

Israel wildfires: future trends, impacts and mitigation strategies

Lea Wittenberg

University of Haifa, Geography and Environmental Studies, Israel (leaw@geo.haifa.ac.il)

Forest fires in the Euro-Mediterranean region burn about 450,000 ha each year. In Israel, the frequency and extent of wildfires have been steadily increasing over the past decades, culminating in several large and costly fires in 2010, 2012 and 2016. The extensive development of forest areas since the 1950's and the accumulation of fuel in the forests, has led to increased occurrences of high intensity fires. Land-use changes and human population growth are the most prevailing and common determinant of wildfire occurrence and impacts. Climate extremes, possibly already a sign of regional climate change, are another frequent determinant of increasing wildfire risk. Therefore, the combination of extreme dry spells, high fuel loads and increased anthropogenic pressure on the open spaces result in an overall amplified wildfire risk. These fires not only cause loss of life and damage to properties but also carry serious environmental repercussions. Combustion of standing vegetation and the leaf litter leave the soil bare and vulnerable to runoff and erosion, thereby increasing risks of flooding. Today, all of Israel's open spaces, forests, natural parks, major metropolitan centers, towns and villages are embedded within the wildland urban interface (WUI). Typically, wildfires near or in the WUI occur on uplands and runoff generated from the burned area poses flooding risks in urban and agricultural zones located downstream.

Post-fire management aims at reducing associated hazards as collapsing trees and erosion risk. Often the time interval between a major fire and the definition of priority sites is in the order of days-to-weeks since administrative procedures, financial estimates and implementation of post-fire salvage logging operations require time. Defining the magnitude of the burn scar and estimating its potential impact on runoff and erosion must therefore be done quickly. A post-fire burn severity, runoff and erosion model is a useful tool in estimating potential risks and management strategic. Moreover, national agencies and local authorities must decide on a range of post-fire measures to mitigate risks quickly since most large fires occur late in summer shortly before the winter season.

Possible climate changes, socio-economic trends, and intense land use pressures are contributing factors in a national challenge to deal with forest fires along the WUI. However, in order to support integrated fire preparedness, response, management and recovery at the national, regional and local scales, stronger research and planning effort are required. This includes long-term monitoring programs and a systematic, standardized data acquisition scheme, compiling fire history, landscape-fire spread, mitigation and assessment of the immediate fire effects, land use changes and weather data. Knowledge of both short and long-term impacts of wildfire is essential for effective risk assessment, policy formulation and wildfire management.