FIRE-RES

Resilient (forest) landscapes, through integrated management

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“ВЪЗСТАНОВЯВАНЕ НА ГОРСКИ МЕСТООБИТАНИЯ

LIFE REFOREST

Content

1. Crises affecting rural areas
2. Resilient landscapes
3. Horizon 2020 - Fire-Res project
4. Integrate landscape management – lessons learned in BG LL
5. Towards education
6. Sources

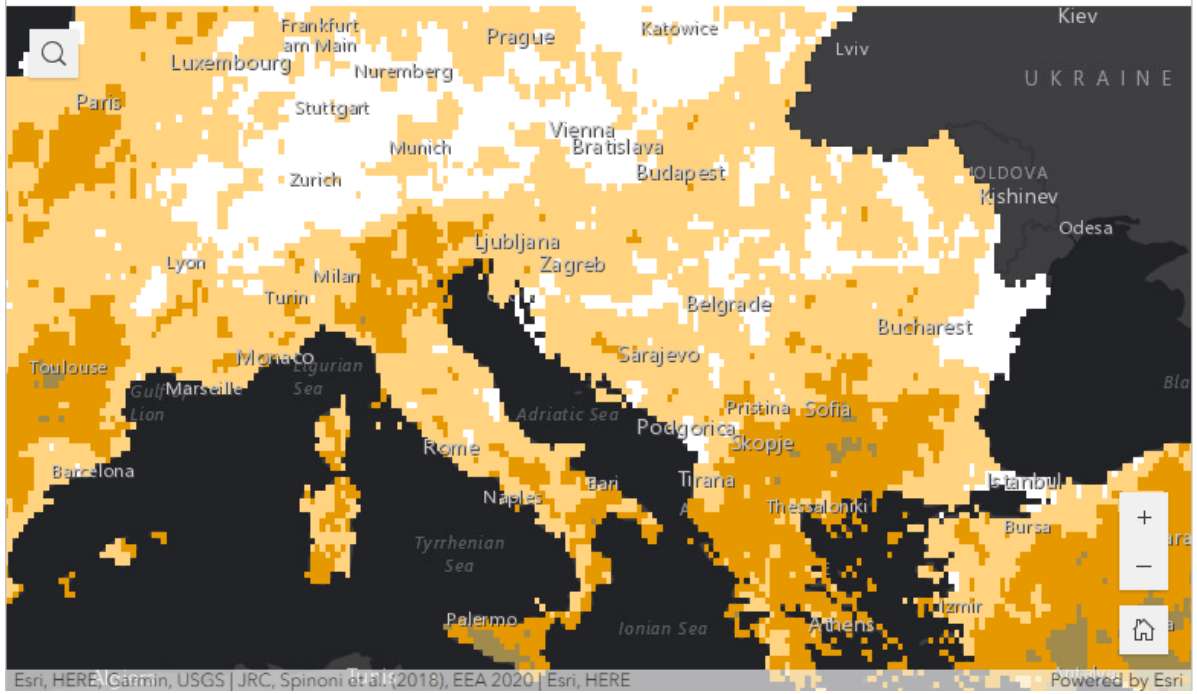
Current crises affecting rural areas and forests

1. Climate Change

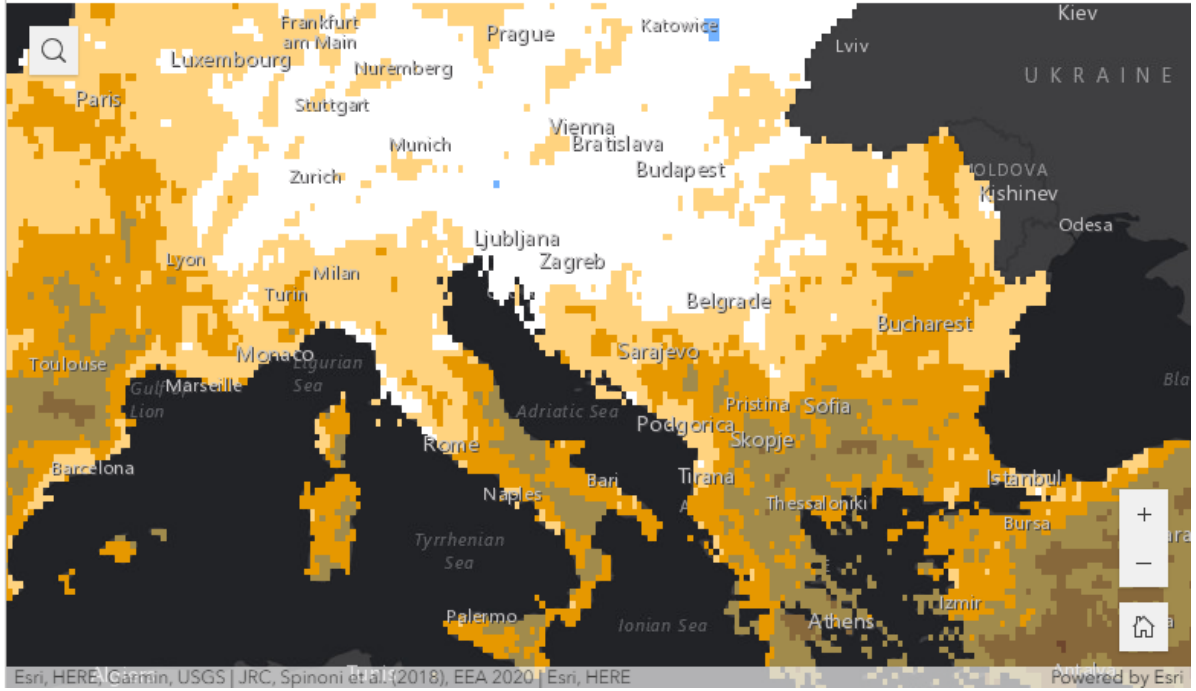
2. Decreasing Biodiversity

CLIMATE CHANGE- Droughts

Projected change in meteorological droughts for a medium emissions scenario (period 2041-2070, compared with 1981-2010)



Projected change in meteorological droughts for a high emissions scenario (period 2041-2070, compared with 1981-2010)

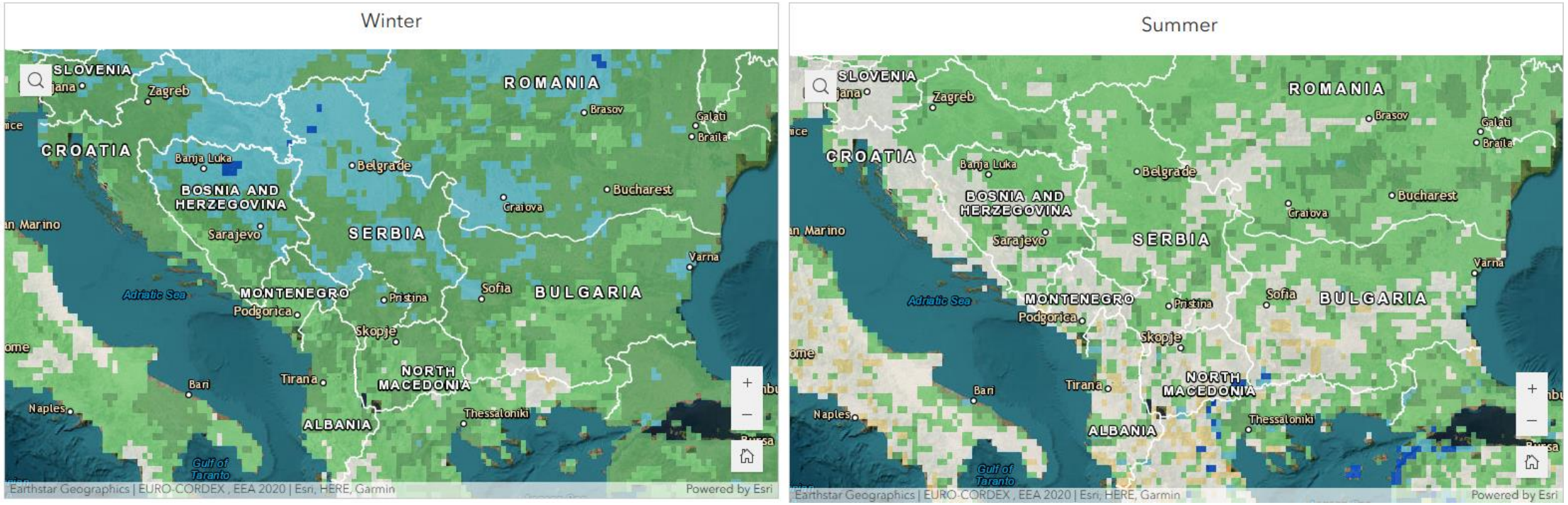


Projected changes in the frequency of meteorological droughts for two emissions scenarios

(a drought event is defined when the Standardized Precipitation Index (SPI-3) is below -1)

- -1.5 to -1
- -1 to -0.5
- -0.5 to 0.5
- 0.5 to 1
- 1 to 1.5
- 1.5 to 2
- 2 to 2.5
- > 2.5

CLIMATE CHANGE- Heavy rain and flash floods



Projected changes in the magnitude of heavy rain in winter and summer in the period 2071-2100, compared with 1971-2000 for a high emissions scenario (%) Heavy rain is defined as 95th percentile intensity of total rain events

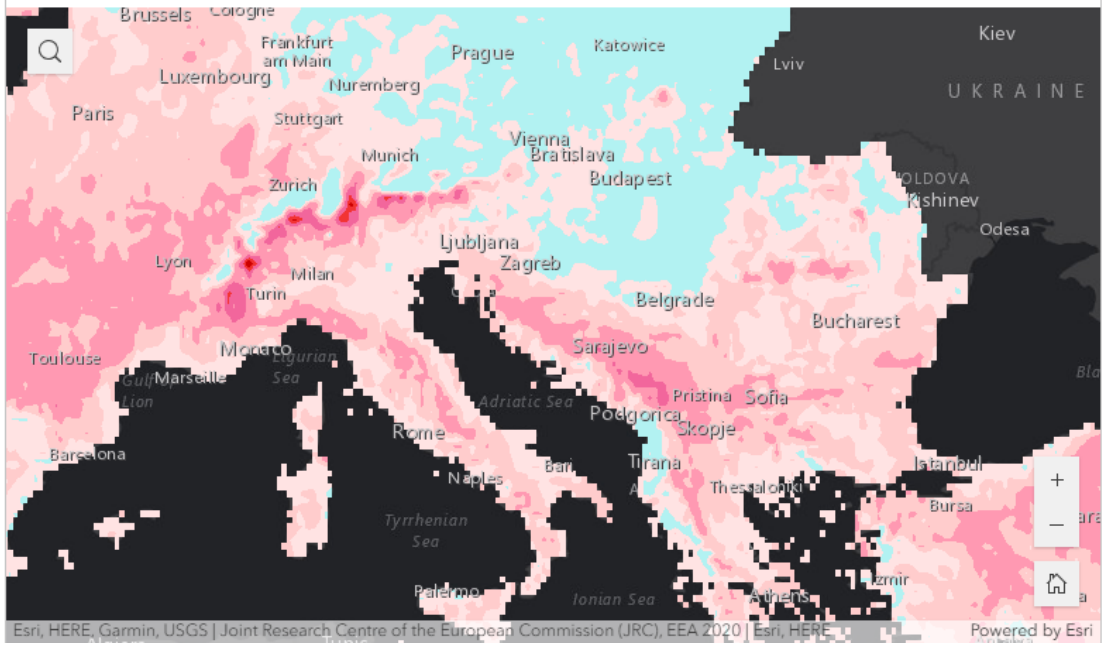
< -25 | -25 to -15 | -15 to -5 | -5 to 5 | 5 to 15 | 15 to 25 | 25 to 35 | > 35

CLIMATE CHANGE- Forest fires

Projected change in meteorological forest fire danger for a low emissions scenario

The map shows an increase in fire danger in most European regions, with the exception of parts of northeastern and northern Europe, for a low emissions scenario.

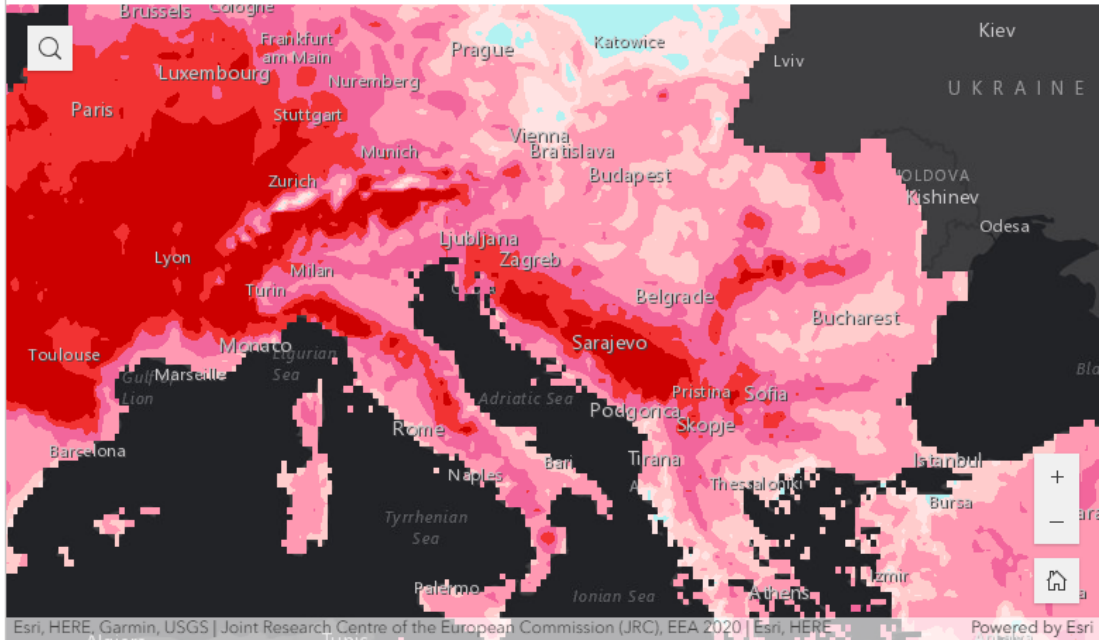
The projected increase in weather-driven fire danger in southern Europe is about 30-40 %. Decreases in weather-driven fire danger are projected in central and northern Europe (except for the far north).



Projected change in meteorological forest fire danger for a high emissions scenario

The map shows increases in fire danger in most European regions for a high emissions scenario.

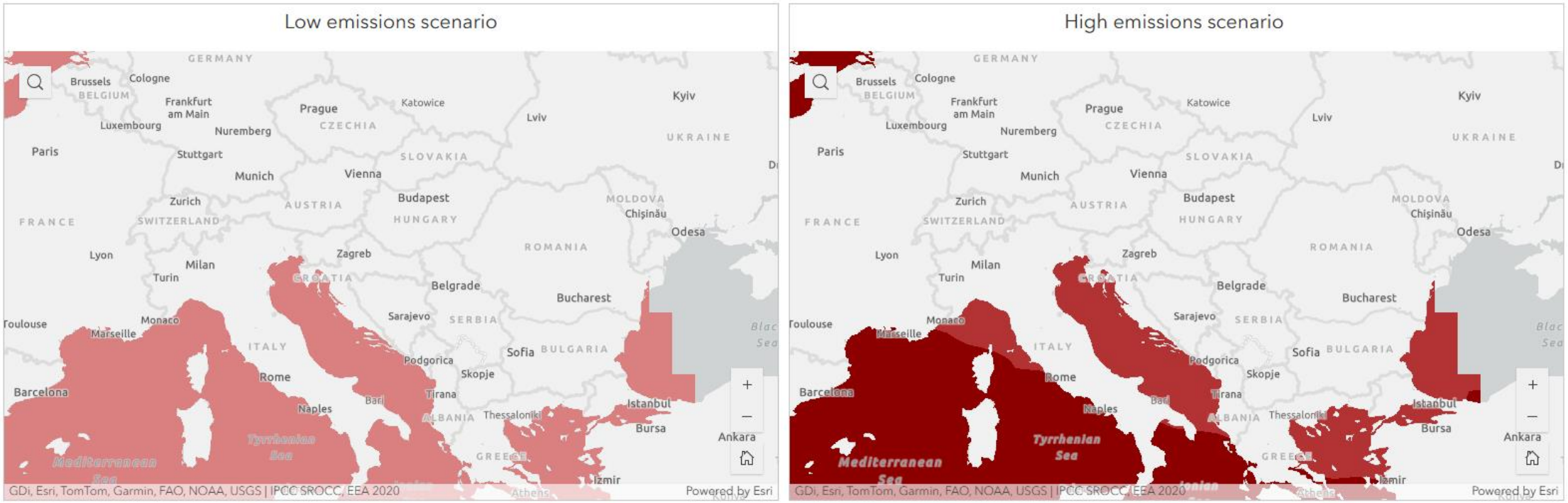
The increase in weather-driven fire danger in southern Europe is more than 40 % and large increases are also projected for northern Europe.



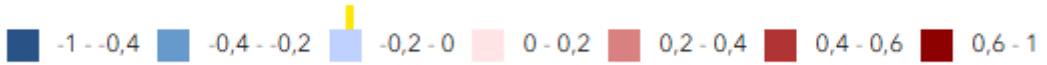
Projected change in meteorological forest fire danger by the late 21st century for two emissions scenarios, compared with the period 1981-2010 (%)

< -30 | -30 - 0 | 1 - 5 | 6 - 10 | 11 - 20 | 21 - 30 | 31 - 40 | > 40

CLIMATE CHANGE- Sea level rise



Projected rise in relative sea level by the late 21st century for two emissions scenarios, compared with the period 1981-2010 (m)

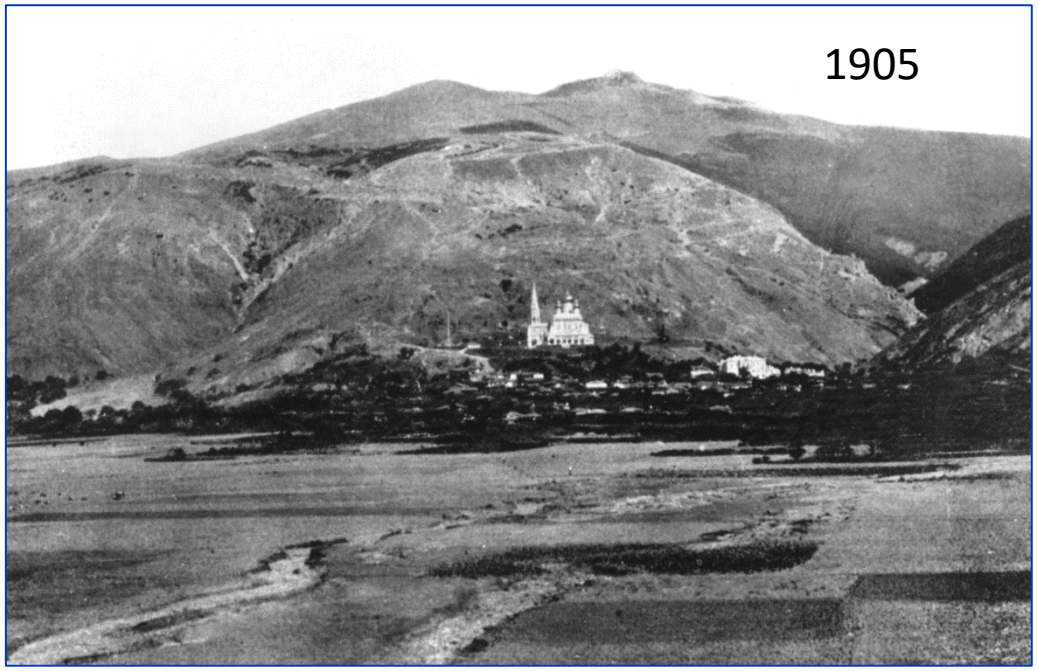


Decreasing biodiversity

- Reduce the functional diversity of forest ecosystems and thereby their ability to respond to the stressors;
- Increasing the risk of new pests and, pathogens, incl. invasive species dangerous to humans;
- Reducing the management capacity of forest ecosystems to mitigate climate change;

The EU Biodiversity Strategy envisages measures at landscape level. This means drawing up the so-called EU Nature Restoration Plan, which *„has to improve the condition of existing and new protected areas and to increase the diversity and sustainability of all landscapes and ecosystems“*.

Building a resilient forest landscape - precondions



Forests are a fundamental, long-lasting element of the landscape. Forests and woodlands are important visual elements in the landscape that change over time. They have great potential to enhance and enrich the environment and make a significant contribution to landscape quality.

The ideas of sustainable management and reproduction of forests are embedded in the foundations of forestry theory and practice;

The management of agricultural and urban landscape elements has traditionally been directed towards commercial goals (often short-term);

The functioning of the forest ecosystem is dependent on the regional land use patterns that can affect ecosystem services provided by forests (material, protective, carbon fixation, etc.);

The degradation of any individual element of the landscape affects all others (Need for a collaborative management approach).

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The terms

Resistance (short term)

Способност за съпротива

The ability of the ecological system to persist through the disturbance event. That is, the capacity to continue providing functions and ecosystem services immediately after the event. At the stand level, resistance could be inferred from the influence of forest structure and composition on fire severity and intensity. At the landscape level, resistance could be inferred from the spatial configuration and composition of patches (e.g., fuel continuity, land cover land use types diversity) on the rate of fire spread (Derose and Long, 2014).

Resilience (long-term)

Издръжливост

The ability of the ecological system to recover the functions and ecosystem services that the system provided before the fire. In the case of wildfire, resilience could be defined as the effect of fire on subsequent forest structure and composition (at the stand level) and on subsequent proportions of age classes and on species dominance in the landscape (at the landscape level) (Derose & Long, 2014). Resilience depends on the characteristics of the system (e.g., diversity of plant responses to fire), the event (e.g., intensity), and the presence of additional stresses before and after the fire event (e.g., prolonged drought, pest outbreaks, torrential rains, etc.).

WHAT IS RESILIENT FOREST LANDSCAPE

Resilience is the ability of a system to absorb disturbances and reorganize itself while undergoing change, maintaining the same functional structure, identity, and feedback;

Basic resilience enables ecosystems to cope with wildfires or other extreme events and helps communities to manage impacts and to recover from these events;

A landscape capable of offering a minimum of the previous ecosystem services;

Resilience means avoiding system collapse in any dimension;

Sustainable management of landscapes in such a way that they have the capacity to recover faster when Extreme Event occurs;

Ecosystem, socio-economic, natural and societal features must be taken into account when determining sustainability.

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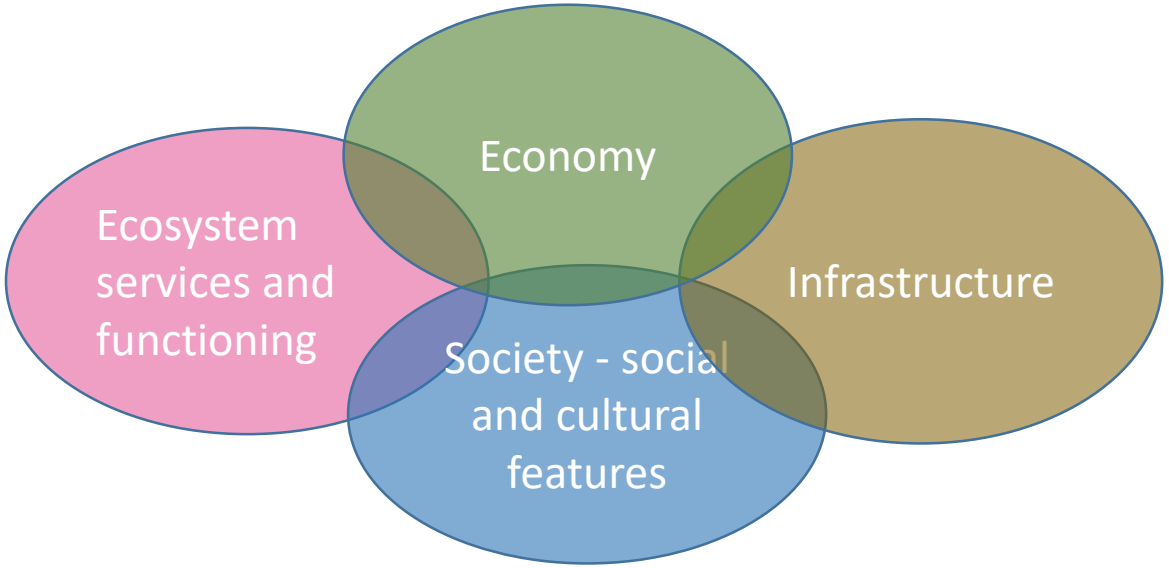
Collaborative, integrated management

Resilient landscapes - definition



- Resilience is the ability of a system to absorb disturbances and reorganize itself while undergoing change, maintaining the same functional structure, identity, and feedback

- Resilience is the ability of a socio-ecological system to sustain human well-being in the face of change, both by buffering shocks and by adapting or transforming in response to change

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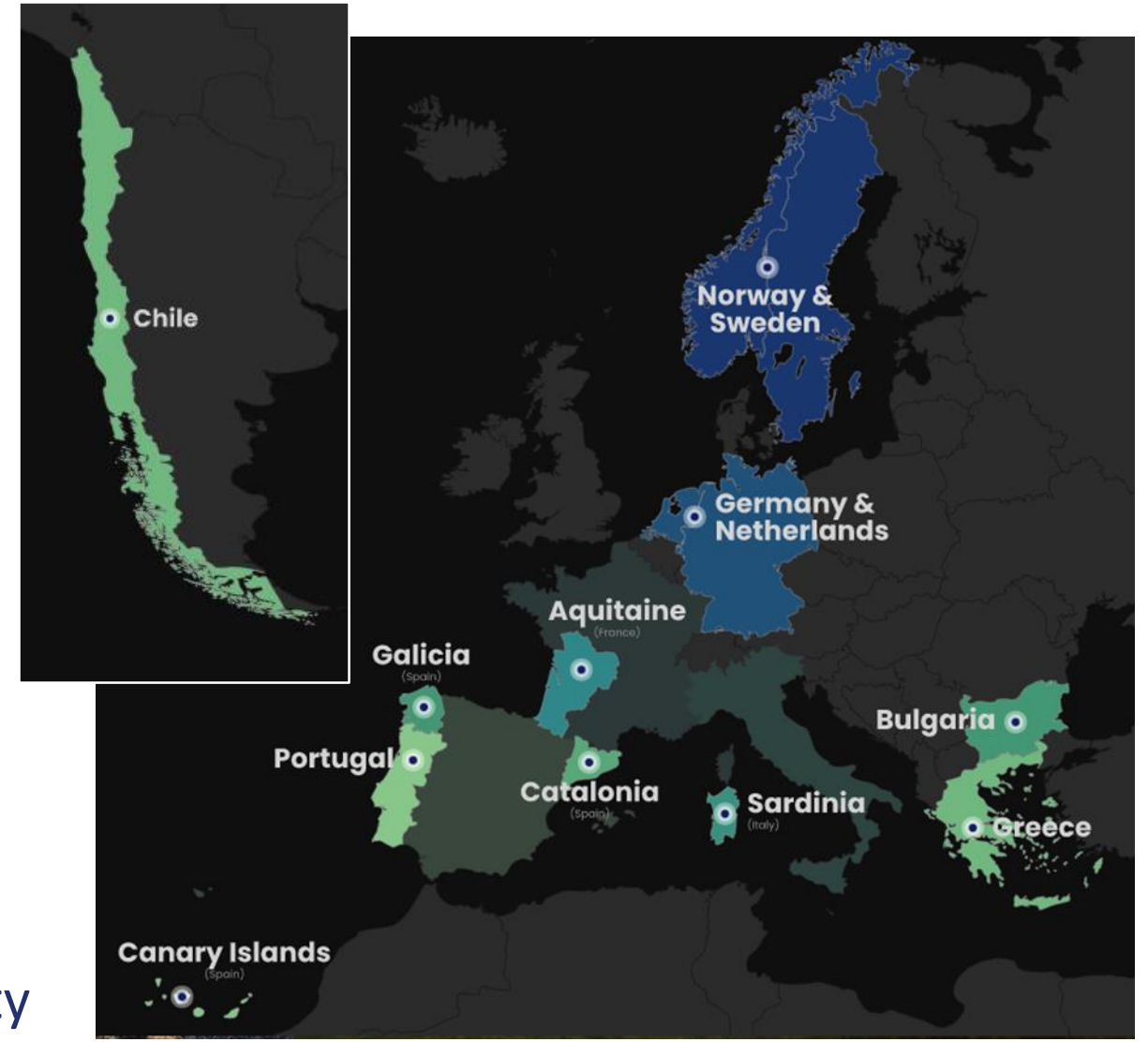
34 Innovation Actions

Prevention and Preparedness

Detection and Response

Restoration and Adaptation



The Innovation Actions will be deployed and tested in **11 Living Labs** to assess and foster scalability at larger scale.

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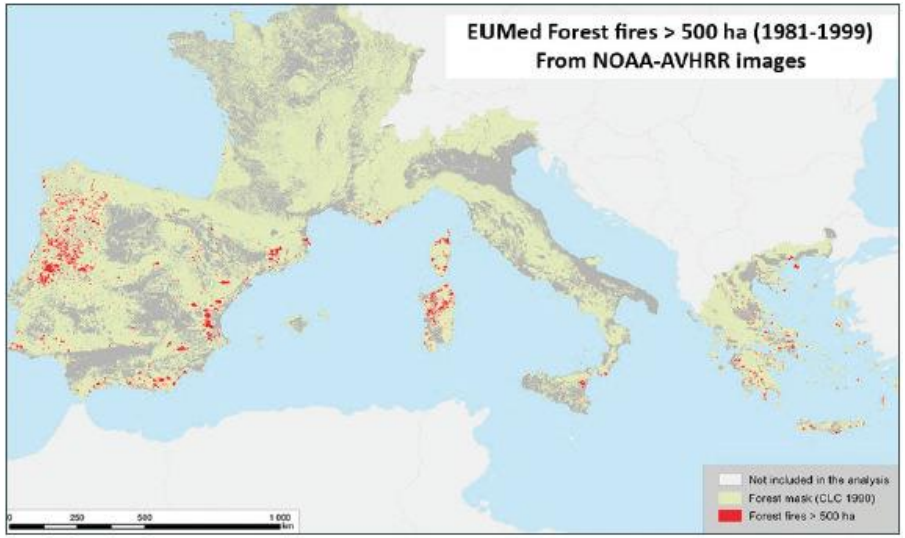
Impact of forest fires in the EU for the period 2000-2017:

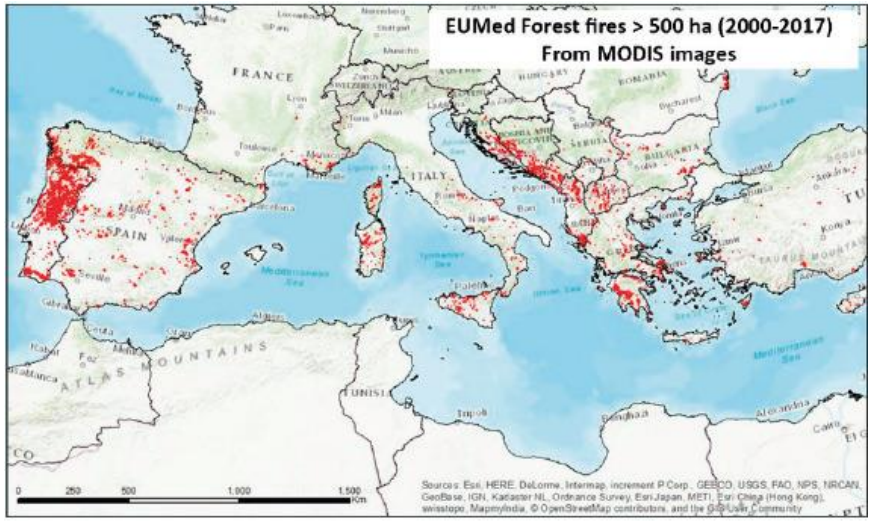
- Ecological losses: 8.5 million hectares of burned area, approximately 480,000 ha per year;
- Human casualties: 611 firefighters and civilians died, nearly 34 per year;
- Economic losses: over 54 billion euros, approximately 3 billion euros per year. At fast economic growth and increase in greenhouse gas emissions, the economic impact on Greece, Spain, France, Italy and Portugal could reach over 5 billion euros per year until 2070-2100.

1981-1999



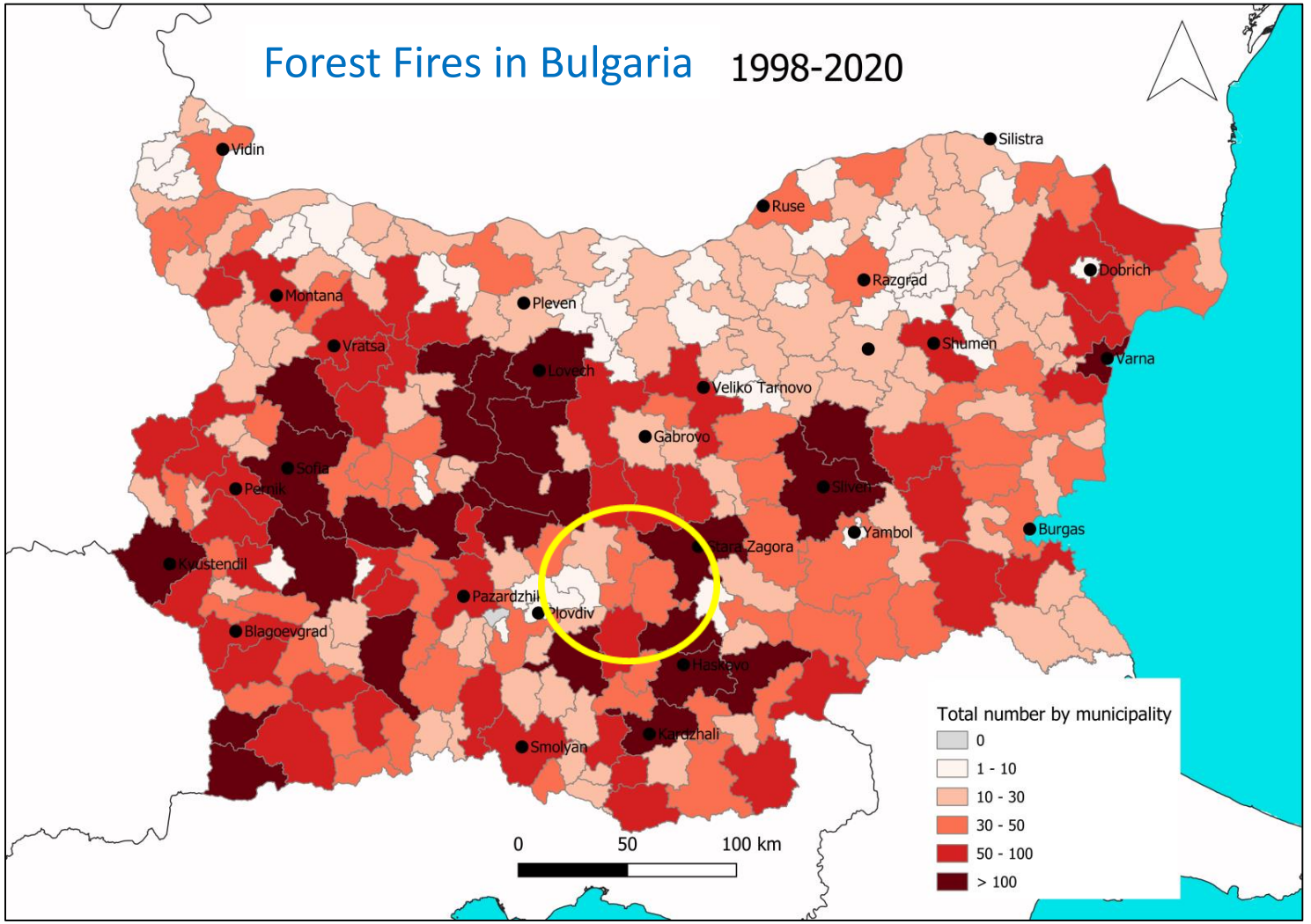
Fires over
500 ha in the EU

2000-2017



BULGARIAN CONTEXT

- 600 forest fires per year, 10,000 ha, apr. 3 million EUR direct losses (excluding recovery costs and long-term ecological losses);
- Dramatic increase in fires after 1990. Most fires come from agricultural areas;
- There are several large fires every year.



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BULGARIAN CONTEXT

Over 90% of fires start
from agricultural areas

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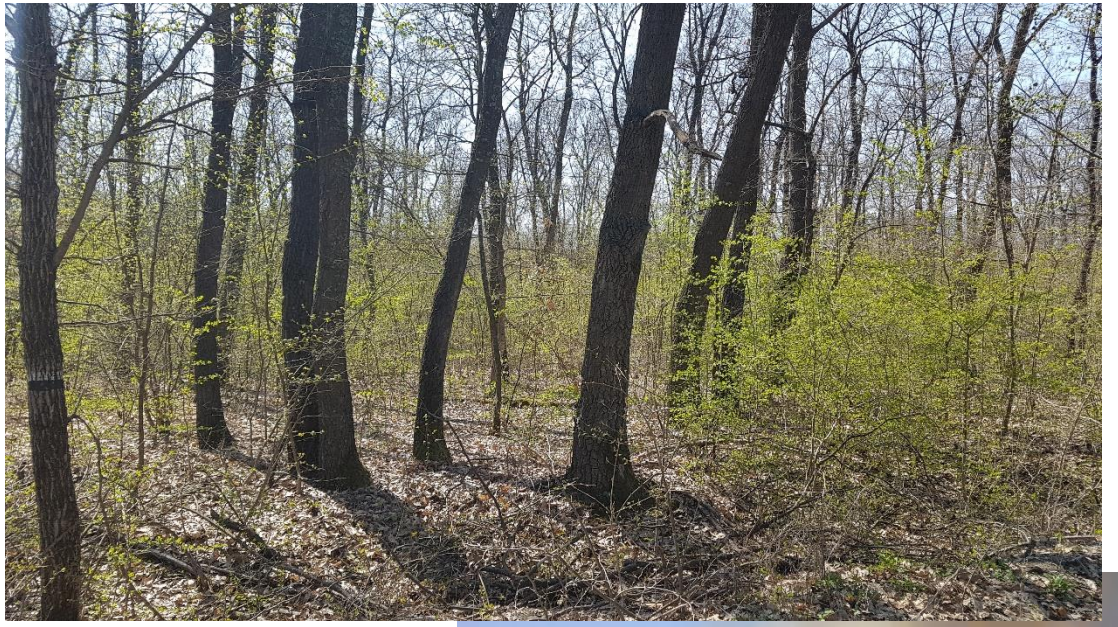
BULGARIAN CONTEXT



When there is very dry plant mass around and in the forest (undergrowth and other grasses and shrubs), flames easily reach the crowns and spread quickly

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BULGARIAN CONTEXT

Brush clearing in the most vulnerable forest areas requires a lot of manual labor. It is expensive and economically unprofitable. This is actually an **impossible task** due to the size of the needs

BULGARIAN CONTEXT

Agroforestry helps

Controlled goat grazing in the most fire-vulnerable areas of the forest is a possible adaptive solution

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Lessons learned in BG LL

Focus on prevention

BULGARIAN CONTEXT

A resilient landscape is the best prevention!

(This means that all vulnerable points of the territories have been identified and fire-prevention treated)

Is there real integrated management of forest landscapes? 

- Operational Management, incl. planning of individual territories is separate. There is a lack of a common vision for the prevention of individual types of territories from "outside„;
- It is most clearly seen in the financing and implementation of fire prevention measures;
- A major problem is the lack of requirement and understanding for sharing responsibility and finances between institutions;
- Many unresolved issues with mapping, determining ownership of vulnerable objects, etc.

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Innovative technologies & socio-ecological-economic solutions for fire resilient territories in Europe

Selection and parameterization of indicators and criteria for prioritization of management areas in LL Bulgaria to prevent large forest fires, protect areas with high asset value and optimize firefighting activities

LL Bulgaria

Funded by the European Union

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 101037419. It does not necessarily reflect the view of the European Union and in no way anticipates the Commission's future policy in this area.

Thematic groups of indicators

Fuel management planning to mitigate the impact of **large fires** and facilitate **fire suppression activities**

#Fuel

Fuel characteristics; Impact on fire behavior; Frequency of events; Fire susceptibility

#Assets

Human health; Environment; Economic activities; Cultural heritage; Critical infrastructure

#Management activities

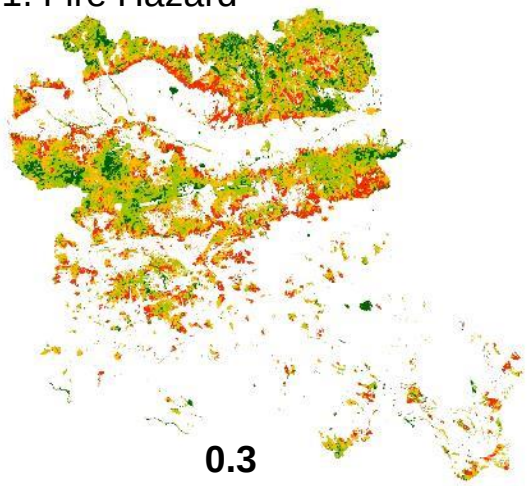
Accessibility of the territory for effective firefighting actions - topographical characteristics; proximity to the territory; availability of water resources

#Long-term changes

Climate change increasing the fire hazard; Infrastructural changes/Urbanization change - increasing assets in the long term

Final results

1. Fire Hazard



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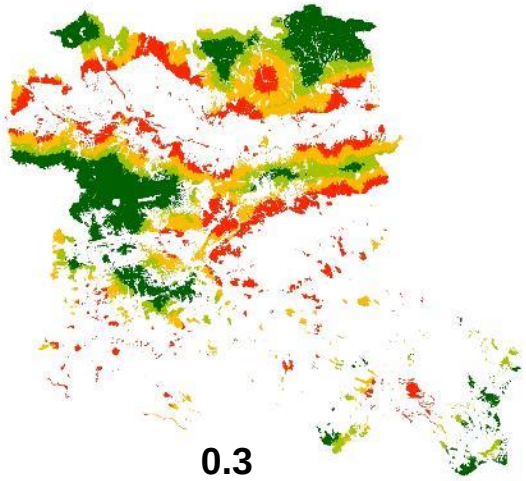
2. Exposure/Vulnerability



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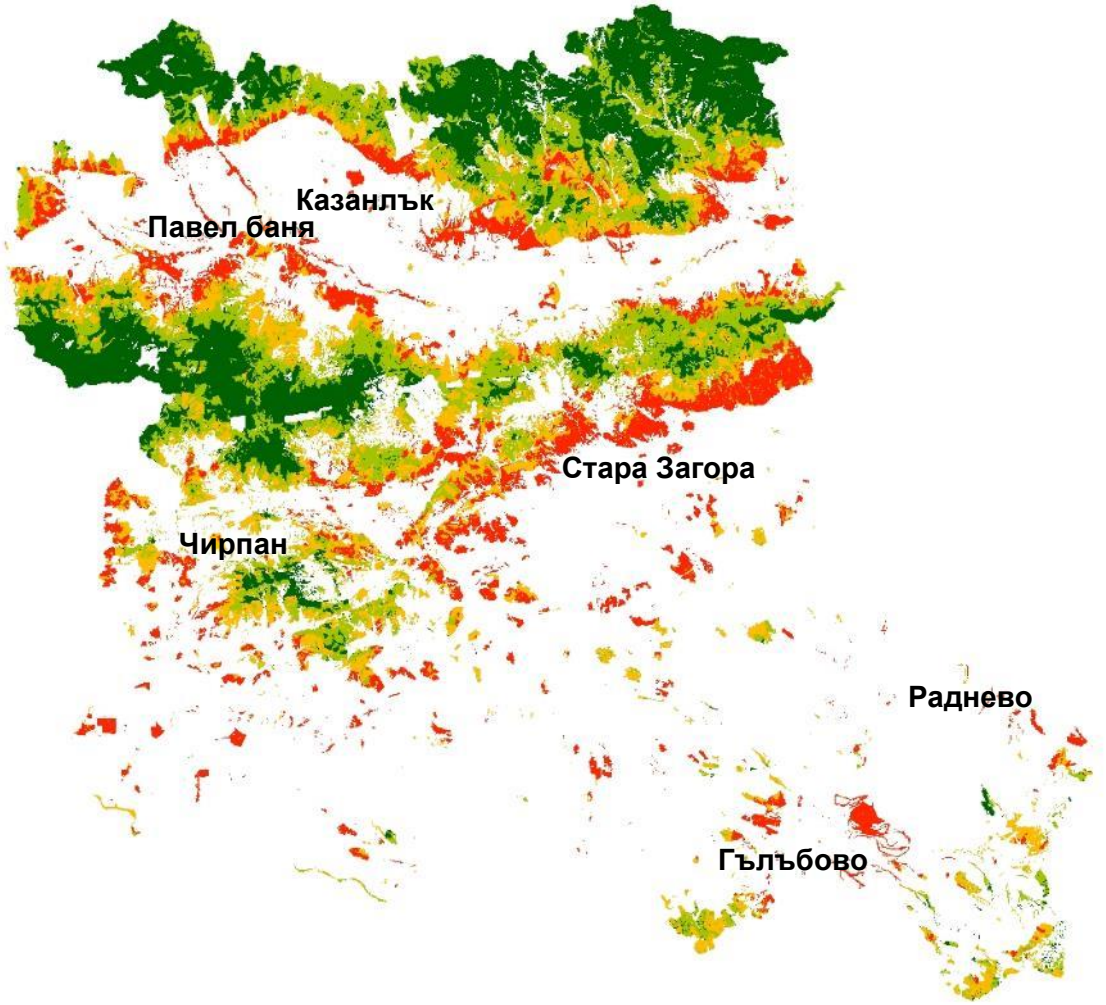
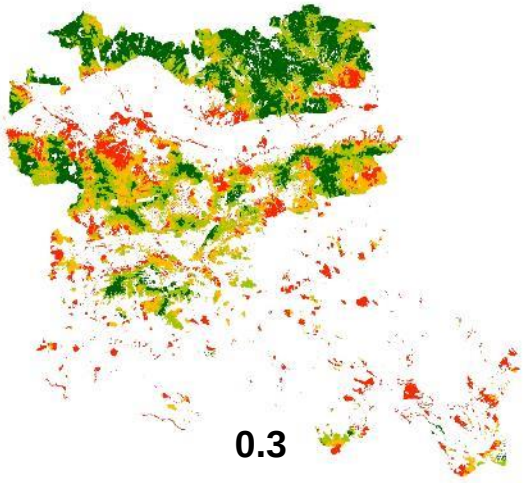


Management zones to prevent large wildfires, protect high value assets and optimize firefighting activities

3. Management activities



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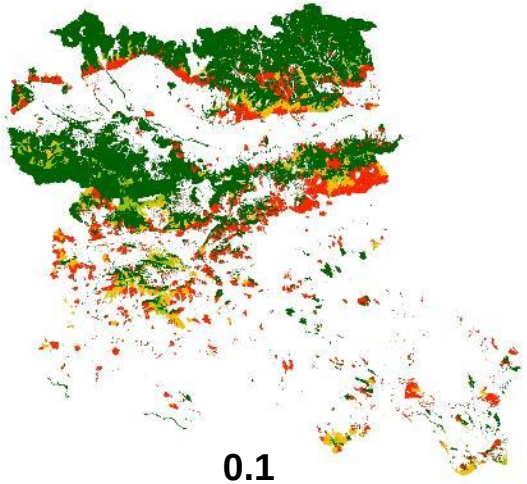
4. Long-term changes



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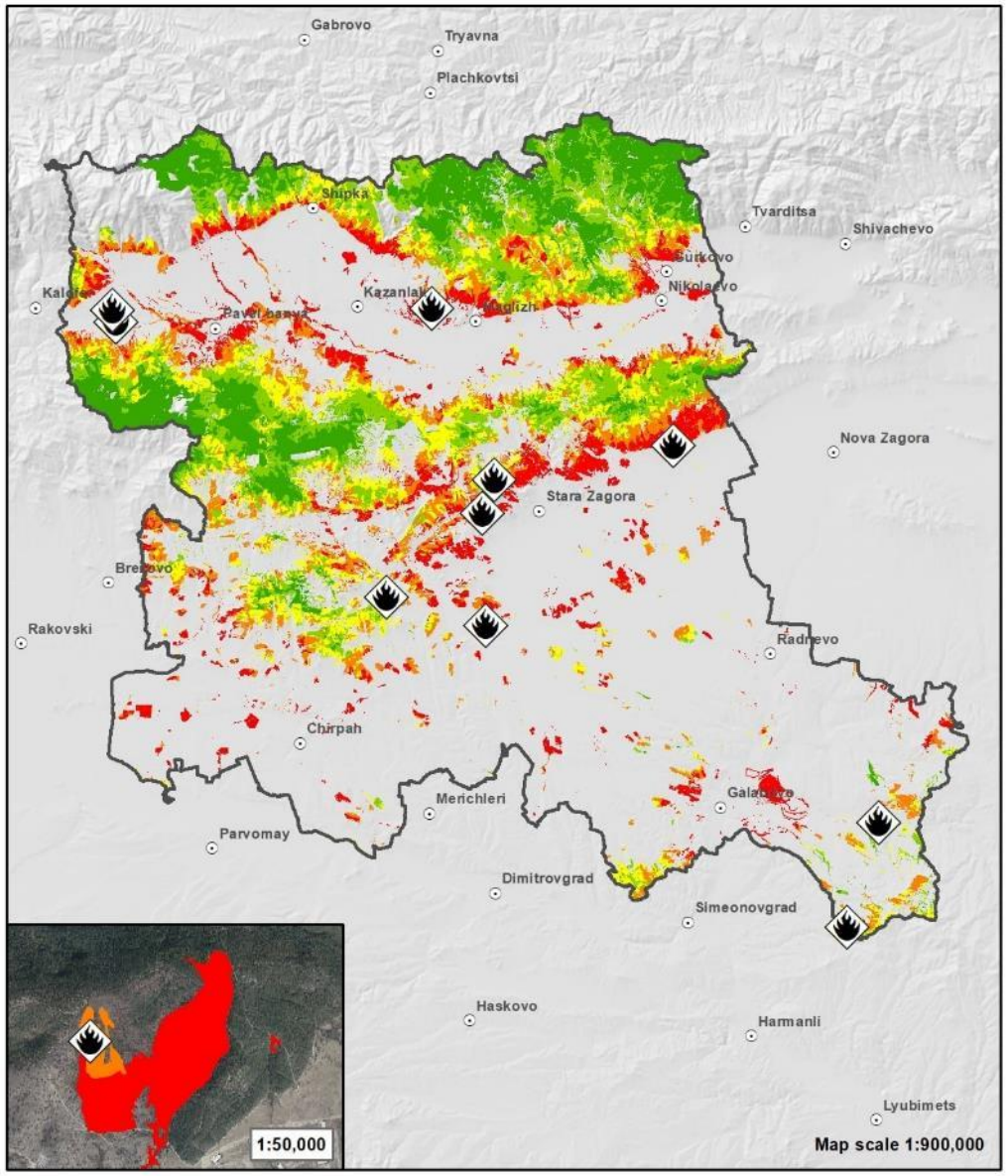
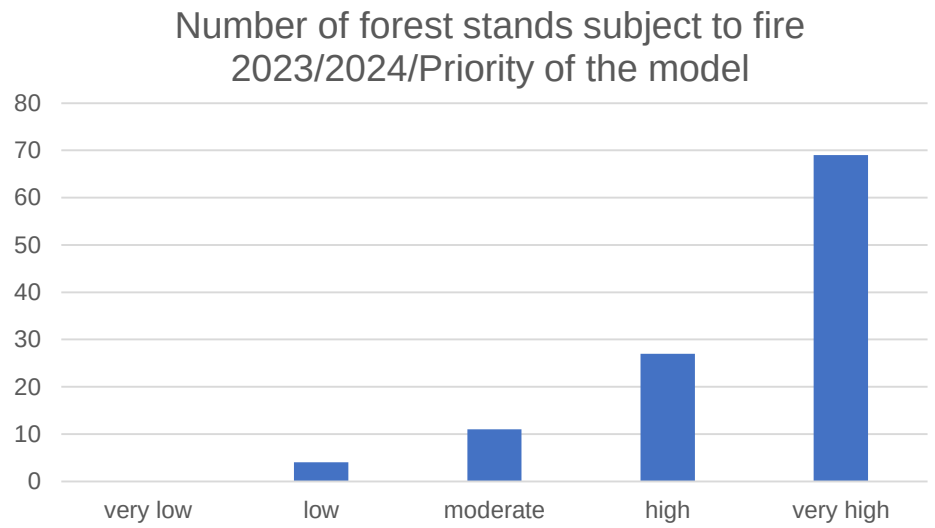
Model validation





During the period 2023-07.2024 within the LL Bulgaria 10 events of large forest fires are recorded.
More than 60% of the fires developed in forest stands with “very high” priority as per the model, and 25 with “high”.
Less than 15% were in “moderate” and “low”, and 0 in “very low”.

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Lessons learned in BG LL

Building resilient landscapes through integrated management

- The leaders should be the local authorities - mayors, municipalities and local institutions;
- ENGAGEMENT OF LOCAL PEOPLE, incl. Training;
- Funding for activities must be shared and sufficient

Discuss understanding of the territorial scope of the landscape - the boundaries of the lands of the settlements - This is how economic management units are formed, which are not new

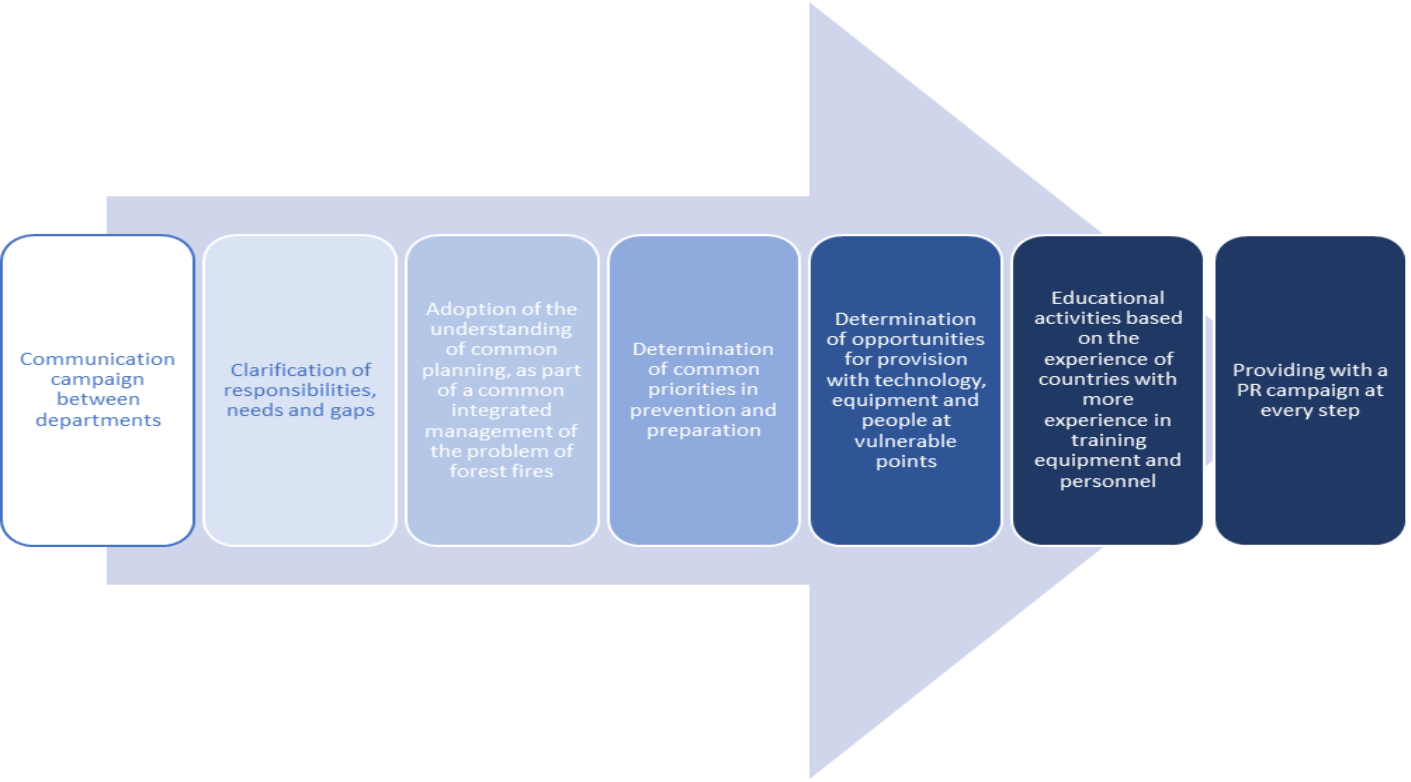
Towards education

- Building resilient landscapes requires integrated management;
- Integrated, collaborative landscape management is adaptive management;
- Adaptive management can mitigate climate change

Creating positive examples of integrated management is key to building a sharing mentality

- Knowledge and promotion are needed
- A positive campaign
- Reasonable changes in regulations
- REGIONAL ASPECT

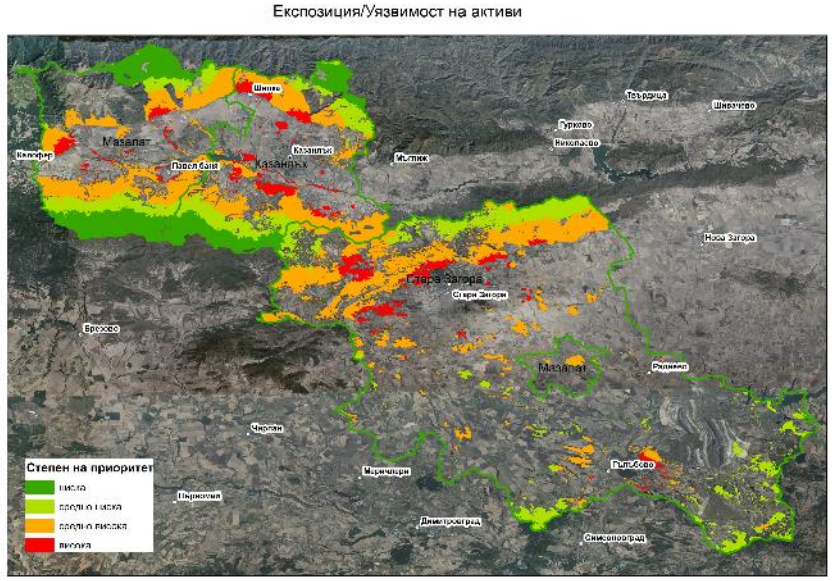
Roadmap to integration – realistic version

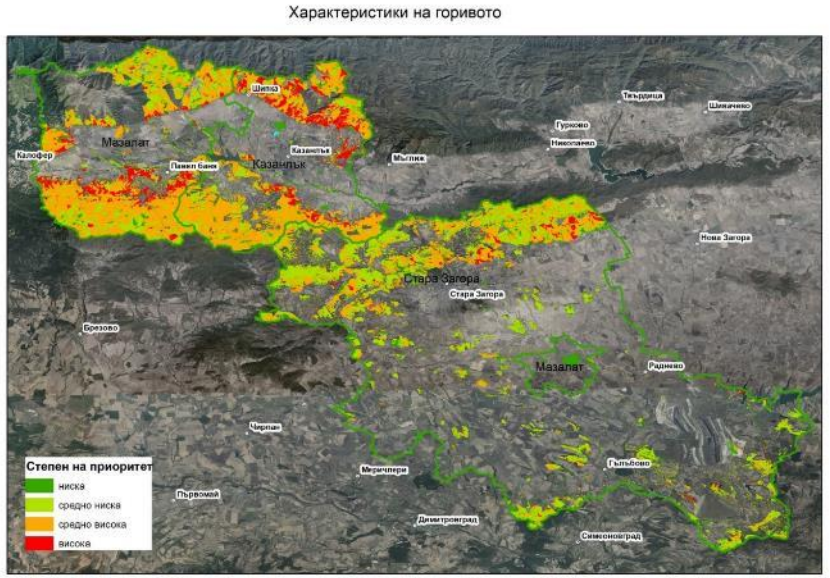


15.07.2024

Meetings with stakeholders

Training of foresters and firefighters to work with the model, as well as mapping forest fires with data from Copernicus EO - August 2024, Kazanlak Municipality





Sources

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- https://www.politico.eu/article/how-climate-change-will-widen-european-divide-road-to-cop26/
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- https://fire-res.eu/

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THANK YOU

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