BirdLife INTERNATIONAL

# AGAINST THE GRAIN

## Improving the management of NATURA 2000 sites and other forests in the EU

BirdLife International
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AAGE V. JENSENS FONDE

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## Summary

At Pan-European level, the European Community is a signatory party to the resolutions adopted by the Ministerial Conference for the Protection of Forests in Europe (now Forests Europe). In this context, general guidelines for the conservation of forest biodiversity, both inside and outside NATURA 2000, have been set out. However, the gradual loss of biodiversity in European forests, reported by the European Environmental Agency (EEA 2010), as well as the failure of EU to reach the 2010 target of halting biodiversity loss, indicate that neither MCPFE principles of "biodiversity-friendly" forestry practices nor NATURA 2000 conservation measures are implemented well enough to have sufficient positive effect on forest ecosystems. Current forest conservation and management policies in the EU are inadequate and insufficient for maintaining ecological integrity of forests in general, and forests within NATURA 2000 in particular. Despite this, the EU Forest Action Plan brings little light on crucial issues: how much protected habitat is needed to prevent from further loss of forest biodiversity; how to identify forests of key biological importance and what are economically and ecologically justified ways to manage them?

The key problem addressed in this book is that the concept "sustainable forest management" has remained a neat-sounding catchphrase with too little unspecified content, often hardly distinguishable from normal commercial forestry. In Part 1 of this book we redefine "good forest management" and propose the following conservation targets:

1. Use NATURA 2000 to increase the area of strictly protected forests to at least 10% of total EU forest in order to prevent further biodiversity loss and secure all remaining natural old-growth stands.
2. Apply ecologically sensitive management to a further 10% of forests surrounding strictly protected areas in order to prevent from their further fragmentation and preserve ecological connectivity.
3. Revise forest management practices to better support ecological and social demands both inside and outside NATURA 2000 sites. This can be achieved in many cases with little commercial loss.

Rural Development Programmes, particularly NATURA 2000 payments and forest-environmental schemes, can and should be directed towards the above purposes. Only ecologically justified and sustainable forestry practices should qualify for compensation.

In Part 2 we illustrate the above with case studies of forestry practices applied in different forest ecosystems across the EU: from boreal coniferous communities (Northern Europe) through lowland temperate and mountain spruce-dominated forests (Central Europe), mountain beech forests (South-Eastern Europe) to pine and oak communities in the Mediterranean region. We also address key problems related to the management of forested NATURA 2000 sites, such as clearcuts and improper post-disturbance management.

Photo by M. Androsiuk

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*By Andrzej Bobiec, Krystyna Stachura-Skierczyńska, Marcus Walsh*



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# Redefining sustainable forest management – targets and recommendations

## Does "sustainable" always mean sustainable? Some forestry myths

Forests cover approximately 35% of the European Union and more than 40% of the continent within its geographical borders. As agriculture gradually abandons less productive soils, natural forest succession along with artificial afforestation is expanding throughout Europe. The extension of the area occupied by stands younger than the harvest age results in the acceleration of the annual increment of the biomass. This trend is frequently reported as unquestionable proof of the success of sustainable forest management, although it tells us nothing of the ecological and aesthetic quality of current habitats.


Photo by A. Bobiec

However, many rare and threatened plant, fungi and animal species depend on natural developmental stages of forests, rich in veteran trees and decaying wood. Such characteristics can fully develop only in forests that are subjected to a long- lasting regime of natural processes, including disturbances such as storms and fire. Such forests typically have mixed stands of naturally occurring tree species. Although often referred to as "old growth" or (as here) "natural forests", biologically important forests contain stands of very varied age, and many have seen at least some human use. Nonetheless, if allowed to develop without intervention, such forests will retain many species and natural processes not found elsewhere. That they also be connected to each other and sufficiently large is critical to the long term survival of the specialised species dependent on them (Hanski 2004).

Obviously, neither increasing forest area nor a steadily growing biomass as such can be used as indicators of the success in natural forest conservation, a sine qua non condition for sustaining forest biodiversity. **Sustainability can only said to have been achieved when the loss of biodiversity will have been halted.** For European forest species (and other habitats such as agricultural), this is still not the case. Sustaining productive stands, a growing stock of trees, does not mean sustaining forest ecosystems. Many forest management rules such as the forced renewal of older stands through planting before they start to decay, restocking of gaps and pest control are contradictory to the preservation of natural forest ecosystems and their dynamics. This means that the preservation and restoration of natural forest ecosystems and full scale forest management should be based on two distinct and explicitly formulated different missions. At the same time, it is possible to make commercial management considerably more benign for biodiversity than is currently the case.

Perhaps the biggest problem impeding the true progress of forestry towards ecosystem-oriented sustainability is caused by a number of deeply-rooted "forestry myths":

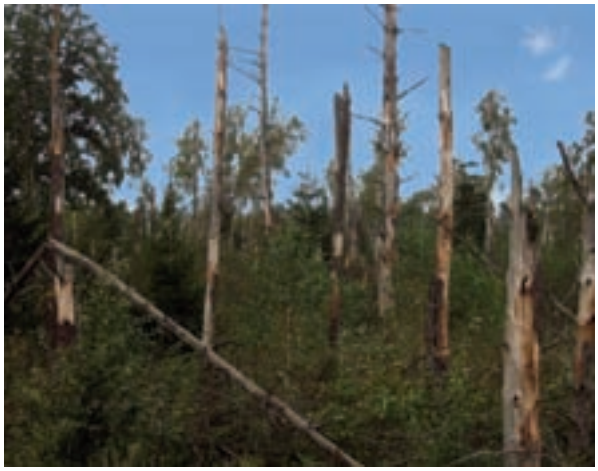
**Myth No. 1.** *All forest functions can be secured by adequate management measures and practices incorporated into the wood production process and implemented at the stand level.*

As case studies presented in the Part 2 of this guide clearly show, preservation of natural forest ecosystems and their functions (and biodiversity) often contradicts the management goals aimed at maximizing economic gain from forest production. These approaches are mutually exclusive; it is not possible to equally balance all forest services within the same functional unit. Forest conservation and production targets need to be set separately already at the landscape level. Within areas dedicated for conservation, all management decisions and actions should be ecology-based and oriented only at restoration and enhancement of natural characteristics of the ecosystem. It is not impossible, however, to achieve a reasonable economic return from sensitively managed protected areas around strictly protected zones, but only as a "by-product" of this special management, not a management goal itself. The reality is the opposite: management in protected areas is often subjected to achieving economic benefit, and ecosystem demands are put aside.

**Myth No. 2.** *Forest management mimics natural processes.*

Classical forestry beliefs, repeated in countless lectures, is that clearcuts and other forms of extensive logging imitate forest fires. Replanting in turn is just imitating the new growth that springs up afterwards. Forests grow even aged, and will end up dominated by one species.

None of this is in fact correct (Kuuluvainen & Keto-Tokoi 2006). Probably the myths originated in a combination of wishful thinking, a lack of ecological education, and observations made from the initial results of a few particularly devastating large forest fires. Such fires are in fact rare. Natural forest fires are caused by lightnings, and consequently usually extinguished by the rain that follows. Even after stronger fires, many individual trees are left alive, and still more slowly dying ones serve as food and refuge to countless species. Wetter places may burn only at intervals of hundreds of years. The result is a mosaic, dynamically changing landscape of trees of all ages, with a preponderance of old growth and much decaying wood. No tree species dominates entirely, because fires, storms, and other disturbances keep changing the landscape over time (Kuuluvainen and Keto-Tokoi 2006, Pennanen 2002).



Natural forest regeneration in Pisz, North-Eastern Poland.
Photo by K. Stachura-Skierczyńska.
In 2002 the strong windstorm damaged over 22 000 hectares of commercial pine forest. 450 hectares were left without any intervention as a reference site, while intensive salvage cuttings and replantings were performed over the remaining area. Today, instead of artificial, even-aged pine monoculture, natural mixed stands re-appear.

Forest management needs to take lessons from the observation of natural processes in order to predict natural trends (such as ecosystem adaptation to environmental changes), but it cannot mimic most of the natural processes being contradictive to the very management tenet. There is no natural analogy to wood harvest, planting trees, pest control or fencing re-planted areas.

**Myth No. 3.** *Forests need active protection. Disturbances, such as fires, windfalls, pest outbreaks threaten forest durability; therefore they should be prevented, controlled and eradicated in every circumstances and at any cost.*

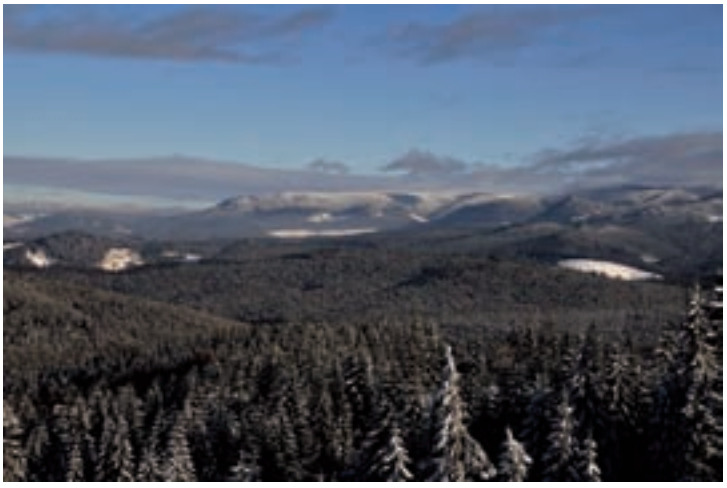
From the ecosystem's point of view, disturbances are not a threat, but a part of the natural forest life cycle. Forests regenerate naturally through such disturbances, since without this capacity they would have disappeared. Moreover naturally mixed stands have better resilience than planted monocultures, and pests generally attack a specific species, leaving others unharmed. Economy-oriented forestry can benefit from putting more trust into natural regeneration – see i.e. Angelstam 1996, Lindenmayer and Noss 2006 and references therein). However, in areas dedicated for conservation, natural processes need to be left to operate. Care must be taken in some cases, e.g. fire driven processes in Mediterranean mountain forests cannot be allowed to spread outside of designated zones (see the Greek case study in this book). Another example is ungulate grazing control, which in the absence of enough large predators is severe and prevents some tree species from regenerating almost altogether (see i.e. Herder et al. 2009).Such exceptions should be considered on a case-by-case basis and never serve as a justification for routine interventions, which dominate in everyday forest "conservation" practice. Unfortunately, the conviction of the need for constant action in protected forests is still deeply rooted in forestry education and consequently also in public opinion.

**Myth No 4.** As long as the annual increment is higher than the crop and the average age of stands increases, forest management is biodiversity friendly.

Neither the wood extraction rate lower than the annual increment nor the increasing average age of stands can be used as determinants of sensitive and biodiversity-friendly management. With very low average age of stands of European forests, the harvest rate must be lower than the increment, since relatively big share of this increment occurs in young and pole stands, much below optimal cutting age. Since trees grow fastest when they are young, it is therefore not unnatural that the currently observed growth rates are higher than in times when the forests were on average older. For the same reason, ageing large areas of young pre-commercial stands contribute to the overall increase of the average age.

## From strictly protected to managed forests-towards an integrated, landscape-level conservation vision

Forests preserving all or most of their natural features can still be found in some regions in Europe, especially the North and East of the continent, as well as in high mountains (Angelstam and Lazdinis 2000). The need for protecting more of these forests has been proved by ecology research. Several studies of forest birds and mammals have shown that populations decline particularly sharply once the amount of suitable habitat drops below 10–20% of the total landscape area (e.g. Hanski and Walsh 2004, Radford et al. 2005). Despite this, the amount of strictly protected forest in Europe is so low – between 1–2% on average, and virtually everywhere less than 5% (except for northernmost parts of Lapland) – that the threshold for the continued presence of many specialised species, including also those of Community interest, is in fact



Forests in Romanian mountains. Photo by S. Bugariu.

Tiveden National Park, Sweden. Photo by K. Stachura-Skierczynska.

not met (Radford et al. 2005, Roberge et al. 2008). This is one of the main reasons for the failure of the NATURA 2000 network in halting the decline of forest biodiversity in Europe (EEA 2010). It has been confirmed that even a "best practice" forest management – and the actual management applied in many NATURA 2000 sites EU-wide is far from this concept – cannot be a substitute for **preservation of sufficiently large forested areas in a natural state**, since any management applied to a natural forest leads unavoidably to a change of the ecosystem character (Hanski and Walsh 2004, and references therein).

*Approach to conservation – Nordic countries as an example*

*The Nordic countries share a long history of nature conservation. Compared with most other states, these countries have established many large protected areas where recreation and many other activities are allowed, but commercial forestry is entirely banned. Tthe key principle regarding designated protected areas is not to intervene. This model approach, however, is in stark contrast e to the intensive forestry operations performed in all other forests. Large-scale clearcuts and timber extraction levels far beyond ecological limits are commonplace even within NATURA 2000 forests not designated for protection.*

*The approach in many other EU Member States is quite different. Rather than accept the need for allowing natural processes to take place in some forests, therather vague concept of "sustainable forest management" is frequently cited as a kind of universal panacea intended to provide a "win-win" reconciliation of both economy and conservation goals. As a result the sharp differences between conservation and forest commercial needs have become blurred, resulting in many Central European States denying proper protection to relatively well preserved forest ecosystems deserving of such status. The total area of strictly protected forests in CE countries is small (around 1%). Other forms of protection add to a few more per cent, but these sites are not free from various forestry practices, including routine "sanitary" cuts (in the name of controlling wood- eating pests), removal of decaying trees etc. In consequence, the very reason for establishing protected areas ceases to exist.*

*On average, the forestry model in Central European countries might not allow for such intensive exploitation ast takes place in commercial Nordic forests. But in fact neither of these approaches is good enough on its own. The fusion of both, with a substantial reduction of clearcutting, while maintaining the clear division between protected areas and commercial stands, would be the best solution.*

Since managed forests have covered most of the Europe's wooded land for hundreds of years, ultimate success in forest biodiversity protection is unlikely to depend solely on forest areas dedicated to preservation. Many forest-dependent animals and plants have wide ranges and are distributed over large areas. Among them several specialized species can survive at low densities in sensitively managed areas around and between strictly protected sites, using them as corridors to these core zones where conditions for them may be even better. Also – and this is critical – **sensitively managed areas around core zones prevent the latter's further fragmentation**. Moreover, they preserve specific sites' microclimates and water regimes. If the forest around such key biodiversity area is clearcut, it results in a disappearance of key species in a very

short time (Pykälä 2007). Biodiversity-oriented management measures, spread over large areas would also benefit other, less specialized, but declining species, dispersed widely across productive forests.

Therefore forest management bears considerable responsibility for biodiversity protection on the regional, national and European scale. There is much evidence, given as case studies in this book, that current "sustainable forest management" (SFM) is largely a myth in urgent need of revision.

## NATURA 2000: sorting out problems

NATURA 2000 covers 17% of the EU land base, and is the largest conservation network in the world REF. According to the Directorate General for the Environment of the European Commission, NATURA 2000 embraces more than 90% of all European protected wilderness sites. However, according to the inventory of Biologically Important Forests (BIF) carried out in Estonia, Latvia, Lithuania, Poland, Belarus, Romania and Bulgaria (Kurlavicius et al. 2004, Yermokhin et al. 2007, Birdlife European FTF 2009), only approximately 50-60% of BIF resources of these countries are covered by the network[1]. On the other hand, many forest areas included inthe network do not differ from regular productive stands.

Natural oak forests in Danube River. Photo by S. Bugariu.

According to EU conservation policy, establishment of NATURA 2000 sites does not prevent their economic use, provided that applied management upholds the favourable conservation status of protected habitats and species (European Commission 2003). In particular, EU forest policy and NATURA 2000 guidelines emphasize "sustainable management" and exploitation (meaning logging) "compatible with nature conservation", (European Commission 2003), but fail to recognise that there exist natural limits compa-tible with economic gain in protected areas. Since these limits have not been properly analysed nor specific guidelines given, there have been hardly any changes so far in forestry practices.

Semi-collared flycatcher *Ficedula torquata* typically inhabits natural mature and old-growth deciduous stands. The species is under threat from habitat destruction in parts of its breeding range. For example, in Bulgaria its preferred habitat of lowland oak forest has been overexploited for timber, and riverine forests have been cleared as part of riverbed alterations. Photo by M. Vasilev.

Although the EU directives impose on Member States the obligation of establishing SPAs and SACs, particular decision regarding applied conservation and management measures are made at the country level. As numerous cases show, the way in

[1] Preliminary assessment for Lithuania, Latvia, Estonia, Poland, Bulgaria and Romania, with exception of Belarus. For more information see national reports at www.forestmapping.net

which NATURA 2000 sites are managed, largely depends on the wishful interpretation of what is a desirable state of an ecosystem, just as the application of sustainable forest management relies on the beliefs of local forest authorities. In the cases presented here (High and Low Tatras in Slovakia, Kytäjä-Usmin in Finland) such "local versions" of SFM are used as conservation tools in NATURA 2000 sites. They often contradict natural ecosystem dynamics, lowering the health of the Natura ecosysten through preventing preservation of natural characteristics and processes. This has further consequences: the long-term survival of specialized forest species dependent from these natural characteristics – "old-growth specialists", many of them included in both Birds and Habitats Directives – is also under threat.

Solving this problem requires reinforcing NATURA 2000 with a strong preservation component. NATURA 2000 can – and should – be more effectively used for increasing the amount of strictly protected forests to cover all remaining natural forests in the EU. Both Birds and Habitats Directives provide an opportunity to establish non-intervention regimes in key biodiversity areas. The Habitats Directive's definition of favourable conservation status of a habitat includes the long-term maintenance of its structure and functions as well as viable populations of its typical species. Consequently, the necessary conservation measures for a NATURA 2000 site should correspond to ecological requirements of the natural habitat types for which it is designated. In case of most NATURA 2000 forest habitats, a conservation objective can be defined as **to maintain the long term structure, functions, processes and resilience of habitat through none-intervention conservation regimes**, i.e. through the creation of a strictly protected zone.

The lynx *Lynx lynx* inhabits large forest complexes characterized by the wide variety of habitats: from young succession stages to old-growth patches and small openings. Animals often use fallen logs, snags and uproots for cover during hunting and resting. The lynx needs a large amount of habitat to survive: an individual home range might reach even 1000 sq km (in boreal Scandinavian forests). Copyright photo courtesy of J. Walencik.

The Habitat Directive's management objectives might also favour the preservation of natural forest characteristics, i.e. in some locations the presence of large undisturbed forests within the NATURA 2000 site will make possible conservation of large mammals listed in Annex II, such as bear, wolf and lynx. Such larger areas will also benefit other declining species of birds (e.g. many woodpeckers, black stork, several forest-dwelling raptors) as well as other taxa. Management policy in commercial forests surrounding NATURA 2000 sites should supplement strictly protected areas and act as their buffers and links. Although this does not exclude the opportunity to achieve a reasonable economic return from sustainable use of their resources, the management must be particularly sensitive and all decisions be undertaken with the welfare of the core protected zone in mind.

## Targets and recommendations for forest management in NATURA 2000 and beyond

**1** 1. Increase the area of strictly protected habitats to ecologically sustainable levels. In order to prevent further biodiversity loss and secure its long-term persistence, we need at least 10% of all forests within EU to be strictly protected (Ferdinandova et at. 2005, Radford et al. 2005).

Recommendations for strictly protected areas include:

- use of the conservation objectives of the Birds and Habitats Directives for establishing large strictly protected forest zones inside NATURA 2000 sites designated for those habitats and species that are integral parts of natural forest ecosystems and depend on occurrence of natural disturbance regimes;
- except for specific cases mentioned above, prevent any management intervention inside established protected areas.

**2** Apply ecologically sensitive management to at least 10% of forests surrounding the previous category of strictly protected areas. These areas cannot substitute for strict protection, but without buffers the need for strictly protected forest climbs to considerably more than 10%, as lack of connectivity will isolate protected patches and endanger their survival in the long term (Angelstam & Mikusinski 2001).

Achieving these targets is by no means as difficult as it may sound. In particular, there are significant forest "supertransects" running across Europe, both North-South from the Arctic to the Aegean and East-West from the Russian border almost to Central France and the Appenines (Fig. 1, see also www.forest-mapping.net). These forests protect not only biodiversity but unique aspects of European culture, landscape and heritages. They are also our lungs and a buffer against climate change.

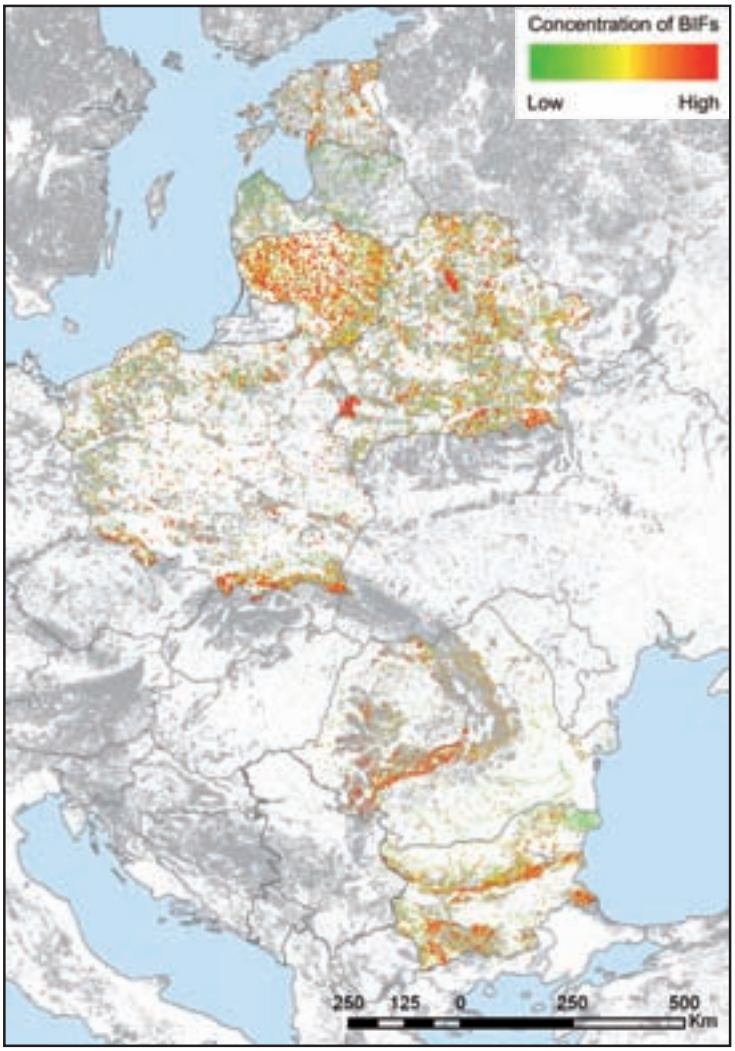
Recommendations for sensitively managed areas include:

- applying of continuous cover or similar types of forestry;
- ban of large-scale clearcuts and short-term cuttings;
- extending of rotation period;
- ban of removal of dead and decaying trees;
- avoidance of sanitary and salvage cuttings;
- priority given to natural regeneration wherever possible.

**3** Revise forest management practices to better support ecological and social demands also outside NATURA 2000 sites.

Recommendations include:

- to ensure the presence of certain elements of value to conservation in commercial forests, such as Woodland Key Habitats and similar biodiversity-rich sites, at least of the order of several hectares to be of ecological significance (see Chapter 2: case studies from Poland and Austria for examples);




A Biologically Important Forest (BIF) is a forest that has remained in a natural or close to natural state, considered as a key area for the conservation of specialized forest-dependent species.
The analysis of BIFs distribution shows the urgent need for the restoration of the ecological connectivity and for the creation of a trans-national forest corridor. Much of Eastern Europe's rural culture is still in harmony with nature and therefore this part of the EU should be considered a priority for the development of nature-friendly social and economic infrastructures, helping local communities to become stewards of Europe's natural heritage and traditions. See www.forestmapping.net for more information.

- to leave as much decaying wood as possible;
- to maintain primarily mixed stands of locally naturally occurring species that retain big trees of previous generations;
- to emphasise the use of environmentally low-impact silvicultural systems;
- to promote the socio-economic, and biodiversity value of sustainably managed non-timber and low-extraction forest products such as preservation of cultural heritage, nature tourism, food products (e.g. mushrooms, berries), wood arts and crafts.

Promotion of socio-economic, non-timber values of forests should become a key component of sustainable management scheme. Photos by M. Androsiuk, K. Stachura-Skierczyńska.

It is important to notice that these recommendations are usually compatible with and encouraged by forest certification requirements.

## Enhancing forest conservation in use of Rural Development funds

NATURA 2000 payments and forest-environmental measures are two of the most promising features of Rural Development Programmes. However, if these incentives are to be used effectively throughout the EU to help sustainable forestry and conservation, it is important to provide some overall rules for their implementation.

In the first place, Rural Development funds should serve specifically for conservation of forests, including development programmes for rural areas **where forests get protected and consequently become off-limits to logging**. In particular, RD payments should be directed for the purpose of reaching "10% strictly protected forest" target.

Moreover, it should be guaranteed that only ecologically justified and sustainable forestry practices would be compensated by these payments. Case studies presented in this book (Part 2) provide examples of such "good forestry practices". Similar measures should form a baseline for forest-environmental schemes to be promoted in all Member States with following basic requirements:

- permanently excluding selected old-growth stands from commercial use;
- practising continuous cover or other forms of forestry limiting or eliminating clearcuts;
- increasing the amount of decaying and dead wood to around 20–50 m3/ha and more;
- favouring mixed stands where they naturally occur and promoting natural regeneration wherever possible;
- where appropriate, supporting forest grazing by livestock, traditional animal husbandry that contributes to development and maintenance of biologically rich, but now rare anthropogenic woodland habitats.

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# Case studies of forest management practices: problems and solutions

## Summary of case studies

### Finland: Continuous Cover Forestry as an aid to biodiversity conservation in Boreal commercial forests

The study focuses on the concept of continuous cover forestry (CCF), also functioning as selective harvesting, as a crucial component of Integrated Forest Management (IFM) approach. The concept of CCF is not new and thus selective harvesting is present in standard forestry practice across many Central and Eastern European countries, as well as once was also in the boreal zone. However, rapidly increasing demand for pulp and wood products in the second half of the 20th century has led to the abandonment of these techniques in favour of large clearcuts. While now modern ecologically-based forestry approach calls for a turn back to old concept of selective harvesting, new 21st century technology gives us a chance to improve it.

### Poland: Forest management for old growth specialist species in commercial forests

The study describes the new initiative of State Forests Holding in Poland aimed at creating and maintenance of special areas designated for protection of dead wood- dependent species.

### Austria: The cooperation between ÖBf and BirdLife – together for nature conservation

The objective of the cooperation between the Austrian Federal Forests (Österreichische Bundesforste ÖBf) and BirdLife Austria is to elaborate basic principles and criteria for the application of measures for bird protection in forests and to implement them on the territory of the Austrian Federal Forests. In order to establish the basis for cooperation, both partners performed the analysis of conservation goals and priorities, and elaborated specific conservation measures for ÖBf-owned forests. Currently these pilot management practices are implemented in three different forest districts.

### Bulgaria: Management of beech forests in Bulgaria

Bulgarian forests, in particular primary mountain beech stands play an important role in preserving the country's priority habitats and species. However, decades of intensive logging and unsustainable forestry operations have led to the impoverishment of their biological diversity. This case presents outlines of recently proposed management guidelines for NATURA 2000 mountain beech forests, aimed at restoration and conservation of their natural characteristics.

### Greece: Natural Regeneration: the best post-fire management for biodiversity

The aim of this study is to describe the safeguarding of natural regeneration after a major wildfire in NATURA2000 site in Peloponnese, Southern Greece. Typical post-fire management includes large-scale and costly interventions such as replanting, removal of dead trees and flood-prevention barrages - all inappropriate from a conservation point of view, neglecting the Mediterranean forest ecosystems' ability to adapt to their natural disturbance regime. On the contrary, safeguarding the natural regeneration by the combination of simple, low cost works and well-planned educational campaign is an extremely cost-effective method of enhancing the return of forests after fire.

## Slovakia: Mismanagement of Natura 2000 sites in Tatry and Nízke Tatry Mts. (Slovakia) after the windstorm

In contrast to previous examples of "good forestry practice", this study brings forward the case of violation of NATURA 2000 goals and principles. Designated primarily for conservation, NATURA 2000 sites in Slovakian High and Low Tatras have become the commercial arena for forestry and massive tourism.

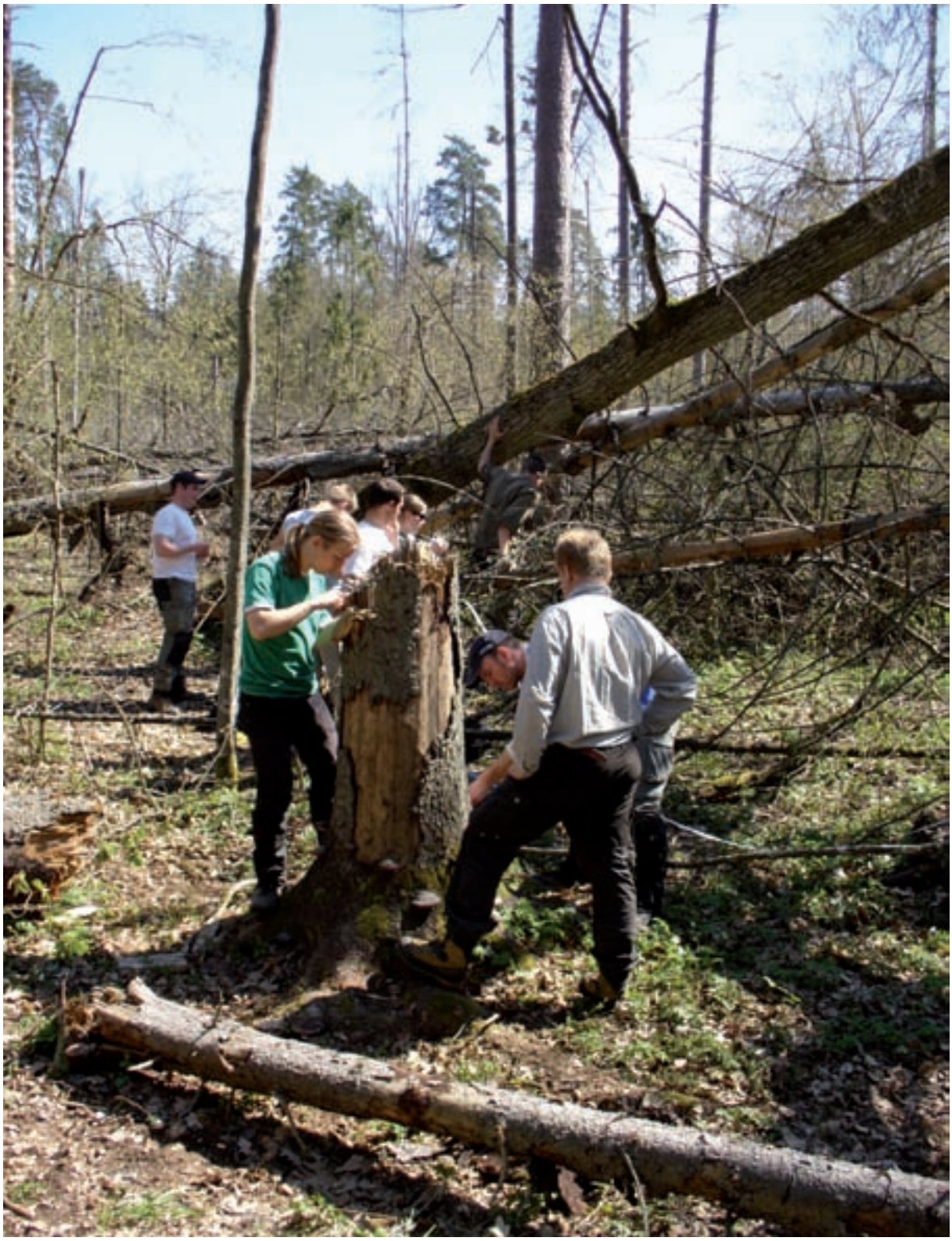

Photo by A. Bobiec

# Continuous Cover Forestry as an aid to biodiversity conservation in Boreal commercial forests

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## Introduction

How far can commercial forestry go to solving social and conservation issues in forest use? For example, there exist certain certification standards for forestry such as the FSC and PEFC, which attempt to get everyone to fall into line to a certain set of standards. This can be a valid approach, but is inevitably going to be hampered by compromise to get "big commercial players" on board, and so may end up being relatively ineffective. The jury is still out on the overall effect of current certification on biodiversity. That there are many examples of poor certification does not mean the case is hopeless. However, there are also natural limits to what certification can achieve, although this is seldom recognised, and sometimes abused either intentionally or through ignorance. There are even stakeholders who claim their certification means they have solved all their forest conservation issues.

Individual commercial forestry companies and consultants can in principle go much further than national certification regulations. But how much further? The answer is – as far as their clients will let them. There is no limit for the company as such except its employees' education and attitudes. Limits are set in practice by the desires of the clients for their forests, and how much society is willing to compensate the owner for using management solutions that may be sub-optimal from a timber production point of view.

Since most clients emphasise the economic return of their forest, a particularly interesting question is how far one can "push" social and ecological issues into commercial forest management without jeopardising the stand's commercial potential – and what is the optimum way to do this.

There is of course no single answer to this question, and indeed many of the key issues are still awaiting study – a list of some of these is below. One thing is, however, quite clear: no commercial stand, no matter how benignly managed, can protect the specialised diversity of habitat of a larger naturally developed forest. Larger natural forest habitat, managed at most for fire and an absence of large predators, is a prerequisite for retaining much of forest biodiversity, as well as many aspects of cultures around the world that depend on natural forest for products as well as for the atmosphere it evokes. However, since the size and number of such wilderness areas will likely long be limited in Europe, the management of the commercial or semi-commercial stands around core protected areas is also of considerable significance.

*Continuous Cover Forestry – an old idea with new approach*

A clear starting point for more natural forest management is to use Continuous Cover Forestry (CCF), **thus avoiding clearcuts as far as possible**. It is quite false to claim that clearcutting imitates any natural process, as even violent fires leave behind large amounts of decaying wood and usually live trees. Frequently fires are small and less damaging, so that a natural forest of any size is almost always a patchwork of stands in different stages of development. Many stages include an uneven-aged phase, when light-loving canopy species have an understorey of shade-growing trees. Big old trees of fire-tolerant species are common; mixed stands are the norm, and natural monocultures rare except at extreme latitudes

or conditions. Even there one sees uneven-aged structures. In all forest types natural regeneration almost always occurs and is frequently very fast: otherwise forests would have over time disappeared by themselves.

A typical Continuous Cover Forestry site after logging. Photo by M. Walsh. About 40% of the trees were retained after this cutting. That is sufficient for spruce to regenerate naturally, but for deciduous trees to regenerate up to 80% of the canopy layer must be removed in the next cutting, which will take place in about 20 years. With smaller trees always also retained, the feel of forest nonetheless remains fairly well after heavier logging. Such sites can still act as buffer zones to e.g. Woodland Key Habitats and other protected zones.

The above description, although verified by forest science for many forest types, contravenes the traditional teaching of at least many Nordic forestry schools. This explains to a large extent why biodiversity is in such poor shape in commercial forests. As one might expect, contravening nature also leads to poorer economy: there is no published evidence from either N America or N Europe that using clearcut + replant is commercially better than using the successive rounds of high thinning and natural regeneration utilised by CCF. There is however an increasing amount of hard evidence that the latter is commercially a better or at least as good a strategy – and this is before taking account of the potential social and ecological benefits.

Sometimes biodiversity is undermined even when the management applied is not a financial issue: there are considerable tracts of forest in Europe, e.g. municipal forests used primarily for recreation, where unnecessary management is carried out "because it has always been so", or because people want forests to look "cleaned up", rather than for any economic or other rational factor. In such cases where optimum timber production is not the prime concern, there is really no need for much management at all except in the interest of safety near paths, and the like.

How far can CCF bring us with biodiversity conservation? Modern CCF is not the same as old style selective cutting which sometimes removed only the finest saw timber leaving behind many trees that from a commercial point of view should be removed. This was probably good for biodiversity, but led to substandard commercial stands. The practice of taking out only the best trees, called creaming, is frequently confused with CCF and cited as a reason the latter should be banned.

In reality, CCF is very different from creaming: once shade-tolerant species dominate the canopy layer, commercially sound CCF requires the removal of ca 60-70% of the dominant trees to allow pioneer species to regenerate again. However, with seed trees and smaller viable trees of lower layers left, the end result is still very different from a clearcut. In cases such as municipal forests where optimal economic rotation is not an issue, removing less trees at a time will be an option. Regeneration will be slower, since less light will reach the forest floor, but as long as the known tree density boundries for regeneration are respected, this will not matter.

CCF techniques are standard practice across a lot of Central and East Europe, and once were so also in the boreal zone. The exponential rise in paper consumption after WWII turned the attention towards fast logging with big mechanical harvesting machines. It was not in the 1950s even assumed that such

machines could operate in a way that would save undergrowth, nor was this important to an industry that can use almost any size of smaller timber. Price and quantity mattered, not quality.

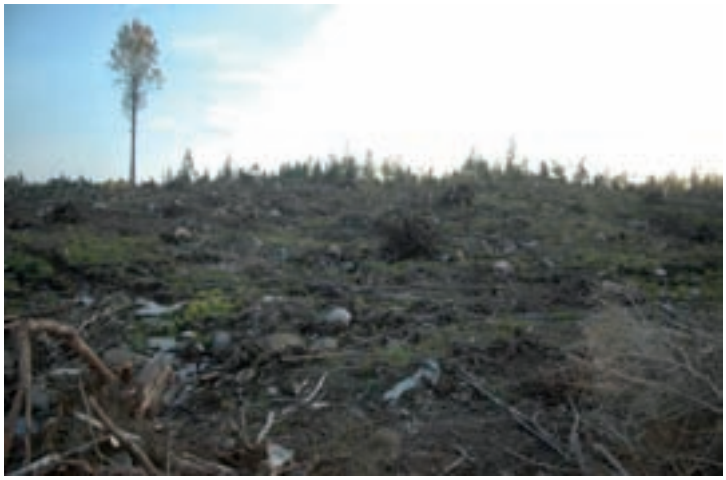
*Integrated Forest Management – towards the balance*

Coming into the 21st century, a change in forest owners' values, the need for better quality timber, and new studies on forestry economy are again leading owners back to CCF. There are many ways in which old style selective harvesting can be improved technically, and there is the question of training harvester drivers. Such issues will not be developed further here. Clearly the revival of CCF brings opportunities for better integrating social and ecological issues into forest management also in the boreal zone. Seeking an optimum for these issues I call here Integrated Forest Management (IFM).

What are the key issues for IFM? Biologists generally agree they include:

- Avoidance of larger clearcuts (larger than ca. 1/3 ha) – i.e. using CCF whenever possible.
- Leaving larger trees of previous generations.
- Leaving decaying wood, esp. of larger size. Up to 10 m3/hectare is a figure generally regarded as possible in a boreal commercial stand without jeopardizing the economic return. This is still 1,5-3 times the current average in boreal commercial stands, although it should be noted that 10 m3/ha is almost an order of magnitude less than the average for natural boreal forests. This underlines the natural limits of CCF for conservation.
- Using natural regeneration, and what it creates, i.e. mixed stands of naturally occurring tree species.
- Leaving set-aside areas, commonly called "mini-reserves" or Woodland Key Habitats. These can be for biodiversity, but also for e.g. watershed management or landscaping reasons.
- Ecologically very fine habitats in a natural condition or nearly so, are not logged at all regardless of size. In Finland a national scheme is in place to compensate owners either with money or land of equal commercial but less biological value. Such a scheme should be mandatory in all EU countries as part of asuring the safety of the continent's last older forests in a fine natural condition.

Many of the above issues are familiar requirements from certification, but to the author's knowledge no country's certification scheme uses all of them. For example, Finnish FSC certification requires 5% set aside and 5% CCF, but one can in principle clearcut the entire rest of the stand at once with no size limit. In other countries there may be size limits, to clearcuts, but these can be avoided by classifying close together stands as separate and cutting one stand after another. In Germany, on the other hand, clearcutting is forbidden under FSC, but there is no set-aside requirement. Non-native trees are rampantly used all over Europe if they grow well, and unfortunately are even eligible for certification.



Clearcut in forested Natura 2000 site Kytäjä-Usmi (FI0100051) at approx. 60°37.59 N 24°40.59 E. Photo by M. Walsh. Typically for S Finland, only 15% of this site's forests (approximately 1800 ha) are strictly protected. There are no limits on the size of clearcuts allowed in the rest, which is all private land. Limits to clearcuts of any kind are rare in Finland, except in national forests in Lapland. Despite this there is no scientific evidence that clearcut-and-replant forestry is more economical to any significant degree compared with more benign methods.

Combined with technically advanced harvesting, CCF in some cases produces the best commercial return of all. It is interesting to note

that CCF as described above is very similar to IFM. Restrictions are related to the amount of standing decaying wood, the number of large retention trees, and of course the size of set-asides. Fire is generally also a missing element.

In summary, IFM works or could work well in the boreal because of the following factors:

- It is gradually being **understood that CCF generally yields a better return then clearcut + replant**. In brief this is because high thinning of big trees gives a far better yield than low thinning of small ones, and because expensive replanting eats the profits from the final clearcut even at very modest rates of interest. It is nonsensical to remove healthy young trees as cheap pulp that in 15-30 years will yield saw-wood prices.
- few non-native trees except hybrid aspen and larch grow well in the boreal zone, thus limiting the available choice largely to naturally occurring species.
- there is a national **compensation scheme** in operation that reimburses the forest owner **for set asides** valued at more than four per cent of the total value of the stand. There is also a scheme for buying truly pristine forest areas for protection. This scheme is voluntary, so it is easy to "sell" the idea to the owner, who retains control over the process.

What is the reality today? There is widespread resistance to CCF among Nordic foresters, because they have been brought up to believe that clearcuts imitate natural forest fires and that it is necessary to plant trees. If one does not clearcut, root rot fungus will supposedly spread (actually, clearcuts will not prevent this unless one removes the stumps as well and replants with a different species), "the understorey never recovers anyway", new genetically superior planted seedlings are said to be better than natural seeded ones etc. But in fact "beliefs" is what these are, since there is no scientific evidence for any of them. What has been demonstrated is the superior tree growth and economy of CCF forestry in the boreal (Tahvonen et al 2009, Pukkala et al. 2010)

Despite these factors, CCF is still in its infancy in boreal Europe, with few clients other than those of the undersigned's clients practicing it systematically in Finland. In Sweden the situation is even worse, but in Norway rather better, since CCF's superior economy is gaining official acceptance and the method is being widely applied (Pukkala et al. 2009, 2010; Tahvonen 2010; Öksetter & Myrbakken 2005). The reasons for CCF use are so far largely commercial rather than related to establishing IFM.

Where clearcut + replant is still the dominant Boreal method of forestry, the chances for quality Natura or SPA management outside strictly protected zones are very limited. A clearcut effectively ends any possibilities for sensible management, unless it is being carried out as a restorative measure to rid an area of non-native species. Therefore establishing CCF in the boreal – and anywhere else – is a cornerstone of any management to be carried out in a protected zone. However, it is important again to emphasise that CCF must not be used as an excuse to avoid establishing larger strictly protected forest areas.

*Conclusive remarks*

In conclusion, one notes with interest that CCF is coming back into Boreal forestry primarily driven by economic concerns. To what extent it can aid biodiversity conservation and social issues is scientifically speaking still a series of unanswered questions:

1. How much better are set-asides' species retained if they are surrounded by CCF forest rather than a clearcut?
2. How well can CCF commercial forests support permanent populations of specialised species, albeit at lower densities than in natural ones?
3. How do visitors perceive CCF stands compared to even-aged ones? It is known that people prefer older stands to younger ones, and abhor clearcuts and sapling stands.
4. If society is prepared to subsidise compensation to owners taking biodiversity into account in their forests, and this money is limited, is it better to e.g.:
   - increase the number or size of set-aside areas?
   - increase the amount of decaying wood over large areas?
   - harvest trees at a non-optimal rate, thus leaving the forest denser overall?

Getting answers to these questions is important. In the face of constant mismanagement of Natura forests all over Europe, it is to be hoped the EU Commission would rapidly overhaul its management requirement for forested Natura sites and SPAs, and apply consistently an Integrated Forest Management approach.

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# Forest management for old growth specialist species in commercial forests in Poland

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## Introduction

Since decaying wood was long ago identified as crucial component of forest biodiversity, numerous studies have been performed in order to improve our understanding of ecology and requirements of many dead-wood dependent species. However, the implications for forest management still need to be explored (Jonsson et al. 2005).

In the course of their long-term commercial exploitation, most of European forests have been deprived of their resources of decaying wood. Today the total volume of decaying wood in average commercial forest amounts to only 3-10% of the quantity that would accumulate under natural conditions (Jonsson et al. 2005, Bobiec et al. 2005 and references therein) - several times lower than the minimum required for the maintenance of rich, viable populations of old-growth specialis species. Therefore, recent ecosystem-based approach in forestry requires specific measures aimed at counteracting current shortage of decaying wood in commercial forests.

The solution presented here involves the designation of special sites excluded from regular management practices in order to serve as **refugees for dead-wood dependent specialized species**. Currently such sites are functioning as part of regular forestry practices in 5 out of 17 RDSFs across Poland.

*Rules of creation and maintenance of "decaying wood-rich sites"*

Designated sites are usually located in:

- selected stands (preferably older age classes), situated at buffer zones around lakes, water reservoirs, bogs, along water courses, in surface spring zones;
- limited access areas (steep slopes, ravines, flooded stands), damaged and otherwise hardly accessible areas in military zones;
- stands presenting natural characteristics;
- 'tree islands' in open agricultural landscapes;
- stands flooded by beavers
- wet and bog forest types, including alder bogs, pine bogs, riverine communities
- identified sites of rare and endangered saproxilic beetles, such as Osmoderma eremita, Lucanus cervus, Cerambyx cerdo
- groups of trees left at clearcut areas for natural death and decay

Typical old-growth stand in lowland deciduous beech forest, rich in large-sized decaying wood. Photo by K. Stachura-Skierczyńska.

It should be noted that, except for few already known sites where specialist species are actually present, most of the above-mentioned choices are based just on the assumption that the given area presents potentially favourable conditions for such species to appear there in the future. Economic factors are also important – the majority of exclusions are placed in stands where, for various reasons, commercial use is anyway restricted, access difficult, and/or potential timber extraction is of low value. Nevertheless, according to the concept of Biologically Important Forests Mapping (www.forestmapping.net) many of conditions listed above (such as limited access, occurrence of disturbances caused by beavers, presence of springs and flooded areas) are indicating high biological value of the forest (Yermokhin et al. 2007).

The total area of sites designated for decaying wood specialists does not exceed 3% of total forest area within the management unit (usually 2-3%). This adds, however, to other restricted areas (such as forest reserves or protective zones around raptor nests), so total area of sensitively managed habitat"special" might exceed 10% of overall forest cover. However, not all of these sites are treated as none-intervention zones. Management standards in decaying wood-rich sites are developed independently within each administrative unit and therefore might vary, but in general the commercial use is allowed provided that it does not contradict conservation aims of the site. In practice the management should contribute to the increase of decaying wood resources, as well as to the diversification of stand structure by leaving standing and fallen dead trees, small openings, uproots and cavities in the forest. None-intervention management is in most cases the best way to achieve these goals, however it is optional, not obligatory. Practically, some forest management units decide to keep the majority of decaiyng wood-rich sites as set-asides, while elsewhere some sort of sensitive management is applied (i.e. thinning, improving water retention). It is noticeable that some forest management units, "in exceptional cases", allow for removal of infested trees from designated sites, which contradicts the whole idea behind. This is the evidence of the deeply rooted "forestry myth" concerning the control of natural processes and "preservation of forest durability"; however, such practices are not common. To conclude, the lack of uniform management recommendations for deacaying wood-rich sites places them somewhere between none-intervention zones and sensitively managed areas (see chapter 1).

Special constructions made of tree logs, branches, clay and small stones are placed in commercial forests where natural resources of decaying wood are scarce. Such constructions are used as micro-habitats for decaying wood-specialized fungi and some invertebrates. Copyright photo courtesy of Regional Directorate of State Forests in Zielona Góra, Poland.

The size of decaiyng wood-rich sites vary from tiny groups of trees 'left for natural death', to relatively large (tens to hundreds of hectares) set-aside areas such as bogs, stands flooded by beavers, restricted military zones, forest reserves etc. Still, considering the landscape scale, these sites are usually small, comparable to the Scandinavian concept of Woodland Key Habitats (Laita et al. 2010).

*Implications for biodiversity*

Currently, estimated resources of decaying wood in designated sites exceed even twice average amounts in adjacent commercial forests. However, this is mostly the effect of preliminary selection of de-

caying wood-rich areas. Some sites (i.e. Strzalowo Forest District in RDSF Olsztyn) contain relatively large (3 ha) stands affected by the bark beetle and left without any routine intervention. Interestingly, the presence of infested stands has not caused massive bark-beetle outbreaks in adjacent commercial forests. On the other hand, several old-growth specialists, such as the three-toed woodpecker *Picoides tridactylus* and the white-backed woodpecker *Dendrocopos* medius, that had been absent for a long time, are now reported from the affected area. However, in order to assess the effect of designated sites on biodiversity, the long-term monitoring of decaying wood resources and specialist species is necessary.

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# The cooperation between ÖBf and BirdLife – together for nature conservation

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## Determining priorities for conservation actions

Nearly half of forest bird species occuring in Austria are classified as vulnerable or nearly-threatened according to the Austrian Red List. These species can be found in a wide range of habitats; however, most of them are specialists adapted to specific "old-growth conditions" that have become very rare in commercial forests. Therefore, conservation actions aimed at the protection of these species would benefit also other groups of old-growth specialists from lichens to decaying wood dependent beetles and even vertebrates.

Considering the total forest area managed by the ÖBf, old growth patches, forest edge zone and dead-wood rich sites are priority habitats for conservation, regardless of the particular forest type. So called **"old wood islands"**, rich in large trees and decaying wood are key habitats for threatened forest bird specialists.

*Elaboration and implementation of measures*

The measures applied in three ÖBf districts include:

- establishment of **stands older than 120 years** as "biodiversity islands";
- increase of decaying wood resources;
- protection of so-called **biotope trees** (large trees of previous tree generations);
- preference of **pioneer tree species** typical for early succession stages in forest regeneration;
- focus on the restoration of natural tree species composition in the fir-spruce-beech mountain forest.

"Old wood island" with large amount of decaying wood and old trees of previous tree generations present. Photo by G. Wichmann.

Particular decisions regarding the location and management of biodiversity islands, as well as the application of other measures, are made in cooperation with bird ecology experts. According to the experience from pilot project in three ÖBf districts, the conservation component aimed at the protection of old-growth specialists can be implemented into daily forestry practice. Moreover, neither the large-scale work-plan reorganization, nor additional financial expenditures are necessary.

# Management of beech forests in Bulgaria

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## Current management and threats to beech forests in Bulgaria

Bulgarian forests, while covering approximately 34% of the country's territory, are responsible for preserving over 60% of the country's priority habitats, over 80% of protected plant species and over 60% of endangered animal species. Despite this, strictly protected sites (reserves, national parks and maintained reserves) cover less than 5% of the total forest area. NATURA 2000 network covers one third of the country's territory, while forests constitute to approximately two thirds of its area.

Threathened forest habitat (Western pontic beech forests) in Strandza Nature Park. Photo by D. Kostovska

Beech forests in Bulgaria comprise 14% of the total forest cover. Five types of beech forests are classified as the EU priority habitats included in the Annex I of Habitat Directive. Along with their high biological value, beech forests are equally important for Bulgarian forestry, supplying one fourth of the total annual timber yield.

In recent decades, beech forests in Bulgaria have been subjected to intensive forest management leading to their uniformity and fragmentation. Beech wood was used as the coppice for firewood and charcoal. Short-term cuttings aimed at fast production of large logs, limitation or lack of proper thinnings, have led to the transformation of primary habitats into very unstable homogenous stands with high stocking rates. Eventually, many primary beech stands have been turned into productive pine monocultures. Decaying and dead trees were removed by routine.

Illegally logged trees in Bulgarian forest. Reshooting of young trees from cut stumps results in creation of so-called coppice stands. Photo by V. Ferdinandova.
Illegal logging is the huge problem of Bulgarian forest management. WWF estimates the volume of illegally logged timber as 3.7 million cubic metres per year, or 45% of the annual harvest. Most of this is used as fuelwood, but about 1 million cubic metres are processed by the timber industry. In response to massive corruption schemes and lack of control over this issue, Bulgarian NGOs developed the community project based on alerts submitted by citizens to the online monitoring system. See http://www.spasigorata.net/ for details.

Fortunately, some areas, predominantly hardly accesible "closed basins" in high mountains, were excluded from timber extraction (as they are now). As a result, montane beech forests have been subjected to a less intensive exploitation and are currently in better state.

*New management prescriptions*

In September 2009, the Bulgarian State Forest Agency adopted new management prescriptions for beech forests, aimed at the conversion of coppice[1] beech stands and coniferous plantations into mixed high-stem beech forests. More specifically, new management guidelines included:

- ban of clearcuts,
- prolonged rotation period,
- low intensity cuttings to be applied; ,
- promoting natural regeneration, indigenous species, rare tree species and mixed stands
- increasing decaying wood resources to at least 5-10 $m^3$/ha.

Although new prescriptions introduce "close to nature" management and therefore are an important step ahead, they are still focused mainly at the production of high quality beech timber. Moreover, they don't distinguish between beech forests inside and outside NATURA 2000 and thus don't imply any special management restrictions for Directives' habitats and species. Recent attempt to fulfil this gap was made by the team of forestry experts from NGOs and the State Forest Agency, who submitted the proposal of management guidelines for NATURA 2000 forests. In addition to basic "nature-oriented" rules (as listed above), new set of guidelines introduced specific measures and restrictions, aimed at the preservation and restoration of natural forest characteristics. In particular, these included:

- establishment of **none-intervention zones** over 10% of the total area of particular forest habitat;
- **protection of natural disturbance regimes:** priority given to natural regeneration, no artificial afforestation on stands affected by large-scale disturbances such as wind falls, calamities, fires, etc;
- establishment of the none-intervention buffer zone (at least 15 m wide) around temporal water courses;
- **increasing the amount of dead wood** to at least 8-10% of the total timber stock; keeping at least 10 standing dead trees per ha;
- restoration of primary species composition in beech stands, i.e. by monitoring and regulating the occurrence of hornbeam in lower parts of mountains.

Concerning the commercial use of NATURA 2000 forests, main restrictions included:

- **total ban of clearcuts** and short-term (up to 20 years) fellings;
- preference towards cuttings with long (over 40 years) or permanent rotation periods;
- preference of selective cuttings, single tree cuttings or group fellings
- thinnings aimed at the preservation of native species and removal of non-native species.

Presented examples, although being a big step ahead, compared to former practices, still have several weaknesses – i.e. 40 years rotation period is rather unsatisfying having in mind that the full life cycle of the beech forest can be as long as 300-400 years. Another weakness is related to the uncertainty of established none-intervention zones, which are not obligatorily permanent. Moreover, more attention should be

[1] Coppicing is a traditional method of forest management which takes advantage of the fact that many trees reshoot from the stump or roots if cut down. In a coppiced stand young tree stems are repeatedly cut down to near ground level. In subsequent growth years many new shoots will emerge, and, after a number of years the coppiced tree (so-called stool) is ready to be harvested, and the cycle begins again.

paid to the management planning at landscape level in order to restore and maintain the mosaic structure of different habitat types as well as ecological connectivity, which is crucial for the successful conservation of forest specialist species with low dispersal ability.

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Unfragmented beech forest in Belasitza Nature Park. Photo by G. Ekov.

# Natural regeneration: the best post-fire management for biodiversity

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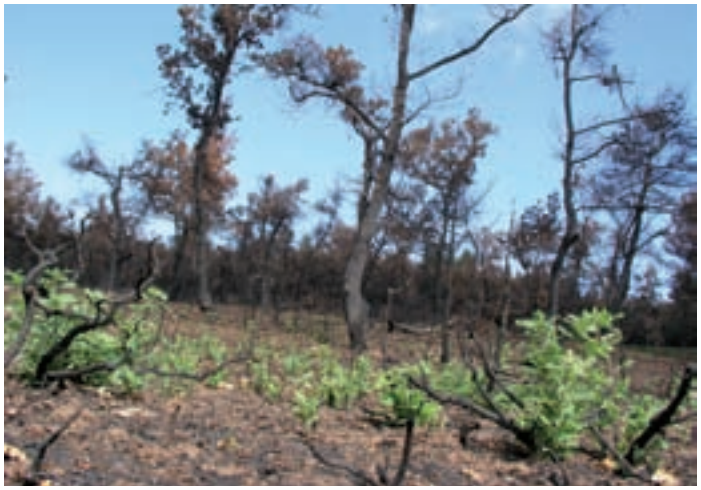
Two NATURA 2000 sites described here (GR2320005 as SCI and GR2320010 as an SPA) are located in Mounts Barbas, Klokos and Selinoudas Gorge in Northern Peloponnese, South Greece. Forest habitats in the area include lowland pine communities, upland fir forest and smaller patches of oak forest, which, due to intensive illegal logging, have been invaded by flammable pines and shrubs. The area is an important site for many forest, open woodland and upland scrub bird species such as woodpeckers, passerines (larks, thrushes, nuthatches, shrikes, tits, buntings), rock partridge and several raptors and owls.

*Post-fire management*

In July 2007, more than 50% of the area was affected by a major wildfire. As a result, not only the coniferous forest, but also oak stands were burnt.



Oak shoots one month after the fire. Photo by K. Papaconstantinou.

As is the case after every major fire, a public outcry called for an immediate action in order to "restore" (for the public, almost synonymous to "replant") the area. However, within no more than three weeks after the fire, local wildlife conservationists observed that many burnt areas, especially within the oak forest, were covered by thousands of new oak shoots, soon followed by other species of trees and shrubs. This brought about a new idea to exclude burnt oak forest from replanting and monitor the effects of **spontaneous natural regeneration**.

The authors identified main factors threatening the process:

- grazing,
- human trampling,
- tree felling,
- flood prevention & replanting activities.

The first idea was to raise public awareness of the great potential of nature to replant itself. A project called *Life after fire* was developed, aimed at educating local people, supported by good media coverage.

Some core areas, where oak regeneration was particularly intensive, were safeguarded by fences made directly from the material available at the site - pieces of burnt wood and dead tree branches. This simple method is traditionally used by shepherds and farmers to control livestock. Such constructions are not as impenetrable as wire fences; however, if supplemented by regular patrolling of the area, they can effectively keep out livestock, offering at the same time an ideal opportunity for disposing of dead tree

branches. Within the study area, **"natural" fences** did their job and prevented livestock from grazing on regenerating trees. On the contrary, it appeared more difficult to persuade the public to keep out from burnt area. Although local residents were allowed to extract some woody material for personal use as firewood (commercial logging was banned), illegal logging within the areas was difficult to control. Nevertheless it seemed the best compromise between declaring the whole area as the no-go zone (unrealistic) and clearcutting of the whole burnt forest as it had usually been practiced before.

Today the burnt area (oak, pine and fir stands) can be described as a forest of dead snags, with several live trees and some unburnt patches within, and a thick understorey of grasses, bushes and young tree shoots. Oaks that were not completely burnt above ground quickly developed new foliage, while completely burnt trees produced shoots from the base of their trunks. Most of new shoots are now over two metres high. Shrub-form oaks, supplemented by other shrub species (holm oaks, strawberry trees, lentiscs etc.) form a dense understorey, approximately 1,5 m high, while the forest floor is covered by a thick layer of grasses and Cistus. There are also many small pines (some almost 50 cm tall), growing from numerous seeds shed by cones opened few days after fire.

*Post-fire regeneration and biodiversity – birds as an example*

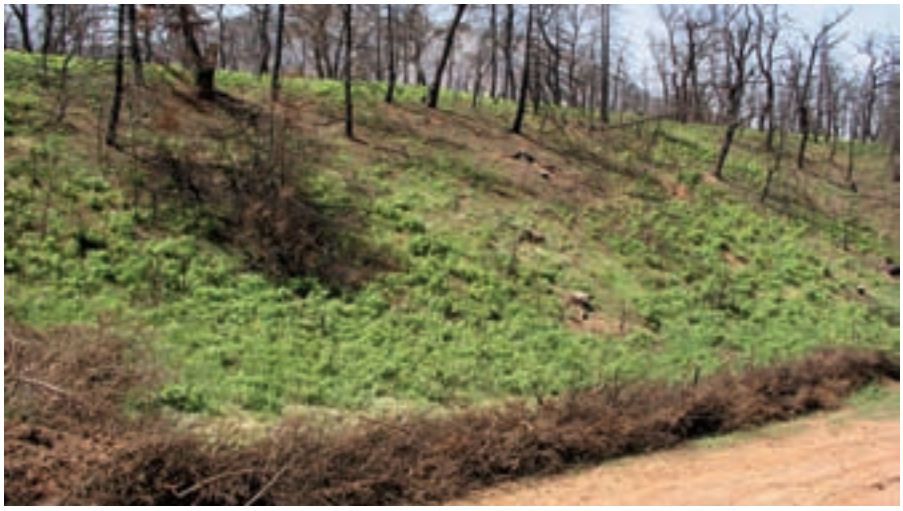
The total number of bird species nesting within study area decreased only slightly compared to the number before fire. The survey conducted during the first spring after fire in the burnt oak forest revealed 20 breeding species (out of 35 before fire) within and around the burnt forest. During the second spring there were already 29 breeding species. Population densities appear to be lower than before fire; although some dead wood specialists, like i.e. middle spotted woodpecker, seem to do particularly well in the burnt forest and even explore pine stands that had been strongly avoided before fire. Although several species (i.e. robin) were breeding successfully within completely burnt patches, most birds do better in areas with several live trees. Nevertheless, all of them evidently use dead trees. It is obvious that the burnt forest is much better for birds if dead trees are not removed.

*Conclusions*

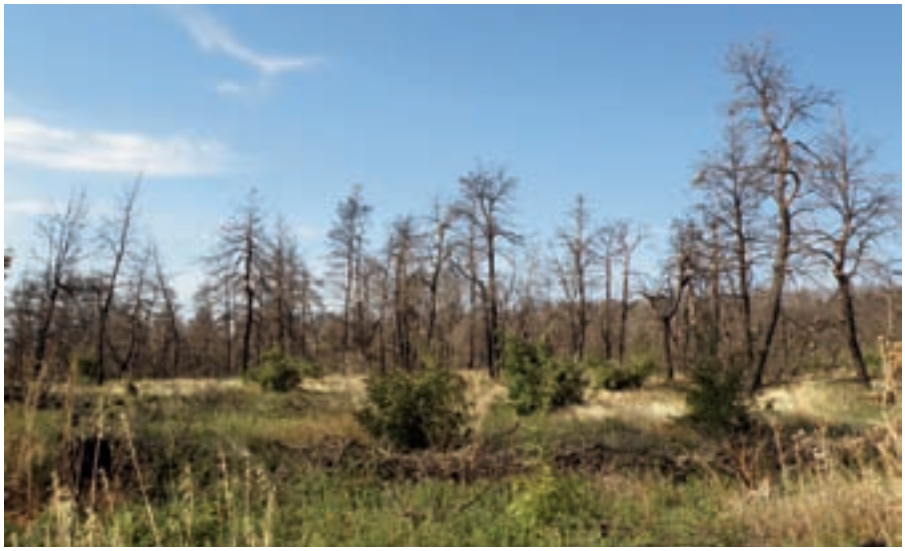
1. **Post-fire management** is equally important as fire prevention policies.
2. Safeguarding the natural regeneration by the combination of a) **simple, low cost works**, b) wardening and, c) **public awareness**, is an **extremely cost effective method** of enhancing the return of forests after fire.
3. Most forest bird species do well in the burnt forest. They tend to return to their territories and use equally dead trees and all habitat components that had survived from fire.
4. It is recommended to keep from any post-fire major interventions as they might destroy bird habitats such as understorey of bush and regenerating trees.
5. The presence of live trees and unburnt patches within burnt areas is greatly enhancing their value for birds.
6. It is extremely important to be alert during first days after fire while many surviving animals seek food or shelter. This is also the crucial moment for the burnt forest because many unburnt patches and surviving trees are being destroyed by careless visitors.

*Comment on fire prevention policies*

"Preventing and controlling forest fires" is irrelevant for perfectly adopted Mediterranean lowland pine forest. Fire is unavoidable here and it will occur sooner or later. However, lowland pine forest regenerates quickly and its persistence is not threatened by a single fire itself. In the long term, the only threat is posed by frequent repeated fires in a relatively short course of time. Therefore, what is needed is not fire prevention or control but promotion of **suitable land use aimed at reducing the susceptibility to fire**. The same applies to Mediterranean thermophilus oak forests: a fire will appear sooner or later; the risk of severe habitat deterioration after the fire depends on their pre-fire management since the vulnerability of oak forests to fire increases substantially when they are invaded by pine. On the contrary, controlling forest fires is crucial for biodiversity-rich upland conifer forests. In 2007 thousands of hectares were lost in four NATURA 2000 areas in Greece. These forests are not adapted to fire as fires do not normally start inside them. In all mentioned cases, fire started in the lowland pine and scrub and was allowed to spread "up to the mountains away from humans". This damage would have been prevented if there was a clear recommendation to protect this particularly sensitive habitat.



Simple fences made of burnt branches are effective method of safeguarding natural regeneration. Photo by K. Papaconstantinou.



Burnt mixed oak-pine forest two years after the fire. Photo by K. Papaconstantinou. Oak shoots are now over 2 m high. In the foreground, the "natural fence" has been left for decomposition. Young oaks are now out of reach of grazing animals.

# Mismanagement of Natura 2000 sites in Tatry and Nízke Tatry Mts. (Slovakia) after the windstorm

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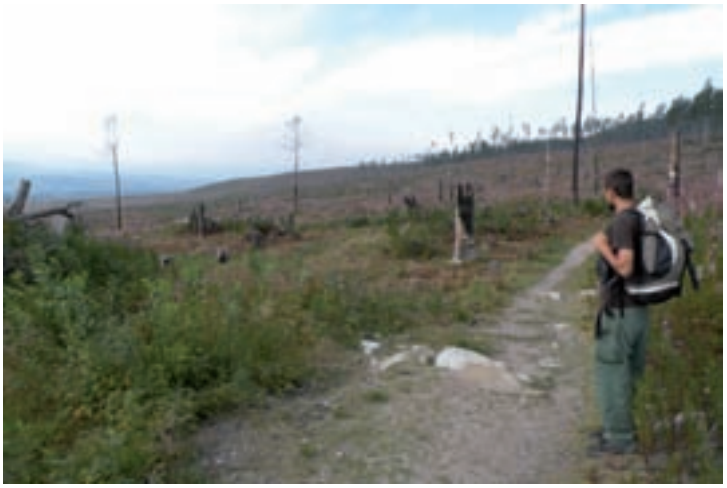
*Background*

The Tatra Mountains represent the highest part of the Carpathians with a typical alpine landscape. The mountain range is located in the northern part of Slovakia along the border with Poland. It has been designated as NATURA 2000 site (SPA and SCI Tatry Mts.). The core area of the site is the High Tatra National Park (Tatranský Národný park; abbr. TANAP), established already in 1948, estimating around 46 000 ha. Together with the Polish part of High Tatras it creates Bilateral National Park. In 1993 TANAP was also declared a Biosphere Reserve.

Wide representation of habitats within TANAP, from submountain to subnival vegetation belt, results in high species diversity, including many endemites. However, a substantial part of the National Park includes human-altered habitats, mainly artificial spruce monocultures approximately 50-100 years old, situated in lower parts of the mountain range.



Clearfelling after the windstorm near Smokovce village, High Tatra National Park. Photo by K. Stachura-Skierczyńska.

Since the very beginning TANAP was a hybrid of interests of nature conservation, forestry economy, intensive mass tourism including large-scale sport activities and urbanization.

The densely forested range of the Low Tatras (Nizke Tatry) runs parallel to the High Tatras separated by the valley of The Vag River. The majority of its area is included in the Low Tatras National Park (Národný park Nízke Tatry; abbr. NAPANT), as well as covered by NATURA 2000 (SPA Nízke Tatry Mts., SCI Ďumbierske Tatry Mts., SCI Královoholské Tatry Mts.). Compared to extremely popular and intensively visited High Tatras, Low Tatras seem relatively undisturbed, especially in the eastern part of the range. However, in many places natural forest communities have been also altered.

*Impact of the windstorm*

On Friday November 19, 2004 a massive windstorm, reaching 90-115 km/h on average, swept through the Tatras. The storm, lasting a couple of hours, was followed by heavy snowfall. As a result, 13 000 ha of forest in High Tatras (about one third of TANAP area; 1,3% of the SPA and 6,6% of the SCI), mainly in

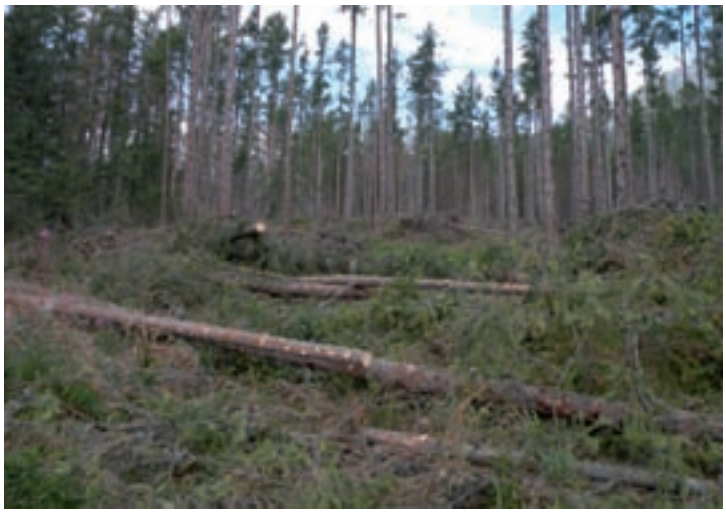
lower parts dominated by spruce monocultures, were completely damaged or severely harmed. The storm affected also Low Tatras, destroying around 25 000 ha of the forests within SCIs and SPAs (approximately 14% of total NATURA 2000 area in Low Tatras). It has been estimated that the storm damaged 3 000 000 m3 of soft wood in High Tatras (90% of the country's total annual yield in this category). In Low Tatras the volume of the destroyed wood mass is estimated to another 500 000 – 600 000 m3.

*Government reaction*

Such disastrous events are not uncommon in mountain regions. As recent history shows, similar strong windstorms occurred in Tatras in previous years (i.e. 1915, 1941, 1981). Nevertheless, the reaction of the government has always been the same - surprisingly one-dimensional.

The windstorm damage from 2004 is perceived by the Ministry of Environment as an excellent opportunity to decrease the level of protection in NATURA 2000 areas, in order to extract as much wood material as possible. Just after the event, the key management decision was made: 93% of affected area in High Tatras to be subjected to salvage logging and afforestation. Only 7% was declared to be set-aside for conservation purposes. Similar proportion was set in Low Tatras (91% for logging, 9% for conservation). However, in the course of time even these tiny excluded areas have not been respected – so far, only around 1% of TANAP and NAPANT have remained untouched.

Apart from massive wood extraction and artificial reforestation with spruce, aerial application of insecticides is also performed. All activities are undertaken on the basis of decisions made merely by authorities and forest administration, without environmental impact assessment, contradicting joint positions of national and international scientific experts and conservation NGOs. The idea behind seems quite obvious, considering the declaration of the Governmental Committee for Restoration and Development of Tatras, who apparently perceives the new opportunity **"to use this catastrophe for a change in the landscape planning and for building new facilities"**. Moreover, the committee **will not really take into consideration the opinion of nature conservationists and NGOs during the decision making process**.

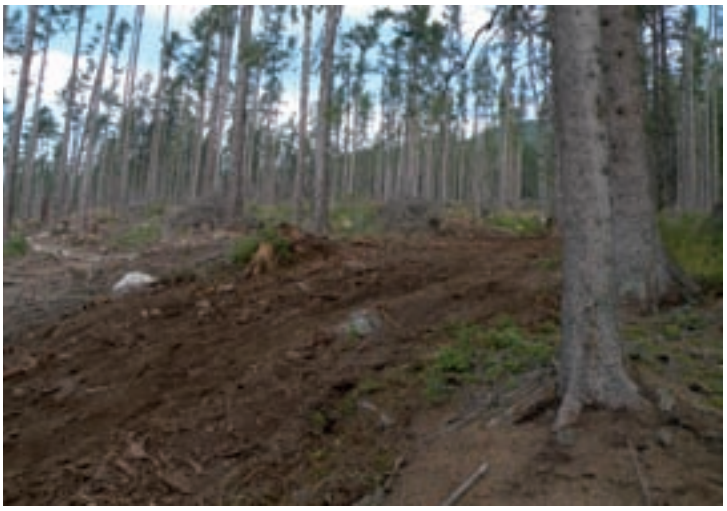


Extraction of timber from higher parts of mountains. Photo by K. Stachura-Skierczyńska.

*The conservation point of view*

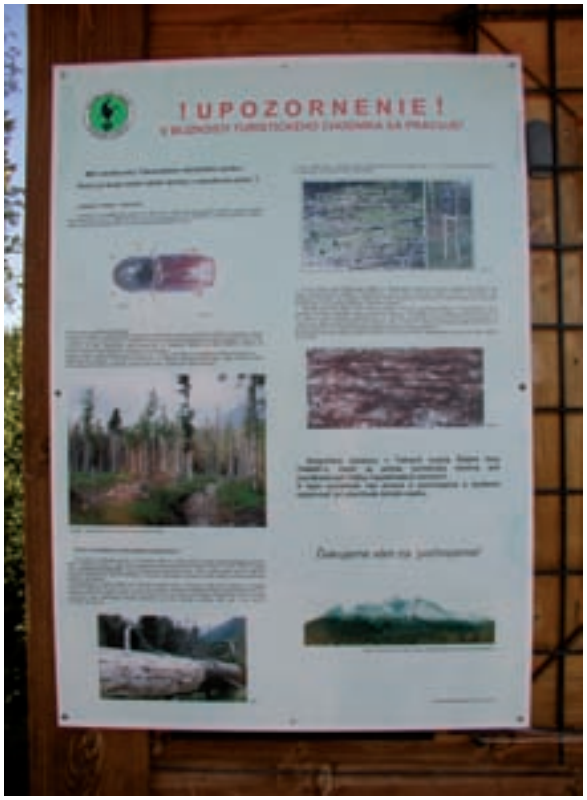
The conservation organizations and experts are convinced that the real ecological catastrophe is happening to Slovakia **now**. The calamity in the Tatras is the result of inappropriate management of the affected area in the past. The structure of the forests has been fundamentally changed by forestry practices, gradually turning natural, rich forest communities with beech and fir into spruce monocultures. Moreover, foresters have not learned from past mistakes – so far, no activities have been undertaken to improve the

quality of altered forests. On the contrary, responsible managers have been frequently applying for permissions to extract timber from natural stands located in higher parts of TANAP forested zone, instead of gradual remodeling of stands structure in the lower zone, even though there are no legal obstacles to do so (the regular planned exploitation of reservations of TANAP exceeds 80 000 cubic meters per year). The fact that the windstorm affected only a small part of forests in higher parts, while the most affected stands were located mainly in the spruce-dominated lowest part of forested zone, evidences **that natural processes create much more stable habitats than humans**. In this situation, the worst solution is what is actually being done: replacing artificial spruce monocultures by planting rows of same species. It can be expected that in the not-so-distant future the next powerful windstorm will cause equal or even bigger damage on the already weakened stands. Will it serve as a pretext for the Slovakian foresters to take the same approach again, neglecting the opinions of scientific and conservation authorities?



Skid tracks after removal of logged trees. Photo by K. Stachura-Skierczyńska.

Conservationists are convinced that responsible authorities could have taken advantage of this unique opportunity to restore natural forest characteristics on a relatively large scale, simply by leaving sufficient amount of affected stands untouched. It is recommended to stratify forested zones, according to their ecological importance and level of naturalness. The highest zone, consisting of natural forest communities, should be left untouched as a whole. In lower parts, none-intervention zones should be located in ecologically sensitive areas, resulting in **more than half of the area left without any treatment. Natural regeneration should be allowed on the largest possible scale**. In addition, pioneering tree species (birch, sorb, goat willow) followed by fit and beech in the next step should be used for replanting in areas where natural regeneration is not possible. Nevertheless, the initial principle should always be **to refrain from any intervention as far as possible**.




„Attention! Forestry works near the tourist route" – National Park's administration explains to the public the need to "protect" affected stands from further damage caused by the bark beetle Ips typhographus. Photo by K. Stachura-Skierczyńska.

Supporters of the none-intervention approach underline that the authorities responsible for the after-storm management in Tatras are in fact gradually changing the character of the protected area in favour of large investments in tourist infrastructure and the well-being of forestry business. Conservation is no longer a priority (provided that it had ever been so).

Several years of efforts to save the unique environment of Tatras by joint actions of scientists and NGOs on European Commission level has not brought any result. Perhaps it is not a surprise since it seems that the Commission apparently has never believed in the efficiency of the NATURA 2000 measures in the context of forest protection. The European Forestry Strategy draft from the EU Commission (September 2004) professes: "Meeting the Gothenburg objective of halting gradual loss of biodiversity by 2010 can be expected to remain a demanding task for some time in the forest sector" (i.e., meaning "it will not happen" - Hanski and Walsh 2004). As we already know, the EU generally failed to achieve the 2010 target, so forestry section is not an exception. As the Commission concludes "this failure was a result of political and financial capital being invested in other issues with a higher priority. In an increasingly complex world where multiple issues compete for attention, biodiversity rarely featured at the top of the 'to do' list"[3]. Slovakian case illustrates this statement strikingly well. Questions are:

- what conclusions will EU authorities draw from this collective failure?
- which constructive solutions will be proposed?
- what kind of strategy will the EU undertake to guarantee the **real** implementation of proposed solutions for the conservation of NATURA 2000 forests?

Online petition: Stop the destruction of the oldest Slovak National Park.
http://www.ekoforum.sk/peticia/stop-destruction-tatra-national-park/

**References:**

Hanski, I., Walsh., M. 2004. How much, how to?—practical tools for forest conservation. BirdLife European Task Force, Helsinki.

[3] http://www.greenweek2010.eu/session/12-halting-loss-biodiversity-%E2%80%93-part-ii-learning-past-failures

Photo by K. M. Skierczyńscy

**The term „forests" used in this book refers to the definition adopted by UN-ECE/FAO (2000):**

Land with tree crown cover (or equivalent stocking level) of more than 10 percent and area of more than 0.5 ha. The trees should be able to reach a minimum height of 5 m at maturity in situ. May consist either of closed forest formations where trees of various storeys and undergrowth cover a high proportion of the ground; or of open forest formations with a continuous vegetation cover in which tree crown cover exceeds 10 percent. Young natural stands and all plantations established for forestry purposes which have yet to reach a crown density of 10 percent or tree height of 5 m are included under forest, as are areas normally forming part of the forest area which are temporarily unstocked as a result of human intervention or natural causes but which are expected to revert to forest.

Includes: Forest nurseries and seed orchards that constitute an integral part of the forest; forest roads, cleared tracts, firebreaks and other small open areas within the forest; forest in national parks, nature reserves and other protected areas such as those of special environmental, scientific, historical, cultural or spiritual interest; windbreaks and shelterbelts of trees with an area of more than 0.5 ha and a width of more than 20 m. Rubberwood plantations and cork oak stands are included.

Excludes: Land predominantly used for agricultural practices.

Elaborating further on this concept, we define three levels of forest naturalness:

1. Naturally seeded forest (usually consisting of mixed stand at least in early succession stages).
2. Plantation-monoculture of native species.
3. Plantation of non-native species.

The first category is by far the most important for biodiversity and the only kind that should be present in NATURA 2000 sites. Restoration of plantations and monocultures of native species towards mixed native stands should also be encouraged. Non-natural monocultures should be banned from all protected areas. Exotic species, as a whole, should be excluded from sustainable forestry scheme.

**Reference:**

UN-ECE/FAO, 2000. Temperate and Boreal Forest Resources Assessment [In:] Forest Resources of Europe, CIS, North America, Australia, Japan and New Zealand. United Nations, Geneva.

The Forest Task Force is an European working group of the BirdLife International Partnership. The scope of the Task Force includes policy on forest issues, i.e. conservation of forests and forest birds, forestry practices, forest certification and other means to apply ecological aspects to so-called sustainable forestry.

Our goal is to ensure that European forestry and forest managing practices, including afforestation:

- do not harm forests or other habitats of high ecological value;
- do not threaten forest birds;
- support the recovery of biological diversity in commercial forests.

We work for better forest protection through:

- locating and mapping biologically important forests in Europe;
- organising seminars on key forest protection issues;
- informing forest owners and managers about environmentally friendly forestry;
- promoting good quality, democratic forest certification schemes;
- creating links among BirdLife Partners and other NGOs as well as representing BirdLife's viewpoint on environmentally benign forestry;
- publishing a wide variety of information on forest research and advocacy.

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