



North Atlantic Fire Science Exchange



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Research Brief for Resource Managers

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Suppression science: Effects of Suppression on the Ecology of the Wildland Urban Interface

La Puma IP, Lathrop RG, and Keuler NS. (2013) A large-scale fire suppression edge-effect on forest composition in the New Jersey Pinelands Landscape Ecol. 28 1815-1827.

[Click here](#) to access the journal article.

The North Atlantic region is commonly characterized by development and forest fragmentation. The resulting forest edges greatly influence the ecological integrity of the landscape, especially in managed fire-adapted ecosystems. The impacts of fire suppression on forest community structure has been well-documented in the scientific literature. Most fire suppression studies, however, have taken place in large forested areas in the western United States and far from the wildland-urban interface (WUI).

This study by Dr. Inga La Puma and others is especially relevant to the North Atlantic region because it examines the concept of a WUI “edge-effect” in which fire suppression efforts directly change forest community structure. The authors used fire frequency to examine how fire suppression efforts affect ecosystems close to human development compared to areas of continuous forest. Differences in fire frequency result in changes in the forest community structure. These changes in forest structure are also correlated with proximity to developed, or human-altered, land. Significantly, the authors asked how forest fragmentation influences fire frequency and the trajectory of forest composition of our fire-adapted forest communities.

Management Implications

- Due to suppression operations, there is less fire in the WUI than in contiguous forest.
- Fire suppression activities have led to an ecological shift from pine communities to oak communities in the WUI.

To investigate this question, the authors focused on the Barnegat Bay and Mullica River watersheds in the New Jersey Pinelands (Figure 1). These study areas both have very distinct WUI areas that transition to the contiguous heart of the pinelands. The upland forest stands in these study areas are typically characterized by the percentage of pine and oak present in the forest canopy. It is important to note that the percent of pine versus oak is generally influenced by the recurrence of fire; pine has a shorter fire return interval (more fire), and oak a longer interval (less fire).

The authors compiled maps of altered land depicting developed areas and land cover classified into three upland categories: Pine, Oak, and Mixed Brushland. These maps were derived from various Landsat satellite data products. The third data source was a fire history database of prescribed and wildland fire perimeters from

1964-2011 that were hand-digitized from New Jersey Forest Fire Service records.

The results of the study illustrate the impact that human populations are having on both fire frequency and on the resulting forest community structure. Figure 2 illustrates that there is now less fire near the WUI than in the interior forest, which the authors attributed to vigorous suppression strategies near these at-risk human values.

In the Mullica watershed, fire is less frequent in the WUI. Then, frequency increases for some distance and finally becomes less frequent again in the heart of the watershed (Figure 2). This decrease was attributed to the arrangement of the Mullica watershed, in which interior areas of the watershed contain large wetlands areas and a well-developed prescribed fire program interspersed with upland forest, resulting in decreased fire frequency from 1964-2011.

Figure 3 represents the ecological result of the fire suppression strategies; it shows a very distinct shift from oak-dominated forests in the WUI to pine-dominated forests in the heart of the pinelands, where fires cannot be as effectively suppressed. Figure 1 depicts the edge effect between the WUI (yellow) and contiguous forest (green).

The findings of this study have several applications within the North Atlantic region by illustrating the effects that fire management in the WUI can have on ecosystem composition and function. This study also illustrates the challenges that we have in managing relic ecosystems in our highly-fragmented landscapes because of the suppression of fire around human populations.

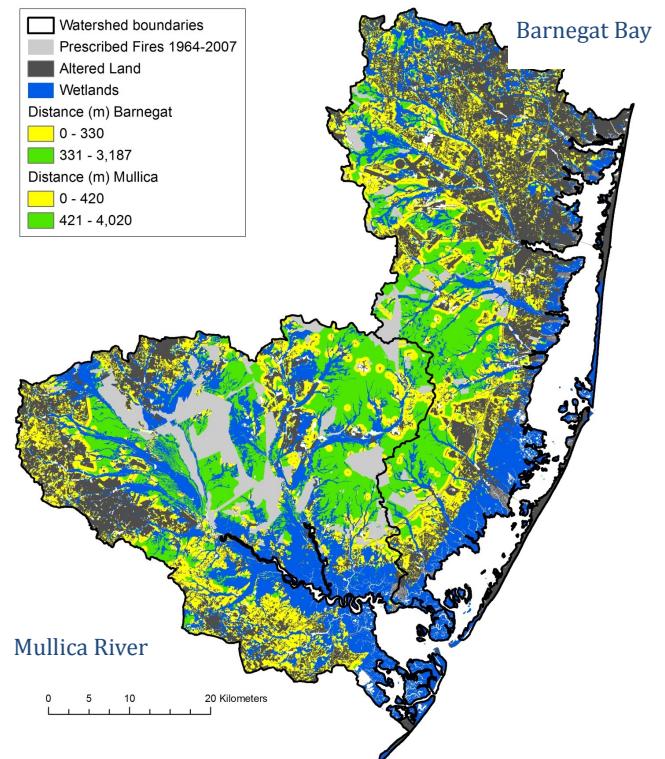


Figure 1

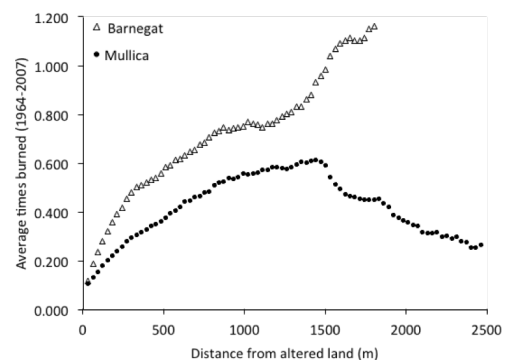


Figure 2

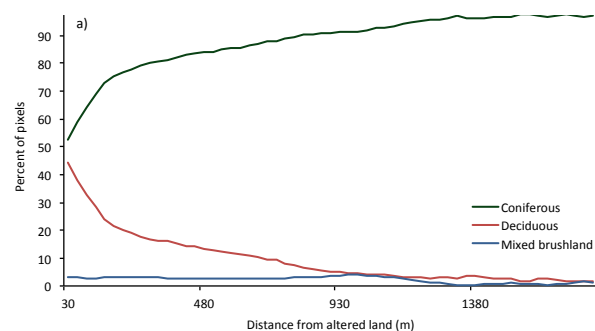


Figure 3