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Another forest fire in Treuenbrietzen - initial assessments from science

Prof. Dr Pierre L. Ibisch
Centre for Economics and Ecosystem Management
Department of Forest and Environment
Alfred-Möller-Str. 1
16225 Eberswalde

Professor for Nature Conservation
Professor for Nature Conservation

Forschungsprofessur / *Research professorship*
Ecosystem-based sustainable development
Ecosystem-based sustainable development

e-mail pibisch@hnee.de
www.centreforeconomics.org

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On Friday, 17 June 2022, a fire broke out on the area of the former Treuenbrietzen forest near Frohnsdorf¹, which was temporarily brought under control by the fire brigade, but ultimately spread considerably². The area affected is the one from which a major fire had already started on 23 August 2018.

Research projects in Treuenbrietzen

The 2018 fire was the starting point for two research projects. First, the Centre for Economics and Ecosystem Management, Eberswalde University of Applied Sciences, started with a small budget and in cooperation with the city of Treuenbrietzen to investigate the development of the areas after the fire on a part of the city forest (CleverForst project). This initiative and the cooperation with the University of Potsdam resulted in a large research consortium comprising eight institutions. In addition to various areas in Treuenbrietzen, the research areas also include areas on the site of the former military training area near Jüterbog.

¹ This is to communicate initial assessments while the fire is not yet out and continues to spread. Our sympathy goes out to all those affected and to the people fighting the fire under the most difficult conditions.

² A project employee discovered smoke development during her research work on site and immediately reported the fire to the fire brigade.

The Pyrophob project (www.pyrophob.de) has been financed by the German Federal Ministry for the Environment and the Federal Ministry of Agriculture since 2020 with funds from the Forest Climate Fund and is currently the largest forest fire research project in Germany. It has already attracted international attention. In spring, for example, forest fire specialists from all over the world visited the project areas in Treuenbrietzen as part of a research conference organised by AWI and GfZ in Potsdam.

The project investigates the effects of different measures on the regeneration of the ecosystem and the effectiveness of forestry measures. This includes leaving dead trees on the calamity area as well as clearing the area or planting different tree species. In the two years of research, numerous valuable scientific findings have already been obtained. However, the recent fire destroyed part of the research design and also many measuring instruments.

The recent fire is bitter not only from a social but also from a scientific point of view, as the areas had already shown an extremely interesting ecological development. A dense growth of pioneer tree species, especially quaking aspen, had set in, and the soil was already covered again by a layer of moss and herbaceous plants. The first advantages of the microclimatic buffering of the new structures on the site became apparent. Under deadwood on the ground, the effect of a decreasing drying potential was already evident. Less flammable deciduous trees began to develop. Thus, in principle, the development of a later less flammable forest was initiated. However, it was clear that a fire risk would continue to exist for several years, although it would not exceed that of unburnt pine forests. The Pyrophob project has installed weather stations in the project area and operates a dense network of additional devices that provide information on temperatures and humidity, for example. In this way, the extreme conditions that prevail on the calamity plots have been documented in recent years.

Ammunition and causes of fires

During the preliminary work for the Pyrophob project, it also became clear that there was a risk from the munitions hidden on the sites. Therefore, the project included the use of considerable funds for explosive ammunition detection and also clearance (about 170,300 € were invested for the areas in Treuenbrietzen alone). In Treuenbrietzen, about 1,566 kg of ordnance (including grenades and fuses - 451 pieces in total) and about 3,720 kg of ammunition metal scrap were recovered on about 13.3 ha³.

Unfortunately, it turned out that the explosive ammunition load on the particularly critical areas (especially the southern area of CleverForst) was so high that quantitative clearance alone was not financially feasible. The safety risks were also considered to be so great that the areas should not be walked on or used for forestry. They were therefore excluded from direct research. These are precisely the areas where the fires broke out in 2018 and again now.

The new fire broke out after a pronounced dry season, but before the days with the highest temperatures. It is questionable whether conditions for spontaneous combustion of ammunition were already present. In the following days, after the fire broke out, the hot temperatures and increasing winds with sometimes strong gusts contributed to the spread of

³ A few hours after the outbreak of the fire and before it spread beyond the areas heavily contaminated with explosive ordnance, the project coordinator, Dr. Jeanette Blumröder, provided information on the explosive ordnance situation to the responsible command on site. This also provided essential information on the trafficability of the area in areas that had been cleared or were considered safe.

the fire. At the same time as the fire on the project areas, other fires occurred in the immediate vicinity (e.g. Lüdendorf; Altes Lager) or also in other parts of Brandenburg independently of each other, also in still living pine forests. Unfortunately, there is a possibility that (negligent) arson is one of the causes.

In any case, it must be emphasised that ammunition loads pose a considerable danger not only in connection with the cause of the fire but also in firefighting. For the prevention of large forest fires and for safe firefighting, a significantly larger area may have to be demunitioned despite high costs, also so that in the event of a forest fire incident, appropriate access routes are available for the fire brigade.

Climate change, land and forest use

In the context of reporting on forest fires, there is a strong focus on climate change. In fact, it must be considered indisputable that the climate crisis substantially increases the risks of forests drying out, dying and burning. This is especially true in phases of coupling of several extreme events such as droughts and heat waves as well as storms. However, it should not be ignored that land use itself contributes significantly to the drying out and heating up of the landscape. Apart from water bodies, only intact forests - especially deciduous forests - can promote the cooling and buffering of the landscape climate. The drainage of the landscape through drainage ditches and locally increased runoff as well as the overuse of water resources - for irrigation and industrial production - must be reduced.

Forestry use also has a central influence on temperatures in forests. The greatest risk, however, comes from conifer plantations such as Brandenburg's pine forests, which still dominate over 70% of the area.

Without pine monocultures, there would be no comparable forest fire risk in Brandenburg.

Contrary to frequently expressed assumptions, mixed deciduous forests can grow in almost all parts of the state. It is not true that only pine can thrive in southern Brandenburg, as numerous examples of existing mixed deciduous forests show.

Pine forests are highly combustible and low-barrier systems in which fires - once started - spread very easily and quickly. The trees and the needles that fall to the ground are resinous, the soil under pines changes unfavourably and allows easily combustible species such as grasses to spread strongly while at the same time the ability to retain water is very low.

Necessities and possibilities of prevention

1. The forest fire risk in Brandenburg can only be controlled through ambitious initiatives to promote forest development. To this end, the dominance of conifer plantations must be combated very quickly.
2. The new planting of coniferous stands must be prohibited by law. This must also apply to non-native species such as Douglas fir or Japanese larch.
3. More intensive hunting has locally contributed to the accelerated development of deciduous trees. It is unclear whether changing hunting strategies alone is a suitable

means of reducing forest fire risk in the short term. More intensive hunting should primarily be effective in the pine monocultures that are at high risk.

4. Forests need more structures that cool the microclimate and the soil and improve water retention. This also includes strong deadwood on the ground that decomposes and forms humus. Deadwood does not automatically mean a growing fire hazard. Rather, it represents a significant opportunity for future soil development. Even after the recent fire, we strongly advocate refraining from clearing areas of biomass. If necessary, work with fire-retardant aisles on extensive calamity areas, which are to be cleared and cultivated for a few years as permanent grassland with sowing of less flammable herbaceous plants (e.g. legumes).
5. Extensive bare areas after forest fires or other calamities increase the drying out and heating of the landscape and thus also endanger agriculture and forestry. This also applies to all open spaces within forests. The fragmentation and encumbrance of forests with infrastructure increases their temperature and the risk of forest fires to a considerable extent. This also applies to wind turbines and their access routes in the forest.
6. It is better not to leave deadwood on areas that have been proven to be heavily contaminated with munitions. Significantly more funds must be made available for locating and clearing explosive ammunition in Brandenburg's forests so that possible causes of fires are reduced.
7. The fire brigades need to be even better educated or trained, taking into account technical-scientific knowledge on forest fires - including international experience with forest fires. In addition, more specialised personnel are needed in the field of forest fire fighting. In areas with a demonstrably increased fire risk, risk management plans should be developed that incorporate local and forest knowledge from the outset. Possible applied research on the (reduction of the) flammability of forests (there are first insights on this in the context of the implementation of Pyrophob) could be used in a targeted manner to further train firefighters or to provide them with real learning experiences under controlled conditions in cooperation with science.
8. A proactive risk assessment should also be carried out as soon as possible for all settlements near or in the forest to prevent future disasters. There are some settlements in Brandenburg that are exposed to a risk comparable to that of regions with a Mediterranean climate. There have also been recent developments of settlements that have even been built within existing pine forests (e.g. Borkwalde near Beelitz). There is great potential for danger here.
9. The climate crisis must be fought with much more commitment - also in Brandenburg. To do this, the priority must be to phase out the burning of fossil fuels. Renewable energies, however, must not contribute to the increased strain on ecosystems, as only these are able to buffer heat, floods, drought and water shortages.

Prof. Dr Pierre Ibisch, Dr Jeanette Blumröder, Anja Binder

Project management Pyrophob and
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Centre for Economics and Ecosystem Management
Eberswalde University for Sustainable Development

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