We need to understand forest makeup, ecosystems and biodiversity to manage Victorian forests

Key points

- Forests that are relatively undisturbed by fire, logging or grazing have high conservation value.

- Old-growth forests are an example. They contain significant number of older trees in the latter stages of their growth, with distinctive crowns, minimal regrowth and little, if any, sign of disturbance.

- These ecologically mature forests provide a wide range of habitats for plants, insects and animals, and are a vital part of the water and carbon cycles, which we depend on for clean water and other ecological and economic benefits.

- They also have cultural significance both for Traditional Owners, and for people of non-Indigenous heritage.

- Two research projects will help us to understand these ecologically mature forests better, so that we can reduce the threats to these precious ecosystems, and mitigate the effects of climate change and extreme events such as fire and drought.

Research project titles

Improving the forest stem-age dataset for East Gippsland

Mapping high conservation value forests in eastern Victoria

Who is doing this work?

Arthur Rylah Institute

University of Melbourne School of Ecosystem and Forest Sciences

Improving data on East Gippsland forest age

The Arthur Rylah Institute is developing a model that will produce reliable estimates of 'stem ages' and distributions of species in forests across East Gippsland. Stem age is the age of a tree since it grew from seed, or from when tree stems re-sprouted at or near the ground after a disturbance such as fire or timber harvest.

The work starts from a simple assumption that the longer a stand of trees has been undisturbed the longer it can grow, so it is more likely it will have trees with older stem ages. It also considers the different ways that species respond to disturbances, particularly fire.

If a stand of trees has been disturbed, then the number that has been replaced and what kind of species have grown back will depend on:

- the type of disturbance; for example, fire, logging, grazing or flooding

- the intensity of the disturbance, depending on the type of event

- the composition of the species in the ecosystem and which of those species dominate a stand

- the relative sensitivity of the dominant species of tree in that stand to different type of disturbance.

The project team will use Landsat imagery, logging and fire histories, and data on the sensitivity and responses of tree species to fire at various growth stages to model the current age of stems. The model will show how these four factors interact to produce the composition of the forest we would expect to see in a particular stand of trees.

Outcomes of the research

Using these data, models and research, the institute will:

- establish a baseline estimate of forest stem age based on extensive field assessments from the 1990's

- model the likely mix of tree species that compose the forest canopy at any location in East Gippsland

- estimate the relative sensitivity of various East Gippsland species to three intensities of fire, at various stages of growth

- derive maps and produce an annual summary of the type and intensity of forest disturbance over the whole region for a 30+ year sequence until 2018-19.

The modelling will produce up-to-date datasets of forest stem ages, which can be validated in the field, with expert review and with high-resolution aerial photography.

Mapping high-conservation value forests in eastern Victoria

The Arthur Rylah Institute's project will provide interim data until the University of Melbourne's School of Ecosystem and Forest Sciences completes its research in 2020.

The university's project team will use LiDAR to delineate the crowns of individual trees and predict their size in the forests of Eastern Victoria. The project team has developed a statistical modelling approach to estimate the age cohort structure of trees within a plot/ stand. They will be integrating this model with the LiDAR based crown mapping to identify the age structure of forests and map areas with ecologically mature trees. The team will be extending their current models from the Central Highlands to include new species of eucalypt and additional forest types common to Eastern Victoria.

The project team will also carry out field work to:

- calibrate and validate models for identifying forest types based on LiDAR data about the structure and extent of tree crowns

- extend the age cohort model from Mountain Ash (*Eucalyptus regnans*) to other dominant eucalypts in Eastern Victoria

- apply the approach to forests in West and East Gippsland.

What does the research team hope to find?

The research will produce information about the impacts of past fire regimes and historic disturbance on the structure and composition of forest. It will identify areas with giant trees, multi-aged stands and areas with structurally mature trees that have suffered recent disturbance and stands that have suffered little disturbance.

How will these projects help us look after ecologically mature forests?

The work of the Arthur Rylah Institute and the University of Melbourne's School of Ecosystem and Forest Sciences will produce reliable data about ecologically mature forest ecosystems in Eastern Victoria, which have high conservation value and need to be protected under the new Regional Forest Agreements.

The project teams will provide insights into the effects of past disturbances, and give us a better understanding of the impacts of bushfires on forest structure and composition. The research will also provide a baseline dataset that can be used for future monitoring of changes in forest structure and forest types.

More information

Future of our Forests
https://www2.delwp.vic.gov.au/futureforests

This series of fact sheets
https://www2.delwp.vic.gov.au/futureforests/forest-values-assessment/forest-values-assessment-fact-sheets

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