The threat of landscape fires to human health and well-being, the environment, and the economy is attracting increasing public attention worldwide. Large and devastating fires in North America and the Mediterranean have been widely reported on in the media. This is coupled with our growing concern about the warming climate, and its interaction with fire.

There are important and nuanced links between landscape fires and ecological restoration. Fire plays an important ecological role in many landscapes, providing natural disturbance and promoting regeneration of plants. However, fire regimes around the world have been altered by people and the frequency and intensity of fire regimes have changed, which can have detrimental effects on the ecology of a landscape and for people.

A key focus of restoration projects may be to restore a more natural fire regime to their landscape. Data on the patterns of landscape fires, where and why they occur, and how they are changing, are therefore necessary to carry out evidence-based restoration. This project has developed a framework and methodology that can be used by any restoration project anywhere in the world, to investigate these patterns in any particular landscape.

Here, you will find links to the methodology and code for the analysis of patterns and drivers of landscape fires in any region using freely available satellite data and processing software:

→ [https://github.com/btomairekirkland/landscape-fire-analysis](https://github.com/btomairekirkland/landscape-fire-analysis)

A case study of the work is published here:


A summary of a case study of how this methodology can be used is presented below.
Landscape fires in Polesia: patterns, drivers, solutions
The first study of its kind for one of Europe’s largest natural landscapes

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.