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FORESTCHECK: Integrated site-based monitoring of the effects of timber harvesting and silviculture in the jarrah forest

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Context

FORESTCHECK is a long-term monitoring program and results will be used by forest managers to report against Montreal Process criteria and indicators for ecologically sustainable forest management. Initiated as a Ministerial Condition on the *Forest Management Plan 1994-2003*, Forestcheck has continued to be incorporated in the *Forest Management Plan 2014-2023* as a strategy for increasing knowledge on the maintenance of biodiversity and management effectiveness in Western Australian forests.

Aims

Quantify the effects of current timber harvesting and silvicultural practices in the jarrah forest (gap creation, shelterwood, post-harvest burning) on forest structural attributes, soil and foliar nutrients, soil compaction and the composition of the major biodiversity groups including: macrofungi, cryptogams, vascular plants, invertebrates, terrestrial vertebrates and birds.

Progress

- Work continued on the preparation of scientific papers reporting the second round of monitoring completed between 2007 and 2012. A manuscript that synthesises changes in species assemblages between the first and second rounds of monitoring in relation to climatic factors, changes in forest structure and improved sampling methods was finalised.
- Seven monitoring grids in Wellington District burnt by the large Lower Hotham bushfire in February 2015 were re-sampled. Invertebrate pitfall and light trap sampling was undertaken on burnt sites in spring 2016 and autumn 2017. Monthly inspections to identify vascular plant species in flower have revealed a number of species not recorded previously at these grids, including a significant range extension and a potential new species.
- Two additional grids were established in Perth Hills District to expand the fire chronosequence to include examples of forest burned very recently. Sampling of stand structure, coarse woody debris, vascular plants, invertebrates and vertebrates was undertaken in autumn 2017.
- Analysis of factors affecting the consumption of coarse woody debris was undertaken using data gathered from 20 monitoring grids burnt by prescribed fire and bushfire. A manuscript presenting models for woody fuel consumption is being prepared.
- Trends in vegetation cover at each monitoring grid have been quantified using satellite imagery to provide a basis for reporting on forest condition for the Forest Management Plan mid-term performance report.

Management implications

- Forestcheck provides a systematic framework for evaluating the effects of current silvicultural practices across a range of forest types and provides a sound basis for adaptive management. Sixty five monitoring grids have now been established, with 50 of these sampled at least twice.
- Findings from the project continue to inform a variety of forest management policies and practices and have been incorporated in periodic revision of silvicultural guidance documents. Monitoring data have been used to verify predictive models for forest growth and species occurrence.
- The network of Forestcheck grids also provides a framework for monitoring responses to random disturbance events such as bushfires and extreme droughts, and for examining the impacts of a changing climate over the longer term.

Future directions

- Finalise analysis of data from the 10-year monitoring period (2002-2012) and publication of 10-year results.
- Review monitoring protocols and incorporate new techniques where these will improve efficiency and quality of data collected.
- Prepare manuscripts reporting on consumption of coarse woody debris and the initial response of vascular plants and invertebrates following the 2015 Lower Hotham bushfire.
- Utilise data from Forestcheck monitoring to inform the Forest Management Plan mid-term performance report.