The European Forest Fire Information System (EFFIS)

Jesús San-Miguel-Ayanz
Meeting of Forest Fire Prevention Experts, Brussels May 14th, 2004

**Fires in Europe**

Average: 50,000 fires/year

Number of Fires in the EU Mediterranean region

- Average: 50,000 fires/year
- Year 2003: 700000 ha approx.

Burnt area in the EU Mediterranean region

- Average: 500,000 ha/year
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Lack of harmonized information on forest fires and their impact in Europe
  • Forest Fires (EEC 2158/92)

Need to monitor the effect of atmospheric pollution on forests
  • Atmospheric Pollution on forests (EEC Reg. 3528/86)

Need for improved cooperation in forest fire preparedness and fighting
  • Community Action Plan on Civil Protection

Need to enhance regional development on areas affected by hazards
  • European Spatial Development Perspective (ESDP)/ ESPON

Other policies related to fires
  • Rural Development, follow up of EFICS
• **Forest Focus (EEC 2152/2003)**
  • Forest Fires (EEC 2158/92)
  • Atmospheric Pollution on forests (EEC 3528/86)
  • Soils
  • Biodiversity
  • Climate Change & Carbon sequestration
  • Protective function of the forests

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Information on forest fires events (Common Core Database)

- Fire location (commune level)
- Date: start (first alarm) / end
- Time of intervention / Time of extinction
- Burnt area: forest / non-forest
- Cause (unknown, natural, accident, deliberate)


European Forest Fire Information System (EFFIS)
European Forest Fire Information System

EFFIS

Modules

Fuel/Biomass

Fire Risk

Burnt Areas

Post-fire risk zoning

CO2 emissions

Regeneration

Common Core Database (Reg. 2158)

Products:

• Cartography
• Tables
• Statistics

Customer and user:

EP

Member States

EC

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EFFIS - Forest Fire Risk Forecasting System

Modules
- Fuel/Biomass

Products:
- Cartography
- Tables
- Statistics

Customer and user:
- EP
- Member States
- EC
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Long-term Fire Risk Index
Probability of fire occurrence

- FUEL TYPES
- TOPOGRAPHY
- FIRE FREQUENCY
- SETTLEMENTS
- SOCIO-ECONOMIC FACTORS
- PROXIMITY TO ROADS
- DEGREE OF ENVIRONMENTAL PROTECTION

Risk
- 0 - 20 (very low)
- 21 - 40 (low)
- 41 - 60 (medium)
- 61 - 80 (high)
- 81 - 100 (very high)

Spatial resolution 1 Km.
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Long-term Fire Risk Index
Probability of likely damage - Vulnerability index

VEGETATION TYPE
TOPOGRAPHY
SETTLEMENTS
ENVIRONMENTAL VALUE
SOILS

Risk
0 - 20 (very low)
21 - 40 (low)
41 - 60 (medium)
61 - 80 (high)
81 - 100 (very high)

Spatial resolution 1 Km.
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Long-term Fire Risk Index

Probability of likely damage - Vulnerability index

Risk
- 0 - 20 (very low)
- 21 - 40 (low)
- 41 - 60 (medium)
- 61 - 80 (high)
- 81 - 100 (very high)

(Extracted from the total area)
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EFFIS - Forest Fire Risk Forecasting System

Modules

Fire Risk

Products:
- Cartography
- Tables
- Statistics

Customer and user:
- EP
- Member States
- EC
EFFIS - Forest Fire Risk Forecasting System
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**Fire event**

**Mapping of burnt areas**

**Damage Analysis**

<table>
<thead>
<tr>
<th>CORINE Code</th>
<th>CORINE Class</th>
<th>Non-Burned Area (ha)</th>
<th>Burned Area (ha)</th>
<th>% Burned</th>
</tr>
</thead>
<tbody>
<tr>
<td>112</td>
<td>DISCONTINUOUS URBAN FABRIC</td>
<td>109878</td>
<td>42</td>
<td>0.0%</td>
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<tr>
<td>211</td>
<td>NON-IRRIGATED ARABLE LAND</td>
<td>1194065</td>
<td>6990</td>
<td>0.6%</td>
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<tr>
<td>212</td>
<td>PERMANENTLY IRRIGATED LAND</td>
<td>682939</td>
<td>403</td>
<td>0.1%</td>
</tr>
<tr>
<td>221</td>
<td>VINEYARDS</td>
<td>134274</td>
<td>2843</td>
<td>2.1%</td>
</tr>
<tr>
<td>222</td>
<td>FRUIT TREES AND BERRY PLANTATIONS</td>
<td>123157</td>
<td>1398</td>
<td>1.1%</td>
</tr>
<tr>
<td>223</td>
<td>OLIVE GROVES</td>
<td>518360</td>
<td>2421</td>
<td>0.5%</td>
</tr>
<tr>
<td>241</td>
<td>ANNUAL CROPS ASSOCIATED WITH PERMANENT CROPS</td>
<td>16563</td>
<td>10</td>
<td>0.1%</td>
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<tr>
<td>242</td>
<td>COMPLEX CULTIVATION PATTERNS</td>
<td>1007677</td>
<td>5040</td>
<td>0.5%</td>
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<tr>
<td>243</td>
<td>LAND PRINCIPALLY OCCUPIED BY AGRICULTURE, WITH SIGNIFICANT AREAS OF NATURAL VEGETATION</td>
<td>773877</td>
<td>11269</td>
<td>1.4%</td>
</tr>
<tr>
<td>244</td>
<td>AGRO-FORESTRY AREAS</td>
<td>164627</td>
<td>2314</td>
<td>1.4%</td>
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<tr>
<td>311</td>
<td>BROAD-LEAVED FOREST</td>
<td>840208</td>
<td>1006</td>
<td>0.1%</td>
</tr>
<tr>
<td>312</td>
<td>CONIFEROUS FOREST</td>
<td>526430</td>
<td>3812</td>
<td>0.7%</td>
</tr>
<tr>
<td>313</td>
<td>MIXED FOREST</td>
<td>573425</td>
<td>3930</td>
<td>0.7%</td>
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<tr>
<td>321</td>
<td>NATURAL GRASSLAND</td>
<td>1247403</td>
<td>6448</td>
<td>0.5%</td>
</tr>
<tr>
<td>322</td>
<td>MOORS AND HEATHLAND</td>
<td>260835</td>
<td>1628</td>
<td>0.6%</td>
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<tr>
<td>323</td>
<td>SCLEROPHYLLOUS VEGETATION</td>
<td>2070419</td>
<td>25793</td>
<td>1.2%</td>
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<tr>
<td>324</td>
<td>TRANSITIONAL WOODLAND-SHRUB</td>
<td>1044180</td>
<td>5266</td>
<td>0.5%</td>
</tr>
<tr>
<td>331</td>
<td>BEACHES, DUNES, AND SAND PLAINS</td>
<td>31072</td>
<td>68</td>
<td>0.2%</td>
</tr>
<tr>
<td>332</td>
<td>BARE ROCK</td>
<td>22903</td>
<td>59</td>
<td>0.3%</td>
</tr>
<tr>
<td>333</td>
<td>SPARSELY VEGETATED AREAS</td>
<td>249691</td>
<td>437</td>
<td>0.2%</td>
</tr>
<tr>
<td>334</td>
<td>BURNT AREAS</td>
<td>19081</td>
<td>1202</td>
<td>9.9%</td>
</tr>
<tr>
<td>335</td>
<td>UNCLASSIFIED FOREST SURFACES</td>
<td>1371987</td>
<td>17445</td>
<td>1.3%</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>12983050</td>
<td>100724</td>
<td>0.8%</td>
</tr>
</tbody>
</table>

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Fast appraisal of fire damages: example of Portugal Aug. 8th – Sept. 15th, 2003

216 184 ha (Aug. 8)  355 976 ha (Aug. 20)  379 038 ha (Sept. 15)

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### EFFIS - Fast appraisal of fire damages

<table>
<thead>
<tr>
<th>Land use</th>
<th>Area burnt (ha)</th>
<th>% of total burned</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture</td>
<td>45206</td>
<td>11.9</td>
</tr>
<tr>
<td>Forest land</td>
<td>323009</td>
<td>85.2</td>
</tr>
<tr>
<td>Barren</td>
<td>8996</td>
<td>2.4</td>
</tr>
<tr>
<td>Social</td>
<td>1827</td>
<td>0.5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>379038</strong></td>
<td><strong>100.0</strong></td>
</tr>
</tbody>
</table>

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Identifies burnt areas on steep slopes and fragile soils that are subject to further damage such as soil erosion, landslides, etc.
Regional estimates of CO2 emissions

\[ \text{CO}_2 = \sum_v A_v \times B_v \times C \times E_v \]

- \( A_v \): burned area (m²)
- \( B_v \): biomass (g m⁻²)
- \( C \): burning efficiency (g g⁻¹)
- \( E_v \): emission coefficient for CO₂
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Burnt area: 5,616 hectares

EFFIS – Regeneration (research)

Fraction of vegetation cover (regeneration) within the burnt area.
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http://natural-hazards.jrc.it/fires/effis
http://natural-hazards.jrc.it/fires/publications