P.A. Martin

Centre for Conservation Ecology and Environmental Science,

Faculty of Science and Technology,

Bournemouth University,

Poole, BH12 5BB.

UK.

Editor in Chief, Forest Ecology and Management

Dear Editor in Chief,

Please find enclosed our manuscript entitled “Stand dieback and collapse in a temperate forest and its impact on forest structure and biodiversity.” We would be grateful if you would consider this work for publication in Forest Ecology and Management. This work uses a unique dataset spanning 50 years from a forest that appears to be undergoing dramatic dieback leading to alteration of structure and biodiversity. Recently an IPCC report noted that many forests are likely to face dieback in the coming century, but that we currently lack the information to judge the potential impact of such events. Of particular concern is the potential for non-linear ‘regime shifts’ leading to a loss of tree cover in forests. Our work finds evidence of dieback in a temperate forest in the UK and in response to this non-linear changes in forest community composition.

For this study we used data on forest structure, community composition and functional diversity collected between 1964 and 2014 over two permanent transects located in the New Forest, UK. Using the dataset we examined temporal responses of forest structure and biodiversity, as well as changes in biodiversity across a gradient of collapse in forest basal area.

Our results indicate that a number of plots showed dramatic loss of basal area associated with death of large trees which we hypothesise may be caused by on-going climate change and exposure to novel fungal pathogens. Over the same period of time grass cover increased dramatically in collapsed plots, showing a non-linear relationship with the gradient of basal area loss. Curvilinear responses to basal area loss were also seen for changes in tree community composition and ground flora richness. In addition in cases where basal area declined by more than 25% it tended not to recover – suggesting the ecosystem exhibits low resilience to disturbances. Given that dieback appears to be occurring in other areas of the New Forest, biodiversity and ecosystem service impacts could be significant. We suggest that resilience of forests in the area could be increased most easily by reducing the high herbivore pressure, which currently limits tree regeneration.

We believe that this work is of general interest to the readers *Forest Ecology and Management* as the potential for widespread dieback of forests is currently an issue of great concern. This interest is highlighted by the highly-cited review by Allen et al. (2010), which noted such dieback has now occurred on all wooded continents, and the fact that the *Journal of Ecology* recently dedicated a special issue to the topic of forest resilience, tipping points and global change.

I confirm that the enclosed work has not been published or accepted for publication in another journal or book.

I confirm that submission for publication has been approved by all relevant authors and institutions and that all persons entitled to authorship have been so named. All authors have seen and agreed to the submitted version of the manuscript.

Yours Faithfully

P A Martin

**References**

Allen, C.D., Macalady, A.K., Chenchouni, H., Bachelet, D., McDowell, N., Vennetier, M., Kitzberger, T., Rigling, A., Breshears, D.D., Hogg, E.H. (Ted), Gonzalez, P., Fensham, R., Zhang, Z., Castro, J., Demidova, N., Lim, J.H., Allard, G., Running, S.W., Semerci, A., Cobb, N., 2010. A global overview of drought and heat-induced tree mortality reveals emerging climate change risks for forests. For. Ecol. Manage. 259, 660–684. doi:10.1016/j.foreco.2009.09.001