SYLWAN 166 (7): 470-490, July 2022
https://doi.org/10.26202/sylwan.2022063
Journal homepage: https://sylwan-journal.pl

CORRESPONDENCE/COMMENTARY

Conservation of forest biodiversity: a segregative or an integrative approach?

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ABSTRACT

Halting the unprecedented rate of decline in global biodiversity belongs to most important problems and challenges of the contemporary world. For a long time, various activities and efforts have been run and taken to achieve this goal. Generally, the undertaken measures go in two major directions. One direction, historically older, is based on the principle of segregation. This direction is generally about spot- and area-based activities. The second direction, on the other hand, seeks to integrate conservation activities into broader natural resource and environmental management plans that assume their use in a sustainable manner. The goal of this paper is to critically analyse the advantages and disadvantages, benefits and limitations of both approaches and their practical effectiveness, taking into account contemporary environmental and social conditions. A particular emphasis is placed on analysing the implications of recent trends and proposals falling under the first of the two aforementioned directions (segregative approach) and stemming from the European Commission's Biodiversity Strategy for 2030. The essence of segregative approach is the setting up a system of protected areas as a basic means of attaining the conservation goals. However, in the light of many examples, it is now becoming increasingly clear that nature cannot be effectively protected by enclosing it within protected areas (reserves, national parks, or wilderness areas) and by drawing a line around them and leaving them alone. The paper presents numerous data and facts showing that efficient conservation of forest biodiversity calls nowadays for integrative approaches, represented by such concepts as an idea of ecosystem approach derived within the scope of Convention of Biological Diversity and/or an idea of sustainable forest management developed within the Ministerial Conference on Protection of Forest in Europe (currently: Forest Europe). The considerations end in a conclusion, that the real challenge of the time is not to further increase the area of protected areas and increase the area under strict protection, but to improve and implement as widely as possible in practice the methods of forest management favourable to maintaining the truly multifunctional character of forests, at the smallest possible spatial scale, as well as to ensure the economic effectiveness of forest management and to prepare forest ecosystems for the challenges which are already appearing and which are to be expected in the near future from the changing climate and other environmental factors.

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KEY WORDS

anthropocene, biodiversity strategy, ecosystem approach, nature protection, strict protection, sustainable forest management

Introduction

Restoring or at least halting the unprecedented rate of decline in global biodiversity belongs to most important problems and challenges of the contemporary world (Sala *et al*., 2000). The importance of this problem is driven by a number of reasons. For broad circles of society, biodiversity is a value in itself that should be preserved in the best possible condition for future generations. However, biodiversity conservation also has purely utilitarian aspects, stemming from its ability (and necessity) to meet the very many needs of present and future generations (Hunter, 2004; Grzywacz, 2005).

It is widely accepted that biodiversity means diversity of forms of life at all levels of its organization. In other words, biodiversity is the diversity of all living organisms found on Earth and the ecological communities of which they are a part. In classical terms, the concept of diversity refers to 3 main levels: 1) genetic diversity, 2) species diversity and 3) ecosystem diversity (Hunter, 2004). However, according to Kaennel (1998), the issue of the protection of biodiversity can also be viewed more broadly as a problem that is much more complex and which covers very many aspects and components, including those that directly dependent on human activities.

The key factors responsible for the current high rate of decline in global biodiversity include: changes in land use, increased atmospheric CO_2 concentration, nitrogen deposition and acid rain, climate change, and biotic exchanges, which involve the deliberate or accidental introduction of alien plant and animal species into local ecosystems (Sala *et al*., 2000).

For a long time, various activities and efforts have been run and taken to, if not completely stop, at least to slow down the rate of loss of biodiversity, covering its various levels and aspects. Generally speaking, the undertaken measures go in two major directions.

One direction, historically older, is based on the principle of segregation. This direction is generally about spot- and area-based activities. They consist in separating certain areas: so called protected areas, excluding them from 'normal' management and giving them a special legal status, based on the recognition that the preservation of natural values is the overriding objective of the management of such natural sites.

The second direction, on the other hand, seeks to integrate conservation activities into broader natural resource and environmental management plans that assume their use in a sustainable manner. Unlike the first direction, this one involves large-scale, or even total, actions, as they affect the vast majority of the land area under a particular form of use (*e.g*., the forest area in a given country).

A general characteristics of segregative *vs*. integrative approaches to forest biodiversity conservation was provided, among others, by Bollmann and Braunisch (2013). According to the mentioned authors, in the case of a pure segregative approach, a certain proportion of forest areas performs only conservation functions (*e.g*., in the form of forest reserves) while seeking to maximize the production function on the remaining forest area. The integrative approach, on the other hand, is about combining ecological, economic, and social issues over as much forest area as possible at any given time.

The overarching goal of this paper is to critically analyse the advantages and disadvantages, benefits and limitations of both approaches and their practical effectiveness, taking into

account contemporary environmental (such as climate change) and social conditions. A particular emphasis will be placed on analysing the implications of recent trends and proposals falling under the first of the two aforementioned directions (segregative approach) and stemming from the European Commission's Biodiversity Strategy for 2030 adopted in May 2020 (EU, 2020).

The analysis will be focused primarily on forests, given that a very large part of biodiversity is associated with forest ecosystems, and because the adoption of the solutions proposed under the EU Biodiversity Strategy for 2030 (EU, 2020) mentioned above would have particularly momentous consequences for this form of land use. These consequences can be considered on a variety of levels; this paper focuses primarily on issues related to the protection and sustainable maintenance of forest biodiversity.

Development of the concept of protected areas as an expression of segregative approach

The major actors, as well as the goals and motivation for setting up protected areas, have changed over time. Initially, they were created to secure the interest of their wealthy owners. Later, aesthetic considerations and scenic and natural beauty of certain areas and objects were the decisive factors. After World War II, the initial focus was on the protection of a kind of 'naturalness' and later on the protection of biodiversity. According to the authors of the EEA report (European Environment Agency, 2012), the blended model is gradually beginning to dominate in the 21st century, where the economic use of protected areas is increasingly important, based on the principle of sustainability of the benefits and goods they generate. As might be thought, the shift in approach suggested here in the way the nature and role of protected areas is viewed is primarily due to the fact that they are occupying increasing areas and at least some proponents of creating such areas are slowly beginning to recognize the ever-increasing social costs of their establishment and maintenance. Globally, a particularly large number – over 80% – of protected areas were set up after 1962, the year when the First World Congress on National Parks was held. In Europe, both the number and area of protected areas in each country has since grown at an exponential rate.

Changes in the understanding of what protected areas are and what role they should play have also been reflected in the official definitions of protected areas used by many representative international organizations. For instance, in 1994, the International Union for Conservation of Nature (IUCN) defined a protected area as 'a land or sea area set aside for the protection and conservation of biological diversity and natural values and associated cultural resources, and managed through appropriate legal arrangements or other effective means'. In its new 2008 definition, the IUCN added to this definition the role that protected areas play in providing various types of ecosystem goods, utilities and benefits (services). According to this new definition, 'a protected site is a uniquely defined geographical space, delineated, established and managed through appropriate legislation or other effective methods in such a manner as to ensure the long-term conservation of natural resources, and the maintenance of ecosystem services and cultural values'.

Current policy in Europe on protected areas is the product of initiatives originating from two main sources: UN Convention on Biological Diversity and the legislation of the European Union itself. The Convention on Biological Diversity is a treaty that nearly 200 countries around the world have adopted. The Convention's provisions imply, among other things, that, where feasible and purposeful, the signatories to the Convention should 'establish a system of protected areas, or areas where activities necessary for the conservation of biological diversity are undertaken'.

At a meeting in Nagoya, Japan, in 2010, the Parties to the Convention on Biological Diversity (CBD) adopted a new Strategic Plan for Biodiversity Conservation 2011-2020, along with a series of so-called Aichi-Targets. The Aichi-Targets are binding for almost 200 countries that have signed the CBD Convention under which they have to protect the most biodiverse parts of their territories and areas that play a key role in protecting ecosystem services. To meet these targets, individual countries have committed to covering at least 17% of their land and inland waters, and 10% of their coasts and marine waters, with a system of protected areas by 2020. The Aichi Targets envisage that these protected areas will also provide social benefits, providing the basis for the sustainable functioning of communities living in and around these areas, and protecting humanity from the impacts of climate change. It is also expected that protected areas will contribute to the economy by generating revenue to provide for their own upkeep.

At the European Union level, the directives of European Council play a particularly important role in the setting up of protected areas. As with the Convention on Biological Diversity, these directives also see the creation of protected areas as a way of conserving biodiversity and providing opportunities to deliver a variety of ecosystem services and benefits.

The turning point in the EU's approach to biodiversity protection came with the publication of a Council's Directive 79/409/EEC concerning the conservation of wild birds (updated as 2009/147/EC) – the Birds Directive. The Habitats Directive (Council's Directive 92/43/EEC) concerning the protection of natural habitats and wild flora and fauna was also very important to this extent.

Both of these legal instruments provide for the setting up of protected areas systems as a means of attaining the conservation goals. The Birds Directive designates Special Protected Areas of Birds (SPAc) and the Habitats Directive designates Special Areas of Conservation (SACs). Together they form the Natura 2000 network, a Europe-wide network of protected areas.

In May 2020, the European Commission adopted another Biodiversity Strategy, this time looking ahead to 2030 (EU, 2020). The main slogan of this Strategy is '*Bringing nature back into our lives*'. As was the case in previous documents of a similar type, the currently adopted version places the main emphasis on solutions characteristic of the segregative approach, *i.e.*, it focuses primarily on the further development of a network of protected areas.

The aforementioned Strategy postulates further spatial development of a network of protected areas. According to the Strategy, the status of protected areas should be given to at least 30% of the EU's land and 30% of its marine areas. This means that an additional 4% of land areas and 19% of marine areas would need to be protected compared to the status quo. As the authors of the Strategy state, this proposal is compatible with the offer currently prepared for the global process under the Convention on Biological Diversity and the 15th meeting of the Parties to the Convention.

A very important element of the new Strategy is the imposition of strict protection on at least one-third of the area of protected areas, *i.e.*, 10% of the land area and 10% of the sea area in the European Union. Taking into account that, according to the authors of the new Strategy, 3% of the land area and 1% of the sea area in EU countries is under strict protection, this would mean that an additional 7% of land area and 9% of sea area should be strictly protected. In this context, the authors of the Strategy pay special attention to the need for strict protection of all remnants of primeval forests and old-growth forests that still exist in the countries of the European Union. This need is motivated by the fact that these are the richest forest ecosystems and that these ecosystems accumulate significant amounts of carbon, which is important for climate protection.

Strict protection as the operating principle of protected areas

Given how much importance the new EU Biodiversity Strategy for 2030 (EU, 2020) attaches to the strict conservation, a thorough assessment of the practical implications of using this approach as a tool to protect biodiversity and other values of selected sites and areas is needed. Since in Europe until recently both the number of such objects and the duration of strict protection have been strongly limited, the experience of other countries, especially the United States, where the idea of creating so-called 'wilderness areas' (functioning on the principle of strict protection) has a long tradition, dating back to the mid-sixties, is more reliable in this respect. An evaluation of the performance of more than a dozen such areas decades after their inception was conducted by Cole and Yung (2010). In their paper they describe in detail a number of cases, primarily from the United States, but also from other regions of the world, where the idea of strict protection (protection of natural processes) has generally failed as a method of permanently preserving the fundamental values of areas protected in this way. This group included such sites as Bandelier National Monument, Saint Mary's Wilderness, Big Gum Swamp Wilderness, Glacier National Park, Grand Canyon National Park, and Joshua Tree National Park. Common to all of these cases was that at some point a decision was made to put them under strict (passive) protection believing that such a strategy would be best for these sites and areas. And in each case, after a shorter or longer period of time, it turned out that human intervention is necessary to save the values that determined the creation of all these objects and their strict protection.

As Cole and Yung (2010) point out, the fact that an area is placed under strict protection does not mean that the wildlife and other values of that area automatically become secure. On the contrary, various threats are very numerous; their sources include anthropogenically induced climate change, alien invasive species, industrial pollution of the atmosphere, water and soils, and habitat fragmentation. Spontaneous succession processes that occur in these areas are also a frequent problem. It appears that all of these factors directly threaten the values protected within parks and wildlife areas and lead to serious questions about what the implications of this are for the ability to sustainably preserve the heritage, especially natural heritage, protected within them.

It is now becoming increasingly clear that nature cannot be effectively protected by enclosing it within protected areas (reserves, national parks, or wilderness areas) and by drawing a line around them and leaving them alone (Cole and Yung, 2010). Permanent sustaining the beauty, heritage and biodiversity of an area requires wise, thoughtful management and, very often, proactive intervention. Cole and Yung (2010) note that the creation of large protected areas in the twentieth century was based on the assumption that they should operate on the principle of protecting natural processes (the principle of protecting naturalness). The cited authors state that these goals were appropriate 100 years ago, when there was a struggle to protect certain areas from civilizational development and uncontrolled exploration. However, the world has changed a lot in the past 100 years, and the rate of change has increased dramatically. The most certain feature of the future is uncertainty. Nature resource management issues in the 21st century are not black and white, but have become very complex and require solutions that are not as clear-cut as they might seem on the surface. Consequently, it is time to rethink the concept of strict protection, based on the principle of protecting natural processes (according to the cited authors: 'it is time to think beyond naturalness'). There has also been a need to define such objectives for protected areas that are, on the one hand, more explicit and, on the other, more nuanced

than the narrowly defined protection of 'natural' processes. The need has also arisen to utilize a wider spectrum of management and development techniques to attain these goals.

Cole and Yung (2010) also emphasize that a key challenge in managing parks and wilderness areas today is the question of deciding where, when, and how to influence the course of physical and biological processes to permanently preserve what we care about in such places. Owing to that reason, they emphasize active management, which in part falls under the concept of ecological restoration, which involves helping humans restore an ecosystem that has been damaged, degraded or destroyed in some way. However, the authors prefer a more general term, intervention, because it means any set of actions aimed at changing the trajectory of ecosystem development, and at the same time it does not imply a return to past conditions (as in the case of restoration). They believe that in many cases conversion (redirection) would be a better term than restoration. Human intervention can take many forms, from causing controlled fires to reducing the number of ungulates, from thinning to helping the individuals or species better adapted to changing conditions to migrate.

The conclusions drawn by Cole and Yung (2010; cf. also Cornwall, 2017) are fully confirmed for those (rather few) sites in Europe where strict protection is applied over a sufficiently large area and over a sufficiently long period of time. Some examples include such sites and areas as Podyje National Park in the Czech Republic (Sebek *et al*., 2015), beech forests in Germany (Schall *et al*., 2018), and Illyrian oak-beech forests (Kovac *et al*., 2018). In Poland, the flagship example within this scope is the 'Strict Reserve' of the Białowieża National Park, widely recognized as a model example of a site little transformed by man, characterized by high natural biodiversity. Meanwhile, it turns out that many elements of this biodiversity are highly threatened or have even definitively disappeared from the site (Brzeziecki, 2017). Many examples can be found in the vascular plant category (Adamowski, 2009; Matuszkiewicz, 2011; Brzeziecki *et al*., 2018b) and the lichen category (Cieśliński, 2009). For example, according to Adamowski (2009), the total loss of the Białowieża National Park's flora since its foundation may amount to as many as 11 rare vascular plant species, including such species as *Cypripedium calceolus* L., *Lycopodiella inundata* (L.) Holub, *Rhynchospora alba* (L.) Vahl. and *Linnaea borealis* L. The author quoted here believes that the cause of the disappearance of many plant species are spontaneous successional changes occurring in the area under strict protection. Matuszkiewicz (2011) also has a similar opinion: according to him, *e.g.*, in the patches of mixed coniferous forest (*Serratulo-Pinetum* community) occurring in the 'Strict Reserve' of the Białowieża National Park, about 30 plant species were completely lost in the course of 50 years (which means that the average rate of flora depletion in this period was 0.6 species/year). According to Matuszkiewicz (2011), it can be assumed with a high degree of certainty that the changes occurring in the case of the area under strict protection, leading to simplification and impoverishment of the floral composition of the communities, have a natural character and are a manifestation of regeneration of the communities previously subjected to anthropogenic pressure. In other words, the regenerated forms of forest communities are clearly poorer in floral terms than the 'deformed' forms (developed under the influence of anthropogenic factors). As the author points out, spontaneous renaturalization under strict protection leads to a reduction in floral diversity of communities, and gradually even to a decrease in diversity at the plant community level.

Very similar conclusions were also drawn by Brzeziecki *et al*. (2018b), who investigated changes in the floral composition of herb layer that took place in the period 1959-2016 on a permanent research plot of the Department of Silviculture of the Warsaw University of Life Sciences, located in the compartment 319 of the Białowieża National Park. An important part of the observed

changes was the disappearance of a large number of species valuable from the point of view of nature conservation, including species included in the Polish Red List of legally protected species, such as *Arnica montana* L., *Goodyera repens* (L.) R. Br., *Lathyrus laevigatus* (Waldst. & Kit.) Gren and *Trollius europaeus* L., among others. The receding species mostly represented the group of light and heliophilous plants associated with rare and receding types of forest complexes, such as oak forests and subboreal mixed forests.

From the perspective of preserving the high natural values of forest ecosystems, particularly great attention must be paid to trees, which play in them the role of fundamental species on which depends directly or indirectly the functioning of all other groups of forest organisms (Palik and Engstrom, 2004; Ellison *et al*., 2005; Alexander *et al*., 2006; Borowski, 2006; Senn-Irlet, 2008). Today, this role is very often under threat, as a result of factors such as climate change, atmospheric pollution, pressure from overstocked ungulates' populations (Bernadzki *et al*., 1998; Côté *et al*., 2004; Salk *et al*., 2013), invasive insect and fungal species (Pautasso *et al*., 2013; Gawęda and Mokrzycki, 2016; Grodzki and Guzik, 2016), and many others. Trees in strictly protected areas are also, and perhaps especially, exposed to these factors. In this situation, it is of the utmost importance that human assistance be provided to keep the demographic structure of all tree species found in individual forest complexes as stable and balanced as possible, and to ensure that they are able to perform their role as foundation species as sustainably as possible (Brzeziecki *et al*., 2021). Human help is also necessary for the restoration of populations and restoration of greater importance in the forests in the case of rare tree species, such as, for example, in Poland: *Taxus baccata* L., *Acer campestre* L., *Populus nigra* L., *Sorbus torminalis* (L.) Crantz and many others, as well as limiting the development of alien invasive species: *Acer negundo* L., *Prunus serotina* Ehrh.

Deterioration of biodiversity conservation in different regions of the world as a side effect of expanding strict protection in Europe

In addition to the many direct, negative effects of strict protection exemplified above, introducing it on such a large scale as is proposed in the EU Biodiversity Strategy for 2030 (EU, 2020) would also have a great many negative side effects, both socio-economic and strictly ecological. The postulate to cover 10% of the land area with strict protection means in practice the necessity to cover with strict protection first of all the area of forests and those which are in public ownership, because this postulate would be relatively easiest to fulfil there. Given that the forest cover rate in Europe is just above thirty percent, this would mean a need to take at least about one-third of the current forest area out of use. For publicly owned forests, this rate would be even higher. For example, the land area of Poland is about 31 million hectares. 10% of that area equals to 3.1 million ha. Such an area should be, as called for by the authors of the Biodiversity Strategy for 2030 (EU, 2020), under strict protection. Since it is difficult to suppose that agricultural land or built-up and urbanized land (jointly approx. 65%) will be suitable for this purpose (to some significant extent), in practice only forest land and possibly some categories of wasteland will remain (the share of the latter is 1.5% on the national scale). This would then mean that more than 40% of the state forests (3.1/7.3; where 7.3 million hectares = the current area of these forests) in Poland would have to be excluded from use and placed under strict protection. The economic, financial, and social impacts and consequences of such an action would have to be enormous. A thorough analysis of these impacts is beyond the scope of this paper, which focuses primarily on the consequences of strict protection from the perspective of biodiversity alone.

In this context, the analysis made by Dieter *et al*. (2020) should be noted. According to the cited authors, in the case of Germany, the practical implementation of the Biodiversity Strategy 2030 would result, under very optimistic assumptions, in the necessity to exclude from production about 22% of the forest area (including all mature stands), which in turn would translate into a decrease in the production of roundwood from the current level of about 77 million m^3/year to 53 million m^3/year, which corresponds to 69% in relation to what is currently logged. Given that a similar phenomenon would also occur in other European countries, total roundwood production in the entire European Union would fall from approximately 473 million m^3/year to 324 million m^3/year (a difference of 149 million m^3/year). As the authors of this analysis have noticed, this change would not only have economic and social consequences, but also purely ecological ones. As the global markets for timber raw materials are interconnected, the gap in the European timber market that would appear would be filled in, at least to a certain extent, by timber imports from other countries such as the USA, Canada, Brazil or Russia. Thus, increased 'protection' of forests in parts of the globe will have a negative impact on forest conservation and use in other parts of the world. The increase in roundwood production will occur in those countries where the proportion of intact forests is higher than in Europe, but where there has been a significant reduction in the total area covered by these forests in recent years. Therefore, a side effect of the EU Biodiversity Strategy for 2030 (EU, 2020) is the great threat it poses to remaining intact forest areas elsewhere in the world. Increasing protection regimes in European countries will therefore further weaken the degree of forest protection in other countries. In the non-European countries, deforestation rates are higher, protected forest area rates are significantly lower, and expenditures on biodiversity conservation are lower than in the European countries. The averaged index for Red Listed Species suggests a higher degree of species extinction risk in the non-European countries. The immediate dangers involved are further deterioration in the conservation status of endangered species, a decrease in the area of primary forest, an increase in the area of degraded land, and an increase in the rate of deforestation. From a global perspective, any positive effects in terms of biodiversity protection in the European Union caused by the adoption of the solutions proposed in the EU Biodiversity Strategy for 2030 (EU, 2020) will be achieved at the cost of a significant deterioration in the situation in this respect in non-European countries.

Sustainable forest management as an example of an integrative approach to biodiversity conservation

Important arguments for the need to reject the segregative approach and replace it with an integrative model are provided by the analysis conducted by Wapner (2014). The author notes, first of all, that the basic premise, on which many movements and institutions dedicated to defending nature from man were and still are based, is no longer valid today. It is about the assumption that these two spheres, *i.e*., the sphere (domain) of human and the sphere (domain) of nature can be physically and functionally separated. Meanwhile, both numerous empirical data and observations over the past several decades, as well as scientific developments, clearly indicate that the above hypothesis is incorrect. Today, humans use so many of the planet's resources, virtually everywhere on Earth, and emit such enormous volumes of various types of waste into the air, water, and soil, that humanity's signature can now be found literally everywhere. There are no longer places on the Earth without anthropogenic impact. Nor, for that matter, is it possible to separate the 'human realm' from the 'non-human realm'. We all now live in a 'hybrid' world; we live in the Anthropocene, a new geological epoch in which human activity has become the

most important factor shaping the conditions of life on the Earth. A characteristic feature of the Anthropocene is a kind of 'end of nature', understood as an independent, self-sustaining entity.

The author quoted here argues, among other things, that the creation of areas from which attempts are made to exclude humans and leave them to 'nature' is very often associated with numerous ethical problems (because, as a rule, this is done at the expense of the interests and welfare of local communities). He also notes that, in the name of maintaining or restoring the 'natural' or 'unspoiled' character of these areas, numerous activities of various kinds are undertaken, often of a permanent nature, which in itself is contrary to the basic idea of 'wilderness' and 'naturalness'. In conclusion, the author states that for many reasons nature cannot be left 'alone' today. He also concludes that neither a naturalistic attitude (assuming full primacy of nature and leaving it 'alone') nor an attitude seeking full human control and power over nature (mastery) is appropriate in the time of the Anthropocene. A middle-of-the-road solution is required that would abandon both of these extreme positions and an understanding that we are bound to the natural world by a complex network of relationships. The middle path includes many actions, such as building wildlife crossings, conscious landscaping, and intentionally creating nature-friendly surfaces and places in cities and suburbs to increase biodiversity and ecological abundance. At the heart of such efforts is the assumption that wilderness is not a place or a state, but a relationship, and that people must be consciously and actively engaged in cultivating and maintaining that relationship at the best possible level.

An important formal basis for an integrative approach to the problem of biodiversity conservation is provided by the Convention on Biological Diversity (United Nations Environment Programme, 1992). In fact, the first two main objectives of this Convention mention both the protection (conservation) of biological diversity and the need for sustainable and balanced use of its elements. The idea of integration is also strongly rooted in the so-called ecosystem approach, developed within the framework of the Convention on Biological Diversity, which is a kind of general guidelines on how ecosystems should be managed to achieve the overall objectives of the Convention (Häusler and Scherer-Lorenzen, 2001; Heckl *et al*., 2003; Brzeziecki, 2008). The essence of the ecosystem approach is defined by a total of 12 principles, known as Malawi Principles. Especially important in this context is Principle no 10, which refers not only to the need to seek an appropriate balance between human conservation and use of biodiversity resources, but also to the need to develop ways of managing ecosystems that allow for the mutual integration of conservation and use of biodiversity resources.

In addition to the Convention on Biological Diversity and its ecosystem approach, the concept of sustainable forest management, as formulated under the Ministerial Process on the Protection of Forests in Europe (MCPFE, currently FOREST EUROPE), has played an important role in the development of an integrative approach to the problem of forest biodiversity conservation. From the beginning of the establishment of this process, which took place at the first conference held in 1990 in Strasbourg, its participants, *i.e*., 40 European countries, have adopted the assumption of multifunctional character of forests and such a model of forest management, in which all significant and important functions of forests are treated equally. This is reflected in their definition of sustainable forest management, according to which it means managing and using forests and wooded areas in such a way and at such a rate as to preserve them as renewable natural resources and not deplete them in the long term, maintain their biodiversity, productivity, capacity to fulfil now and in the future relevant ecological, economic and social functions at local, national and global levels, without causing damage to other ecosystems.

The above definition, only slightly modified, has been enshrined in forestry legislation in all European countries, including the Polish Forest Act of 1991 (amended in 1997). The idea of multifunctional, sustainable forest management was promoted and implemented in many other important documents, directly and indirectly concerning forest management in Poland, such as the National Environmental Policy from 1991 or the National Forest Policy from 1997. The development and detailing of the general principles of sustainable, multifunctional forest management was and is included in such documents as: Regulations No. 11 of 1995 and No. 11a of 1999 of the Directorate General of the State Forests on Improvement of Forest Management on Ecological Foundations; Regulation No. 30 of the General Director of the State Forests on Promotional Forest Complexes of 1994; Polish Policy for Comprehensive Protection of Forest Resources (Grzywacz, 1994); Instruction for the Preparation of a Nature Conservation Programme in the Forest District of 1996; 6th and 7th editions of the Silviculture Guidelines of 2003 and 2012.

In the practical implementation of the assumptions of sustainable, multifunctional forest management a particularly important role falls to silviculture, as that branch of forestry science and practical forestry, which deals directly with the trees and tree stands, which are the main component of the forest vegetation. The way of understanding the specificity and tasks of this discipline of forest science and the field of practical forestry has undergone and is still undergoing evolution, from the 19th century view of silviculture treated as an activity similar in terms of methods, means and objectives to agricultural cultivation, to the modern view of the essence of silviculture as an activity aimed at controlling, in the direction desired by man, the development processes that take place in the forest, treated as a complex natural phenomenon (Bernadzki, 1993 1995a, b, 2000). Such a direction is often referred to as close-to-nature silviculture, guided by the well-known aphorism: 'who wants to command nature must obey it' (Bacon, after Schütz, 2001). From the point of view of close-to-nature silviculture, the preservation of the natural values of forest ecosystems is as important as the preservation of their ability to perform their productive function (Bernadzki, 1995a). This allows to treat close-to-nature silviculture as the main tool for the implementation of the principles of the ecosystem approach and assumptions of sustainable, multifunctional forest management into practice.

Advocates and promoters of close-to-nature silviculture make the basic assumption that the vast majority of forests should be managed and used (Schütz, 2001). What is important, however, is under what principles this use takes place. Close-to-nature silviculture is synonymous with a holistic (comprehensive) understanding of forests and forest management and shaping their multifunctional character at the smallest possible spatial scale.

Generally speaking, the basic premise of close-to-nature silviculture boils down to shaping as diverse tree layer and tree stand structures as possible, as the most important elements of forest ecosystems. It is assumed that a diverse stand structure (in terms of tree species composition, tree size and spatial distribution, proportion of deadwood) is positively correlated with the number of potential ecological niches and species of plants, animals and fungi that can use these niches (Schütz, 2001, 2002; Spiecker, 2003; Brzeziecki *et al*., 2013; O'Hara, 2014, 2016).

A good summary of the achievements, challenges and issues to date regarding sustainable forest management on a Europe-wide scale is the recent report that has been prepared as part of the FOREST EUROPE (2020) process. The report begins by recalling the definition of sustainable forest management as it was formulated during the first MCPFE Conference that was held in Helsinki in 1992. In the introduction, the authors state that European forests managed according to the sustainable forest management concept play a key role from the point of view of climate protection and biodiversity. They also provide important water and soil conservation

functions, are the source of many livelihoods, and are a condition for the health and wellbeing of rural and urban communities. The forests in Europe provide a variety of functions and ecosystem services, including renewable raw materials, which are a desirable alternative to other materials with a higher environmental footprint, thereby contributing to the accelerated achievement of climate neutrality and overall sustainability goals. The area of forests in Europe is steadily growing, allowing them to accumulate more and more carbon while sustainably producing wood raw material. Over the past 30 years, Europe's forest cover has increased by 9% and now totals 227 million hectares, meaning that $^1/_3$ of Europe's land area is forested. In the last 30 years, the volume of trees and the mass of carbon contained in forest biomass has increased by 50% (an increase of 1.7% per year). This is a result of both the increase in total forest area and the fact that only a portion (approx. $^3/_4$) of the net annual wood increment in forests is utilized. Every year, Europe's forests biomass absorbs $^1/_{10}{}^{th}$ of the total volume of carbon emissions from other sectors of the economy. The storage of carbon in a variety of products and wood products harvested from forests also contributes significantly to reducing CO_2 emissions. The total volume of wood raw material production rose to 550 million m^3, up by 40% compared to 1990.

Simultaneously, Europe's forests play an important role in biodiversity protection, provide jobs and income for rural communities. The vast majority of European forests are seminatural. The diversity of species composition of tree stands has been steadily growing for several years. Similarly, the amount of deadwood has also been growing. Approximately 2% of the forest area has a status of undisturbed by man. Almost 24% of the forest is in protected areas, where the aim is to preserve biodiversity and landscape. This figure is significantly higher than it was a few decades ago. Forest area for biodiversity protection increased by 65% over 20 years, while forest area for landscape protection increased by 8%. Forest stands performing soil and water conservation functions and providing other ecosystem benefits occupy 32% of the forest area. The major forest bird species populations have remained stable for nearly 40 years.

However, threats and challenges occur also in a big number, especially with regard to forest health and economic sustainability. On many sites, abiotic and biotic factors have caused forest damage with devastating effects on local ecosystems. In 2015, damage occurred in 3% of the forest area in Europe. Since then, the frequency of large-area disturbances has been steadily growing. Their sources include extreme droughts, heat waves, bark beetle gradations, and more widespread wildfires. Air pollution deposition has steadily declined over the past 25 years; nevertheless, some pollutants locally continue to exceed critical values. On average, the health condition of the forests in Europe has been continually declining. Average values of assimilative apparatus loss rates increased in 19% of monitoring plots, which is twice the number of plots where the condition of this apparatus improved between 2010 and 2018.

In addition, the scale of demands and expectations from forests is constantly increasing. They are concerned with such issues as carbon sequestration, providing renewable biomaterials and products that can replace non-renewable resources, supporting rural development, and meeting recreational needs. This is all happening in the context of a rapidly changing climate. At present, silviculture in Europe faces a major challenge to meet these diverse expectations and needs. It is also expected to increase the adaptive capacity of forests to climate change. There is no doubt that the ability of forests to meet all these demands and demands is limited, so compromises are necessary.

The concept of sustainable forest management is based on the idea that forests should perform ecological, economic and social functions in such a way as to provide benefits to present generations without compromising the ability to satisfy the needs of future generations. It is a fea-

ture of European forests to strive for a state of equilibrium between the various components and functions of sustainable forest management (Pretzsch *et al*., 2008). At this point, that state has largely been achieved. As the authors of the FOREST EUROPE report (2020) point out, new pressures (including from significant increases in the scope of protection, especially strict protection) and challenges could easily upset this delicate balance at any time. They therefore postulate that any search for a new state of this balance should take into account all functions and roles of forests (a holistic rather than a sectoral approach) and should be based on sound analysis and strong scientific foundations.

The issue of climate change

The need for a pro-active approach to shaping stand structures also comes up very strongly in the context of current and projected climate change. As is widely accepted today, most of the consequences of climate change on forest ecosystems, with particular emphasis on trees and stands as their most important components, will be negative (Sykes, 2009). The increasing frequency of extreme events, both abiotic (hurricane winds, extreme drought, wet snowfall) and biotic (insect outbreaks, fungal diseases), plays a special role here. They are already causing great damage to many forests in the world, in Europe and in Poland. It is predicted that the scale of the problem will only increase in the near future (Candell and Raupach, 2008; Malmsheimer *et al*., 2008; Köhl *et al*., 2010; Leech *et al*., 2011; Zajączkowski *et al*., 2013; Bellasen and Luyssaert, 2014).

The high threat from a changing climate means that the issue of increasing the adaptive capacity of existing forests to environmental change has now become a major concern for forest management in Europe and worldwide. The concept of adaptation includes activities aimed at increasing the resistance of forest stands to the impact of harmful forest insects, diseases and fires, as well as measures and methods to increase the resilience of forest ecosystems, that is, the ability to recover and regenerate after the occurrence of all kinds of disturbances and disasters.

Recently, a number of different principles and courses of action have been proposed to increase the adaptive capacity of forests to changing climatic conditions. The vast majority of these proposals fall within the concept of close-to-nature silviculture and aim to reduce what has long been known as silvicultural risk (Bernadzki, 1995a, 2000). From this perspective, three main lines of action come into play: 1) actions to increase the resilience (resistivity, robustness) of existing forests and prevent the occurrence of damage caused by increasing destabilization of climatic conditions, 2) actions to increase the potential of forests to spontaneously regenerate and return to the desired state after damage occurs (actions that increase forest resilience), 3) actions to increase the capacity of forests to smoothly (gradually, evolutionarily) adapt to changing climatic conditions (Brang *et al*., 2014, 2016).

According to many authors, maintenance of health and vitality of forest ecosystems at a sufficiently high level is a basic condition for the sustainable maintenance of the multifunctional character of forests and preserving their ability to provide a full range of ecosystem goods and benefits (services), both now and in the future, including, and perhaps even primarily, maintaining a high level of forest biodiversity (Candell and Raupach, 2008; Malmsheimer *et al*., 2008; Köhl *et al*., 2010; Leech *et al*., 2011; Bellasen and Luyssaert, 2014; Ammer, 2019; Brzeziecki *et al*., 2021).

It is now clear from the increasing magnitude of damage and loss caused to forests by a variety of factors what strategy for forest use and management is most appropriate for mitigating climate change. Contrary to what is sometimes suggested today (the authors of the EU Biodiversity

Strategy for 2030 (2020), among others, also do so), this strategy should not be about trying to accumulate as much carbon as possible in the organic matter found in the forest. This is because there is a fundamental question of the sustainability of the results obtained in this way. Even if some activities lead to increased carbon sequestration by forest ecosystems in the short term, this generally has a negative impact on the sustainability and stability of the forest and the ability of the forest to perform a variety of functions in the long term. Besides, the mitigation of climate change through measures to increase the amount of carbon stored in forest ecosystems is always associated with the risk of its sudden release to the atmosphere as a result of various types of disturbances, such as fires or insect gradations (Malsheimer *et al*., 2008). The likelihood of such events increases in the face of intensifying climate change and a projected increase in the frequency of extreme events. As highlighted by Malsheimer *et al*. (2008), the current observed and projected further increase in forest threats from various types of disturbances and disasters necessitates a revision of the view that unharvested forest resources can unconditionally and unreservedly play a central role in climate change mitigation. Taking all this into account, from a climate protection perspective, the most efficient and safest strategy is to pursue the widest possible use of wood as a raw material and source of environmentally safe energy (Blattert *et al*., 2020).

Summary and conclusions

In conclusion, it must be said that the proposals for action in the EU Biodiversity Strategy for 2030 (2020) do not take into account many pieces of the data and facts exemplified in this paper. First of all, it should be taken into account that the requirement of strict protection of 10% of the land area in many countries, including Poland, would have to be realized mainly at the expense of forests. One would have to reckon that up to 40%, if not more, of the forest area would have to be taken out of use. This would have enormous negative social and economic consequences.

However, also from a purely ecological point of view, *i.e*., from the point of view of achieving the main objective of the EU Biodiversity Strategy for 2030 (2020), *i.e*., halting the decline in biodiversity, the proposals contained therein, including in particular those concerning strict protection, should be assessed as harmful, in the light of numerous examples from all over the world indicating that sustainable preservation of various values, including natural values, of areas outstanding in this respect, requires active human intervention. In the Anthropocene era, when human activity became the main factor shaping the conditions of life on Earth, nature ceased to exist as an independent, self-sufficient entity. The hybrid nature of the modern world means that the segregative approach to the problem of biodiversity conservation must give way to an integrative approach.

The problem with proper understanding of the role and consequences of strict protection in the case of forest ecosystems often lies in the fact that in the short term the effects of this form of protection are, at least on the surface, positive: the number of old trees increases, the dead wood accumulates rapidly, and structures typical of primeval forests appear. It turns out, however, that in the long run, very often these positive effects are balanced or even exceeded by negative phenomena: the disappearance of many tree species that play a role of foundation species in forest communities, the simplification and homogenization of the tree stand structure, and the disappearance of many valuable elements of biodiversity (Bernadzki *et al*., 1998; Cole and Yung 2010; Brzeziecki *et al*., 2012, 2016, 2018a, 2020; Drozdowski *et al*., 2012; Sebek *et al*., 2015; Bruchwald *et al*., 2018). The examples supporting the claim that this really happens are abundant. The supporters of the strict protection, however, refuse to acknowledge these facts. If they even recognize them, the only solution they propose is even more strict protection. But what if after some time it turns

out that this 'more' is still not enough? After another 10 years, will there be a postulate of a further enlargement of the area under strict protection? Is there any upper limit to this extent? It is hard to resist an impression that, in fact, to make the strict protection effective, 100% of all land and sea areas would have to be covered rather than 10%. Since this is not possible for obvious reasons, the role of strict protection must be limited to the minimum, and the main emphasis and attention must be directed to such ways of managing ecosystems that allow to find and maintain a balance between the need to preserve sustainably all their natural values, and the possibility of using them and satisfying various needs of the human population, playing a dominant role on the globe, whether we want it or not. From this point of view, creating further protected areas does not help much. It would be far better to assume that the entire surface of the globe (land and sea) should have protected area status. Only then is there a chance that the currently large global decline in biodiversity can be put on halt to some extent, if not halted completely.

In countries such as Poland, covering 'only' 5% of the forest area with strict protection by 2030 would be a very big, but still relatively realistic, challenge. While selecting the areas to be included in this form of protection, it would be advisable to base on the existing solutions to the maximum extent (forest reserves, protection zones, ecological spots, 'old-growth islands', 'reference areas', 'unchanged areas', 'xylobionts refuges'), as well as to select areas and objects that are as little controversial as possible, both from the economic and social point of view as well as from the ecological point of view. In the latter case, such objects should be preferred where there is no danger that 'natural' succession processes will lead in a short period of time to the loss of many natural values of these objects, and where there is no danger of a mass decay of tree stands and the occurrence of various calamitous phenomena (as it happened, for example, with the spruce in the Białowieża Forest – cf. Brzeziecki *et al*., 2018c).

The role of a kind of 'guinea pig' could be played here by the national parks, which are considered as the highest form of nature protection and in case of Poland occupy an area of almost 320,000 ha. Strict protection currently covers 'only' about 25% of their area. A significant increase of this percentage (*e.g*., up to 90%) would allow to estimate more precisely the actual costs and problems connected with the introduction of this form of protection on such a large scale, as it is postulated by the EU Biodiversity Strategy for 2030 (EU, 2020), both in purely economic terms as well as from nature, landscape and social perspectives. For instance, it will be possible to find out whether parks operating in this way will actually make a sufficient contribution to the development of the economy by generating revenue to provide for their own upkeep, as envisaged for example in the Aichi targets.

It should be also noted that with the growth of the protected areas, even some of the keen supporters of separating such areas begin to notice that the protection of natural values cannot be the only function of such sites and begin to emphasize the significance of social and economic functions. In the case of forest ecosystems, this way of perceiving the goals and tasks of these areas is close, at least in the sphere of declarations, to how the problem of protection and use of forest resources is approached in contemporary forest management in Poland, Europe and many other developed countries in the world. The currently predominant model of forest management, implemented for years with great success, assumes equal importance of all the main functions of forests: protective, productive and social. The issue of sustained conservation of forest biodiversity is one of the main priorities of this model. This raises the fundamental question of whether it makes sense to continue to enlarge significantly the size of protected areas and contrast them with the unprotected areas.

At the same time, it is hard to resist the impression that all the effort that forest management has already put in, and that is constantly taking place, to improve the forest management methods as to ensure the sustainability of all the functions they perform, including those of biodiversity conservation, is largely ignored by people and institutions dealing with nature conservation, at various levels, from the local level to that of the European Commission. It is also hard to resist the impression that it is not so much about 'nature conservation' as it is about taking control over a very large area, especially forests, creating employment opportunities for a growing number of people who work and live from 'nature conservation' and forcing through a very convenient management model in which no responsibility for the effects is borne because the only goal is to protect 'natural processes'.

The real challenge of the time is not to further increase the area of protected areas and increase the area under strict protection, but to improve and implement as widely as possible in practice the methods of forest management favourable to maintaining their truly multifunctional character, at the smallest possible spatial scale, as well as to ensure the economic effectiveness of forest management and to prepare forest ecosystems for the problems which are already appearing and which are to be expected in the near future from the changing climate and other environmental factors. Meeting this challenge, however, requires proactive, well-thought-out actions and programmes rather than pushing 'do-nothing' strategies, as is the case with strict protection.

Acknowledgement

The paper has been written on the basis of the expert opinion entitled: 'Consequences of extending strict protection over large forest areas in Poland (implementation of one of the objectives of the EU Biodiversity Strategy for 2030 – to extend strict protection over 10% of land areas, including all remaining primary and old-growth forests in the EU), with particular emphasis on the threats posed by the climate change and adverse successional changes in forest communities.' The opinion was prepared under the contract No. EZ.271.2.6.2021 concluded on 10 February 2021 between the Directorate-General of the State Forests in Poland and the Institute of Forest Sciences of Warsaw University of Life Sciences. The translation of the expertise into English was conducted by LIDEX company (www.lidex.pl).

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STRESZCZENIE

Ochrona leśnej bioróżnorodności: podejście segregacyjne czy integracyjne?

Jednym z największych wyzwań współczesnego świata jest powstrzymanie lub przynajmniej zahamowanie dużego w skali globalnej tempa spadku bioróżnorodności. Aby ten cel osiągnąć, wysiłki społeczności międzynarodowej zmierzają w dwóch zasadniczych kierunkach. Pierwszy to działania o charakterze segregacyjnym (punktowym i obszarowym), polegające na wydzielaniu różnych kategorii „terenów chronionych" oraz na uznaniu, że ochrona walorów przyrodniczych stanowi nadrzędny cel zarządzania takimi terenami. Drugi kierunek obejmuje działania o charakterze integracyjnym, totalnym, obejmujące jeśli nie całość, to zdecydowaną większość danej formy użytkowania ziemi (np. powierzchni leśnej). Ich celem jest wypracowanie takich sposobów zarządzania ekosystemami, które pozwalają godzić oczekiwania i potrzeby człowieka z koniecznością trwałego zachowania różnorodnych zasobów przyrody.

Przyjęta niedawno przez Komisję Europejską Strategia Bioróżnorodności 2030 „Przywracanie przyrody do naszego życia" utrzymuje się wbrew swej nazwie w tradycji działań o charakterze separatystycznym i dąży do rozdzielenia „świata człowieka" od „świata przyrody". Stwierdzenie to dotyczy głównego postulatu zawartego w tej strategii, tj. objęcia ochroną ścisłą 10% powierzchni lądowej krajów Unii Europejskiej. Postulat ten w praktyce mógłby być zrealizowany przede wszystkim kosztem lasów, jako tej formy użytkowania ziemi, która ma najbardziej „naturalny" charakter. Innymi słowy, realizacja Strategii Bioróżnorodności 2030 oznaczałaby konieczność wyłączenia z użytkowania około $^1/_3$ całkowitej powierzchni lasów (w tym przede wszystkim lasów publicznych). Bezpośrednim skutkiem przyjęcia takiego rozwiązania byłoby ograniczenie wielkości pozyskania surowca drzewnego o co najmniej 30% w stosunku do obecnego poziomu. Nagłe i znaczące ograniczenie wielkości produkcji surowca drzewnego (w przypadku drewna okrągłego należałoby się liczyć ze spadkiem pozyskania w Europie z obecnego poziomu ok. 473 mln m^3/rok do poziomu 324 mln m^3/rok) miałoby ogromne, wręcz katastrofalne konsekwencje dla funkcjonowania całej gospodarki Unii Europejskiej. Ubocznym skutkiem wprowadzenia Strategii Bioróżnorodności 2030 byłoby także znaczące pogorszenie stanu ochrony lasów w innych częściach świata, przede wszystkim w lasach tropikalnych, w których w reakcji na ograniczenia wprowadzone w krajach europejskich doszłoby do zwiększenia i tak nadmiernego obecnie tempa eksploatacji zasobów leśnych.

Pomysł objęcia ochroną ścisłą dużych powierzchni lasów należy ocenić jako szkodliwy również z czysto przyrodniczego punktu widzenia. Ochrona ścisła często bowiem zawodzi jako metoda zachowania wysokich walorów przyrodniczych ekosystemów leśnych. Szczególnie dużo dobrze udokumentowanych przykładów z tego zakresu pochodzi z Ameryki Północnej. W przypadku takich obiektów jak Bandelier National Monument, Saint Mary's Wilderness, Big Gum Swamp Wilderness, Glacier National Park, Grand Canyon National Park, Joshua Tree National Park czy też lasy Pacific Northwest ochronę ścisłą przyjęto wielu lat temu jako podstawową metodę zachowania ich wysokich walorów przyrodniczych. Po kilkudziesięciu latach sprawowania tej formy ochrony okazało się, że interwencja ze strony człowieka jest jednak niezbędna, aby ratować te wartości i walory, z powodu których te obiekty powstały.

Podobne problemy pojawiają się także w przypadku Rezerwatu Ścisłego Białowieskiego Parku Narodowego – jednego z najważniejszych obiektów w ogólnoeuropejskim systemie ochrony przyrody. W ciągu ostatnich kilkudziesięciu lat utracił on wiele ze swych cennych walorów przyrodniczych, w tym m.in. liczne gatunki z grupy roślin naczyniowych oraz porostów. Wieloletnie i unikalne na skalę światową badania prowadzone w tym obiekcie wskazują, że z punktu widzenia zachowania jego walorów przyrodniczych jednym z podstawowych problemów jest generalny brak stabilności i zrównoważonej struktury demograficznej na poziomie głównych gatunków drzew leśnych. Zjawisko to wynika z wielu przyczyn, takich jak zmiany klimatu, zanieczyszczenia przemysłowe atmosfery (depozycja azotu), presja nadmiernie rozmnożonych dużych roślinożerców, zbyt mała intensywność i częstotliwość naturalnych reżimów zaburzeń, naturalne procesy sukcesyjne czy też inwazyjne gatunki grzybów i owadów. Od drzew, jako tzw. gatunków fundamentalnych, zależy bezpośrednio lub pośrednio byt wszystkich pozostałych grup organizmów leśnych. Ustępowanie wielu gatunków drzew leśnych w warunkach ochrony ścisłej, pozbawionych pomocy ze strony człowieka, negatywnie wpływa na stan zachowania tych elementów bioróżnorodności (owady, grzyby, porosty, ptaki), które są od nich zależne.

Na podstawie tych i wielu innych podobnych przykładów (m.in. Park Narodowy Podyje w Czechach, iliryjskie lasy dębowo-bukowe) coraz lepiej widać, że nie da się skutecznie ochronić

przyrody, zamykając ją w obrębie „terenów chronionych" (rezerwatów, parków i obszarów *wilderness*) oraz wykreślając wokół nich linię i pozostawiając je samym sobie. Trwałe zachowanie piękna jakiegoś terenu, jego dziedzictwa oraz bioróżnorodności wymaga mądrego i przemyślanego zarządzania oraz bardzo często podejmowania aktywnych działań (interwencji ze strony człowieka).

Postulat wprowadzenia ochrony ścisłej na taką skalę, jak to się obecnie proponuje w Strategii Bioróżnorodności 2030, nie bierze pod uwagę podstawowego faktu, który jest oczywisty dla coraz liczniejszej grupy badaczy: że dzisiaj, w dobie antropocenu – nowej epoki geologicznej, w której działalność człowieka stała się dominującym czynnikiem kształtującym warunki życia na Ziemi – domeny (sfery) człowieka nie można oddzielić od domeny (sfery) przyrody. Podstawową cechą antropocenu jest swoisty koniec natury rozumianej jako samodzielny i samopodtrzymujący się byt. W czasach antropocenu efektywna ochrona różnorodności biologicznej jest możliwa tylko na bazie aktywnego, integracyjnego modelu. Model taki, sugerowany m.in. przez tzw. podejście ekosystemowe opracowane w ramach Konwencji o Różnorodności Biologicznej, jest podstawą przyjętej 30 lat temu w odniesieniu do wszystkich lasów w Europie, a więc również i w naszym kraju, koncepcji trwale zrównoważonej, wielofunkcyjnej gospodarki leśnej. Aktualny bilans wdrażania tej koncepcji w krajach europejskich został ostatnio przedstawiony w raporcie opracowanym w ramach procesu Forest Europe. Bilans ten jest jednoznacznie pozytywny w odniesieniu do praktycznie wszystkich przyjętych kryteriów i wskaźników tej gospodarki, w tym także odnoszących się do walorów przyrodniczych lasów europejskich. Z raportu wynika, że w Europie w dużym stopniu udało się osiągnąć równowagę między poszczególnymi, głównymi grupami funkcji pełnionych przez lasy, w tym funkcjami produkcyjnymi i pozaprodukcyjnymi. W ostatnim czasie powierzchnia lasów w Europie stale wzrastała (o 9% w ciągu minionych 30 lat), dzięki czemu akumulują one coraz więcej dwutlenku węgla, a jednocześnie produkują w sposób trwały surowiec drzewny potrzebny gospodarce i zaspokajający różnorodne potrzeby społeczne. W ciągu ostatnich 30 lat miąższość drzew, a tym samym masa węgla zawartego w biomasie drzewnej, zwiększyła się w lasach europejskich o 50%. Zdecydowana większość lasów w Europie ma charakter półnaturalny, co sprzyja zachowaniu wysokiego poziomu różnorodności leśnej. Systematycznie rośnie stopień zróżnicowania gatunkowego lasów europejskich (dzięki realizowanym na szeroką skalę programom przebudowy drzewostanów). Rosną też wskaźniki dotyczące ilości martwego drewna w ekosystemach leśnych – jako ważnego elementu funkcjonalnego, od którego zależy trwałość występowania dużej grupy organizmów leśnych. Zasady trwale zrównoważonej, wielofunkcyjnej gospodarki leśnej, uznającej równorzędność wszystkich funkcji lasów, zapisane są w odpowiednich aktach prawnych, wytycznych, zasadach i instrukcjach wydawanych na różnych szczeblach zarządzania, co gwarantuje, że będą one konsekwentnie realizowane w praktyce.

Jest kwestią absolutnie kluczową, żeby w odniesieniu do lasów i gospodarki leśnej zachować równowagę, o której jest mowa w raporcie Forest Europe. Tymczasem proponowana obecnie Strategia Bioróżnorodności 2030, w tym przede wszystkim zawarty w niej postulat objęcia 10% powierzchni lądowej Europy ochroną ścisłą, całkowicie tę równowagę burzy. Istniejące przykłady bardziej zniechęcają, niż zachęcają do powiększania wielkości obszarów leśnych objętych ochroną ścisłą. Z tego względu ewentualne zwiększanie zakresu tej formy ochrony powinno mieć stopniowy (ewolucyjny, a nie rewolucyjny) i dobrze przemyślany charakter oraz brać pod uwagę wszystkie istniejące uwarunkowania: przyrodnicze, społeczne, ekonomiczne i gospodarcze.

Uwzględniając współczesne realia i dostępną wiedzę na temat ujemnych skutków ochrony ścisłej, główną uwagę i nacisk należałoby położyć na dalszy rozwój, doskonalenie i konsekwentne wdrażanie rozwiązań, metod i działań o charakterze integracyjnym, czyli takich, jakie w przypadku

lasów mieszczą się w koncepcji trwale zrównoważonej, wielofunkcyjnej gospodarki leśnej i półnaturalnej hodowli lasu. Oznacza to takie działania i metody, które z jednej strony zapewnią możliwość dostarczania przez lasy obecnie i w przyszłości szerokiej palety usług i użyteczności ekosystemowych, a z drugiej – pozwolą zachować w jak najlepszym stanie ich różnorodne walory dla przyszłych pokoleń.