

Spruce Bark Beetle in Šumava NP: A Precedent Case of EU Wilderness Protection, the Role of NGOs and the Public in Wilderness Protection

Jaromír Bláha, and Vojtech Kotěcký

Abstract—Šumava National Park, in the Czech Republic, is, along with the adjacent Bayerischer Wald NP in Germany, one of the largest wilderness areas in Western and Central Europe. Mountain spruce forests here have been heavily influenced by natural disturbances. Following years of debate about conservation management in the national park, logging operations on the Czech side were stopped by massive public protests, including a logging blockade, in 2011. Meanwhile, the Ministry of the Environment Minister and the National Park Director proposed changes that would legalize logging in areas which were previously left to natural processes, reduce the national park's long-term goal of extending the core zones and facilitate development activities (i.e. new ski lift in a core zone of the NP). A survey among visitors of the Šumava NP was carried out in summer 2011. The results show that views of logged clearings bother tourists more than dead trees in wilderness zones. The most effective public awareness measure seems to be direct wilderness experience. The results also confirm that wilderness might significantly boost the region's economy.

Keywords: wilderness protection, national park, visitor questionnaire, public awareness campaign

Introduction

Šumava National Park, designated and administrated by the national government, was established in March 1991, in the central part of a mountain range running along the border between Germany and Austria – see Figure 1. It extends over an area of 690 square kilometres. Forests cover almost 84% of the national park, with meadows and pastures accounting for 7%. Altitude of the park stretches from 600 metres above sea level to 1,378 metres. About 1,000 square

kilometres of Šumava Protected Landscape Area serve as the national park's buffer zone and protect some natural features of the region that lie outside the park.

The national park is a mosaic of old growth forest fragments (montane spruce, mixed spruce and beech, montane beech and waterlogged spruce forests), peat-bogs and peat meadows, glacial lakes, wild rivers, forests more or less changed by humans and succession vegetation in abandoned former villages. There are only several small villages within this natural complex. The overwhelming majority of settlements ceased to exist after a forcible resettlement of the German minority after the Second World War and after part of the territory ended up behind the Iron Curtain and was thus made inaccessible by the Communist regime.

After the political changes in Central Europe and opening of the Iron Curtain, designation of the National Park in 1991 presented a unique opportunity to renovate the undisturbed natural processes in a relatively large area in Central Europe, to study interactions among diverse ecosystems and to create a vital space for rare species such as the lynx (*Lynx lynx*) and, potentially, also the wolf (*Canis lupus*) and the brown bear (*Ursus arctos*). IUCN described the national park as “part of the largest, best conserved and most species-rich forested area in Central Europe” (Fischborn 2012).

Šumava NP is home to the only viable population of the western capercaillie (*Tetrao urogallus*) in the Czech Republic. Flagship species, such as the lynx, the black grouse (*Tetrao tetrix*), the European elk (*Alces alces*) and the Ural owl (*Strix uralensis*), usually receive most of the attention, but perhaps the most unique fauna of Šumava National Park is the relic and endemic insect fauna of isolated peat bogs, stony habitats, waterlogged spruce forests and remaining fragments of montane forests (Spitzer 2001). Šumava peat bogs and waterlogged forest are a wetland of international importance under the Ramsar Convention.

The German Bayerischer Wald National Park, designated and administrated by the regional (land) government of Bavaria, was established in 1969. It originally covered an area of 130 square kilometres. Its highest areas are covered by montane spruce forests, with montane mixed (spruce and beech) forests on the slopes and mostly waterlogged spruce forests in valleys. In 1997, the Bayerischer Wald NP was extended towards the west and so today it covers an area of 242 square kilometres. The establishment of both Šumava NP and Bayerischer Wald NP provided a unique opportunity for restoring and protecting a large wilderness area in Central and Western Europe.

J. Bláha is forest and nature conservation campaigner at Hnutí DUHA (Friends of the Earth Czech Republic), Lublaňská 18, Praha, 120 00 Czech Republic. V. Kotěcký is at Charles University in Prague, Faculty of Humanities, U Kříže 8, Praha 5, 150 00 Czech Republic, and Hnutí DUHA (Friends of the Earth Czech Republic). E-mail: jaromir.blaha@hnutiduha.cz.

In: Watson, Alan; Carver, Stephen; Krenova, Zdenka; McBride, Brooke, comps. 2015. Science and stewardship to protect and sustain wilderness values: Tenth World Wilderness Congress symposium; 2013, 4-10 October; Salamanca, Spain. Proceedings RMRS-P-74. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 208 p.



Figure 1—Šumava NP (red area) and Bayerischer Wald NP (blue area)

In Bayerischer Wald, political agreements are respected and the area left to natural processes is gradually being extended and by 2027 the non-intervention zone should cover 75% of the park. The natural zone with no human intervention currently covers 56% of the park's area.

Bark Beetle and Wilderness: Lessons Learned for Scientists and Foresters

The central part of Šumava consists of an ecosystem comprising mountain spruce forests, waterlogged spruce forests, and peat bog spruce forests interspersed with raised bogs. The vegetation of the individual forest types and peat bog formations create a spatially and functionally complete mosaic in a large area. While there are substantially modified forests, spruce monocultures and semi-monocultures in the peripheral parts of the national park, recent research by Czech scientists and Friends of the Earth has shown that 50% of the national park consists of natural habitats that can be immediately included into a wilderness zone without human intervention (Bláha et al. 2013).

Montane spruce forests of this area are continuously affected by natural disturbances – the wind and the spruce bark beetle (*Ips typographus*) outbreaks (Svoboda et al. 2010; 2012). The spruce bark beetle is considered to be a keystone species of this forest type (Müller et al. 2008).

Since the very beginning of the Šumava NP decisions about its management have been bogged down in never-ending discussions about whether bark beetle infestations should be controlled or a strict 'non-intervention' policy adopted in a core zone (Křenová and Vrba 2013). The traditional forestry

approach applied in commercial forests in order to reduce the activity of the spruce bark beetle, prevent its outbreaks and slow down the montane forest disintegration stage by means of cutting down the infested trees was also applied in Šumava NP between 1995 and 2006. It led to the thinning of the forests and therefore to their lower stability or to the creation of clearings and forest stands walls.

However, subsequent windfalls substantially accelerated the forest disintegration stage. Figure 2 shows the spruce bark beetle outbreaks between 1996 and 2001 – the most extensive cutting of the infested trees happened in 1996 and 1997. Other gales, which were not so strong, caused windfalls mainly in such stands where clearing had been created as part of the fight against the spruce bark beetle – see Figures 3, 4a and 4b. This stage was finished by the Kyrill storm in 2007. In those national park forests that had not been affected by logging the storm caused mainly individual or group windfalls or breaks – see Figure 5. However, the montane forests affected by previous logging were literally swept away (Bláha 2012). An impact assessment search after the Kyrill storm suggested a significant negative influence of the removal of windfalls and bark beetle infested trees on the acidophilous and peat bog spruce forests in the core habitat of the western capercaillie (*Tetrao urogallus*) (Bejček et al. 2007). In most of these stands no other cutting has been carried out.

The results of the monitoring of natural regeneration in the non-intervention areas show that the spontaneous forest regeneration after spruce bark beetle outbreaks is fast and more than sufficient. The average density of the regeneration is 4,848 spruce and mountain ash seedlings per hectare (Čížková et al. 2011).

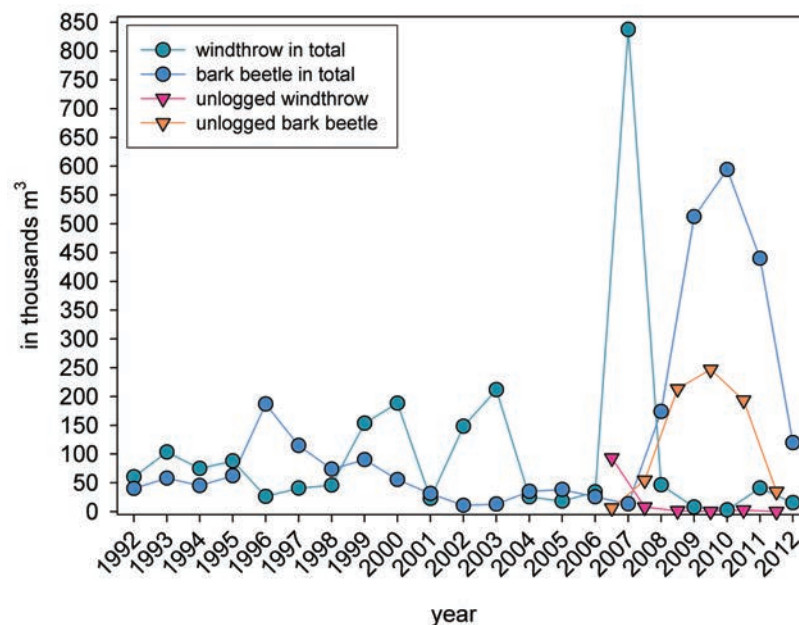


Figure 2—Windfalls and spruce bark beetle outbreaks (*Ips typographus*) are “communicating vessels”. Up to 2007, all trees attacked by bark beetle and fallen/broken by wind were logged in II. zone of Šumava NP. In 2007 some parts of forest stands destroyed by windstorm Kyrill were left without intervention. From August 2007 to 2012, increment of area covered by newly fallen or attacked trees was counted from aerial photos. This area is converted to total timber volume (m³) in individual years by multiplication with average growing stock (300 m³·ha⁻¹).



Figure 3— A new road created in 1989, i.e. before the establishment of Šumava NP, opened the stands adjacent to Trojmezná Old Growth Forest. The spruce bark beetle then began to breed on the edges of the stands. The cutting of the infested trees resulted in clearings, which were further extended by the wind. Photo: Jaromír Bláha / Friends of the Earth Czech Republic

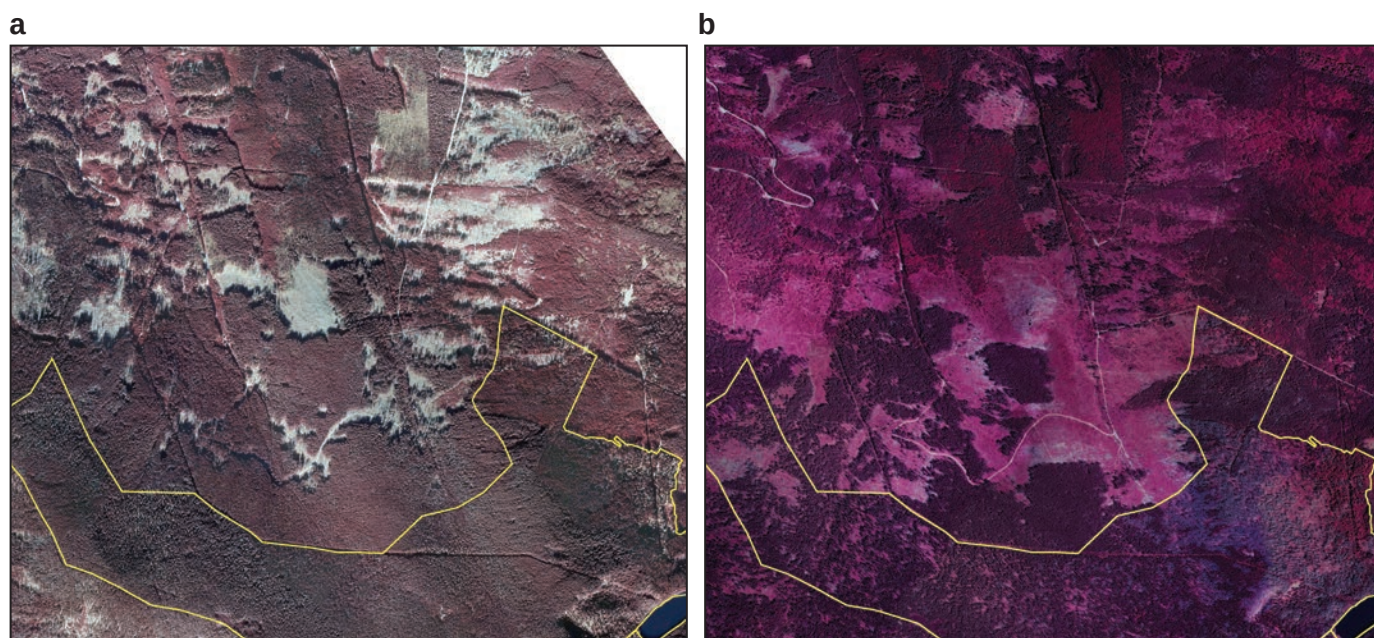


Figure 4a, b—Aerial photographs show the extension of the clearings (especially of those created by the wind) near Trojmezná Old Growth Forest (marked by the yellow line) in 1996–2006.



Figure 5—In Trojmezí Old Growth Forest, Šumava NP no action against the bark beetle was carried out and the wind affected the area only insignificantly. Photo: Jaromír Bláha/Hnutí DUHA – Friends of the Earth Czech Republic

Conflict of Interests

Friends of the Earth Czech Republic has recognised that the complicated problem with spruce bark beetle in Šumava NP is a precedent case for wilderness protection in protected areas – national parks (IUCN PA category II) and natural reserves (PA category I. by IUCN) – in the Czech Republic and Central Europe. Intervention in natural disturbances contravenes the very principle of national park core zones. Furthermore, it also damages the key habitats of endangered species, such as the capercaillie (Bejček et al. 2007).

However, wilderness protection in Šumava National Park also faces strong logging and construction pressures. In the case of the calls for logging leading to the reduction of wilderness areas a combination of factors is in play – high prices of timber, surplus of timber processing capacity, surplus of the capacity of logging work suppliers, and large reserves

of timber in the national park that can be logged instantly. Of the total area of 48,749 hectares of the government-owned forests in Šumava National Park, 17,628 hectares of forests were older than 100 years as of 2010 (Krejci 2010). If they had not been part of the national park they would have been logged immediately. Based on current average timber value in Šumava NP, value of timber in forests above 100 years is estimated at € 300 million.

There are even stronger pressures on building more boarding houses, hotels, private holiday resorts as well as residential houses. Due to the very attractive natural environment and the large number of visitors to the park (two million visitors a year: Dickie and Whiteley 2013) the prices of the land potentially available for construction are very high in Šumava National Park. That results in land speculation and pressures on development in the areas of pastures, meadows and forests. Ironically, Šumava NP belongs – along with Krkonoše NP and with the Prague suburbs – among areas with the highest number of completed homes per capita in the Czech Republic in the last decade (Ouředníček et al. [eds.] 2011).

In the southern part of Šumava NP development interests and local politicians are trying to push through the construction of a ski resort in one of the key capercaillie breeding sites and across lynx and European elk migration routes (EIA Servis 2011) – see Figure 6.

These commercial interests are in conflict with the public interest in preserving biodiversity as well as the informational value brought by the spontaneous ecosystem development, of interest of the national park's visitors, who come to admire the wilderness areas, and theoretically to some of the local inhabitants who profit from the tourist industry. A comparison of the economic effect of soft tourism with the effect of the traditional logging and forestry use of the forests in the adjacent Bayerischer Wald NP has shown that the profits

generated by the specific national park tourism – i.e. by those tourists who visit the area because of the national park – are higher than the lost profits from logging and forestry activities (Mayer and Job 2011). That is reflected in the income of local communities as well – communities within Šumava NP have at least twice as much profit as communities immediately beyond the border of the national park (Zeman 2008).

However, policy decisions in the Czech Republic are often distorted by what the country's intelligence service described as “calculated, illegitimate influencing of the legislative process” by shadowy interests with links to political parties and government bodies, with environmental protection as one of the most at risk areas (BIS 2012). Therefore, permanent wilderness protection in Šumava NP requires strong support by the public and especially by local inhabitants and by park visitors in order to be viable.

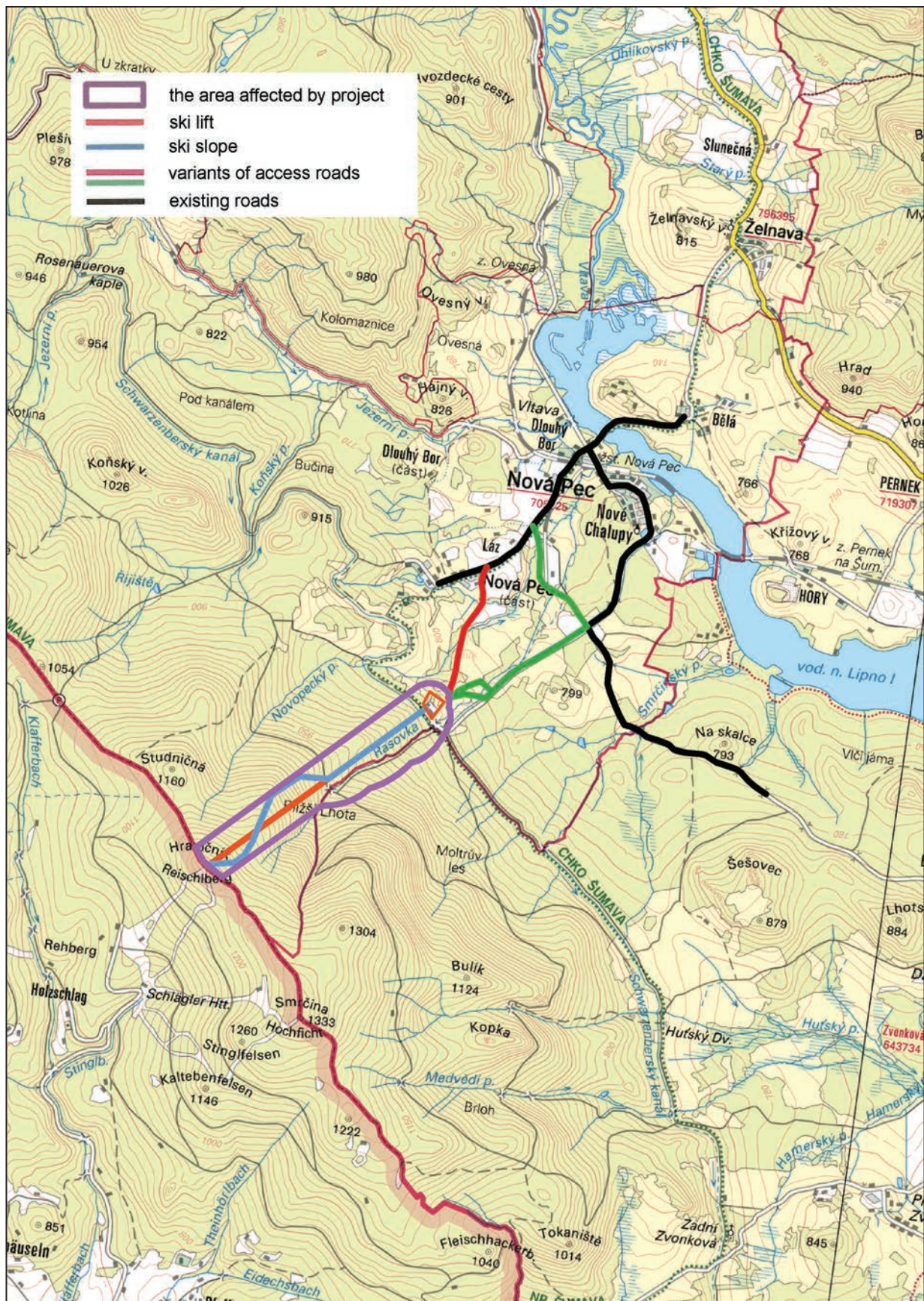


Figure 6—Project of ski resort development in southern part of Šumava NP.

Friends of the Earth's Advocacy Work to Restore Wilderness in Šumava NP

Friends of the Earth Czech Republic has advocated for wilderness protection in Šumava NP since 1994. Its work is focused on the general public as well as on selected key actors—i.e. the local inhabitants and park visitors.

A combination of strategies and means was used in the campaign to protect Šumava NP: Intensive media work including press conferences and media releases, briefings for journalists, excursions for journalists and other media events; a petition (20,000 signatures collected); a concert; celebrity involvement; demonstrations; public excursions to the wild areas of Šumava NP; summer work camps for volunteers in the field (revitalization of water regime in peat bogs); Lynx Patrols—public involvement in protection of lynx against poaching; and monitoring of logging in the national park. Along with public work, there was lobbying, expert and legal work, research reports on nature conservation and wilderness in Šumava, complaints to the Czech Environmental Inspectorate (CIZP, the national environmental law enforcement body), and the European Commission, formal involvement in logging permit procedures, and lawsuits.

And, finally, on three occasions, peaceful blockades were organised by Friends of the Earth, other environmental groups and scientists. We launched them when there was a threat of systematic destruction of the wilderness areas and of the mission of the national park as well as of permanent damage of the key habitats in the national park by logging.

In spite of the strongly positive economic impact of the national park and wilderness areas, the public awareness campaign aimed at the local inhabitants was largely

unsuccessful. The decisions of the local mayors are strongly influenced by regional politicians who strive to push through the construction of a ski resort and reduce the non-intervention areas. Local communities are divided and some key members actively undermine nature conservation in the national park. Despite that (and because the actual villages are in fact distant from some key sites in the park), national public opinion continues to oppose logging and development in the national park. Because of that, short-term work has focused more on the park visitors. Thousands of brochures, leaflets and post cards for visitors were distributed via local guest houses and hotels. Information stalls in some of the most visited spots in the park, where volunteers explained the issue and the wider concept of wilderness protection to tourists, were organised every year.

Campaign Results

The debate – and, consequently, advocacy by Friends of the Earth, other environmental groups and scientists—has gone through three key stages.

While there was de facto non-intervention management in some parts of the national park, wilderness was not a major issue when the park was established in 1991. This is why the field managers' initial reaction to a bark beetle outbreak in mid-1990s was to focus on large-scale clearcuts in the higher and central parts of Šumava NP (see Figure 7). Friends of the Earth started to file complaints with The Czech Environmental Inspection (CIZP) in 1995–1998. The explicit case for wilderness—and for natural disturbances being part of it—was, however, rather surprising for both the national park administration and the Ministry of Environment officials.



Figure 7—Large scale clearcuts at the border ridge along the border between Šumava NP and Bayerischer Wald NP after logging of bark beetle affected trees and subsequent windfalls, Šumava NP, 2000, Photo: Jaroslav Soukup.

That is, partly, why in 1999 the national park management decided to cut down the bark beetle infested spruce trees even in the fragmented remains of old growth forests and in the first zones that were, in fact, wilderness at that time. Logging would have resulted in no montane spruce forests without intervention against the bark beetle in Šumava National Park. Therefore, Friends of the Earth, along with scientists and several local people, organized a peaceful blockade, which stopped logging in Trojmezná Old Growth Forest – the largest and most valuable remainder of an old growth montane spruce forest in the Czech Republic – during that summer. The blockade caused a heated nation-wide debate about the mission of the national park. The blockade also resulted in a shift in political discussions—in 2000 the representatives of non-government environmental organizations, scientists and the Minister of the Environment sat down to one table to negotiate. The outcome of the talks was the invitation of an expert IUCN delegation to Šumava NP.

According to a 2001 poll, public opinion was split: one third opposed wilderness, if that included bark beetle outbreak, 38% supported it and the rest remained undecided (CVVM 2001).

IUCN experts invited by the Ministry of Environment visited Šumava NP in 2002. One of the key recommendations was to consolidate and enlarge the core zone with non-intervention management to 30-40% of the NP area within 3-5 years, and no clearcuts in central parts of the national park (Solar and Galland 2003).

However, the national park director of that time refused to comply with the new minister's order to respect the IUCN recommendations and continued cutting down the bark beetle infested trees even in the core zones of the park. The peaceful blockade by Friends of the Earth stopped extensive cutting in waterlogged natural forests around the Vltava River headspring—which is one of the most attractive places for tourists in Šumava National Park. NP director was removed by his superiors and felling in the core zones was restricted in 2004 by the new Šumava NP director, and so it remained

for years. This was the moment when, after an initial confusion of the late 1990s and early 2000s, Šumava started an ambitious transformation into a common European national park, an IUCN Category II protected area.

The new NP strategy for wilderness protection, proposal of new zoning and new non-interference areas were drafted in 2005. A long discussion with local municipalities about new zoning did not lead to common agreement for it to be formally approved. However, it was the basis of national park administration work for years to come.

Enlargement of bark beetle non-interference regime areas to 30% of the NP was approved by the Ministry of the Environment after the Kyrill storm (see above) in 2007. Meanwhile, public opinion has moved after the years of debate and work by Friends of the Earth and scientists. A 2008 regional opinion poll commissioned by the Ministry of Environment showed that 54% of the people in the region support natural processes of the most valuable parts of Šumava NP, even if it includes bark beetle activity (STEM 2008).

Visitors' views are even more favourable. 68% of 4,118 visitors polled in a 2009 survey of tourists in the park said that the NP is important for their decision to visit the Šumava Mts. (Friends of Earth Czech Republic, 2009), and 63% of tourists who responded in the 2010 poll said that they expect to see nature without human interference in substantial parts of the national park (Friends of Earth Czech Republic, 2010). This is crucial for nature conservation since tourism is the backbone of the local economy: approximately 2 million tourists visit Šumava NP every year. Another poll in 2011 asked what proportion of the park, if any, should constitute the core zone which will be left without human interference (Friends of Earth Czech Republic, 2011). Seventeen percent suggested less than 30% of the NP; while 45% supported 30–40% and 36% wanted to see wilderness on more than 40% of the NP – see Figure 8. The key question whether visitors like or dislike to see so many dead trees was asked in a 2010 poll. Fifty-two percent of the 3,916 visitors who responded to the poll said that they did not mind to see dead trees; 33%

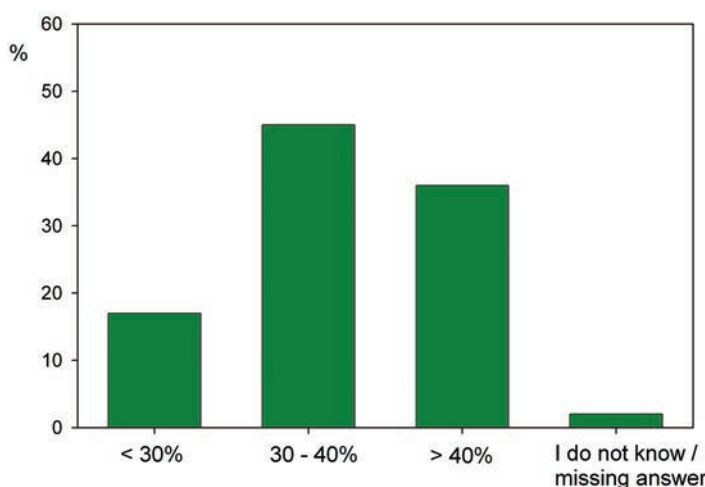


Figure 8—Result of the visitors poll 2011, answered by 2,932 respondents. Question: What part of Šumava NP should be left without human interference, with limited access to some sites (e.g. peat bogs, core breeding grounds of capercaillie), considering that the remaining parts of the NP will be managed in a close-to-nature forestry?

even said that they deliberately visited these sites in order to watch natural changes of the forest. Forty-seven percent disliked the view of the dead trees, but only 5% avoided the affected sites when hiking in the NP – see Figure 9. These results are very close to similar research in Bayerischer Wald NP (Suda and Pauli 1998). A similar question about the acceptance of clearcuts shows that 68% of NP visitors dislike the view of clearcuts (while 31% do not mind); 10% dislike them and avoid the affected sites (see Figure 10).

Šumava NP Wilderness in Danger

2010 brought a major shift in government policy. The new conservative minister of the environment replaced the national park director with a retired politician who was famous for his statement: “Nature is an enemy, and therefore it is necessary to fight it.” (Týden 2011)

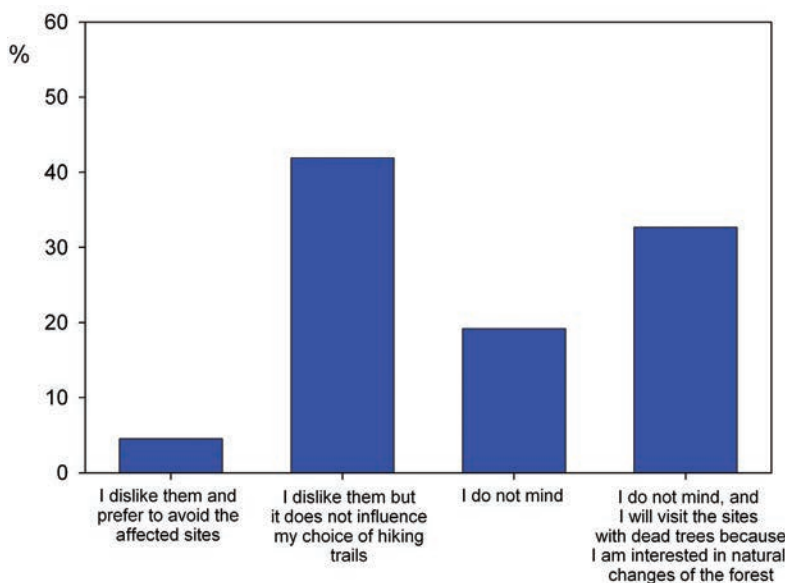


Figure 9—Result of the visitors poll 2010, answered by 3,916 respondents. Question: Do you dislike that you have to see many dead trees in non-intervention zones of the NP?

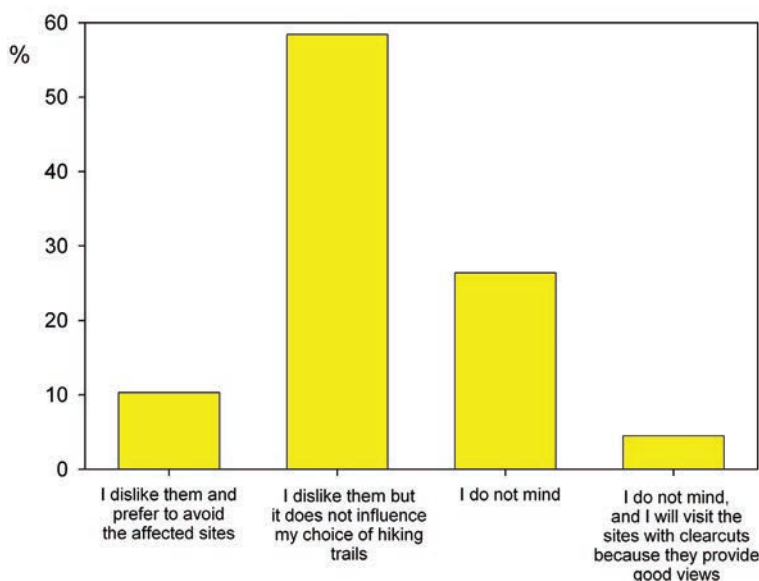


Figure 10—Result of the visitors poll 2010, answered by 3,916 respondents. Question: Do you dislike the view of clearcuts in the national park?

The first steps of the new director was to cancel the park's application for the European Council Diploma, which was prepared as a result of the previous positive management policy, and dissolving the Šumava National Park Scientific Council. The scientists created the Šumava NP Shadow Scientific Council (note the similarity with the independent Climate Change Council in Australia, created by former members of the dissolved government's CCC after an election in late 2013) and started to play a major role in the debate. The national park director also laid off a number of national park experts: zoologists, visitor managers, environmental education specialists, officials responsible for oversight of construction activity in the park, and others (Bláha, 2011).

Tree felling started in major parts of non-intervention zones and the use of pesticides continued in other parts of Šumava NP during the spring of 2011. The plan to solve the bark beetle outbreak by clearcuts and pesticides never underwent a formal Natura 2000 impact assessment, which is obligatory under the EU law.

Tree felling became massive in some of the previously non-intervention zones, and the situation culminated in an open conflict between the proponents of wilderness and the government when hundreds of active citizen, tourists and scientists attempted to block tree felling in the ancient spruce forest habitats around Bird Creek (Ptačí potok), a part of Modrava peat bog area - see Figures 11 and 12. They received support from environmental groups in the country and abroad, national human rights and anti-corruption advocates, celebrities and top scientists. However, the national park administration mobilised some people in the local communities to demonstrate against the conservationists, and special police units intervened upon the government's request – see Figure 13. The protests were intensified by demonstrations in front of the Ministry of the Environment in Prague and by national petitions – see Figure 14. The government stopped felling around Bird Creek because of this pressure, but only after it had created 32 hectares of clearcuts (out of 280 ha of Bird Creek area defended by the blockade).



Figure 11—Waterlogged and peat forest stands at Bird Creek (Ptačí potok) area. Photo: Markéta Jedličková/ Friends of the Earth Czech Republic



Figure 12—Nonviolent blockade of tree felling at Bird Creek (Ptačí potok) area, July 2011. Photo: Jindřich Prach



Figure 13—Special Police units intervened against conservationists, Šumava NP, Bird Creek (Ptačí potok) area, August 2011, Photo: Iva Zímová, <http://www.blurb.com/b/2510563-priroda-si-pomuze-sama>



Figure 14—Demonstration in front of The Ministry of Environment against tree cutting in non-intervention regime areas in Šumava NP, August 2011, Photo: Jan Losenický .

Several weeks later a regional court decided that police actions against the people who had blocked tree felling were illegal, that police had breached the protestors' constitutional freedoms and that they were obliged to deal with the protestors' complaints that the logging itself was illegal before intervening in favour of one side. This, along with the national ombudsman's ruling that tree felling in Natura 2000 sites without an impact assessment was illegal and with the CIŽP's decision to fine the park administration for breaches of law, was a major breakthrough in the debate – but not in government policy.

The Šumava debate came to a (yet unfinished) resolution in early 2013. After years of controversies, the government and some local Members of Parliament decided to deal with the dilemma by means of special new legislation, which was introduced to the parliament.

The proposed law would open some of the key wildlife sites to logging, enable development projects including a ski resort in the middle of key capercaillie and lynx habitat (see above) and implies that development projects will not have to respect national park conservation anymore.

Furthermore, the government proposed a new management plan which suggests downgrading the protection status of Šumava NP from IUCN category II to IUCN category IV while keeping the 'national park' label, because it is well aware of its marketing and political advantages.

The proposal raised another wave of widespread public opposition. Thousands of people wrote to the Members of Parliament: it is estimated that each Member of Parliament received more than 500 original, personal letters or emails calling for the protection of the Šumava wilderness. The parliamentary debate was interrupted by the (unrelated)

collapse of the governing coalition and an early election scheduled for late October 2013. However, it is clear that the legislative battle will reopen shortly after the election. Since most political parties, both left- and right-wing, are divided over the Šumava issue, a lively parliamentary debate and narrow margin votes are expected.

Discussion

The most effective feature of the public awareness campaign seems to be direct wilderness experience during public excursions. They can permanently influence the participants' opinions, very often to such a degree that they later become personally involved in wilderness protection. Negative emotions caused by a large number of dead trees are experienced by some of the public excursion participants when they look at them from a distance. However, their views change soon after they enter the forest with dead trees where a large variety of life, structures and shapes is obvious and their feelings become positive. The same has been shown by visitor polls in the adjacent Bayerischer Wald NP (Suda and Pauli 1998). However, public excursions have a limited impact due to the low number of participants although they share their personal experience with others.

The blockades were of significant influence – they were milestones in the debate about wilderness protection in Šumava NP. We believe that peaceful blockades were a distinctive feature of the campaign, justifiable in exceptional cases when other actions have failed and when there is a threat of permanent damage to natural values. The blockades accelerated debate, made all the parties including politicians take a stand, and caused politicians to return to discussions with experts and with the public.

The current threat to the national park has met a strong reaction from the international community – which perceives the danger that deterioration of wilderness status of Šumava NP may lead to similar developments in other protected areas across Europe and the EU in particular. Seventy-two heads of conservation bodies – national park directors, executives of WWF, Birdlife, European Environmental Bureau and others – sent a strongly worded letter to the Czech minister of the environment, expressing concern about the government's proposals: "Above all, there is a clear signal that even the best known National Parks are not protected."

The issue is of significance not only for the future of nature protection in the Czech Republic, but also beyond – not least in relation to the review of EU nature conservation legislation which is expected to take place in the next couple of years.

Re-designating the park, which is also one of the key Natura 2000 sites in Central Europe, would be extremely dangerous as a major precedent because of the domino effect. A blatant breaching of Natura 2000 rules in a site of crucial importance, one which has been under protection of both national and EU legislation, would set a dangerous example for other governments.

It will be very important what stand on the case the European Union will take. Janez Potocnik, the EU Commissioner for the Environment, sent a letter to the Czech minister of the environment in 2012, asking him to "put a halt to the large scale logging in the Šumava NP". European Commission officials visited the park afterwards. However

we do not know what will be the result and final position of the European Commission, yet. The outcome of this process will also answer the question to what extent can Natura 2000 ensure wilderness protection in Europe. The cases of threats to the remainders of wilderness in Europe, such as Białowieża Forest, Šumava, and others show that a special EU wilderness directive (a piece of EU legislation) may be needed.

Acknowledgments

We are heavily indebted to Jan Hokeš for assistance with translation, Jeňýk Hoffmeister, who helped with editing and preparation of figures, and Tomáš Svoboda for GIS research.

References

- Bejček V., Chvojková E., Lysák F., Volf O., 2007. Řešení následků orkánu Kyrill v NP Šumava. Expertní posouzení vlivů záměru na Evropsky významnou lokalitu a Ptačí oblast Šumava. Manuscript, 36 p. [in Czech].
- BIS, 2012. Annual report of the Security Information Service for 2012, www.bis.cz/n/ar2012en.pdf.
- Bláha J., 2012. Ekosystémy horských lesů a problematika jejich ochrany, In: Machar I. and Drobilová L. (eds.): Ochrana přírody v České republice. Vybrané aktuální problémy a možnosti jejich řešení, Universita Palackého v Olomouci, 308-336 [in Czech].
- Bláha J., 2011. Čistka na Šumavě: test, kdo a kam řídí národní park, <http://denikreferendum.cz/clanek/11702-cistka-na-sumave-test-kdo-a-kam-ridi-narodni-park> [in Czech].
- Bláha J., Romportl D., Křenová Z., 2013. Can Natura 2000 mapping be used at to zone the Šumava National Park? European Journal of Environmental Sciences 3, 57-64.
- Čížková P., Svoboda M., Křenová Z., 2011. Natural regeneration of acidophilous spruce mountain forests in non-intervention management areas of the Šumava National Park – the first results of the Biomonitoring project, Silva Gabreta 17, 19-35.
- CVVM, 2001. Názozy veřejnosti na některé otázky Národního parku Šumava. Centrum pro výzkum veřejného mínění, Sociologický ústav AV ČR, 2 p. [in Czech].
- Dickie I., Whiteley, G., 2013. An outline of economic impacts of management options for Šumava National Park, EFTEC, London, 52 p.
- EIA Servis, 2011. Regulační plán propojení Klápa – Hraničník, EIA Servis, České Budějovice, 179 p. [in Czech].
- Fischborn M., 2012. Šumava National Park – to beetle or not to beetle? IUCN Global Protected Areas Programme, <https://portals.iucn.org/blog/2012/08/09/sumava-national-park-to-beetle-or-not-to-beetle/>.
- Friends of Earth Czech Republic, 2009. Výsledky ankety mezi návštěvníky NP Šumava. www.hnutiduha.cz/publikace/vysledky-turisticke-ankety-na-sumave-2009 [in Czech].
- Friends of Earth Czech Republic, 2010. Výsledky ankety mezi návštěvníky NP Šumava. www.hnutiduha.cz/publikace/vysledky-ankety-mezí-navstevniky-narodniho-parku-sumava-2010 [in Czech].
- Friends of Earth Czech Republic, 2011. Výsledky ankety mezi návštěvníky NP Šumava. www.hnutiduha.cz/publikace/vysledky-ankety-mezí-navstevniky-narodniho-parku-sumava-2011 [in Czech].
- Krejčí F., 2010. Biodiverzita / kalamita, Šumava 2/2010, 4-7 [in Czech].
- Křenová Z., Vrba J., 2013. Just how many obstacles are there to creating a national park? A case study from the Šumava National Park, European Journal of Environmental Sciences 4, 30-36.
- Mayer M., Job H., 2011. Opportunity costs of nature based tourism in the Bavarian Forest National Park in relation to the forestry and wood processing sector, Natur Und Landschaft 86, 553-554.
- Müller J., Bußler H., Goßner M., Rettelbach T., Duelli P., 2008. The European spruce bark beetle *Ips typographus* in a national park: from pest to key-stone species. Biodiversity and Conservation 17, 2979-3001.
- Ouředníček, M., Temelová, J., Pospíšilová, L. (eds.), 2011. Atlas sociálně prostorové diferenciacie České republiky. Karolinum, Praha; ČSÚ 1997 – 2006 [in Czech].

- Šolar M., Galland P., 2003. Šumava National Park (Czech Republic), Report of the IUCN / WCPA Mission 22-25 September 2002, 25 p.
- Spitzer K., 2001. Reliktní a endemitní entomofauna jako priorita v ochraně přírody, Sborník z konference Aktuality Šumavského výzkumu v Srní 2.-4. dubna 2001, Správa NP a CHKO Šumava 2001, 172 p [in Czech].
- STEM, 2008. Národní park Šumava. STEM – Středisko empirických výzkumů for Ministry of Environment, Praha, 24 p. [in Czech].
- Suda M., Pauli B., 1998. „Wir kommen wieder“ – Tote Bäume schrecken Gäste im Nationalpark nicht ab, Nationalpark 98 (2), 40-43 [in German].
- Svoboda M., Fraver S., Janda P., Bače R., Znenáhlíková J., 2010. Natural development and regeneration of a Central European montane spruce forest. *Forest Ecology and Management* 260, 707-714.
- Svoboda M., Janda P., Nagel T. A., Fraver S., Rejzek J., Bače R., 2012. Disturbance history of an old growth sub-alpine *Picea abies* stand in the Bohemian Forest, Czech Republic, *Journal of Vegetation Science* 23, 86-97.
- Týden, 2011. Kůrovec? Problém nejvyšší na rok, Týden weekly, 25 July 2011 [in Czech].
- Zeman R., 2008. Výhody a omezení obcí ležících ve správním území Národního parku Šumava z hlediska zdrojů obecních příjmů. Bc. Thesis, Vysoká škola evropských a regionálních studií, o. p. s., České Budějovice, 55 p. [in Czech].