Search for a balance between changing requirements for benefits from the forest and its condition in the Moravian-Silesian Beskids (Czech Republic)

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Introduction

Forest policy and forest management problems related to a majority of Czech mountains are especially evident with regard to the Moravian-Silesian Beskids. The study of these problems has progressed thanks to the considerable effort of forest organizations and to the long-term support of forest research. With respect to specific problems in mountain areas, we will present our results and describe the methods used to achieve them.

To decide whether present forest management is rational and what it should be like in the near and more distant future, we must determine the management objectives, analyze the overall condition of the forest, estimate its functional potential and define its possible limitations. In order to fully grasp the situation, it is finally necessary to trace the main stages of forest development under man's influence.

Natural preconditions of forest existence and the historical background of forest use in the Beskids

Natural environment

The Beskids represent the last range of mountains on the western edge of the Carpathian arch. The present area of this natural forest region is 63 thousand hectares. From the viewpoint of environmental protection, the Beskids are a protected landscape area (as declared in 1973) and, from the viewpoint of protecting the water regime, a protected area of natural accumulation of water (as declared in 1978). The forest cover is 70%, in more or less enclosed forest complexes up to 85% and in more spacious agricultural enclaves lesser.

Today's geomorphology is the result of the folding of the Cretaceous deposits in the Tertiary into blocks of the WE-order. Mountain knobs, separated by deep transversal valleys, were then modelled by subsequent weathering and by the continental glacier in the Quaternary. Knob peaks reach heights ranging from 1127 to 1328 m (Lysá hora Mt.), and the foothills are situated at an altitude of about 350 m. Slopes inclining from the main ridge down to the north are steep, those descending to the south are more gentle.

The flysch geological mantle is formed by sandstone, conglomerates and shales at different stages of weathering. Thus, the soils which are dominated by loamy-sand cambisols or podzols differ greatly in depth, gravel and nutrient contents. They are susceptible to water erosion.

The macroclimate of the Beskids tends to be continental, and the mountain range is a region with the highest amount of rainfall in the Czech Republic (> 1500 mm p.a.). The mesoclimate and the wind conditions in particular are related to the existing orographical situation.

An orientation characteristic of the potential natural vegetation, existing prior to the anthropogenic impact, is provided by the classification of the area by forest altitudinal vegetation zones *(Table 1),* which are named according to the tree species determining the ecosystem of the final forest. Clearly dominant is the fir-beech forest vegetation zone.

Table 1: **Forest altitudinal vegetation zones (FAVZ), their elevation and surface proportion (%).**

FAVZ	Altitude	%	FAVZ	Altitude	%
3 – oak-beech	280–400	4.4	6 – spruce-beech	850–1100	4.9
4 – beech	360–780	3.9	7 – beech-spruce	1100–1250	1.1
5 – fir-beech	500–900	85.6	8 – spruce	1250–1328	0.1

Three existing natural reserves in the region will help us to obtain an approximate idea about the natural composition of the forest in this forest vegetation zone: It was a mixture of

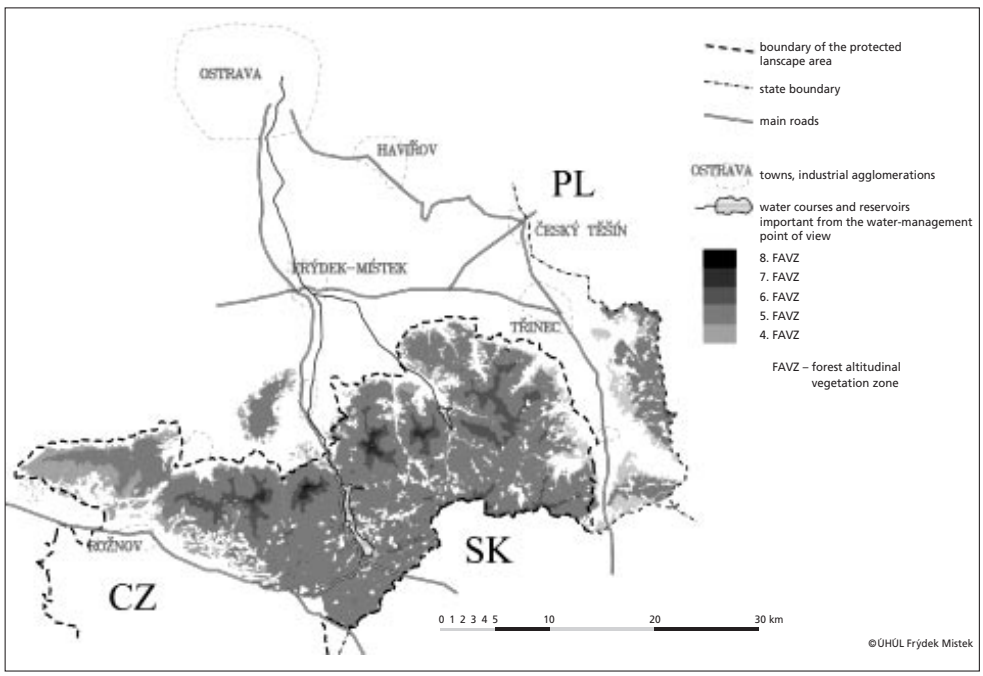

Figure 1: **Beskids, a natural forest.**

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beech *(Fagus sylvatica)* and fir *(Abies alba)* at a ratio of 4:6, which fluctuated with elevation and soil conditions. The two species covered up to 90% of the area, the remaining 10% being covered by sycamore maple *(Acer pseudoplatanus)* and elm *(Ulmus scabra).* The natural occurrence of spruce *(Picea abies)* was very low and found only in the higher forest vegetation zones if related to the whole mountain range.

Development of forest use

The forests were compact and uninterrupted for a long time, and their major function – in the eastern and southern margins of the mountain range in particular – was to protect the local population against Hungarian and Tartar invasions. The very first intervention situation was medieval colonization: from the north for mining or, to a lesser extent, agriculture in the 13th century and from the east pastoral (Wallachian) farming in the 15th century. This colonization gave the landscape its character for a long time. The forests were exploited freely and gradually devastated to such a degree that their further plundering, grazing and deforestation had to be restricted by the imperial patent of 1754, as in many other places of the Bohemian Kingdom at that time.

When new manufacturers with a great need of timber started to appear in addition to the already existing glass works and foundries in the lowlands at the base of the mountains, which was already completely deforested, there was suddenly a lack of timber. The need could only be met by the Beskids where the full-value forest grew on barely a third of the area, however. The former inefficient restrictions were, therefore, followed by the purposeful regulation of timber felling at the turn of the 18th and 19th centuries, and the reforestation measures in particular were precisely defined in the regular forest management plans.

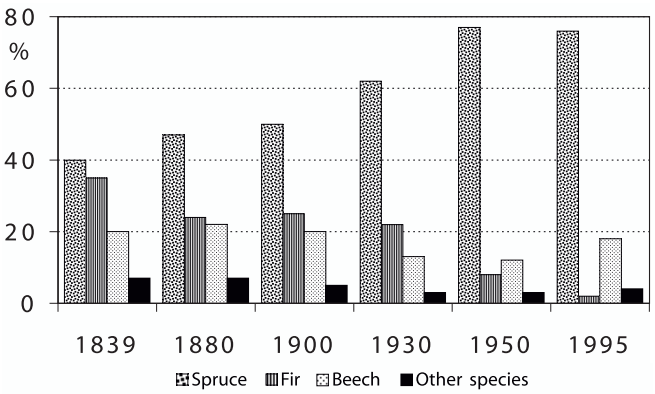

Figure 2: **Development of tree species composition in the Beskids.**

The developing tree species composition *(Figure 2)* mirrors the influence of the management methods on the forest. A certain stabilization can be seen as early as 1839. Beech that was mainly felled at the beginning of the industrial era was replaced by artificially cultivated spruce.

The forest entered the second half of the 20th century as a forest of age classes, with felling by compartments, with the dominating representation of spruce, mainly in unmixed stands. Stands up to 20 years old were nearly all Norway spruce monocultures in 1950. Under the impact of the abiotic factors, the Norway spruce stands proved their instability even in the Beskids in the past.

The forests and forestry in the Beskids had to face an entirely new situation from the 1950s. An industrial centre of the country was developed in the near Ostrava region. New housing agglomerations started to grow in connection with the rapid development of metallurgy, heavy engineering and the chemical industry, with extensive black coal mining and new power plants. Documented development of the number of inhabitants on the area of 1834 km^2, including the Beskids and three Czech industrial districts, the whole territory of Ostravsko, is evident from *Figure 3.*

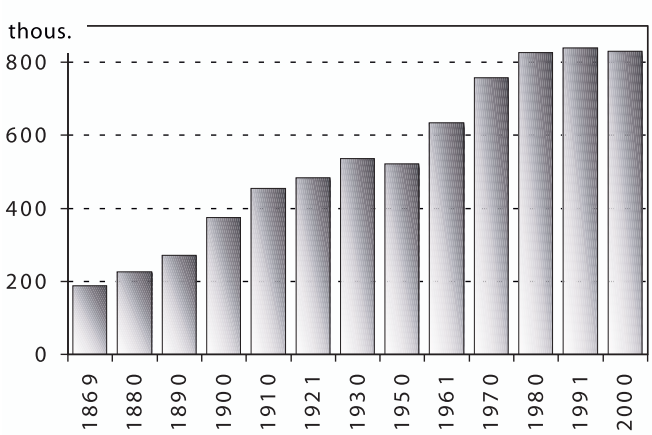

Figure 3: **Demographic development in the region of Ostrava.**

If a limiting factor to industrial growth 150 years ago was timber shortage, it was now a threat of a lack of drinking and utility water. Water reservoirs started to be constructed for its accumulation and processing, and the Beskids forests were providently given a special role in the hydrological regime of the local landscape. In 1954, the Beskids forests were declared an area hydrologically important for the country by a Government decree, and forest management directives were issued at the same time, which were amended in 1964. The directives at that time assumed that efficient water management can be achieved through the preponderance of the old forest stands. The conservation method of silviculture in the next 20 years, i.e., the low-intensity management and restricted main felling resulted in an increased stand density and growing stock (216 m^3·ha^{-1}, 322 m^3·ha^{-1} and 369 m^3·ha^{-1} in 1960, 1970 and 1980, respectively), which soon proved fateful for the condition of the forest and unfavourable from the viewpoint of its beneficial (environmental and social) functions.

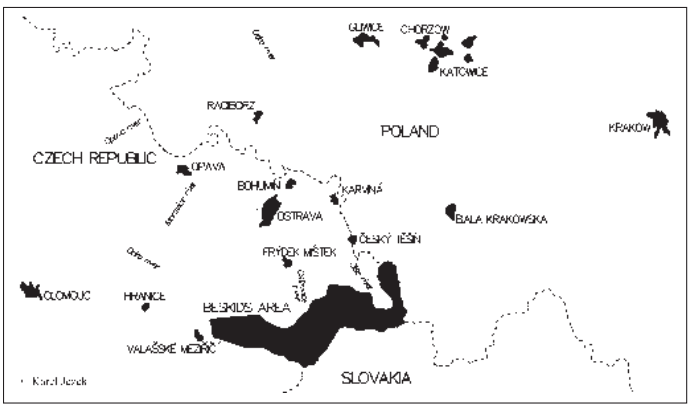

Figure 4: **Geographical location of the Beskids.**

The extensive industries in the Ostrava region and a similar agglomeration situated in Poland to the northwest *(Figure 4)* produced huge amounts of solid and gaseous air pollutants. The very first records of air pollution damage to the forests in the industrial area of the foothills date back to 1900. Information on the amount of air pollutants emitted in the area of 1834 km^2 is given in *Figure 5.* Values from the year 1998, expressed as ‹specific emissions› (t·km^{-2}), are compared with values for the Prague agglomeration, which were particularly polluted. These values are about one third lower than those for 1980.

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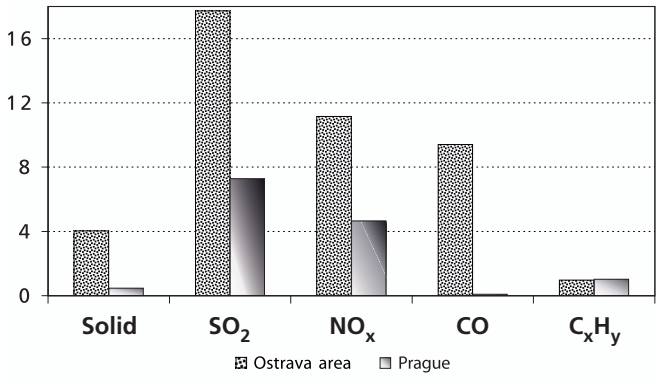

Figure 5: **Specific emissions in the region of Ostrava.**

The Beskids were, however, first seriously afflicted as late as at the beginning of the 1970s. First to be damaged by the long-term accumulation of sulphur dioxide were the Norway spruce stands in the northern, so-called Front mountains near the industrial centres. However, signs of new damage, detectable only by finer diagnostic methods, were found all over the mountain range. The damage was dramatic in the spring of 1979, in response to an exceptional atmospheric situation when the air temperature at night from 31 December 1978 to 1 January 1979 dropped by 22 °C due to an influx of Arctic air in just 12 hours. The zone between 700 and 1100 m exhibited severe to critical damage to all tree species in the next spring, which was concentrated at about 850 m and affected a forest area of 10 700 hectares.

If it was not necessary to fell all of the dying stands during the subsequent period of time, thousands of hectares of forest stands got thinner due to forest decline. Incidental felling resulting from air pollution gradually ceased after reaching a maximum in 1980–1987. In ten years (1979–1989), there were 1,760 million cubic meters of timber felled on 63 000 hectares of forest land. The average incidental felling of 27 $m^3 \cdot ha^{-1}$ per ten years, or 7.5 $m^3 \cdot ha^{-1}$ in 1980, is exceptional if we take into consideration that it was concentrated on a few thousand hectares of the forest at higher altitudes and particularly predisposed to the impact of air pollution. Furthermore, the course of the air pollution disaster was multiplied by the originally unfavourable condition of the forests, in which tree crowns and assimilatory organs were not sufficiently developed due to previous improper tending, which accelerated the disintegration of the stand structure and destabilization of the continuous forest areas. There were not enough starting points to regenerate the stands; the subsequent regeneration had to follow the uncontrolled disaster proceedings at being implemented with no regeneration plan. The impact of air pollution has been slowly weakening since 1988, yet the effects are still evident.

The above-mentioned facts related to the effect of air pollution on the forest is not complete and is not the main subject of this communication. The air pollution disaster had serious consequences: The production potential was, to a great extent, devaluated, the environmental functions of the forest were impaired both directly and indirectly (by providing access to the exploited stands and by transport technologies) and the existing systems of forest management were seriously disturbed. Air pollution had a particularly negative effect at the highest altitudes of the mountain range, which are ecologically sensitive and vitally important from the viewpoint of their landscape functions. There were fewer fir trees throughout the Beskids, which further increased the instability of the forest stands. In contrast, the relative representation of Norway spruce did not fall, and the average timber reserve in the area remained hardly unchanged (348, 369 and 362 $m^3 \cdot ha^{-1}$ in 1977, 1980 and 1988, respectively). The regeneration of extensive clear-cut areas was further complicated by unfavourable ecological conditions for the following forest generation (TESAŘ and TICHÝ, 1990). The direct regeneration of the forest to its original appearance before the disaster is extremely costly. The extent of damage increased to such a degree that a regional project on forest ecosystem preservation and restoration was prepared (ÚHÚL, 1993).

Forest functions in the system of multi-purpose use of the Beskids mountain forests

The forest area of the Beskids leads in average timber production in the Czech Republic thanks to the particularly favourable growing conditions and the prevailing Norway spruce stands. This function is subject to certain limitations due to negative impacts on the environment, especially air pollution.

The hydrological function of these forests was the centre of attention in the 1950s, which changed the focus in the watersheds of new water reservoirs due to the social urgency of protecting water resources. The closeness of the mountain range to large human settlements predetermines the Beskids forests a very popular area of recreation; accommodation facilities have been built in the depth of the forest for longer holidays. Sociological inquiries indicate that visitors most enjoy undisturbed forest views; a disturbed forest environment is most unacceptable to visitors.

From the viewpoint of the multi-functional character of the forest, landscape preservation is considered to be a superstructure. A forest which is in equilibrium with its environment has the greatest functional capacity and is, thus, the strongest link in the homeostasis of the landscape.

The social tasks of the forest directed to environmental functions were responded to by foresters at their own experience. When the primary focus of silviculture on rational timber growing was found to be misdirected, funds were provided for the research of fundamental issues related to fulfilling specific requirements. The targeted forest and hydrological research launched in the 1950s (ZELENÝ, 1993) brought new information and knowledge that were employed in a model case of the controlled water-management function of the forest as early as the end of the 1970s. The research project that focused on the accommodation of the forest to air pollution in the 1980s was extremely costly (KŘÍSTEK and TESAŘ, 1994). The latest research project focuses on the functioning of contemporary forest ecosystems with the aim of providing long-term support to the landscape preservation of the Beskids forests.

Ensuring hydrological functions of the forest

The need for such a task resulted from several important facts:

- There are water reservoirs in the Beskids on the Ostravice R. and Morávka R. to supply the industrial areas in the Piedmont with drinking water; the forest cover in the protection zones is 80%.
- The Beskids were declared a Protection Area of the Natural Accumulation of (Surface) Waters by the government as a mountain area precipitation, the forests of which are very important for abating high water in torrents, thus protect-

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ing the infrastructure of the cultivated landscape in the Piedmont.
- The flysch parent rock of the Beskids facilitated the development of soils which are highly susceptible to water erosion.
- From the 1960s, the intensive commercial use of the Beskids mountain forests introduced single-purpose technologies, particularly in logging and timber transportation; managing the production of wood in this way markedly impaired the environmental effect of the forests.

Thus, the mountain forests in the Beskids were classified as the forests important for water management with concrete hydrological functions: the complex function in the watersheds of water reservoirs and with the detention function in the rest of the area.

The project on the multi-purpose use of these forests was launched in the 1970s (PEŘINA and KREČMER, 1979) and was based on long-term forest and hydrological research (commenced as early as the 1950s) and on other ad hoc prospective research into forest sites, forest stand conditions and methods and technologies of forest management with the aim of proposing procedures which would:
- restrict the wood-producing function of the forest as little as possible;
- strengthen as much as possible the functional efficiency of the forest from the viewpoint of the declared water management concerns (protection of water quality in reservoirs, flood and erosion protection in the Piedmont landscape);
- be economically effective, i.e., not increase the processing costs of raw water treatment to obtain drinking water and which would help to reduce the damage caused to the landscape by water.

Decisions about management and procedures to ensure water-management functions

Assuming that investments in forest management will be adequate for the required functions of the forest, the forest area was subjected to differentiation by defining the functional groups of forest stands, the criteria being the impacts of the forest ecosystems (with their natural and anthropogenic components) on the elements of the rainfall run-off process (water balance uptake and output items; infiltration; surface run-off and concentration, soil water capacity, subsurface run-off components). Procedures were recommended for the functional groups with respect to silviculture, protection, felling and stand regeneration, including the suitable kinds of mechanization and technologies (KREČMER and PEŘINA, 1987). The recommendations also took into consideration different viewpoints concerning construction and maintenance of the forest road network and specific functional (motivated by watershed management viewpoints) measures with regard to the concrete (complex or detention) functionality.

It was recommended that forest areas within the Water Reservoir Protection Zone 1 constitute a special functional group. This is the most severe zone and requires particularly sanitary protection by preventing the flow of concentrated water surface run-off into the reservoir. Since the water-management function of this zone is exclusive, it is necessary to first define such a stretch of the zone that would make the primary extraction feasible with no entry of mechanisms. It is, therefore, acceptable to build roads but only in justified cases and only if they are paved. If forest roads enter the Protection Zone 1 from higher localities, they must be technically equipped to quickly channel the precipitation that runs down the roadway crowns and flows into ditches and the stands for dispersion and seepage.

Other forest areas with important water-management functions were recommended for classification into four functional groups according to which the forest management methods and specific functional measures were to be differentiated. The functional groups are as follows:
- erosion control – on slopes with gradients > 40% or on slopes with gradients < 40% in the event that the slopes are in danger of potential water erosion;
- desuctional – on water-logged soils;
- water protection – such as riparian belts of stands along the erosionally efficient tributaries of the water reservoir and torrents in the mountains;
- infiltration – other forest areas in plains and on gentle slopes not endangered by potential water erosion.

The timber haulage technique and technologies and the construction and maintenance of communication of all kinds appeared to be a key problem in the natural conditions of the Beskids. The aim of the measures recommended for the anti-erosional functional group are the protection of the soil and the forest floor: (a) timber skidding should be carried out carefully together with skyline skidding and cable system methods, (b) the forest road network should be reduced to a minimum and (c) if a road is built, road gradients should be avoided at which the roads cannot be protected against the scouring effects of the running water. Similarly, for the desuctional functional group there are recommendations concerning soil-friendly logging and skidding procedures as well as the rational drainage of the secondarily water-logged forest to improve the retention capacity of the forest soils. For the functional group of water protection the recommendations are similar to those applied for Protection Zone 1: to ensure sanitary water protection near the tributaries of the water reservoirs and to generally maintain the stability of stream banks and the flow capacity of the stream beds.

It was urgently recommended for all the functional groups of the mountain watershed forests with important water-management functions that the forest road network density be maintained at a maximum of 50 linear meters per hectare of the forest stand, since long-term studies revealed unfavourable impacts of higher densities on the torrent run-off regime during rainstorms. The limit can be easily observed by changing techniques and technologies by implementing the skyline and cable systems instead of the long preferred tractor skidding. Practical application proved the effectiveness of these recommendations.

Tractor skidding started to be used intensively in the Beskids mountain forests at the beginning of the 1960s. Only some 4% of the felled timber were still yarded by the skylines, and the road network necessary to make the stands accessible for skidders reached an extreme size (up to 270 meters of forest roads and hydrologically efficacious skidding trails per hectare, on average 70 m/ha). The method was rationalised by lower costs for the tractor skidding of 1 cubic meter of timber. Unfortunately, the calculations did not take into account the costs of constructing and maintaining the road and skidding trail as a component of the wood-producing function production costs. When these costs were later added, the skidding by tractors appeared to be nearly twice as costly as the skyline yarding. At the end of the project, the annual volume of timber skidded, for example, in the watershed of the Šance water reservoir by the skylines and cable systems gradually increased

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to 27–28% of total fellings. This was in fact the goal of the project, i.e., 30% of annual fellings.

However, the original ‹cheap› technology was still considered too costly by a concerned public. The water in the reservoir was often turbid due to solid particles from wash-off in the watershed, especially from the forest roads and skidding trails (Buzek, 2000). The turbidity could not be coped with by the adopted single-stage raw water treatment and, therefore, another, more complex and expensive raw water treatment technology had to developed. A comparison of the costs for the introduction and operation of the new water treatment technology with the costs of a multi-purpose management of the forests in the water reservoir zones showed that any capital investment into prevention in the area of the forested mountain watershed is about 11 times more economically effective (Krečmer, 1988).

Ensuring landscaping functions of the forest

The serious destabilization of the forest ecosystems due to air pollution was only one of the factors that helped to speed up the search for methods which would support the landscaping-stabilization function of the Beskids forests. According to the concept of regional ecological stability in the Czech Republic (Buček *et al.* 1996), a supra-regional biocentre is to be built around one of the mountain knobs (Kněhyně, 1257 m) (Tesař, 1999). Its core is a nature reserve situated at the summit, the area of which is nearly 200 hectares and contains forests in a relatively good condition of health, despite serious disturbance by air pollution. The cultural forests stretching along the entire circumference of the core, an area of about 1200 hectares, containing unmixed Norway spruce or beech stands or mixed stands of the two species with the admixture of sycamore maple, are to be converted into the nearly natural forests in about 50 years. This means that any natural processes, which begin spontaneously should be allowed to evolve in their own time. It is especially the stages of forest disintegration due to air pollution that should offer a free way to the succession of the elements of the preparatory and transitional forest. It is clearly understood that the final forest will be achieved after many decades. The present maturing stands will be purposefully and gradually converted into a nearly natural final forest; this is going to happen in the course of a long period of regeneration and with the combined use of shelterwood felling and small-scale clear cutting methods. This will facilitate the development of different microecotopes to provide optimum conditions for the juvenile stages of all the basic tree species. The purpose of these procedures is to support the creation of a forest of which the growth would exhibit natural cycles without being in danger of large-scale destruction, a forest with a variety of developmental stages and steps, a forest which would provide a living space for biota, which is very diverse. This concept of supporting biodiversity is being approached by considering the most reliable way of changing the present destabilized forests into forests with a dynamic ecological equilibrium.

Management of the commercial forest

The greatest objective of forest management is to create a sufficient functional potential in the prevailing cultural forest, in a forest of age classes, in which the existing tree species composition is entirely unnatural in some places. Forest managers are prepared to enforce the consistent application of the principles of ecologically adequate silviculture, based on the empiricism of the last decades and on the latest scientific syntheses. Axioms of this new concept are as follows: (a) the production space of the forest should be permanently utilized at its optimum capacity by growing mixed stands; (b) the continuity of the forest environment and the reproduction of the site-accommodated populations of tree species should be secured by natural regeneration; (c) the timber output should be optimized by tending the growing stock with the simultaneous support of the ecological and environmental functions (Thomasius, 1994). The objective will not be a nearly natural forest but a forest to ensure direct benefits for the community. Nevertheless, it is going to be a forest with an adequate ecological stability, managed according to the principles of biological automation with low inputs of additional energy and materials. Its flexibility should allow the application of specific functional requirements at any moment. It should be remembered, however, that there will be a very long period of transformation before such a forest is achieved. The success of the project depends on in-depth study, on the definition of adequate procedures and on the consistent implementation of management by several responsible generations of foresters.

Forest policy tools to support sociological functions of the forest

Conclusions of the project of the multi-purpose management of the Beskids forests with the important role of hydrology were emplemented practically and locally. They were the basis for the former Ministry of Forestry and Water Management of the Czechoslovak Republic to issue a generally binding «Instruction for the management of forest lands in the protection zones of water resources» (1982). It was issued initially for another range of mountains, the Krušné hory Mts., which are strongly affected by air pollution, so that the application of multi-purpose forest management methods can reduce economic losses due to high water in the foothills by 20 to 25%, thus making them economically efficient.

Sub-statutory standards, including the «Instruction», were no longer legally binding after the liberalization of the legislative system after 1989; yet, the need to ensure the functioning of the mountain forests still persists. Before 1990, practically all forests in the Czech Republic were managed by the state. Some of the forests were then returned to the original owners, private persons and municipalities during the process of restitution. Thus, the problem arose to develop a forest policy to ensure the beneficial non-wood producing functions of forests in the hands of various owners. The study of this has progressed slowly (Krečmer, 1993, 1994, 1994a).

The state enterprise, Lesy České republiky (Forests of the Czech Republic – LČR), which is in charge of the management of the national forest, had to ensure that priority be given to social concerns as of 1997. This obligation arose from the law related to state enterprises. To this end, the enterprise started «Project 2000», which includes the above-mentioned principles of multi-purpose management of the forests with important water-management functions.

With the new Forest Law of 1995, the areal delimitation of these socially important forests and the recommendation of the suitable methods for their management became a task for the newly developed planning tool – the regional planning of forest development – shared by the state forest policy and the environmental policy. Their recommendations can also be included by the owners of the non-state forests in their operating plans. Approved projects on concrete forest measures can then be subsidized by the society's overhead capital. The government policy of subsidies is being refined annually by a

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legal directive on subsidies from the state budget, provided to support forestry and to secure the non-wood-producing functions of the forests, torrents training, etc.

The system of subsidies for forestry and its social functions is now the responsibility of state administrators, for whom it is a relatively new task. The state forest administration was specialized in the supervision of forest laws for generations, its role being that of the forest police. The new tasks include consulting and initiation and support of concrete measures in response to public concern about the future of forests.

Summary

The forest area of the Moravian-Silesian Beskids is on the slopes of the most westerly range of mountains of the Carpathian System in the Czech Republic, the only site with specific growth conditions for the forest. The exceptional significance of the area consists on its role in ensuring the range of requirements for the functions of the forest for a large industrial agglomeration. In this area, the forests form a vitally important environment. The region has the natural appearance of a mountain landscape and a long and eventful history of forest use. The forest culture changed its original composition to the benefit of species highly valued in past centuries. Particularly dramatic were the changes which occurred in the course of the last 60 years. They occurred because of strong anthropic pressure and within a very short period of time as far as the life of a forest is concerned. The demands of the society concerning other benefits of the forest, especially the protection of water resources for a new industrial agglomeration with extensive housing areas in the Ostrava region in the northern foothills, were gradually increasing with the growing problem of air pollution. Since the 1950s, local forestry has been facing new and unusual problems related to forest policy and the multifunctional use of the forest. In order to ensure forest functions, new solutions must be sought in terms of forest management and particularly in terms of silvicultural methods, which have to be sufficiently flexible to efficiently respond to environmental changes and to a possible shift in the demands placed on the forest. The present forest management systems are based on the principles of sustainable forestry, i.e., on the principles of ecologically justified silviculture.

Zusammenfassung

Die Suche nach einem Ausgleich zwischen den Anforderungen an die Waldfunktionen und dem Waldzustand in den Mährisch-Schlesischen Beskiden (Tschechische Republik)

Die Gebirgsregion «Mährisch-Schlesische Beskiden» liegt im westlichen Teil der Karpaten und ist auf dem Gebiet der Tschechischen Republik der einzige Bezirk mit spezifischen Wuchsbedingungen für den Wald. Die ausserordentliche Bedeutung dieses Waldgebietes ist u.a. durch die hohen Anforderungen an soziale Waldfunktionen begründet, die im Hinterland eines ausgedehnten industriellen Ballungsgebietes erfüllt werden müssen. Relief und Textur dieser Mittelgebirgslandschaft wurden durch eine lange und bewegte Geschichte der Waldnutzung geprägt. Die natürliche Baumartenzusammensetzung und Struktur der Wälder wurden zugunsten von schlagweisen Fichtenforsten verändert. Besonders dramatisch waren die Veränderungen der Wälder im Laufe der letzten 60 Jahre. Dennoch stiegen – gleichzeitig mit einer erheblichen Waldzerstörung durch Immissionen – die gesellschaftlichen Anforderungen an eine vielseitige Waldnutzung, insbesondere an den Schutz der Wasserressourcen für das nahe gelegene Ballungsgebiet im nördlichen Vorgebirge.

Die Forstwirtschaft beschäftigt sich seit den 1950er-Jahren mit neuen und bisher ungewöhnlichen forstpolitischen Fragen, die mit der multifunktionalen Nutzung des Waldes zusammenhängen. Für die Ausrichtung des Waldes auf solche Anforderungen werden neue Bewirtschaftungsverfahren und entsprechende waldbauliche Systeme gesucht. Von letzteren wird eine hinreichende Flexibilität erwartet, um wirkungsvoll auf Umweltveränderungen und/oder andere Anforderungen an die Waldfunktionen reagieren zu können. Die gegenwärtigen Bewirtschaftungssysteme basieren auf den Prinzipien einer nachhaltigen Waldbehandlung, d.h. auf den Grundsätzen des ökologischen Waldbaus.

Résumé

Recherche d'un équilibre entre les exigences requises envers les fonctions et l'état de la forêt dans la région des «Beskides de Moravie-Silésie» (République tchèque)

La région forestière des «Beskides de Moravie-Silésie» est, dans la zone située en République tchèque, la seule chaîne de montagnes des Carpates qui dispose de conditions de croissance spécifiques pour la forêt. L'extrême importance de cette région forestière relève entre autres des exigences élevées requises envers les fonctions sociales de la forêt qui doivent être satisfaites dans l'arrière-pays d'une vaste zone urbaine industrielle. La longue histoire agitée de la gestion forestière a façonné le relief et la texture de ce paysage de moyenne montagne. On a modifié la composition des essences et la structure naturelles des forêts au profit de plantations d'épicéa. Les changements qui ont affecté les forêts au cours des soixante dernières années furent particulièrement dramatiques. Les exigences sociales envers une gestion forestière multifonctionnelle, notamment en ce qui concerne la protection des ressources hydriques pour la zone urbaine voisine sise dans les contreforts septentrionaux, ont cependant augmenté parallèlement à une dégradation sensible de la forêt, due aux immissions.

Depuis les années cinquante, la foresterie doit se pencher sur de nouvelles questions de politique forestière, inhabituelles jusqu'ici, qui ont trait à la multifonctionnalité de l'aire boisée. Afin de tenir compte de ces exigences, on recherche de nouvelles méthodes de gestion et des systèmes sylvicoles qui soient suffisamment flexibles pour pouvoir réagir efficacement aux changements de l'environnement et/ou à d'autres exigences requises envers les fonctions de la forêt. Les systèmes de gestion actuels sont basés sur les principes d'une gestion durable de la forêt (principes de la sylviculture écologique).

Traduction: Claude Gassmann

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