

## 6<sup>th</sup> International Wildland Fire Conference

### Regional Statement of the Euro-Alpine Region – An Input Paper to the Conference Statement

13 October 2015

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#### **General Fire Assessment**

The partners of the Euro-Alpine Region were able to stimulate research and collaboration regarding the role of forest fires as natural hazard for the Alpine environment as a follow up of the European project ALP FFIRS that ended 2012. The ambitious goal of ALP FFIRS was to set up a framework for a common warning system for forest fire danger for the whole Alpine region, taking into account weather conditions and vegetation patterns ([www.alpfirs.eu](http://www.alpfirs.eu)). The tool consists of a daily fire danger level assessment and forecast in order to identify critical periods of forest fire danger in advance. Through the cooperation within and between the partner countries in Switzerland, Austria, Italy, Slovenia, France and Germany, it was possible to develop a tool aimed at improving wildfire prevention under a changing climate in the Alpine Space.

- Different methodological approaches have been used to identify the most appropriate fire weather index for alpine conditions (Eastaugh et al. 2012<sup>1</sup>, Arpaci et al. 2013<sup>2</sup>), which allowed us to critically evaluate existing systems;
- We managed to achieve several methodological advances in developing danger rating systems fitting for Alpine conditions (de Angelis et al. 2015<sup>3</sup>, Arpaci et al. 2014<sup>4</sup>), which allowed us to adapt existing danger rating approaches to regional Alpine conditions;
- A methodological approach for the definition of the wildland-urban interface (WUI) in the Alpine context, by combining the three WUI components: human infrastructures, burnable vegetation and the interaction area between the two, was developed (Conedera et al. 2015<sup>5</sup>);
- We reconstructed the fire history and related landscape evolution that occurred in the Alps during the Holocene in order to derive negative and positive impacts of current fire regimes on the value of ecosystem services in the Alps, as well as the incidence of human fire uses and fire suppression policies (Valese et al. 2014<sup>6</sup>);
- In recent years, the Alpine region has experienced highly variable forest fire activity with new record values regarding the number of fires and sizes of burned areas. Higher temperatures in combination with local dry weather conditions are often hypothesized as reasons for the observed anomalies (Müller et al. 2015<sup>7</sup>);
- Furthermore, a projection of the fire ecology of beech forests in the Alps was made in order to assess the future potential of forest fires in these ecosystems (Ascoli et al. 2013<sup>8</sup>, 2015<sup>9</sup>).

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<sup>1</sup> Eastaugh C. S., Arpaci A., Vacik H. (2012) A cautionary note regarding comparisons of fire danger indices Nat. Hazards Earth Syst. Sci., 12, 927–934, doi:10.5194/nhess-12-927-2012

<sup>2</sup> Arpaci A., Eastaugh C.S., Vacik H. (2013) Selecting the best performing fire weather indices for Austrian ecoregions, Theoretical and Applied Climatology, 114 (2013), pp. 393–406

<sup>3</sup> De Angelis A., Ricotta C., Conedera M., Pezzatti G.B. (2015) Modelling the Meteorological Forest Fire Niche in Heterogeneous Pyrologic Conditions. PLoS ONE 10(2): e0116875. doi:10.1371/journal.pone.0116875

<sup>4</sup> Arpaci A., Malowerschnig B., Sass O., Vacik H. (2014), Using multi variate data mining techniques for estimating fire susceptibility of Tyrolean forests, Applied Geography, 53, 258-270, <http://dx.doi.org/10.1016/j.apgeog.2014.05.015>.

<sup>5</sup> Conedera M., Tonini M., Oleggini L., Orozco C.V., Leuenberger M., Pezzatti G.B. (2015), Geospatial approach for defining the Wildland-Urban Interface in the Alpine environment, Computers, Environment and Urban Systems, 52, 10-20, <http://dx.doi.org/10.1016/j.compenvurbsys.2015.02.003>.

<sup>6</sup> Valese E., Conedera M., Held A.C., Ascoli D. (2014), Fire, humans and landscape in the European Alpine region during the Holocene. Anthropocene (2014), <http://dx.doi.org/10.1016/j.ancene.2014.06.006>

<sup>7</sup> Müller M.M., Vacik H., Valese E. (2015) Anomalies of the Austrian Forest Fire Regime in Comparison with Other Alpine Countries: A Research Note Forests, 6, 903-913; doi:10.3390/f6040903

<sup>8</sup> Ascoli D., Castagneri D., Valsecchi C., Conedera M., Bovio G. (2013), Post-fire restoration of beech stands in the Southern Alps by natural regeneration, Ecological Engineering, Volume 54: 210-217, <http://dx.doi.org/10.1016/j.ecoleng.2013.01.032>.

<sup>9</sup> Ascoli D., Vacchiano G., Maringer J., Bovio G., Conedera M. (2015) The synchronicity of masting and intermediate severity fire effects favors beech recruitment. Forest Ecol. Manage. (2015), <http://dx.doi.org/10.1016/j.foreco.2015.05.031>

## **Conclusions**

- Fire has always been a driver of landscape evolution and a mirror of human activities in the Alpine region. The unevenness of human population density in the Alpine region is a key issue in defining ad-hoc management strategies. Land abandonment of marginal areas, alongside climate anomalies, is leading to a new generation of unmanageable large fires, where lack of accessibility and fuels build-up are the main constraints. Separately, new civil protection challenges are arising in localized areas and during periods of the year, from an increasing pressure brought by mountain tourism.
- Preparedness is becoming a core issue where the WUI is being expanded, and new strategies have to be considered. The proposed scientific findings allows for drastically reducing the forested area to be considered (20–50%) when planning a detailed analysis in terms of fire ignition risk and fuel measures. Thus, a WUI definition in the Alpine region should be understood as a first step toward fire prevention through forestry or technical measures. Considering limited financial and human resources to suppress fires in the Alpine region, the concentration on very susceptible areas could be a way to counter these challenges.
- Mixed severity fires are an important ecological factor for the natural regeneration of beech forests. Research in beech disturbance ecology can help to improve silviculture and post-fire restoration of Alpine forests.
- Several studies have effectively demonstrated that fire occurrence is related to weather, fuel and human infrastructure parameters. The main governing parameters of fire distribution in the Alpine region seem to be climate and population density. Therefore, higher fire susceptibility around densely populated valleys and in the drier areas of these valleys can be identified. The use of different methodological approaches is appropriate in order to identify the main drivers for fire ignition and fire behavior.
- The application of regionally adapted early warning systems and daily fire danger bulletins can help to reduce the likelihood of human induced fire ignitions.