Landscape fires in Polesia: patterns, drivers, solutions

The first study of its kind for one of Europe's largest natural landscapes

Data source and tools:

global FRY database, cloud-based software

Number of fires analyzed:

5.338

Study period:

2001 - 2019

Study area:

155.880 km2

Location:

Polesia
in Belarus and Ukraine

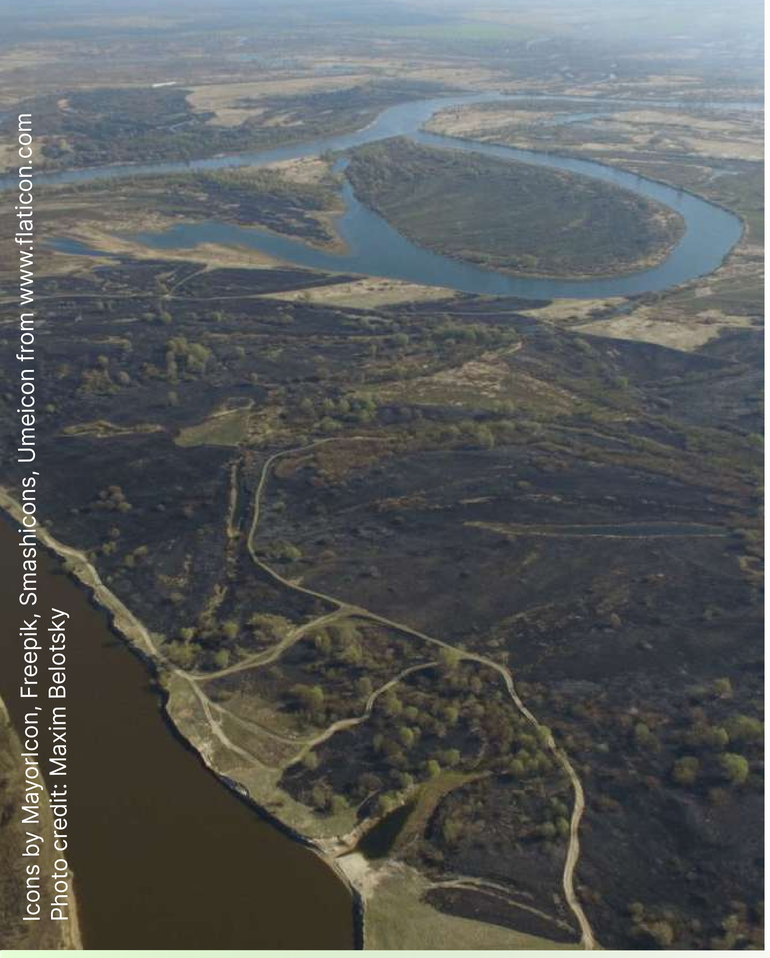

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Photo credit: Maxim Belotsky

Kirkland et al. (2023). Landscape fires disproportionally affect high conservation value temperate peatlands, meadows, and deciduous forests, but only under low moisture conditions. Science of the Total Environment, 884, 16384

Context

Alongside other temperate regions, Polesia is predicted to be at greatest risk of increasing fire activity due to climate change. But the problem is quite acute already today: large-scale peatland drainage and deforestation have made the area more prone to deteriorative fires. They threaten the economy, valuable ecosystems and outstanding biodiversity of Polesia, lead to an increase in greenhouse gas emissions, and cause severe air pollution and radiation spreading from the Chernobyl Exclusion Zone.

The essence of the study

For the first time, researchers determined the patterns, environmental and human drivers of fires in ecosystems of Polesia. The study quantifies how areas of conservation priority (peatlands, floodplain meadows, and deciduous forests) are exposed to and interact with fire. To get acquainted with the study, follow the link: https://doi.org/10.1016/j.scitotenv.2023.163849.

Outcomes

- **Mapping of seasonal distribution of large fires;**
- **Identification of land cover types that are more prone to fires;**
- **Discovery of the drivers of fire size and occurrence;**
- **Exploration of the occurrence and spatial patterns of fires within protected areas.**

Findings

Under low moisture conditions, fires disproportionally affect Polesia's protected, internationally important peatlands and floodplain meadows, and the most extreme fires threaten primeval deciduous forests.

The majority of fires started in agricultural areas and spread into adjoining natural and semi-natural habitats.

Large fires are driven by fuel load, fuel type, weather, distance to roads and moisture conditions.

Low soil and fine fuel moisture conditions were important drivers increasing the risk of burning in vulnerable habitats.

Conclusions

Restoring and maintaining natural hydrological regimes could be an effective solution to increase the resilience of fire-vulnerable ecosystems and support global biodiversity and carbon storage commitments.

The authors of the study elaborated a reproducible methodology that can be applied to other understudied regions positively impacting landscape restoration and effectiveness of fire protection measures. The code used to conduct the analysis is available online and a link is provided in the article.

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