

## Ten recommendations for forest restructuring and an ecosystem-based transformation of forest management

After the extraordinary drought and heat period of summer 2018, forest ecosystems and forest management, which depends on their functioning, face major challenges. The large number of fires alone has shown that coniferous monocultures in particular represent a risky management model. The severely weakened forests are also likely to show increased vulnerability to other extreme events such as storms, pests and diseases in the future. The risk of ecological, business and economic damage may increase considerably in the coming years, depending on weather conditions. It is now time to act more decisively on the basis of available knowledge.

1. **The conversion of the extensive coniferous monocultures must become obligatory for all types of property, at least on an appropriate part of forest stands.** For decades, the necessity of forest conversion has been demanded in Germany's monocultures-influenced forest regions. Since then, considerable progress has been made in numerous forest regions and it has been proven that it is possible to convert forests that are far removed from nature into more natural forests. In others, however, no steps have been taken or the opportunity to create more diverse structures has been rejected. After use, new coniferous stands are still being established in an outdated manner. The previous success and ecological initiatives depended too much on individual foresters or ownership. The persevering forces were also driven by market demand for softwood. Now there is a need for increased efforts and resources to promote ecosystem-based adaptation of forest restructuring, but above all for appropriate regulatory instruments. The legal anchoring of good technical practice for forestry defined according to appropriate current criteria is indispensable.
2. **Consideration should be given to new models for the spatial design of commercial forests.** The forests are relevant for a large number of different ecosystem services. Not all of them can be optimally provided on the same area at the same time. Accordingly, differentiation of use and zoning should be considered. More intensively managed (possibly also plantation-like) stands should be embedded in a near-natural and ecologically functional forest ecosystem landscape. This must be laid out as an interconnected system consisting of corridors and nodes that is as coherent and undissected as possible. The system must have ecologically relevant key attributes (mainly various tree species, mixed age with a higher proportion of very old trees).

Small, isolated forest stands in the landscape must be connected and rounded off. The design of forest edges must aim at reducing storm attack areas and edge effects.

3. **Additional weakening of forest ecosystems by infrastructure must be avoided urgently, especially if this leads to fragmentation and opening of closed forest stands.** In this context, roads should be mentioned as well as routes for high-voltage lines, pipelines or the construction of wind turbines in forests.
4. **In future, research and practice should focus more on how silvicultural measures can strengthen the self-regulating forces of the forest, e.g. by promoting microclimatic regulation, cooling and buffering capacity.** The need for forest management to adapt to climate change has been the subject of intense debate for a decade and a half. Many early demands and recommendations by decision-makers have simply been ignored. In the meantime, the forestry debate has narrowed down too much to the planting of alternative tree species. Blind spots have been accepted and ecosystem-based research and action approaches have not been pursued. There are findings which show how the promotion of a near-natural species composition and forest structure has a positive effect on ecological characteristics and productivity.
5. **All forestry practices must be put to the test and questioned with regard to the impairment of forest ecosystems and adaptation to climate change.** These include, among other things, the establishment of dense backstreet networks in mixed deciduous forests, the strong illumination of stands or traffic and impact in phases of unfavourable weather (e.g. in summer during heat and drought periods or after prolonged rainfall when soils are strongly water-saturated).
6. **The remaining old mixed deciduous forest shall be adequately protected.** Effective protection must also include the establishment of appropriately large buffer zones in which the forest is managed in a near-natural manner and integration into a network of near-natural forests. In regions where old mixed deciduous forests only occur in isolated areas, a moratorium on felling must apply.
7. **Forests must be given more room for natural forest development.** The 5% target of the national biodiversity strategy with regard to natural forest development must relate to forests that are adequately large and permanently protected. Instead of primarily pursuing interventionist management approaches, more emphasis should also be placed on self-regulation of forest ecosystems in other larger areas. This does not necessarily mean a long-term renunciation of use, as the Lübeck management model, which has won several awards, shows.
8. **Opportunities for the restructuring of forests must be exploited, especially after catastrophic events.** After storms and forest fires, at least 50% of the damaged wood should remain on the land as an investment in soil formation and the self-healing powers of the forest. A total removal of the above-ground wood biomass is to be

prohibited in principle. Priority should be given to natural succession, which leads to more diverse structures and is also economically advantageous.

9. **Modern wildlife management must replace traditional hunting practices that are demonstrably not conducive to forest restructuring.** Hunting must be result-oriented with regard to the strategies applied. The regulation of game populations must be oriented towards natural population fluctuations and not towards stable populations. Ecological self-regulation in the course of the re-immigration of domestic predators should also be supported for cost reasons. Wild populations should not be fed.
  
10. **For the forest, the concept of holistic ecosystem management should be followed instead of a one-sided, business-oriented forestry that opposes the requirements resulting from ecology. Rather, forest management, wildlife management, the promotion of the landscape water balance and nature conservation should be considered together.** Such ecosystem management also includes the consideration of all ecosystem services provided by the forest, the consideration of the fact that the forest itself needs living and dead wood for its functioning, the appropriate participation of the population as well as the recognition of upper limits for the extraction of timber. The extent and practices of forest management must be geared primarily to the - dynamically changing - ecological site conditions and the resulting requirements and not at all to demand, economic efficiency or available technology. Such forest ecosystem management includes appropriate risk management to prevent production and harvest losses or forest losses due to fire, storms and calamities.

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