



Long-term ecological approach to the disturbance management of the forests of N Poland

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Climate projection presents we will note an increase of floods, wildfires, heatwaves, and droughts are the result of overlapping interacting physical processes across multiple spatial and temporal scales. Next to natural causes of fires – lightning, availability of flammable fuel, dry conditions to allow fire spread – human activity is highly important. Unfortunately, palaeoecological and historical data regarding past vegetation and hydrological changes or fire activity that could be helpful in management are often neglected when preparing management and nature conservation plans. Here, we present how palaeoecological data can be used in forest management planning. Historical fire regimes, plant flammability, fuel load and data regarding land cover changes and anthropogenic influence should be considered in forest management and when designing more effective fire suppression strategies in the future.

Our study region – the Tuchola Pinewoods – is located in northern Poland where since ca. 1700 CE, due to political conflicts and administrative changes, the management of the forest has changed substantially. Those management changes led to a transformation in forest composition from mixed broadleaf-dominated forest to a Scots pine (*Pinus sylvestris* L.) monoculture. Based on palaeoecological investigations, historical documents and cartographic materials, we show that in the past 300 years, the Tuchola Pinewoods witnessed not only disastrous fires, but also windfalls by tornados and insect outbreaks.

We will provide a critical review of past forest management and future research directions related to the impacts of fire risk land management and ecosystem services: (a) habitat composition and structure (biodiversity), (b) natural water management, and (c) mitigation of climate changes. The long-term understanding of past forest management and disturbance will help to better adapt to future projections of increased disturbance in a warmer world.

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