

Searching for solutions to the conflict over Europe's oldest forest

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This article has been accepted for publication and undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the [Version of Record](#). Please cite this article as [doi: 10.1111/cobi.13229](https://doi.org/10.1111/cobi.13229).

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Article Impact Statement:

Decision making on Białowieża Forest will affect local people and biodiversity and ecosystem services of worldwide importance.

The Białowieża Forest World Heritage site is one of the last remaining primeval forests in lowland Europe and is a refuge for European Bison (*Bison bonasus*), the largest land mammal on the continent (Table 1). A decade-long conflict about how to protect and sustainably use Białowieża Forest (Schiermeier, 2016) has been exacerbated recently by a plan for a 5-fold increase in logging in Białowieża forest district (MoE, 2016) and an outbreak of spruce bark beetles (*Ips typographus*), an insect that kills weakened spruce trees. Despite protests, a controversial decision backed up by State Forests to increase logging in Białowieża was approved in March 2016 by the Polish Ministry of Environment (MoE 2016). The primary reason given for increased logging is the urgent need to address the beetle outbreak, which has affected over 30% of the trees and is thus threatening the entire ecosystem. Logging was identified by forest scientists as the best way to fight the beetle (Trębski, 2016). Executives of the State Forests organization contend foresters are not attempting to profit and that limits on logging were determined by independent experts who considered the welfare of trees and species diversity (Sowa et al. 2016). However, ecologists claim that logging is inefficient and that dead wood is indispensable to the functioning of the forest (Grodzki et al. 2006), pointing out that the largest outbreaks of the beetle occurred in

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areas where sick and dead trees were being logged. Moreover, for logging to effectively control the beetle, 80% of the infested trees would need to be removed (Fahse & Heurich 2016), which was not done in Białowieża (Bobiec et al., 2016). Activists have blocked logging on a regular basis.

We considered the dispute over Białowieża in financial, social, and political contexts. The actors involved in the conflict (Fig. 1) have different interests and perspectives, most of which are supported by science. We considered the positions of selected actors and how they represent some of the dimensions of the conflict to provide a perspective that could shed new light on the issue and foster constructive discussion in the search for long-term solutions.

Although revenue data from the regional forest industry are difficult to obtain because only 30% of the wood is publicly auctioned (data are confidential under the secrecy of sales clause), whereas 70% is sold within each regional forest with competitive prices (negotiated beforehand with regular buyers) (State Forests 2010). The value of regional sales is estimated at US\$22.5 million over 10 years (MoE 2016; Sowa et al. 2016). These forests also provide revenue from ecotourism, which for Białowieża is US\$20-25 million/year. Moreover, approximately 40% of the citizens in the region (900 of the 2150) earn income from tourism, and more than twice as many local citizens work in the tourism industry as in the forestry sector (Stokstad, 2017). In other words, tourism likely generates 10 times more benefits for the region than forestry.

Although the returns from logging in Białowieża Forest are low, the perceived value is often the opposite because of the contribution of the forestry sector to the Polish economy overall. State Forests owns 1.9 billion m³ of wood, and wood exports are valued at US\$13 billion/year (PLN45 billion) in forest-related products, which is 10% of all Polish exports. Poland is the tenth-largest producer of furniture in the world and the fourth-largest exporter.

The majority (89%) of State Forests' revenue results from wood sales, totaling US\$2 billion in 2016 (PLN7.4 billion). The misperception that logging in Białowieża Forest makes an important contribution to Poland's economy is reinforced by the strong forestry lobby. The conflict over whether to log Białowieża Forest therefore goes beyond the desire for what is best for the forest and is related to value perception. Some actors view Białowieża Forest as a plantation that needs careful management, whereas others believe natural processes should be allowed to proceed.

To understand the complexity of the conflict, one needs to consider the political arena. When the conflict began in 2015, Poland was experiencing significant political changes. Then newly appointed minister of the environment strongly supported State Forests and stated before the elections that Białowieża Forest was rotting and that 200,000 m³ of timber per year should be cleared (Augustyn 2014). Representatives of the European Commission visited Białowieża Forest in June 2016, after which the commission plead for an immediate halt to logging. Logging, however, continued. In November 2017, the European Commission sued Poland for infringement of the Habitat Directive and Bird Directive in the Court of Justice of the European Union, which imposed a fine of €100,000/day. The European Court of Justice also referred to the precautionary principle and the danger of irreparable harm from logging of old growth. The harvesters were withdrawn from Białowieża Forest. In its recent ruling, the court ordered the immediate revocation of logging permits and stated that Poland had failed to fulfil its obligations to protect the Forest (CoJ 2018). In January 2018, the minister was dismissed and the future of the Białowieża Forest remains uncertain.

The conflict over Białowieża Forest emerged at the science-policy interface and is relevant to governance of socioecological systems. For science to influence policy, 3 properties are required: credibility, relevance, and legitimacy (Sarkki et al. 2014). For

example, the frequently cited evidence of Six et al. (2014) for direct control of the beetle or indirect control via thinning to increase the tree's own defences is often refuted based on the argument that it is not relevant to local circumstances. Moreover, if the forest is considered a coupled human and natural system, then perhaps no single disciplinary approach can resolve the conflict and interdisciplinary cooperation is needed. If 1 or more actors involved have not been heard in the process, the decisions may be perceived as illegitimate, even if they are based on science (Sarkki et al. 2015). Therefore, the case also fits the information-deficit model (Cáceres et al. 2016), where the necessary science to back up decisions is not available or policy makers lack an understanding of the available science (e.g., Posner et al., 2016). Often, when science gaps occur, a power-dynamics model (Cáceres et al. 2016) exists, in which an inherently political decision is the ultimate aim and science is only one of many elements considered (e.g. Azevedo-Santos et al., 2017).

Considering both models, wherein robust, relevant, and legitimate science is adequately communicated to capable decision makers, the solution to the conflict may arise from appropriate engagement with all stakeholders (Tucker, 2010). Participatory governance has become a central element of environmental governance and represents a new layer in hybrid governance models composed of state-centered, market-based, and local-based mechanisms (Castro et al. 2016). Many conflicts related to protected areas have been resolved through a participatory, adaptive-management approach (Agrawal et al. 2000). Stakeholder analysis (or in depth social mapping) can be used in the participatory negotiations (Reed et al., 2009). This method identifies stakeholders who are affected by or can affect conflict and thus identifies points in the decision-making process where conflicting interests may need alignment and where compromises need to be made. However, 2 factors are irrefutable in the case of Białowieża: this forest is a World Heritage site (despite claims to the contrary [see Minister statement on the second day of government meeting on 21 June

2017. Available from

http://sejm.gov.pl/Sejm8.nsf/wypowiedz.xsp?posiedzenie=44&dzien=2&wyp=3&type=A&symbol=WYPOWIEDZ_POSLA&id=390) and the EU Habitat Directive and Bird Directive

has to be followed given that Poland is an EU member. Because participatory mechanisms are not flawless (e.g., Newig et al. 2017), the existence of these factors and the security they provide must be recognized. Furthermore, a potential weakness of the participatory processes is that privileged actors retain their authority to govern in a given arena while maintaining a façade of decentralization and democratization. Even with its flaws, the participatory approach has proven efficient in similar conflicts. By bringing all stakeholders to the table and analyzing the economic, social, cultural, and environmental impacts of each potential solution, an appropriate approach can be identified to address the conflict over Białowieża Forest and protect a range of ecosystem services and multilateral values in this World Heritage site.

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Table 1. Events and dates of events relative to conservation of Białowieża Forest.

Dates	Facts	Comments
XV Century	Strict protection of the area for game hunting	declared by the Royal Family of Władysław Jagiello
1931	Foundation of Białowieża National Park	one of the first national parks in Europe; one of the last fragments of Europe's primeval forest; habitat for several hundred European free-roaming bison; contains a variety of habitats, including centuries old oaks and elms; transboundary property offering exceptional opportunities for biodiversity conservation; occupies 0.6% of forest area in Poland (forests occupy one-third of the country's area; except for this park, the remaining area of Białowieża Forest is managed by the State Forests; 83% of Polish forests is managed by the State Forests (7.6 million ha of 9.2 million ha [State Forests 2016])
1979	World Cultural Heritage	park is included in the UNESCO list of heritage sites
1992	Extension of the World Heritage site	World Heritage Committee approved extension (up to 141,9 ha with buffer zone of 166,7 ha) of the UNESCO World Heritage site Belovezhskaya Pushcha/Białowieża Forest, Belarus, Poland (2014), which became transboundary

		Białowieża Forest, Belarus, Poland (1 of 3 in Europe and 7 worldwide)
2004	nominated to be part of Natura 2000	Natura 2000 network of protected areas stretches across all 28 EU countries

Figure 1. A flow chart of actions taken by groups in the conflict over the Białowieża Forest (solid lines, people arguing for no logging, natural regeneration, ecotourism, and World Heritage Site protection and believing logging is for profit; dashed lines, people arguing for active protection and nonprofit logging and believing logging benefits local population through wood sales and home heating).

