In the immediate aftermath of the fire's extinction, work began on the cutting-down of the burnt and dead stands. Over two years, it was necessary to haul away as much timber as is usually harvested over 15. There were no buyers for the severely-burnt 15–30 year-old timber. Bearing in mind the complete annihilation of the humus layer, it was decided that the 60,000 m<sup>3</sup> of timber and branches from the stands would be chopped up and returned to the land surface, in the hope that the barren substratum might begin to be revitalised.

February 1993 brought the Programme for the Management of the Rudy-Rudziniec-Kędzierzyn Fire Site drawn up with the assistance of the forestry science centres. The affected 9000 ha had become a massive plantation site and some 100 million seedling trees and shrubs were introduced into it.

A first priority was to tend the young forest. In the face of the ongoing serious threat of fire – to which uniform and even-aged young plantations are so particularly vulnerable – it was necessary to bring the entire site within a system to safeguard against fire. This comprises special breaks located either side of roads from north to south and east to west. Together extending over more than 183 km, each comprises a 5-metre belt of meadows or fallow land, 5 metres of shrubs and 90 metres of stand with no conifers (pines or spruces) present.

In 1994, the Kuźnia airstrip for planes and helicopters was installed in the Rudy part of the fire site. This has two enormous tanks of water plus fire-fighting equipment. The fire prevention system is augmented by 4 observation towers and 22 points at which to take water.

The first stages of work on the degraded land saw pioneer species (pine, birch and larch) brought in. Their basic task is to create the appropriate micro-climatic conditions into which such target species as beech or oak can be introduced. Particular care is also taken to encourage the self-seeded trees that did appear in large numbers in the affected area.

To meet the needs of the regeneration of the fire-devastated ecosystems, Europe's most modern container nursery was built in Nedza forest sub-district

***February 1993 brought the Programme for the Management of the Rudy-Rudziniec-Kędzierzyn Fire Site drawn up with the assistance of the forestry science centres. The affected 9000 ha had become a massive plantation site and some 100 million seedling trees and shrubs were introduced into it.***



Restocking work on the fire site (A.)

(Rudy Raciborskie FD. This produces seedlings with covered root systems. Such seedlings, though more expensive than the traditional ones, ensure a markedly better suitability of cultivation (the plants “take” more easily), and later lower operating costs. The nursery produces 8 million seedlings (mostly with mycorrhizae) each year.

The mycorrhizae – fungi living symbiotically with the roots of woody plants – guarantee trees not only a more effective uptake of nutrients and water from the substratum, but also protection against invasions by pathogenic organisms. It would obviously be pointless looking for signs of mycorrhizal fungi at fire sites (but also for that matter in ex-agricultural soils or those degraded by industrial pollution). Here the helpful fungi were destroyed completely, and it is necessary to resort to a method of inoculating the roots of seedlings with the relevant symbiotic fungus in the nursery.

It is in large measure thanks to the use of seedlings with mycorrhizal associations in restocking and reforestation – using the latest technologies (including biopreparations devised by a team of scientists under Prof. Stefan Kowalski) – that there has been such success with the great operation to save the sites which had fallen victim to the Rudy Raciborskie fire, and to restore life to them.

\*  
\*       \*

Why did such catastrophic fires have to take place? Can the blame be placed solely with longlasting drought? Scientists emphasise that the Potrzebowice fire lasted only 8 hours, but was capable of destroying as much as 6000 ha of forest. They see this as possible because it found conditions to develop in the pine monoculture. The fire at Rudy Raciborskie – which took in “only” one-third more land than that in the Pila area – lasted very much longer, and the stands there were more varied, such that the fire could not move like lightning. But the ultimate source of the catastrophe in Rudy needs to be looked for in the long-term impact of industry. Silesia's habitats burn so frequently and so well because they are degraded by industrial emissions, with the result that the forests are well-illuminated, and in consequence very much exposed. Instead of their natural herb-layer vegetation, their floors have an often very-inflammable substitute that is excessively luxuriant, thanks to the inputs of nitrogen compounds from pollution. The species present are reed grasses and ferns. Thanks to the drought (and this was its only impact), the growing season for both kinds of vegetation had ended as early as in August. At that point a spark was enough to set the destruction going.

### **In the Piska Forest**

The greatest damage to Poland's forests for several decades was that done on July 4<sup>th</sup> 2002 by a gale which developed over north-eastern Poland in the early afternoon. The gale steamrollered its way along a belt c. 130 km long and 10–20 km wide, flattening thousands of hectares of forest. Nature sustained quite heavy damage, and several generations of foresters will have work to do as a result. The gale left behind it a nightmare “battlefield” landscape extending for kilometres, in which trees were uprooted or simply torn from the ground.

As a result of the gale, windthrown trees were to be found on a scale hitherto unmet-with in the Piska Forest (Forest Districts of Pisz, Drygały and Spychowo), the Kurpiowska Forest (Ostrołęka, Nowogród and Łomża FDs), the Borecka Forest (Borki, Czerwony Dwór and Giżycko FDs), the Augustowska Forest (Płaska and Szczebra Districts) and the Romincka Forest (Goldap Forest District).

The wind broke timber with a total volume well in excess of 3.5 million cubic metres. For comparison, the assumed pre-disaster harvest for the whole of the State Forests in 2002 was of 23.6 million cubic metres. The Białystok SF Regional Directorate, whose Forest Districts were hardest hit, harvests around 2 million cubic metres a year. The losses incurred were to an estimated value of 300 million zł.

Destructive winds are nothing new to the foresters administering this part of the country. It would suffice to note that Pisz Forest District (in which the damage of July 4<sup>th</sup> 2002 was greatest) obtained 19,000 cubic metres of its 158,000 cubic-metre harvest of 2001 from windthrown timber. In Drygały Forest District, taking second place with Nowogród District in the sad ranking as regards the July damage, windthrown and waste wood supplied nearly 28,000 m<sup>3</sup> in 2000 and

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A destructive gale blew down 17,000 ha of stands in the Pisz Forest (S.Z.)

9000 in 2001 (where the annual harvest is of around 100,000 cubic metres). In January 2002, the Borecka Forest and Forest Districts of Olecko, Suwałki and Giżycko fell victim to gales that felled stands with a total biomass of 500,000 m<sup>3</sup>. But all this was as nothing compared with what the November gale achieved. It broke or threw trees over almost 33,000 ha, completely destroying stands over 17,000 ha. One-tenth of the area of the Piska Forest was lost, and in Pisz Forest District itself the stands damaged accounted for almost one third of the entire area.

Great damage was done in Nature Reserves, and in the protective zones around the nest sites and places of occurrence of protected species. The gale did damage over almost two-thirds of the Ciemny Kąt Reserve (Nowogród FD), one third of the stands in the Wyspa Lipowa Reserve (Czerwony Dwór FD) and one third of the Borki Reserve (in Borki FD). Temporary seed stands covering a total of 780 ha were also damaged.

The gale also destroyed many tourist facilities, forest car parks, campsites, etc.

Losses on such a massive scale required extraordinary action. To this end, a regional headquarters for the response was established on July 5<sup>th</sup> in the Białystok RDSF, and work got underway methodically in regard to the restoring of order. A precise inventory of the damage was first drawn up, and forces and technological means then assigned. It was clear from the beginning that the Forest Districts hit by the catastrophe would not themselves be able to deal with its effects. The HQ therefore began to determine the level of the help that would be needed from other Forest Districts and Regional Directorates. In the first place, it was necessary to clear windthrown trees from forest roads.

One of the most burning problems (if one may excuse the phrase) was to prevent fires from breaking out on the sites of disasters. The summer was hot and dry, so a very high level of risk was maintained. While the voivod of Podlasie instituted a complete ban on entering forests, there were still roads to travel, and the more curious simply flouted the ban, perhaps not even comprehending the enormous danger they were putting themselves and others in. There were after all vast areas of unstable, damaged and dried-out trees and branches, a local atmosphere saturated with terpenes and etheric oils, such that any use of flame would have posed a further major threat to forest, those working in it and those living locally in rural areas and in Pisz. Bearing all this in mind, two extra forest



The far-reaching effects are hard to foresee. Here: destruction in Pisz Forest District (S.Z.)



***The site was divided into plots of between 50 and 200 ha. These were assigned to the forest service departments (ZULs) as delegated – along with foresters and sub-foresters – from the Districts of the Białystok and Olsztyn Directorates. Almost 3500 people were engaged in removing the effects in 2000, including over 3000 sawmen and specialist backup. In the Pisz Forest District alone some 10,000 m<sup>3</sup> of timber was harvested daily.***

airbases were organised, while tower-based and ground-patrol observations were stepped up. More than a hundred kilometres of firebreaks were put in place in the Forest Districts of Pisz, Drygały and Nowogród.

Foresters were faced with the question of how to manage the excess of timber available from north-eastern Poland. As early as on July 5<sup>th</sup>, the Director-General of the State Forests called for an end to be put to the planned cuts in the SF Regional Directorates of Białystok, Olsztyn and Warsaw, in order that wood made available by the catastrophe might be used first.

At a working council convened between the Director-General and foresters from the Piska Forest on July 9<sup>th</sup>, principles by which work was to be carried out in the disaster area were determined, along with a plan by which other Districts of Białystok Regional Directorate (and other Directorates) were to help out.

The site was divided into plots of between 50 and 200 ha. These were assigned to the forest service departments (ZULs) as delegated – along with foresters and sub-foresters – from the Districts of the Białystok and Olsztyn Directorates. Almost 3500 people were engaged in removing the effects in 2000, including over 3000 sawmen and specialist backup. In the Pisz Forest District alone some 10,000 m<sup>3</sup> of timber was harvested daily.

The State Forests managed to reach agreements on the taking of more pine pulpwood with the country's largest customers for it (the cellulose and paper-making plants in Świecie, Kwidzyn and Ostrołęka). A deal with the Ostrołęka power plant involved the supply of fuelwood chips (it is estimated to be able to burn even 300,000 m<sup>3</sup> of such a year). On the other hand, the most valuable, large-dimension cuts of softwood had to be protected against depreciation by being immersed in local bodies of water.

While the more distant effects of a disaster on such a scale are hard to foresee, foresters in such situations must always count on an influx of secondary insect pests. It is not known whether nature will be able to take care of the situation unaided, or if wide-ranging emergency measures will have to be taken (e.g. the spraying of chemicals). A priority task for foresters in the first years after the catastrophe in fact became to bring the sanitary state of the forest back to order; and to take particular care of the stands adjacent to those that had been damaged.

The biotic and abiotic threats to forest are hard to anticipate. The phenomenon of secondary inundation of land is possible, or else the opposite – the drying-out of land, changes in microclimate (big leaps in temperature, strong heating of the land and drought, severe ground frosts in winter, soil erosion, etc.). Stands that remain also pay the price.

It results from the concept for the silvicultural and protective management of post-disaster sites (as devised by the Białystok RDSF), that the restocking work will require as many as 136.5 million seedlings (including 110 million of Scots pine, 11 million of spruce, 5.5 million of birch, 3.7 million of oak and 2.7 million of alder). Their generation is the task for the nurseries of the Białystok Directorate, which is preparing for a restocking effort on the grand scale. Thou-





sands of hectares of plantation will have to be fenced at once, in order to protect them from the appetites of game animals.

A subject for analysis has been the proposal that c. 2000 ha be left to natural succession (with no clearing of windthrown trees). This would be Europe's largest undertaking of this kind, a unique testing ground for science which is also of hard-to-overestimate significance for forestry practice, as well as for the education of the public. The team of scientists, foresters and NGO representatives established by the Director-General is now to determine the principles upon which to proceed in this designated area.

The question as to the total costs of restoring forest to land devastated by gales will be premature for some time yet, and may indeed prove impossible to answer satisfactorily. Money is still going to be needed. In the first phase, foresters focused on saving that which could still be saved, setting themselves the task of cleaning up – by the end of May 2003 – the wood most in danger of depreciation (lying timber and windthrown fragments). This is important on account of the aforementioned threat posed by secondary pests. To meet their initial needs, those seeking to save the forest quickly obtained some 5,500,000 zł from the Forest Fund. A 20 million zł loan was also secured from the National Fund

Clearing up gale damage  
in the Pisz Forest.  
Receiving timber (A.R.)

***The Forest Gene Bank – the first object of its kind in Poland and one of very few in Europe – was opened on December 13<sup>th</sup> 1995. This is the GEF's largest technical and organisational undertaking and at the same time yet another material testament to Polish forestry's implementation of the Convention on Biological Diversity ratified by Poland.***

for Environmental Protection and Water Management. A solid response to SF appeals also came from the Funds for Environmental Protection and Water Management at voivodship level. The boards of Funds from even long distances away (as in Western Pomerania or Katowice) did not turn the request down. On the strength of an agreement signed on October 29<sup>th</sup> 2002 by the Director-General of the State Forests and the heads of 10 Voivodship Funds, a grant worth 4 million zł in total was conferred for the restoration of order to disaster-hit forests and the purchase of necessary equipment. The State Forests is also counting on the receipt of funding for this purpose from EU funds.

By late autumn 2002, the day-to-day costs of removing the effects of a gale had come to be covered by income from timber sales.

### **The Forest Gene Bank – guaranteeing a future**

The environmental disaster in the forests of the Sudety Mountains was an impulse behind the search for effective methods by which to preserve and protect endangered forest species and ecosystems in Poland. The decision was taken to establish the Forest Gene Bank – an institution for which protection of this kind (e.g. against natural disasters) would be the primary task. The guidelines for such an undertaking were drawn up by the Directorate-General of the State Forests in 1992, in cooperation with the Institute of Dendrology of the Polish Academy of Sciences in Kórnik and the Forestry Research Institute. The technical assumptions thereto were accepted by a team of experts, including from the World Bank.

The FGB is in Kostrzyca, in the Śnieżka Forest District (it would probably be hard to find a better location). Its development cost 12,000,000 zł (at today's prices). The greater part of this came from the State Forests, though some was covered by a grant from GEF, the Global Environment Facility of the World Bank, as assigned for the support of the biodiversity conservation programme, and some from the means of the National Fund for Environmental Protection and Water Management, the Ecofund Foundation, a Voivodship Fund for Environmental Protection and Water Management, the Forestry Research Institute and the EU's PHARE Programme.

The Forest Gene Bank – the first object of its kind in Poland and one of very few in Europe – was opened on December 13<sup>th</sup> 1995. This is the GEF's largest technical and organisational undertaking and at the same time yet another material testament to Polish forestry's implementation of the *Convention on Biological Diversity* ratified by Poland.

The Forest Gene Bank has as its task the collection of the genetic resources contained in seeds, pollen and tissue fragments of vegetative and generative organs. These are resources that will be representative of all the seed stands, plus trees, the oldest (more than 200-year-old) trees irrespective of species, and the shrub and herb-layer species of endangered plant biocoenoses.

In three cold rooms there is enough space to store 20 tonnes of seeds from the most valuable Polish stands. At low temperature the seeds of forest trees

(that have previously been dried) may be kept for several decades and still retain the necessary vitality and germinability. For the seeds of some species (oak, maple and sycamore), as well as the plant tissues, the technology foreseen is that of deep freezing in liquid nitrogen, ensuring that the dormant plant parts may wait unharmed for their “five minutes” for even as much as 200 years. All of the technological processes involved are steered and monitored automatically.

The tasks of the FGB also include the inventorying of forest ecosystems and sites whose genetic resources are earmarked for conservation. It acts, not only in the name of the preservation of populations heading for extinction, but also for their active reinstatement.

The first seven years of functioning of the gene bank has seen some 4000 objects collected, including those deriving from 518 stands of the highest genetic quality, and just under 2500 from the most valuable individual trees. More than 300 items originate from seed plantations, progeny plantations and preservational stands, as well as other areas of particular importance for forest genetics.

Alongside its basic resources, Kostrzyca also preserves strategic resources of the seeds of economically-important forest trees. For example, in the year 2000 – to meet the needs as regards the reinstatement of beech in the Western Sudety Mountains – some 40 tonnes of beech seeds were collected from south-west Poland. Some 35 tonnes of seed from the species were also collected in 2001 – a mast year for beech.

Kostrzyca is also home to Poland's second laboratory producing a biopreparation that contains mycorrhizal fungi (the first is the one in Nędza in Rudy Raciborskie Forest District). In Śnieżka Forest District, as at Nędza, there is a modern container nursery producing seedlings with mycorrhizal infections and covered root systems. The main customer for these are the Sudety Mountain forests that are effectively being brought back from the dead.

Regional Gene Banks are also being established to meet the most important challenges at regional level. Their activity will remain in close connection with the “Central bank”. In the case of the Carpathians, for example, the role is played by the Wyhrczadeczka bank in Wisła Forest District.

The Kostrzyca FGB is an exceptionally important part of the *Programme for the Preservation of Forest Genetic Resources and the Selective Cultivation of Forest Trees in Poland in the Years 1991–2010*. The basic aims here are revealed in the name itself – to preserve biological diversity, the persistence



The Forest Gene Bank in Kostrzyca (T.O.)





In the beech mast year 2001, some 35 tonnes of seed from this species were able to be collected for storage at Kostrzyca (R.J.)

of forests and the continuity of the processes ongoing in forest ecosystems. The Programme further seeks to restore forests to degraded or destroyed habitats and to guarantee those administering forests the appropriate amount of reproductive material of the required quality. This is at the same time a manifestation of the desire to ensure that qualitative features might be improved by careful selection, such that production can intensify while the resistance to biotic threats is enhanced. Finally, the Programme enshrines the principle critical to modern forest management, i.e. that based around the division of the country into natural-forest regions and seed regions, which makes it crystal clear where and on what basis seeds and seedlings from one area may be moved to another. What happens if origins and alien introductions are not given thought is made only too clear by the example of the Sudety forests.

To plan – or sometimes even ahead of plan – the State Forests is attaining what is assumed by this 20-year undertaking. The seed base created ensures full meeting of the needs of Forest Districts for seeding material of the appropriate quality and native origin (and hence best suited to the Polish habitat and climatic conditions in which development is to take place). It has at its disposal a network of Europe's four most modern seed stores, as well as 21 dehusking plants. Constant checks on the material are in turn ensured by seven evaluation stations and five checking stations.

The seeds are sown in forest nurseries, of which there are almost 1300 in the State Forests, covering over 3300 ha. These produce more than a billion seedling trees annually. The so-called under-canopy nurseries are popular – allowing the seedlings of shade-tolerant species to grow up under the canopy of older trees. As has been mentioned, the State Forests also has very modern container nurseries producing seedlings with covered roots (apart from the two that have already been mentioned, there are other such nurseries in Jabłonna Forest District in Warsaw RDSF and Oleszyce FD in Krosno Directorate).

In seeking to ensure that the nurseries are well furnished in the necessary infrastructure and run by specialised forester-nurserymen, the State Forests shows a preference for the development of the larger objects whose activity better meets cost-effectiveness requirements (in that unit development and operating costs are much lower).

An important premise of the *Programme for the Preservation of Forest Genetic Resources...* is that the species of tree previously eliminated from their natural habitats are reinstated. An example of such an action may be the aforementioned programme to restore the fir to the Sudety Mountains. The first stage is to inventory local populations and make field-based choices of trees and stands that are to be preserved. Seed plantations are then established (separately for each altitudinal zone) – as a base for future stands.

As has been mentioned, the Forest Gene Bank has begun work on a project to reinstate the beech in the Sudetic Mountains. In cooperation with the Karkonosze and Tatra Mountains National Parks, a programme to introduce arrolla pines

into the Sudety Mountains has also been initiated, with the aims here being to increase biodiversity and raise the level of resistance of forest communities.

A similar aim is to re-establish the yew, once a forest-forming species with a wide range across Poland.

\*  
\*      \*

Crisis phenomena, including the catastrophe in the Western Sudety Mountains, large fires, the damage done by gales and such devastating floods as in 1997, all offer support for the contention that the kind of integrated and durable organisation that the State Forests represents is best suited to coping with the severe challenges that unpredictable nature – often with unwitting anthropogenic assistance – can pose. The State Forests has come through tough tests at Rudy Raciborskie, Potrzebowice and Pisz, and has taken effective action in battling against the results of long-term, excessive human intervention with the laws of nature in the Sudety Mountains. In all of this, it has obtained decisive proof that the efficiency with which it can deal with such problems is first and foremost a product of its strength – which it derives from that integrated structure. In our conditions, only such a structure is able to carry through and implement steadily over many years the kinds of very costly undertakings that have been required. This would seem to be the best possible comment to make in response to any discussion as to the organisational shape of Polish forests and their ownership status.



The Jabłonna Forest District's container nursery at Skierdy (W.M.)

*Promotional Forest Complexes play a particular role in what may broadly be understood as forest education and the promotion of the state forestry policy pursued by the State Forests. These are a unique expression of sustainable, multifunctional forest management.*

*Photo P.F.*







# Knowledge for all – promotional forest complexes

Environmental education and the shaping of favourable public attitudes towards nature (including the forest environment) are among the important activities of the State Forests. This is, after all, in the interests of both parties, and touches upon the most important existential issues of present and future generations.

The guiding and promoting of sustainable, multifunctional (and hence pro-environmental) forest management, the instilling of these principles into public awareness and the building of a desirable attitude to forests and foresters' activities are all tasks being implemented down the years by the State Forests. A further aspect of educational activity is to get through to the many environmental organisations and associations that – while being guided by the purest conservation objectives – do not always adopt proper theses when it comes to the choice of methods best serving them.

The need for the State Forests to pursue environmental education follows on from the law and from the forest and environmental policies enacted by the Government, as well as from international agreements and conventions signed by Poland (see chapter "The letter and the spirit of the law"). This is the foundation upon which an exceptionally diverse set of undertakings is based.

Educational activity is engaged in by Forest Districts as the units operating in the field and having (inevitably) the best contact with communities and local authorities, as well as with schools and kindergartens. Regional Directorates are also involved, as is the Nature and Forest Education Centre in Rogowo, the aforementioned Forest Gene Bank in Kostrzyca, and the Gołuchów-based Forest Culture Centre and associated Museum of Forestry.

Knowledge addressed to different circles of recipients on the threats to and means of protecting forest nature is conveyed by the State Forests in booklets, brochures and occasional publications. An important role in this is played by the book and forest-journal publishing engaged in by the State Forests Information Centre (CILP). This also offers a vast variety of information on State Forests' activity, on the official website at [www.lasypanstwowe.gov.pl](http://www.lasypanstwowe.gov.pl).

Own publications (sometimes in the form of short illustrated guides) are published, as funding becomes available, by Forest Districts and Regional Directorates. The valuable features and natural curiosities characteristic of

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The Forest Culture Centre and Museum of Forestry in Gołuchów (M.F.)

Poland's forests may be met with along the numerous educational trails. Even the most modest leaflet or booklet will tell one what is worth noting, what natural processes take place in different parts of the forest, what role in the present state of affairs human activity has, what the forest owes to the work of the forester and what mistakes foresters made in the past.

Awaiting in forest education centres are exhibitions with natural history subject matter. Many Forest Districts cooperate permanently with local schools at different levels. It is clear that education is not only aimed at the youngest generation, though in the case of it the principle of "knowing how to enjoy oneself" allows for truly tremendous results. It is to be believed that this generation, and its successors, will represent a new way of thinking on the natural environment, and a new way of understanding the processes ongoing in a forest.

In turn, the adults taking part in courses and conferences are quite often teachers in nature-related subjects. Also keen to extend their knowledge are representatives of scientific circles, environmental organisations, the timber industry, and – last but not least – foresters themselves.

Promotional Forest Complexes play a particular role in what may broadly be understood as forest education and the promotion of the state forestry policy pursued by the State Forests. These are a unique expression of sustainable, multifunctional forest management, marking a final departure from the concept of the so-called normal forest with which previous generations of Poles had grown up.





The Nature and Forest Education Centre in Woziwoda Forest District, within the Tuchole Forests PFC (M.F.)

The idea of the "Promotional Forest Complex" was used officially for the first time in the justification to Decision 23 of the Minister of Environmental Protection, Natural Resources and Forestry of November 8<sup>th</sup> on the conservation and management of the Białowieża Primeval Forest. Following this was the historic Ordinance of the SF Director-General no. 30 of December 19<sup>th</sup> 1994 on the establishment of several first Promotional Forest Complexes (let us recall that it was not much after – on February 14<sup>th</sup> 1995 – that the D-G issued Ordinance 11 on the improvement of forest management on ecological bases). The definition "historic" would seem fully justified in this case, as the PFC is a Polish idea for the wide promotion of multifunctional, sustainable forest management having no equivalent in Europe and representing an innovation in world terms (leaving aside Canada's so-called model forests). Attention should also be paid to the social and educational aspects of this unprecedented undertaking, as well as the wide opening-up of the forest to people, especially a young generation of Poles, that it represents.

PFCs are larger contiguous forest areas usually falling within the areas of several Forest Districts. As they are established, attention is paid to their being representative of different nature and forest regions, and hence also different

habitat conditions, stand species compositions, valuable natural features and basic forest functions.

A PFC is first subject to a multifaceted reconnaissance of the biocoenoses within it, the natural conditions and the ongoing changes. Considered in particular are the status of the forest as regards geological, soil, climatic, hydrological and habitat conditions, in order that information on these may be of service as new management plans are devised, or existing ones adjusted in line with new principles.

The forest management pursued in PFCs on ecological bases has as its aim the preservation or reinstatement of the natural variability of forest nature, in such a way that economic objectives are fully integrated with the needs of nature and landscape conservation. Analysis is carried out in regard to the degree of concordance between the forest biocoenosis and the habitat conditions. The causes of any deformations present are determined and, with a view to naturally-degraded or distorted communities being restored and concordance with the habitat assured, a particular preference is given to natural succession.

Each PFC has its own list of objects enjoying legal protection, as well as protected plants and animals. New forms of nature conservation are proposed, and the multifaceted conservation work engaged in in regard to the flora and fauna (including even microorganisms) is to ensure that their genetic richness is preserved. The analyses allow foresters to come up with their own proposals as to how the list of protected areas and species might be extended. They also allow the Technical and Management Committees to be advised of possible directions of development when it comes to large-scale forms of nature protection in forests – in order that these can be taken account of in local physical development plans.

The PFCs represent an example of the harmonised social and economic development of a region that is worth copying. They are at the same time a testimony to the fact that rational use and renewal of forest resources need not reduce either the resource productivity of forests or the non-productive functions.

Also characteristic is a further manifestation of the special care foresters take of the state of their forest, and thereby the entire natural environment in the PFC, namely their steady efforts to remodel heating systems in forest housing estates and settlements such that they come to include modern, environment-friendly combustion technologies. Biological wastewater treatment plants and installations to utilize wastes are also installed. Meanwhile, in forests themselves, small bodies of water are either being reconstructed or established from scratch.

One of the important tasks of the Promotional Forest Complexes is – as the name suggests – to promote multifunctional and sustainable forestry and its role in the spatial management of the country. That said, the term "promotion" should be understood to include not only the popularisation of such a view of forestry "on the outside". For it also represents a way in which modern forest management and progress in the forest sciences and technologies can be promoted within the profession.

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An important, even standard, task of the Promotional Forest Complexes is forest education. Here: a day out in the Tuchole Forests PFC (M.F.)

A further important criterion in the founding of the Promotional Forest Complexes was the possibility of showing which threats resulting from the “progress” the forest ecosystems are subject to, and the degree to which multifunctional and sustainable forest management can succeed in combating those threats. The PFCs are testing grounds for the new forestry and nursery techniques and technologies in the Forest Service. They engage in research and experimentation work whose results are subject to implementation throughout the State Forests, serving in the propagation of the eco-development principle in all the forest areas the organisation manages.

The PFCs at the same time offer a forum within which foresters can cooperate with the public – on the socio-scientific councils of each

Complex which bring together representatives of the local authorities, scientific experts, members of NGOs, representatives of local media and individuals that are the subject of particular public confidence.

As of the end of August 2003, there were 13 Promotional Forest Complexes in Poland, covering a total area of 622,000 ha, or some 8.7% of the entire SF-managed forest area (Fig. 18). Among them are both areas in which natural features have remained well preserved (e.g. the Białowieża, Goleniów and Bukowa Forests), and those that have been markedly transformed at the hand of humankind (as in the Lubuskie, Tucholskie and Gostynińsko-Włocławskie Forests). Drawn up for each PFC are “Principles of silvicultural and protective procedure”.

An important – one might say standard – task for the PFCs is forest-related education. Such a role is served by the numerous educational trails, exhibition and display rooms and centres of nature and forest-related education. These adopt accessible means in which to exemplify – even for complete laypeople – the nature of sustainable development and the form it should take, the *modus operandi* of forest ecosystems, what is involved in the restoration of disturbed or distorted natural environments as well as the desired concordance between biocoenosis and biotope and how modern forestry resorts to natural-succession. It is possible for the visitor to learn of the linkage between timber harvests,



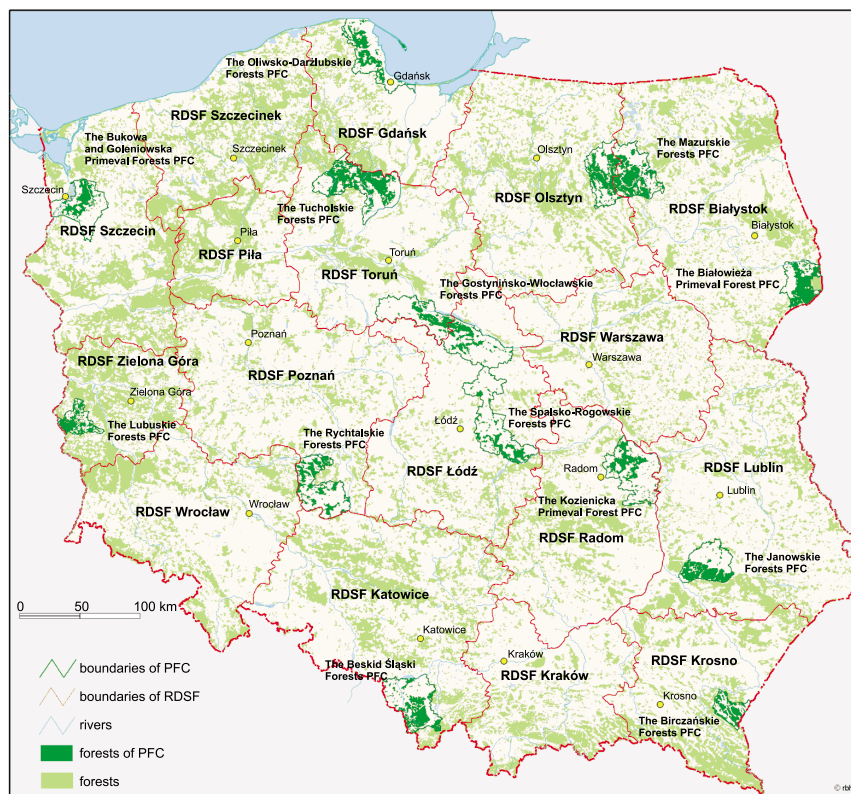


Fig. 18. Promotional Forest Complexes

silvicultural and protective needs, of what the conservation of the biodiversity of wild plants and animals entails, and of the role the so-called Areas of Ecological Utility, etc., should play. Nature lessons are organised in the forest, in the middle of nature, and there are even “green schools” for children and young people. The forms taken by lessons are often rather informal (involving quizzes of knowledge on nature, bonfires, etc.), with some foresters becoming particularly willing to practise their teaching talents.

Attesting to the fact that, after several years of standstill, the PFC idea is beginning to take off again, is the creation of further examples after a several-year break since the Birczańskie Forests PFC was established in January 2001. 2002 saw the Director-General call two more into being: the Spalsko-Rogowskie Forests, and the biggest yet founded in the shape of the Mazurskie Forests PFC. The final target figure is for their to be around 18 Promotional Forest Complexes.

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*A decided majority of local authorities are very well able to cooperate with the State Forests, talking sensibly and to the point on matters of importance to local communities. In fact, in many cases, the partnerly relations go beyond the formalised framework provided for in law.*

*Photo M.T.*









# A common good

***The subjects of public consultation are issues relating to the recognition of forest areas as particularly valuable naturally or societally. Among those matters subject to joint consultations are the protection of forests from fires and other threats (industrial and municipal damage, the effects of excessive penetration by people), plans for the touristic management of forests, water management issues and projects for local and regional undertakings in environmental protection (including the afforestation of ex-agricultural land, areas planted with trees, environmental education), etc.***

The wish to promote democracy through the development of civil society and the taking of decisions of importance to the public in public are characteristics of today's world that have also reached the State Forests. Coming as a sign of this was Ordinance no. 23 of the Director-General of August 4<sup>th</sup> 1997 on consultation with local authorities and public organisations as regards undertakings within the framework of sustainable development and tasks resulting from the nature conservation programmes drawn up for Forest Districts in forest management plans. The Ordinance in question (as superseded two years later by Ordinance 65 in connection with the entry into force of the so-called "Competence Act") attests unambiguously to the fact that the State Forests is ready to heed democratic procedures in its relations with local authorities, and to take account of the suggestions of partners in its projects.

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An important area for agreement involves the role played by forest management in local and regional economic development (the development of timber resources, the extent of timber harvests, the safeguarding of raw timber for local and regional woodyards and job opportunities in forestry).

What is important is that the forum for the exchange of views is at the very bottom of the decisionmaking ladder. The co-decision power with local communities can and usually does ensure that tensions are nipped in the bud, with an early achievement of consensus preventing misunderstandings from arising and being transferred to higher levels (at which point it often happens that they take on a life of their own and bring ever wider circles into conflict).

In the preliminary communication to the aforementioned Ordinance 23 issued in August 1997 by the SF Director-General to all Regional Directors we read, *inter alia*, that: "The making available of a draft forest management plan for 14

days in the Forest Inspectorate – so that any local residents who wish to might see it – is not the result of any directly applicable provision in law, and is against the expectations of society (including parliamentary and local governmental initiatives)”. As is clear, foresters take the initiative, even though no law has required it of them.

In accordance with the regulations in force, the means of managing each Forest District are subject (in the phase in which the forest management plan is drawn up) to analysis on the part of two bodies, the so-called first and second Technical Management Committees. In the first Committee it is indicators and guidelines for those implementing the management plan for the given Forest District that predominate. It is on the basis of these that the exhaustive inventorying of important ecosystem components is carried out. Only when the so-called small-forum work is well advanced (such that the results of inventories for the District have been processed, working versions of management and review maps drawn up and proposals for pre-final and final cutting plans put forward) does the Director at the SF Regional Directorate call into being – at the motion of the executor of the plan – the aforementioned Second Committee. Its opinion is a confirmation of the accord between the work done and the forest management instructions and First-Committee guidelines in place. It also analyses management to date, and its influence on a forest's current state. It at the same time expresses an opinion in regard to plans and concepts for forest management in the upcoming 10-year period, as presented by implementers of plans, and then establishes guidelines for the final configuration of the plan for the next decade.

Important from the point of view of the interests of the local community is the fact that sessions of the Committee are participated in – not only by representatives of the SF Regional Directorate (as implementer of the plan), but also as advisors and opinion-givers, by representatives of locally relevant institutions and NGOs involved in environmental protection, nature, spatial planning and local government.

In practice, the sessions of the Technical Management Committee in an average Forest District are attended by about 20 people. However, in many cases where matters of particular social import are up for discussion, the number of participants is much greater. For example, discussions over the future of forests managed by the Forest District responsible for the Białowieża Forest PFC drew around 100 in-



Consulting the local community in the field (Babki Forest District) (Z.Ś.)



Afforestation is one of the measures combating unemployment in rural areas (P.F.)

interested people to the meeting of the Second Committee. These ranged from representatives of the Ministry of the Environment, the National Parks Board and the DGSP, via outstanding scientific experts (from the Forest Research Institute, Warsaw Agricultural University and the Schools of Agriculture in Kraków and Poznań) through to the Regional Director from Białystok, local foresters and representatives of the local administration and council and members of NGOs.

Let us recall that Socio-scientific Councils are called into being in the Promotional Forest Complexes.

An area which makes itself felt in the complicated subject matter of joint administration with the public is that of the *National Programme for the Augmentation of Forest Cover in the years 1995–2020*. Afforestation is, after all, an instrument in the fight

against rural unemployment. In poor gminas in the middle of the forest, the Forest District may well be the biggest employer after the Gmina Office, with the work to replant giving much-needed job opportunities.

The *National Programme for the Augmentation of Forest Cover in the Years 1995–2020* could not be implemented if it were not for the participation of local authorities. A model example of this is generally taken to be that adopted and put into effect in Warmia-Mazury voivodship. Foresters stress the full participation in its preparation of bodies of the administration (at voivodship, powiat and gmina levels), and the elected assemblies on the different administrative tiers. As a result, within the framework designated by the Regional Development Act, a comprehensive study of the voivodship's development has come into being, with the due degree of consideration being given to matters of forest management, including the programme for reafforestation itself.

There is no shortage of good examples of cooperation between foresters and local authorities, though the “sparks sometimes fly” where the two circles meet. This is mainly the case in relation to developments that the authorities would like to see in or on the edge of a forest, while foresters are keen to warn of the consequences if unconsidered actions are taken.

Disputes concern the siting of private developments, but also the undertakings of the gminas themselves, like housing estates and elements of infrastructure (roads, power systems, etc.). Sometimes, gminas may point to forest areas they consider suitable for buildings or roads, in this failing to recall that the Agricultural and Forest Land Protection Act prohibits such actions. Controversies also arise with projects associated with mineral extraction, quarrying and



peat-cutting. While local authorities see sources of much-needed income in these activities (and at the same time a means of resolving local labour-market problems), foresters draw attention to the irrevocable damage that may be done in nature.

A typical source of conflict remains the recognition of forests as having protective status. While foresters give their opinions on the associated decisions, or else draw conclusions in relation to them, the Forests Act provides that the decisionmaking is in the hands of the Minister of the Environment (something that local councillors sometimes forget). The reverse situation also applies, with local authorities coming forward with a proposal that foresters are against on account of the stands concerned not meeting the necessary criteria. It is against this background that there appear problems reflecting the particular status of protective forests. Limitations on the economic use made of forests denote reduced income for local budgets, at the same time undermining investment plans that would feed gmina coffers.

Money is the problem. Paradoxically, the full implementation of the idea of sustainable forest management (including in regard to increased public participation) sometimes brings further complications. For example, a gmina may on the one hand wish to have as wide as possible an inflow of forest tax from productive forests, while at the same time wishing to have as many old, naturally-valuable stands as possible, since these attract tourists. But it is not only financial matters that are a source of misunderstandings. Sometimes these also arise from a lack of familiarity with regulations or a simple lack of knowledge as to the opportunities for joint undertakings.

The experience to date shows that a decided majority of local authorities are very well able to cooperate with the State Forests, talking sensibly and to the point on matters of importance to local communities. Attesting to this are, not only the sittings of the Technical and Management Committees, but also the numerous joint undertakings on various scales (e.g. the organizing of nature and forest educational trails, tourist trails, forest parking places, etc.). In fact, in many cases, the partnerly relations go beyond the formalised framework provided for in law.



Local authorities anticipate tax income from productive forests, but would at the same time like to have as many of the old stands attractive to tourists as possible. Here: in the Łąck Reserve within the Gostynińsko-Włocławskie Forests Promotional Forest Complex (S.W.)

*The extent to which Poland has put in place the principles underpinning sustainable and multifunctional forestry makes the country a leader in Europe. The unquestionably significant attainments of our forestry indeed allow it to be claimed that we have gone beyond what is average for the Union.*

*Photo G.T.K.*









***In a report of a bilateral review of the law in the “Agriculture” sphere of negotiations, the European Commission was able to conclude that Polish legislation in matters of forestry is in accordance with the assumptions of EU policy on forests.***

# Knocking on the EU’s door

There is no doubt that Poland’s integration into the European Union represents a new challenge for the State Forests. On the one hand it has denoted a need to prepare for the market rules now in force in the European Communities, and the associated increased competition, while on the other it had made possible an active participation in the processes ongoing in EU forests, with Poland injecting some of the not-insubstantial fruits of its own labours into the process by which modern European forestry is being shaped.

Forestry resembles many other fields of the Community economy in not being subject to a Common Policy. For this reason, Poland’s candidacy for accession has not included any negotiation of conditions for the adjustment of the country’s law in this field. Indeed, Polish forestry was well-prepared to meet the accession requirements from this point of view. The last important formal or legal requirement, i.e. the approximation of principles in the selection of and trade in reproductive material, had already been met by June 7<sup>th</sup> 2001, with the passing of an Act regulating this matter in line with EU Directives. It should be recalled that, while the instrument in question (popularly referred to as the “Seed Act”) enters into force on the day of Poland’s accession, its provisions are already being complied with in practice within the State Forests.

In a report of a bilateral review of the law in the “Agriculture” sphere of negotiations, the European Commission was able to conclude that Polish legislation in matters of forestry is in accordance with the assumptions of EU policy on forests.

Furthermore, the extent to which Poland has put in place the principles underpinning sustainable and multifunctional forestry makes the country a leader in Europe. The unquestionably significant attainments of our forestry indeed allow it to be claimed that we have gone beyond what is average for the Union.

A priority of the internal policy of Member States is harmonious regional development. In this, forests are an important element and as such are subject to the mechanisms shaping economic policy. For this reason also, the Union is not implementing assistance programmes aimed directly at forestry. Such support may be obtained, however, if the properly-identified need for it can be construed as important for regional (including rural) development, or for work on rural infrastructure, the protection of the environment, or commercial, energy, research, etc. policy. Noting this, it is possible to anticipate that Polish forestry will not be in

a position to take great advantage of means from the assistance funds. However, indirect mechanisms are appearing, as for example through enhanced afforestation programmes appearing in May 1999 and serving in rural development via the European Agricultural Guidance and Guarantee Fund.

In establishing the European Economic Community, the 1957 Treaty of Rome did not refer to forestry as an area of common policy. Likewise, the Maastricht Treaty does not supply legal bases that would serve this area. It is true that the first attempts to establish common procedure in the shaping and protection of forest resources, the enhancement of the non-productive functions of forests, and the trade in raw timber, were taken in the Community as early as in 1959, in the course of the Brussels Forestry Conference (at which Belgium, France, The Netherlands, Luxembourg and Germany took part). Nevertheless, it was only in 1989 that the Council of the European Communities adopted an Action Programme for Forestry. This designated desirable directions in which to proceed in such spheres as the afforestation of agricultural land, the strengthening of the regional development and significance of forests, the reinforcement of the role of the market in the trade in forestry products, the protection of forests from pollution and the establishment of a Standing Committee on Forests.

As can be seen, of probably greater significance in the devising of principles for modern forestry (and at that on a scale extending beyond the EU) are the aforementioned *Ministerial Conferences on the Protection of Forests in Europe* held in Strasbourg (1991), Helsinki (1993) and Lisbon (1998) (see chapter on “The Letter and Spirit of the Law”). It has been thanks to them that almost all European countries have participated – via “the Helsinki process” – in the implementation of sustainable forestry principles. It needs to be remembered that Poland was a precursor of the process, having enacted its own “modern” Forests Act in 1991.

While it is true that EU policy on forests is touched upon in a large number of Directives and other official documents (as in a Council Resolution of December 15th 1998 announcing an EU Forest Strategy), the references are in the nature of recommendations of general directions, rather than acts of law that are binding upon Member States. The practice is rather for the different states to pursue a policy that reflects the ideas of the Helsinki Process to a greater or lesser



Polish forestry should not have inferiority complex to EU forestry. Here: a pine seed stand in the Augustowska Forest (W.S.)



Plus trees – oaks and beeches  
(W.Ł.)

extent. There remains a prevalent conviction that an obstacle to the reaching of full consensus is resistance on the part of commercially-orientated private forestry, which does not always offer its unreserved acceptance of the multifunctional forest concept, and of the idea that forests should be protected even at the expense of the direct material benefits that might be gained from them. Evidence for this may be provided by the February 2002 introduction of Pan-European Forest Certification in competition with the FSC system in place previously. The PEFC system was an initiative clearly inspired by the private owners' circles, on account of their view that the FSC system was proving excessively restrictive (and hence costly), going too far in its interference with a legal person-

ality's right to dispose of its own property as it wishes.

Noting that the criterion of multifunctional forest management – as devised through the Helsinki Process and contained in the EU Forest Strategy – does not always meet with universal acceptance (especially in countries in which private forest ownership is a major force), it is likely that some parts of it at least will remain “on paper” only. Politicians have concentrated their initiatives on national and regional forest programmes, as treated as an element of rural development policy. The devising and implementation of national programmes is as recommended to the countries signatory to the resolutions and declarations of successive Ministerial Conferences. In Poland, work on a National Forest Programme is now at an advanced stage.

The particular location and ascription of forestry matters within many different spheres of the economy (ranging from agriculture, via environmental protection as far as regional policy and infrastructural development) ensures that the form practiced in Poland – including within the State Forests – is of enormous significance not only in regard to the availability of the assistance and structural funding system operating in the EU. Like other branches of the national economy, forestry must reckon with the basic condition that resort to EU money is only possible where well-qualified personnel able to cope fluently with the exceptionally complicated and bureaucratic Community procedures are available. Bearing this in mind, the State Forests has joined with Warsaw University in



launching a postgraduate study course in EU matters for SF employees, who should gain a close familiarity with this area of interest.

In line with an Order of the SF Director-General, the Regional Directorates are setting up working teams who are to specialize in matters of the EU assistance programmes and integration in general. Their task will be to ensure that optimal use is made of the financial opportunities that accession brings with it.

The clear preference the EU shows for the private sector has become the basic context for our integration. It requires that we are cautious in assessing the chances of financing from EU coffers for Poland's State Forests (which will, we may note in parenthesis, be the EU's largest forestry concern by area following the accession). This does not mean that the support in question must only be linked with projects anticipated for agriculture, rural infrastructure, etc. An indirect benefit may be the assistance that SMEs will be able to apply for. The EU has devised many effective financial instruments that promote this sector (preferential credits extended by banks and specialised funds, investment and tax relief, accelerated amortisation, etc.). Noting that the sphere of private forest and timber-industry services is in fact that of small and medium-sized enterprises above all, this may be a major factor favouring the modernization and development of this activity of importance for the whole of Polish forestry, the State Forests included.

When set against the forests of EU Member States, their Polish counterparts differ not only in terms of status (as regards state ownership of the resource), but also depart significantly in regard to their accessibility (confirmed in regard to the SF by the Act of July 6<sup>th</sup> 2001 on the retention of a natural character of the country's natural resources). Finally, a difference is also to be seen in the degree to which the idea of multifunctional forestry is being implemented in practice – something that finds its confirmation in a modern *Forests Act*, in the *National Policy on Forests*, in the *National Environmental Policy*, in the *National Programme for the Augmentation of Forest Cover*; and physically in the established Promotional Forest Complexes. As has been mentioned, work on a National Forest Programme is well advanced, as are the State Forests' preparation for compliance with EU Directives from the moment of Poland's accession (notably the “Birds Directive” – 79/409/EEC and the “Habitats Directive” – 92/43/EEC) and its work in co-creating the coherent Europe-wide Ecological Network that is Natura 2000.

Poland's sector of private forestry services is mainly home to small and medium-sized enterprises (Z.Ś.)





The State Forests has at its disposal a modern computer information system known as SILP, whose network takes in the Forest Districts and sub-districts. Here: a forester with a portable computer known as a *rejestrator* (J.D.)

Where the techniques and technologies applied are concerned, the forest management practised by the State Forests does not depart from best practice, and could indeed serve as such a model for many countries, including some in Western Europe. The results have gained recognition from the world authorities in the field, so that it may be stated without fear that we bring to a unifying Europe a particular treasure – a wealth of forests of a value rare on the scale of the continent as a whole, combining both natural riches and a major economic resource.

Long-established agreements involve the State Forests in close cooperation with foresters from such EU countries as Austria and Finland. Exchanges of experts have been ongoing since the 1970s, and subject-related meetings address virtually every sphere of forestry, from the fight against pests, nature conservation and tourism, through to timber management. Polish foresters also play an active part in conferences financed or co-financed by foreign institutions, including the British Council (in regard to computer techniques in spatial planning), PHARE (forest functions in modern spatial management), the Danish Environment Protection Agency (the agreeing of ecological projects) and many others.

The State Forests has been and is working steadily on a modern computerised SF Information System (“SILP” in Polish), whose network extends across the basic organisational units of the Forest Districts (each sub-district has a portable computer or “register”). This plays a major role in ordering and facilitating the circulation of data, and hence forestry management in general.

In crossing the threshold into the EU with its country, the State Forests will probably find itself under strong pressure to subordinate to regional policy. In extremis this may even involve attempts to undermine its present status as regards ownership and territorial integrity. For this reason a retention of the present structure will need to be promoted intensively, in order that the unquestioned attainments of Polish forestry (to which the SF has contributed so markedly) might be made clear to all. The societies in the EU countries (and the opinion-formers and politicians among them) should be made aware that the elevated position of Polish forestry is very much the consequence of its specific ownership structure – in which the state plays so major a role. It is thanks to this that it has been possible to put into effect the idea of multifunctional forestry, as well as to counteract the unforeseeable catastrophic phenomena that have come along from time to time.

It needs stressing that these tasks are implemented successfully by the State Forests as a self-financing organisation that is not forever turning to the central budget for funding. This is in no way changed by the fact that certain tasks commissioned by the state administration are grant-aided.

On the other hand, a pressure on Polish forestry in general and the State Forests in particular will appear, as a result of the Single Market and the ruthless competition within it, whether this be from heavily-subsidised forestry like that in Germany, or exceptionally commercially-orientated forestry like that in Scandinavia. The result will be a further emphasising of economic effectiveness as a

criterion in European forestry. Taking account of this aspect of Poland's accession also, the State Forests has continued with its programme of far-reaching economic restructuring begun at the beginning of the 1990s. The aim has been to obtain a fundamental optimisation of the costs of operations. Thus Poland's entry into the EU has many dimensions where the State Forests is concerned, including among them both opportunities and threats.



Spruce habitat  
in the Romincka Forest (W.S.)



# Glossary

**AFFORESTATION** – the introduction of stands from artificial planting or seeding on land designated for the purpose, be this formerly agricultural land or wasteland.

**AGE CLASS** – a group into which a stand may be classified in relation to age. A class extends over 20 years (hence class I is trees aged 1–20 lat, class II 21–40, etc.).

**BIOCOENOSIS** – groupings (populations) of different species occupying an environment (e.g. a forest biocoenosis).

**BIOPREPARATION** – an insect-killing agent (insecticide), in which the active ingredient are microorganisms (viruses, bacteria, protists, nematodes or fungi).

**BIOTOPE** – an environment in which a given assemblage of organisms occurs.

**BREAST HEIGHT DIAMETER** – the thickness (diameter) of standing timber measured at a height 1.3 m above the ground.

**CLASS FOR REGENERATION (KDO)** – a type of vertical stand structure in which there is simultaneous utilisation and restocking under the canopy of the parent stand, albeit with a status regarding restocking that does not yet meet the requirements set.

**CLEAR-CUTS** – areas on which final felling entails the removal of the entire stand, with a view to its being restocked in the next few years.

**CUTTING AREA** – area of forest from which the stand is cleared within the framework of forest utilization.

**DIVISION INTO NATURAL-FOREST REGIONS** – categorisation of parts of the country into different natural-forest divisions, i.e. provinces, districts and mesoregions, allowing for the optimal utilisation of the natural environment with account taken of its diversity.

**DRY-WOOD** – trees dying or dead on account of excessive stand density, attack by primary or secondary insect pests, the impact of industrial emissions, water relations, etc.

**ECODEVELOPMENT** – a Polish version of sustainable development, (which in fact preceded it) entailing a subordination of the needs and aspirations of the public and the state to the possibilities of the environment, such that all economic activity is carried on in harmony with nature.

**ECOLOGY** – the science involving itself with study of the mutual relationships between organisms, and between organisms and the environment in which they live.

**ECOSYSTEM** – a functional system linking communities of living things (the biocoenosis) with its non-living environment (the habitat).

**ECOTYPE** – an ecological form (race) of a species maintained heritably and conditioned by specific (local) properties of the environment.

**EPIPHYTOSIS** – a mass (epidemic) appearance of plant disease in a defined area as the result of a given pathogenic agent (e.g. a fungus).

## Glossary

**FOREST COVER (INDEX THEREOF)** – the percentage relationship between the area of forest and the whole geographical area of a country.

**FOREST-FLOOR VEGETATION** – the lowest vegetation layer formed from herbaceous plants and dwarf shrubs (like bilberry), as well as mosses, lichens and fungi.

**FOREST UTILISATION** – activity having as its aim the use of the natural wealth of forests and its preparation for recipients (also branches of the forest sciences).

**HABITAT** – a complex of factors of the abiotic (inanimate) environment comprising climatic conditions plus the water regime and soil relations and relief.

**HABITAT TYPE** – generalised concept of habitat categories with a similar suitability for forest production. The classification of forest habitats takes account of four levels of habitat fertility (respectively from the poorest to the most fertile – coniferous forest, mixed/coniferous, mixed/broadleaved and broadleaved habitats), as well as five levels of habitat humidity (ranging – from the driest through to the periodically-inundated – i.e. dry, fresh, moist, marshy and riparian), and geographical location (in lowlands, uplands, submontane areas or mountains).

**HABITAT TYPE (HABITAT)** – unit describing similar conditions for the development of vegetation (stands) and taking account of soil fertility and humidity.

**INDUSTRIAL EMISSIONS** – gaseous chemical compounds and particulates released to the atmosphere by industrial and municipal plants, etc.

**MASS PEST OUTBREAKS** – large-scale appearance of harmful insects – often assuming catastrophic proportions – as a result of a configuration of ecological factors favourable to a given species.

**MATURE (FELLING) STAND** – a stand that is showing a distinct decline in increment not brought about by external factors and which, on account of its age and the dimensions of its trees, is suitable for felling.

**MERCHANTABLE TIMBER** – 1. volume of (standing) wood up from stump height with a diameter at the thin end of at least 7cm overbark; 2. harvested round wood with a diameter at the narrower end of at least 5 cm without bark; gross merchantable timber – with the bark on; net merchantable timber – without the bark.

**NATURAL-FOREST DISTRICT** – a unit within a natural-forest province that is uniform from the physiographic point of view.

**NATURAL-FOREST PROVINCE** – basic natural-forest unit into which the country is divided – a contiguous area with more or less similar physiographic conditions of which 8 have been identified in Poland.

**PATHOGENS** – agents inducing disease, as primary ones that attack living organisms or secondary ones that attack damaged trees.

**PHYTOCOENOSIS** – a plant biocoenosis.

# Glossary

**PLUS SEED STAND** – a seed stand of the highest genetic quality in which the collection of seeds is mainly done from standing trees.

**PLUS TREE** – a tree of the highest genetic and silvicultural quality identified as a base for vegetative and generative reproduction.

**PRE-FINAL FELLING PRODUCTS** – wood and timber obtained in the course of tending and sanitation measures in stands.

**PRESCRIBED CUT** – the amount of timber that can be harvested, as set out in a forest management plan (or simplified form thereof) and as resulting from the needs for forest to be renewed, tended and protected, as well as the principles of sustainability and continuity of use; pre-final prescribed cut – as planned as part of pre-final felling; final prescribed cut – as planned as part of final felling.

**PRIMARY PESTS** – insect pests destroying the assimilatory apparatus (needles, leaves) and occurring in mass outbreaks.

**PRODUCTS OF FINAL FELLING** – timber harvested in mature stands.

**PROTECTIVE FORESTS** – forests specially protected on account of the functions they serve or the level of threat they experience (a full list of protective forests is contained in the Regulation of the Minister of Environmental Protection, Natural Resources and Forestry of August 25<sup>th</sup> 1992, Dziennik Ustaw Official Journal of Laws no. 67, item 337).

**REGENERATION CLASS (KO)** – a type of vertical stand structure in which there is simultaneous utilisation and restocking under the canopy of the parent stand, albeit with a status regarding restocking that allows further stages of tending to be embarked upon.

**REPAIR PLANTING AND REFILLING** – introduction into gaps in planted stands of new saplings or seedlings.

**REPELLENTS** – means of scaring off pests (above all game animals) and protecting plants applied in the safeguarding of young trees against damage.

**RESTOCKING OR RENEWAL** – the introduction of stands from artificial plantings or natural self-sowing in places in which they have existed previously but have been either cut or destroyed by gales, fires, etc.; natural renewal – where the stand arises from self-sown individuals or regrowth; artificial renewal or restocking – where new trees are introduced by human agency.

**SECONDARY PESTS** – insect pests attacking weakened trees and mainly damaging the cambium.

**SEED ORCHARD** – a plantation formed from grafts obtained by grafting scions from plus trees onto stock of the same species. These quickly enter the seed-producing stage, thereby maintaining the features of the plus trees involved.

**SEEDLING SEED ORCHARD** – a plantation of seedlings grown from seed of a defined number of plus trees (offspring of at least 40 trees).



## Glossary

**SNOW BENDING** – snow settling on the branches of trees and shrubs, frequently (especially when wet and heavy) causing the breaking of branches or even whole trees.

**STAND RESOURCES** – the volume of timber in the above-ground parts of trees, expressed in cubic metres per ha.

**STANDING STOCK OF TIMBER** – the volume of timber in stands or total volume thereof in a given unit like a Forest District (as expressed in cubic metres).

**STEPPIFICATION** – limitation (mainly through drought) of conditions favouring the development of forest, with resulting encroachment of steppe vegetation.

**TAPPING** – removal of tree bark plus phloem by feeding game animals (e.g. moose, red deer and roe deer).

**TEMPORARY SEED STAND** – a stand whose origin and good quality guarantee the obtainment of seeds giving a next generation of the required quality. Seeds are collected after cutting of particular parts of the stand, which is carried out in years of good production.

**TIMBER HARVESTING** – technological process entailing the removal of trees, either singly or from defined areas, with a view to desired silvicultural and economic results being achieved.

**TOTAL VOLUME OF TREE** – timber volume measured in cubic metres.

**ZONES OF INDUSTRIAL DAMAGE** – in relation to the intensity of the harmful impact being exerted by gases and particulates (manifested inter alia by the loss of assimilatory apparatus), a distinction is drawn between the following zones: 0 – no damage (reductions of assimilatory apparatus of up to 10%), I – minor damage (11–25%), II – moderate damage (26–60%), III – severe damage (of over 60%).

**WINDBREAKS AND WINDTHROWS** – trees broken or blown down by wind or snow.

# List of abbreviations

<b>Bb</b>	– marshy coniferous forest (a forest habitat type)
<b>BbG</b>	– montane marshy coniferous forest (a forest habitat type)
<b>BG</b>	– montane coniferous forest (a forest habitat type)
<b>BMb</b>	– marshy mixed/coniferous forest (a forest habitat type)
<b>BMG</b>	– montane mixed/coniferous forest (a forest habitat type)
<b>BMś</b>	– fresh mixed/coniferous forest (a forest habitat type)
<b>BMw</b>	– wet mixed/coniferous forest (a forest habitat type)
<b>BMwyż</b>	– upland mixed/coniferous forest (a forest habitat type)
<b>BP</b>	– pre-final felling structure (a stand type)
<b>Bs</b>	– dry coniferous forest (a forest habitat type)
<b>Bśw</b>	– fresh coniferous forest (a forest habitat type)
<b>BULiGL</b>	– Forest Management and Geodesy Bureau
<b>Bw</b>	– wet coniferous forest (a forest habitat type)
<b>BWG</b>	– high-mountain forest (a forest habitat type)
<b>DGLP</b>	– Directorate-General of the State Forests (DGSF)
<b>NFOŚiGW</b>	– the National Fund for Environmental Protection and Water Management (NFEPWM)
<b>GUS</b>	– the Central Statistical Office
<b>IBL</b>	– the Forest Research Institute
<b>IUCN</b>	– the International Union for the Conservation of Nature and Natural Resources (World Conservation Union)
<b>KDO</b>	– class for regeneration (a stand type)
<b>KO</b>	– regeneration class (a stand type)
<b>LG</b>	– broadleaved montane forest (a forest habitat type)
<b>LKP</b>	– Promotional Forest Complex (PFC)
<b>Lł</b>	– riparian forest (a forest habitat type)
<b>LMb</b>	– marshy mixed/broadleaved forest (a forest habitat type)
<b>LMG</b>	– montane mixed/broadleaved forest (a forest habitat type)
<b>LMow</b>	– fresh mixed/broadleaved forest (a forest habitat type)
<b>LMw</b>	– wet mixed/broadleaved forest (a forest habitat type)
<b>LMwyż</b>	– upland mixed/broadleaved forest (a forest habitat type)
<b>Lśw</b>	– fresh broadleaved forest (a forest habitat type)
<b>Lw</b>	– wet broadleaved forest (a forest habitat type)
<b>Lwyż</b>	– upland broadleaved forest (a forest habitat type)
<b>OHZ</b>	– Centre for the Breeding of Game Animals
<b>Ol</b>	– alder woodland (a forest habitat type)
<b>OlJ</b>	– alder-ash woodland (a forest habitat type)
<b>PGL LP</b>	– the State Forests National Forest Holding
<b>RDLP</b>	– Regional Directorate of the State Forests (RDSF)
<b>TBFRA 2000</b>	– Temporal and Boreal Forest Resource Assessment 2000