

The background image shows a mountain range under a clear blue sky. The mountains are covered in brownish vegetation with several patches of white snow. In the foreground, there is a field of tall, green grass.

National Policy on Forests in Poland and forest management in the Carpathians

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I. Legal basics of sustainable and balanced forest management.

The priority legal act, being a determinant of activity conducted in the forests, is the Forest Act of September 28th, 1991.

Legal acts, which quadrature with the Forest Act, are *inter alia*:

- Spatial Planning Act
- Natural Protection Act
- Water Law Act
- Hunting Law Act
- Forest Reproductive Material Act.

The background of the slide is a photograph of a forest. In the foreground, a young, thin tree stands on the right side. The middle ground is filled with a dense forest of green trees. In the background, there are blue mountains under a clear sky. The text is overlaid on this image.

The Order 11a of General Director of State Forests
National Forest Holding of May 11th 1999 constitutes
the following principles:

- Keeping the biological diversity of forests.
- Maintaining the production richness of forests.
- Maintaining the health and vivacity of forest ecosystems.
- Protection of soil and water resources in forests.
- Keeping and intensification of forests' role in global carbon balance.
- Maintaining and boosting long-term and multilateral social and economic benefits taken from forests.
- The existence of legal, political and institutional solutions supporting durable development of forest management.

General rules of forest management, based on the principles of sustainable and balanced development:

1- *Limitation in the processes of water relations degradation in forests by:*

- Keeping the approximate natural state of intra-forest water basins and watercourses, as well as restoring them.
- Keeping in the area of rivers' valleys the flood plain forests, alder swamp forests and other natural plant formations as the refuges of rare species of *flora* and *fauna*, and as the regulators of habitats' humidity and local climate.
- Keeping an intact state of intra-forest wastelands, e.g. swamps, sloughs, moors, birds' refuges, heaths, dunes and rocks, together with their *flora* and *fauna*, in order to protect full biological diversity.
- Within the frames of the spatial management plans, intensification of endeavours to reforest the higher altitudes of drainage basins and watersheds, in order to boost water retention in forests, decrease the pollution's movement and erosion of soil.

2- To state the economic aims of forest management and correct silvicultural planning, it is essential to:

- Undertake the researches of soil and habitat, ensuring the identification of biotope's conditions, and stating the level of degradation or devastation of habitats, and the principles of their reconstruction.
- Undertake forest survey, as a basis for stating current and long-term aims of forest management,
- Undertake forest site survey, enabling the classification of habitats and areas according to their value and biological quality, with a special acknowledgement of NATURA 2000 areas.

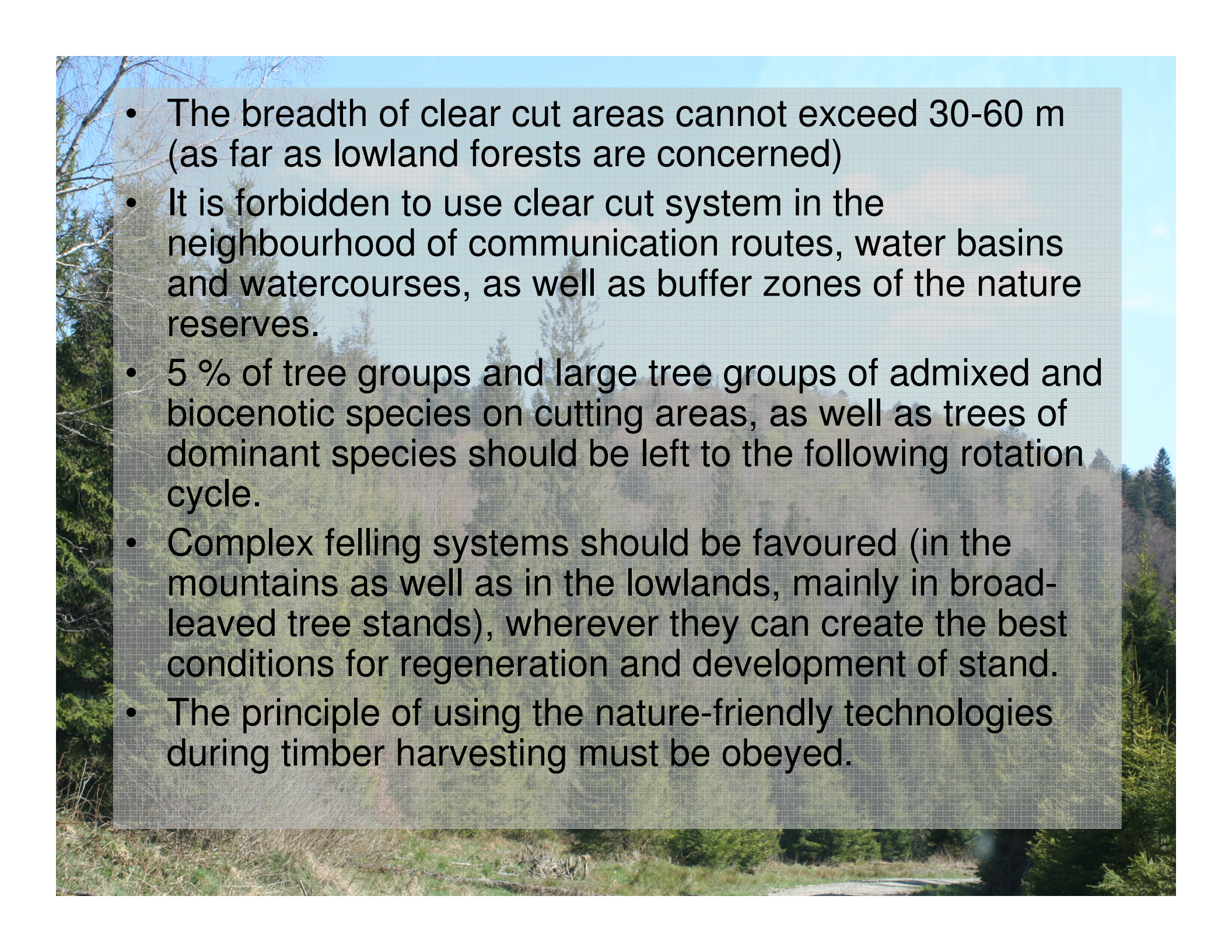
3- In the current implementation of the forest management plan, it is essential to:

- Enrich the forest-field border, by creating the ecotone zones.
- Initialize the natural regeneration in all site types, according to the requirements of quality and origin in case of dominant species, and to the necessary participation of admixed and biocenotic species.
- Limit the use of clear cuts and their areas, and run the cut lines adaptable to the differentiation of forest habitats, tree stands and terrain configuration.
- Favour the factors which increase the durability of forest in silviculture and forest protection (accordance with habitat's conditions, naturalness, local origin, diversity, vitality, genetic richness).
- Restore the lost biodiversity of forest biocenosis and enrich the forest landscape by differentiation of, according to the natural conditions: the age, species and spatial structure of the stand.

The background image shows a lush forest landscape. In the foreground, there is a dirt road or path leading into the woods. The middle ground is dominated by a large, semi-transparent text box with a grid pattern, which contains the main content of the slide. The background features a mix of green and brown trees, suggesting a transition in seasons or a specific forest type. The sky is a clear, bright blue with some light clouds.

Detailed principles of forest management:

- The principles of dividing the territory into seed regions, and the rule of registering seeds and seedlings must be obeyed.
- It is necessary to continue the creation of the nationwide bank of gene resources' reserves.
- Natural regeneration in all habitats must be favoured.
- Use of chemical substances for the needs of young-growth tending must be restricted only to necessary and reasonable cases.
- It is advised to limit the clear cut system in final cutting.

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- The breadth of clear cut areas cannot exceed 30-60 m (as far as lowland forests are concerned)
 - It is forbidden to use clear cut system in the neighbourhood of communication routes, water basins and watercourses, as well as buffer zones of the nature reserves.
 - 5 % of tree groups and large tree groups of admixed and biocenotic species on cutting areas, as well as trees of dominant species should be left to the following rotation cycle.
 - Complex felling systems should be favoured (in the mountains as well as in the lowlands, mainly in broad-leaved tree stands), wherever they can create the best conditions for regeneration and development of stand.
 - The principle of using the nature-friendly technologies during timber harvesting must be obeyed.

II. General data on the Carpathian forests.

- There are 3 Regional Directorates of State Forests in the Carpathians: in Katowice, Kraków and Krosno, supervising the activity of 35 State Forests units located in the area of the Carpathians.
- The area of forest stands in the Carpathians is 691 392 hectares, which is an equivalent to 7,7% of the total forest area in Poland, and covers 33% of the Carpathian's area*.
- The State Forests National Forest Holding administers 66% of the Carpathian forests, that is 456 610 hectares.

**The area of Polish Carpathians: 2 092 560 hectares (based on the report "Condition of the Carpathians", The Carpathian Ecological Region's Initiative, November 2001).*

Chart 1.

Stand compositions of forests in the Carpathians administered by the State Forests NFH (by area)

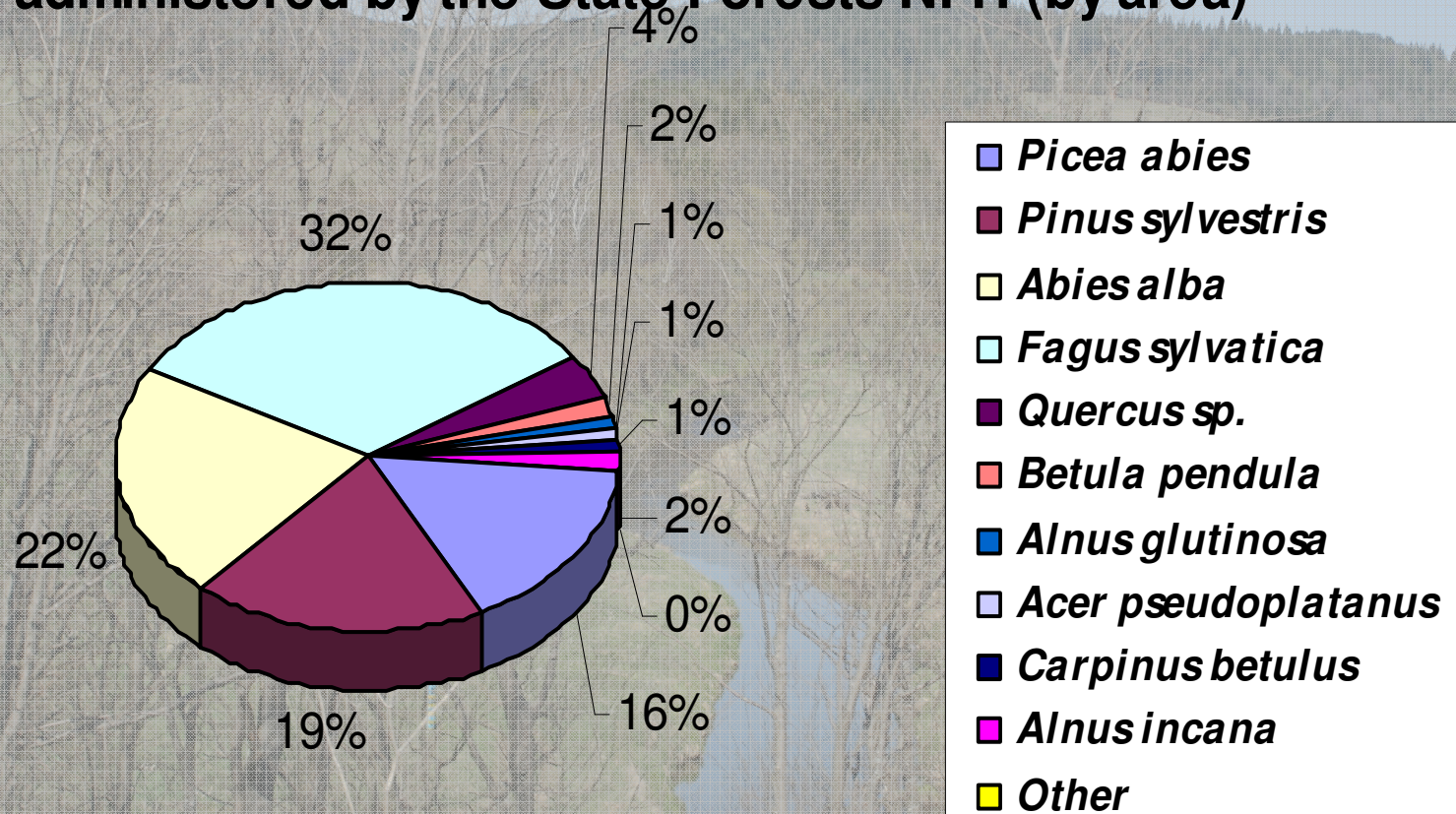
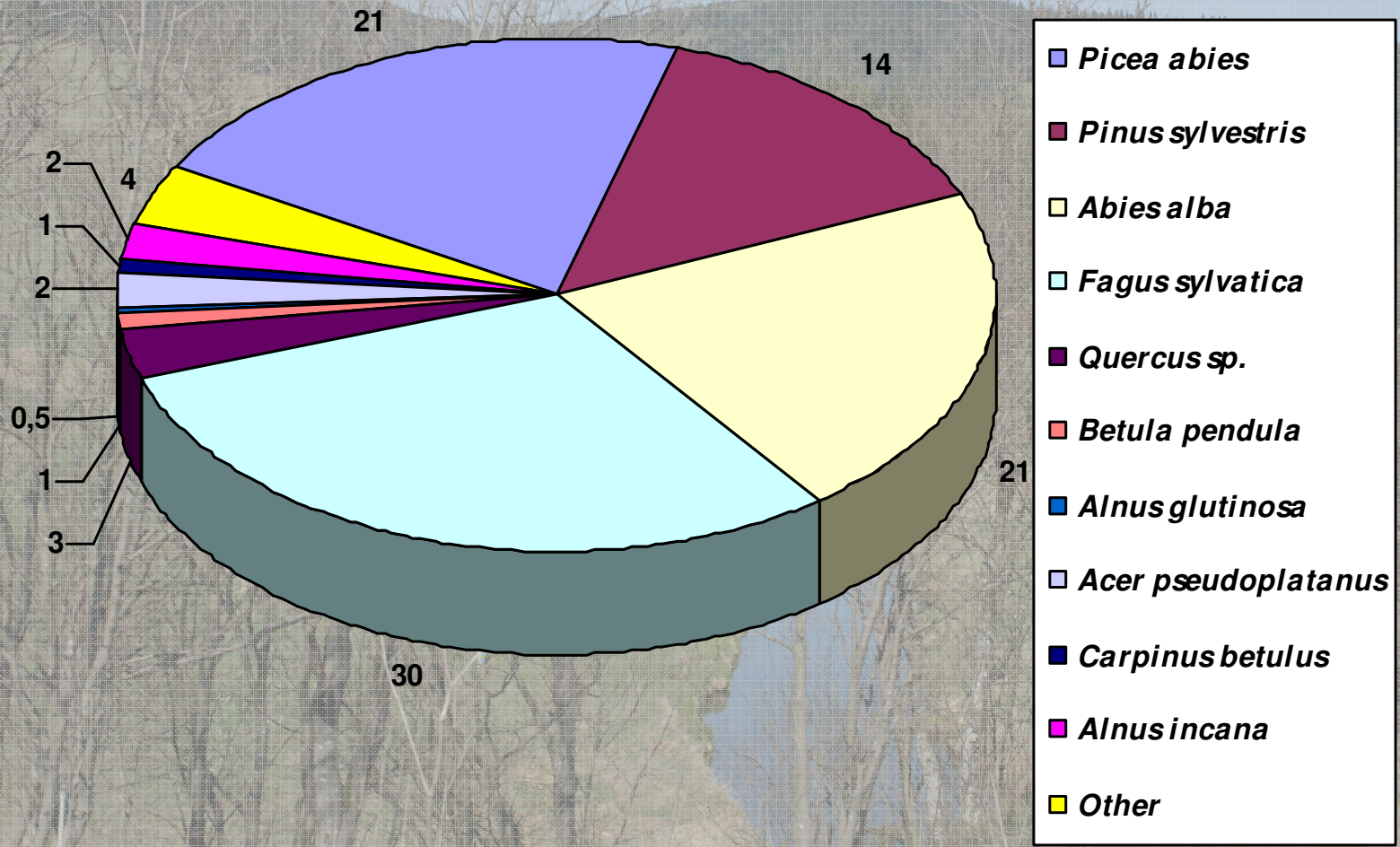
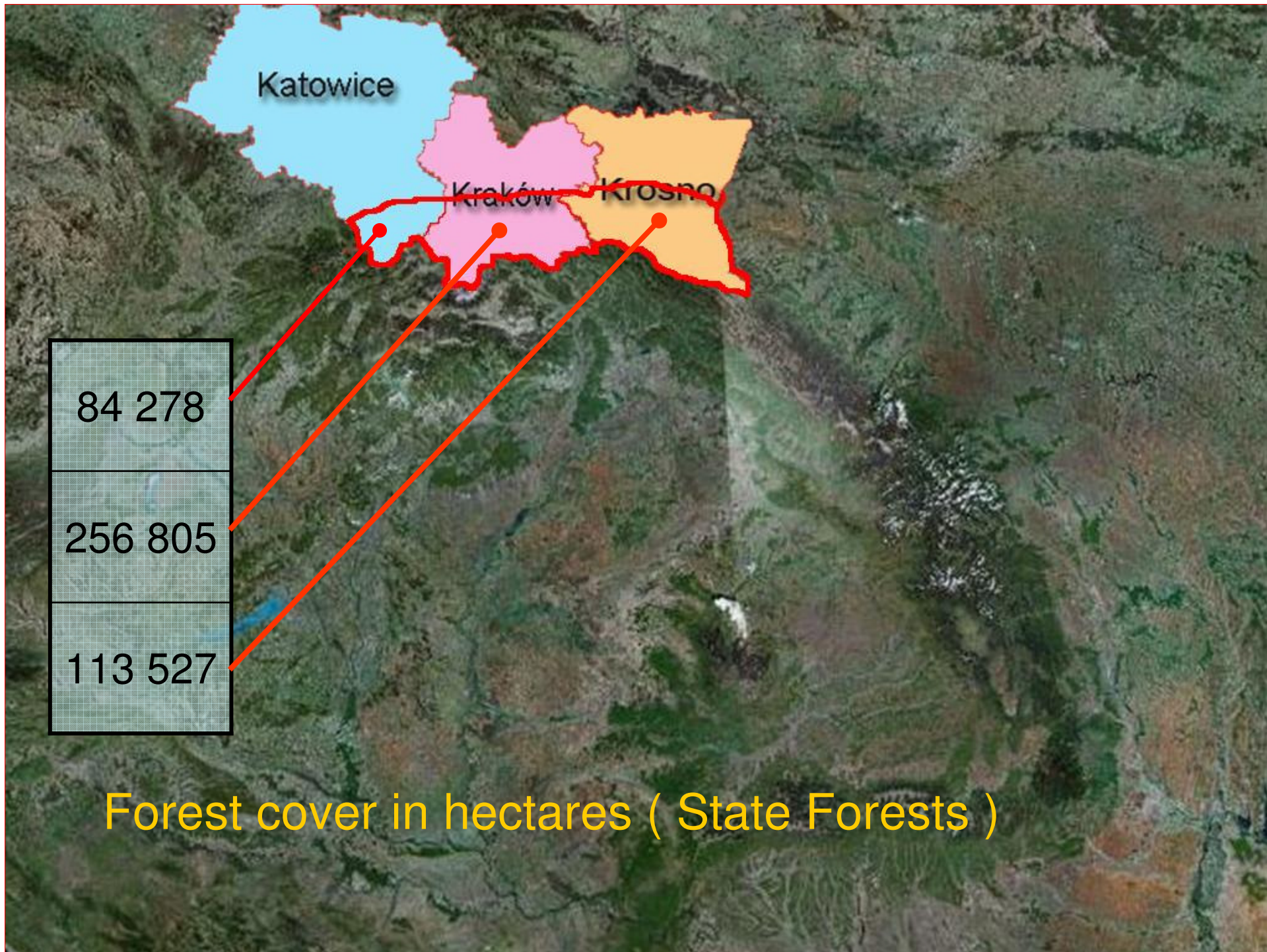


Chart 1a

Stands composition in the Carpathian State Forests (by volume)





Nearly all mountain forests are legally protected as one of categories below:

Table 1. The protective forests.

Protective forest category:	Area in hectares
Nature reserves	10 897
Soil-protecting	62 506
Water-protecting	281 631
Damaged by industry	28 240
Experimental areas	5016
Forests of a special ecological value	6548
Refuges	6766
Plus seed stands	2286
Total:	403 890

Ecological functions of forests.

- These functions are expressed by a positive influence of forests on shaping global and local climate, atmospheric composition and water circuit in nature.
- They counteract the floods, erosion and avalanches.
- They protect the landscape from steppization, and they affect the biodiversity of *flora* and *fauna* of forest ecosystems.

b) Protection of biodiversity

There are 6 National Parks in the Carpathians, covering an area of 82 573 hectares, administered by Directors who report directly to the Minister of Environment:

- The Babiogórski National Park – 3 392 hectares;
- The Tatrzański National Park – 21 164 hectares;
- The Gorczański National Park – 7 030 hectares;
- The Pieniński National Park – 2346 hectares;
- The Magurski National Park – 19 439 hectares;
- The Bieszczadzki National Park - 29 202 hectares.

Table 2. Natura 2000 areas.

Name of an area	Area in hectares
Special Protection Areas „SPA”- „Dolina Górnej Wisły” –Order of Minister of Environment of 21.07.2004 (Forest units Ustroń and Bielsko)	3535 hectares
Special Areas at Conservation „SAC” – „Beskid Śląski” – after the Alpine Conference, January 2006	26 256 hectares
Special Areas at Conservation for Habitats „SAC” – „Beskid Żywiecki”	35 326 hectares
Special Areas at Conservation „SAC” – „Beskid Mały”	7186 hectares
„Special Protection Areas for Birds and Habitats” – „Bieszczady”, Order of Minister of Environment of 21.07.2004	107 318 hectares
„Special Areas at Conservation for Birds” – „Pogórze Przemyskie”, Order of Minister of Environment of 21.07.2004	64 075 hectares
„Special Areas at Conservation for Birds” – Góry Słonne” – considered by the European Commission	55 220 hectares
„Special Areas at Conservation for Birds and Habitats” – „Beskid Niski” – consultations ongoing	152 750 hectares, of which about 65 000 hectares in the Krosno Regional Directorate of State Forests

Table 3. Other forms of protection of biodiversity:

Name of an object	Number	Area in hectares
Landscape Parks	15	414 761
Nature and Landscape Complexes	7	1 932
Natural Monuments	439	-
Protective zones for selected animal species	153	6 179
Areas at Protected Landscape	9	812 997
Plus trees	1222	-
Seed orchards and seedlings seed orchards	28	126
Gene conservation stands	22	521



The gene resources stored in the Carpathian Gene Bank in February 28th, 2007, were:

- **2876 kg of seeds of Silver fir, Norway spruce, Scots pine and European larch;**
- **6248 kg of cones of Norway spruce and Scots pine;**
- **142 kg of seeds of common ash and rowan.**

Chart 2. The Forest Gene Bank Kostrzyca

Number of gene resources stored in the Forest Gene Bank Kostrzyca (June 19th 2007)



Altogether there are 733 kg of gene resources from 444 single trees and stands stored in the Forest Gene Bank Kostrzyca.

a). Productive functions of forests.

1- Aims and tasks of forest management in the mountains are subject to the protective functions fulfilled by the forests. It is visible over all in the silvicultural systems.

- Nearly all of the stands in Carpathian forest units are managed with the use of complex cutting systems (shelterwood system and stepwise cutting). Many stands form the so-called stands by conversion. Stands by conversion include mainly artificial spruce and pine stands.
 - In both cases, the principle of a permanent presence of a forest ecosystem on the ground is in force.
 - The first way of stands management (shelterwood system or stepwise cutting and selection cutting) makes the forest regenerate naturally. In the second case, the nurse crops (stands by conversion) are utilized by group cuttings and shelterwood cuttings, planting the target species such as: silver fir, common beech, sycamore maple, European ash, small-leaved lime, mountain elm or – more seldom – European larch.
 - Practically in the State Forests there is no timber harvesting in the upper forest zone, above the elevation 900 m, on the steep slopes and rocks.
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The annual volume of prescribed cut in the State Forests in the Carpathians is 2 367 thou. m³ of merchantable timber, and the actual average utilization of timber in the years 2002-2006 was 4 527,7 thou. m³.

Table 4. Prescribed cut.

Regional Directorate of the State Forests	Annual prescribed cut [m ³]*	Actual annual utilisation [m ³]**
Katowice	805 826	3 529 533
Kraków	479 438	446 544
Krosno	1 081 700	596 617
Total:	2 366 964	4 572 694

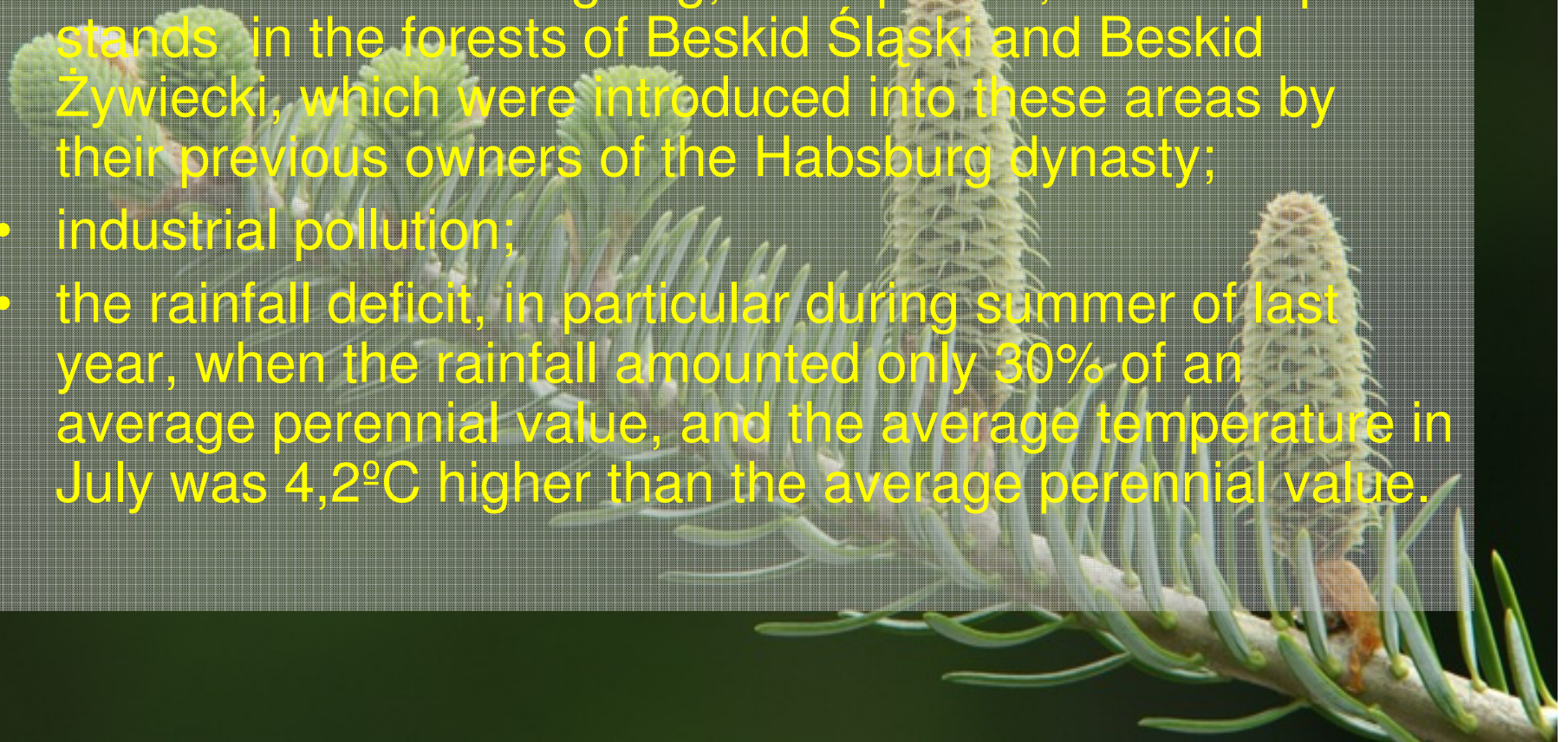
*As planned for 2007.

**Average value from years 2002-2006.

Reasons of timber harvest exceeding:

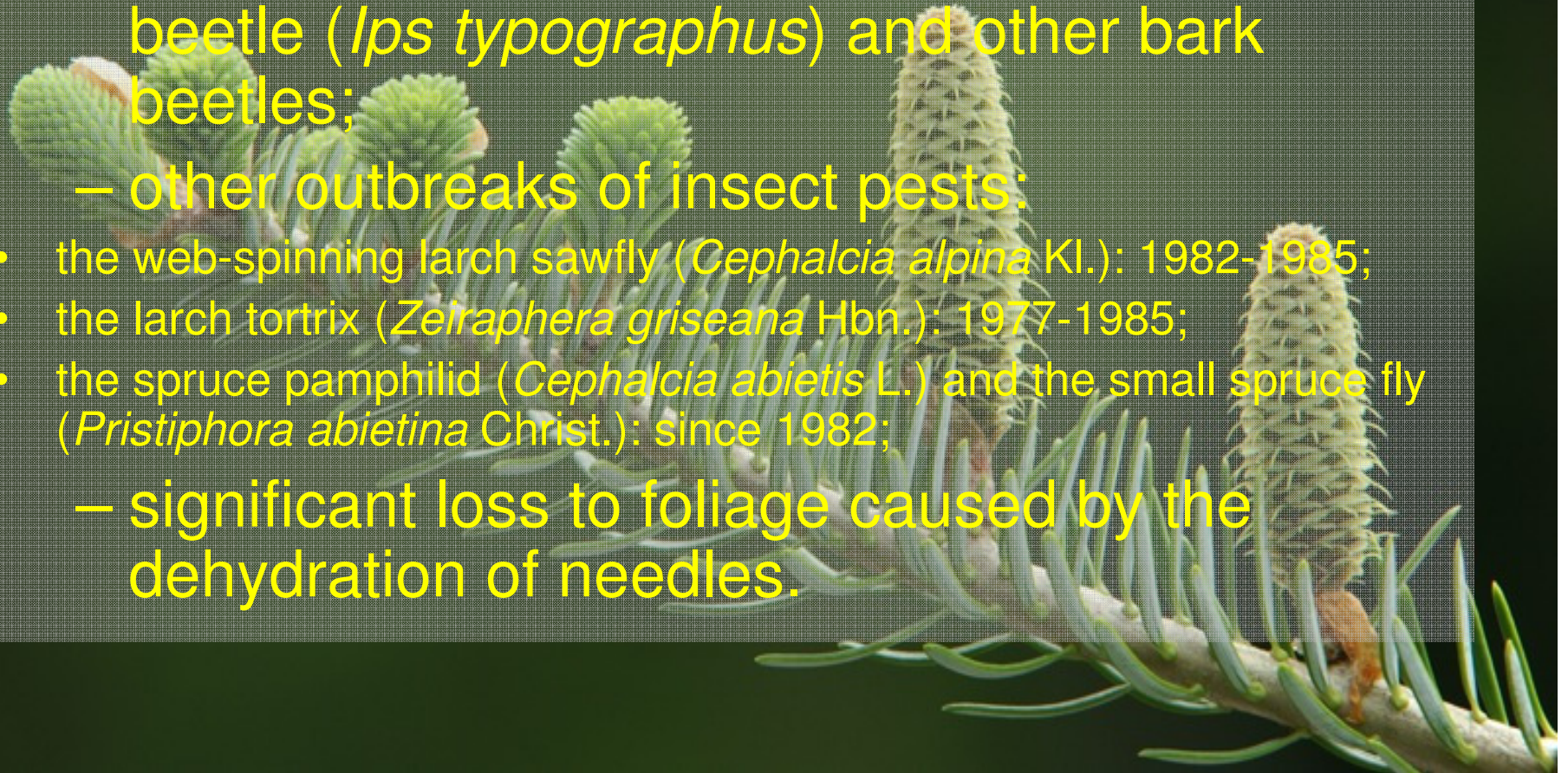
Primary reasons of exceeded annual prescribed cut:

- the decline of the outgoing, one-species, artificial spruce stands in the forests of Beskid Śląski and Beskid Żywiecki, which were introduced into these areas by their previous owners of the Habsburg dynasty;
- industrial pollution;
- the rainfall deficit, in particular during summer of last year, when the rainfall amounted only 30% of an average perennial value, and the average temperature in July was 4,2°C higher than the average perennial value.



Secondary reasons of the decline of spruce stands in the Beskidy mountains were:

- mass occurrence of the mushroom root rot (*Armillaria mellea*) in the weakened stands;
- increased activity of the eight-toothed bark beetle (*Ips typographus*) and other bark beetles;
- other outbreaks of insect pests:
 - the web-spinning larch sawfly (*Cephalcia alpina* Kl.): 1982-1985;
 - the larch tortrix (*Zelraphera griseana* Hbn.): 1977-1985;
 - the spruce pamphilid (*Cephalcia abietis* L.) and the small spruce fly (*Pristiphora abietina* Christ.): since 1982;
- significant loss to foliage caused by the dehydration of needles.




Programme of counterracting the negative results of spruce stands

Altogether the threatened spruce stands cover an area of 25 971 hectares, which is 44% of an area taken by this species

It is necessary to take out proper logistics, including:

- gene preservation of the most valuable spruce origins in the Forest Gene Bank Kostrzyca and in the Carpathian Gene Bank in Wisła;
- Adjustments of the Forest Reproductive Material Act in order to enable the seed harvest of valuable forest tree species, suggested to conversion, of other provenances;
- ensuring the technical conditions to produce the planting material for the needs of conversion;
- ensuring the technical conditions for reforestation in the years going;
- proper informative and educational activities aimed to the local community, and above all to the owners of private forests, to convince them about the necessity of taken activities.



A very intensive timber harvesting and log transport, forced by sanitary reasons, not only will cause specific natural effects, but also will be a source of potential conflicts, demands and criticism.

Potential areas of criticism against the foresters will concern:

- - worsening of esthetic value of forests and their meaning for the landscape shaping, as well as the conditions of recreation and tourism;
- - disadvantageous influence of timber extraction and log transport on the condition of the roads and quality of water in watercourses and water basins.



The area of converted stands in the State Forests of the Carpathians was **5070** hectares in last 5 years, of which **2600** hectares in the Beskid Śląski and Beskid Żywiecki.

According to the ecological disaster, there have been **19 000** hectares of tree stands appointed to the conversion in the mentioned regions.

b). Forest management tasks:

- In the State Forests area in the Carpathians, there are 4 593 hectares yearly afforested and reforested*, of which just the afforestations influencing directly the region's forest area amount 229 hectares. Additionally, the State Forests help during the afforestation of privately-owned agricultural grounds on around 721 hectares.
** average data from the years 2004-2006.*
- To improve the reforestation success, especially on post-agricultural land, the State Forests implemented the programme for a driven mycorrhiza vaccination of seedlings with a mycelium of *Hebeloma crustuliniforme* fungus, produced by the laboratories of Forest Gene Bank Kostrzyca and State Forests unit in Rudy Raciborskie. On average, there are 806 000 of seedlings per year vaccinated in the Carpathian forest units.
**data from the years 2006-2008.*
- Natural regeneration appears on the area of 3 928 hectares per year*.
**average annual area from years 2004-2006.*

c). Damages to forests.

Abiotic threats:

- **Winds**
- **Hurricanes**
- **Snowfalls**
- **Hoarfrost**
- **Draught**
- **Environmental pollution**

Biotic threats are activated by the appearance of abiotic factors:

- mushroom root rot (*Armillaria mellea*). It is estimated that the area of stands harmed by the mycelium of the above fungus in the Carpathians is 32 177 hectares, mainly in the Beskid Śląski and Beskid Żywiecki region.
- annosus root (*Fomes annosus*). There are approximately 8 546 hectares of the Carpathian stands administered by the State Forests infected by this fungal disease.

Table 5. Area of the Carpathian forests damaged by game*.

Age category	Damage up to 20% in hectares	Damage level 20-50% in hectares	Damage over 50% in hectares
Plantations	2356	530	124
Thickets	2205	224	28

**average value for the years 2004-2006*

Protected species of large mammals and birds in the Carpathians.

Species	Number
Bison bonasus	243
Canis lupus lupus	433
Ursus arctos	126
Lynx lynx	284
Rupicapra rupicapra	113
Tetrao urogallus	400
Tetrao tetrix	350


Number of game.

Species	Number*
Cervus elaphus	8710
Dama dama	116
Capreolus capreolus	40922
Sus scropha	4043

**after the stocktaking of game from the year 2006.*

Social functions of Carpathian forests.

Facility	Amount
Educational trails	76
Environmental education centers	4
Nature/forest exhibition rooms	13
Open-air teaching sites	25
Education points	18
Total:	136



In the area administered by 3 Regional Directorates of State Forests, according to the proper Orders of General Director of State Forests, 3 Promotional Forest Complexes were called into being:

- Promotional Forest Complex “Lasy Birczańskie”: 29 636 hectares;
- Promotional Forest Complex “Lasy Beskidu Śląskiego”: 39 849 hectares;
- Promotional Forest Complex “Lasy Beskidu Sądeckiego”: 19 650 hectares.

Threats:

- Climate changes (increase of temperatures; lack of water)
- Anthropopressure
- Problems with the implementation of sustainable development in the privately owned forests
- Natural appearance of forests on the polonins and mountain meadows after giving up grazing
- Damages of forests by abiotic and biotic factors
- Acid rains and other industrial damages
- Water erosion
- Uncontrolled cuttings in privately owned forests and stealing of wood

Conclusions

- Keeping everlasting forests in the mountainous regions
- Promoting the linkage between keeping biodiversity untouched and human well-being
- Afforestation of agricultural land
- Protecting natural ecosystems on steep slopes, watersheds, upper frontier of forest etc.
- Keeping the number of big game (herbivores) on a balanced level
- Keeping the number of predators (wolves) on a balanced level to save local populations of roe deer, red deer and to reduce the loss of domestic animals
- Carry on the reconstruction of forests there where artificial monocultures finally lead to forest decline
- Propagate the natural regeneration
- Stop water erosion by building barriers on the temporary water beds and using environmentally friendly machinery for logging and transportation



Thank you for your attention.