To manage Victorian forests, we need to understand forest biodiversity and ecosystems

Key points

- Biodiversity refers to all components of the living world: the number and variety of plants, animals and other living things across our land, rivers, coast, and ocean. It includes the diversity of their genetic information, the habitats and ecosystems within which they live, and their connections with other life forms and the natural world.

- Biodiversity in Victoria's forests, as in the rest of the State, has declined since European settlement.

- More than half of the state's native vegetation has been cleared since European settlement, and many native plant and animal species are at risk from a range of pressures, including the impacts of climate change.

- We need to understand Victoria's forests to manage them effectively and ensure Victoria has functioning plant and animal populations, improved habitats and resilient ecosystems, even under a changing climate.

East Gippsland forest Image: DELWP

- Understanding where biodiversity values occur in the landscape informs policy and decision-making about how forests are shared and managed.

- We are updating our knowledge of where biodiversity values are in the forest though on-ground surveys, spatial modelling and field validation of models.

Research project titles

Mapping high conservation value forests in eastern Victoria

Improving the forest stem-age dataset in East Gippsland

An up-to-date representation of rainforest communities within forest ecosystems in Victoria
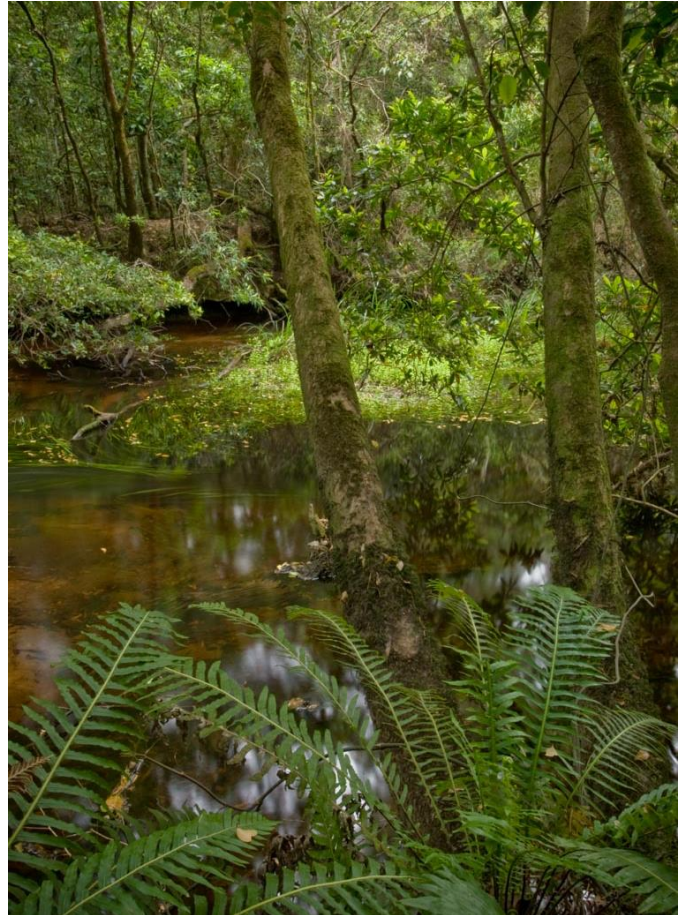
Updating Victoria's ecological vegetation classes

Who is doing this work?

University of Melbourne School of Ecosystem and Forest Sciences

Arthur Rylah Institute (DELWP)

Department of Environment, Land, Water and Planning

VICTORIA State Government | Environment, Land, Water and Planning

Mapping high conservation value forests in eastern Victoria

Ecologically mature forests support biodiversity and provide habitat for native species. These forests have become rare due to cumulative impacts of land use, forest management practices, and natural disturbances such as bushfires. Old-growth forest is a type of ecologically mature forest.

For the previous Regional Forest Agreements, forest growth stages were identified and described using aerial photographs of forest growth in State forests, but not across the reserve system. In the past 20 years there has been no comprehensive re-mapping of Victoria's forest growth stage. Major bushfires have occurred, so it is important to conduct an up-to-date assessment of the age of forests to determine how they have changed.

Technology has also improved since forests were last assessed - experts can now map forest more accurately using new satellite imagery and three-dimensional mapping tools.

LiDAR mapping

The University of Melbourne's project team will use LiDAR data to map the crowns of trees in the forests of Eastern Victoria, to better understand the extent and structure of ecologically mature forests.

This mapping involves an aircraft flying over the landscape, continuously making measurements by scanning the forest with pulsed laser light and measuring the reflected pulses that return to the aircraft. The technique yields a highly-detailed three-dimensional profile of the vegetation structure. The technique reveals incredible information about forest structure, from the top of the canopy to the understorey. The images can even reveal strips of bark hanging from branches and the tree ferns at the forest base.

This is a long-term project which will provide data for statistical models to estimate the ages of the trees. When complete, this model will provide a reliable way to identify forests that contain a high proportion of structurally mature trees, which are important to biodiversity.

The maps will be a foundation for an analysis of the impacts of past fire regimes and historic disturbance on the structure and composition of forests.

Improving the forest stem-age dataset in East Gippsland

DELWP's Arthur Rylah Institute (ARI) is developing a model that will produce reliable estimates of the likely stem ages and distributions of tree species in forests across all public land in 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 project team will use Landsat imagery to interpret disturbance histories, along with data on the sensitivity and responses of tree species to fire at various growth stages. The model will identify the likely current composition and growth stage of the forest for all forested public land in East Gippsland

The data produced by this model can support improvements to habitat distribution models for forest-dependent species.

An up-to-date representation of rainforest communities

Rainforests are a distinct type of forest ecosystem occurring only in environmentally stable settings, where fires have been absent for a long time. There are two forms of rainforest in Victoria: Cool temperate and warm temperate. Cool temperate and some types of warm temperate rainforest are listed as threatened under the Flora and Fauna Guarantee Act (1988). The most widespread community of warm temperate rainforest is not listed. Cool temperate rainforest occurs in highland areas with higher rainfall and fertile soils. Warm temperate rainforest occurs in lower lying areas and some coastal parts of Gippsland.

Rainforest and related vegetation are rare in Victoria and are susceptible to disturbances including fire, disease and threatening processes such as harvesting. Rainforests are protected from forest and fire management activities and require buffer areas that provide protection from drying, disease, fire and weed invasion.

The project team at the ARI will combine new high-resolution aerial photographs and satellite data with artificial neural-network classification programs to model and map the extent of rainforest systems. Machine learning techniques will incorporate examples of rainforest types and other vegetation determined from aerial photographs matched against climate and terrain satellite data.

Improved mapping will provide an updated estimate of the amount of rainforest in Victoria and a baseline measure for monitoring changes.

Updating data on Victoria's ecological vegetation classes

Ecological vegetation classes are the standard unit for classifying types of vegetation in Victoria. Plants are classified according to morphology, ecological characteristics, how they are distributed across an area, and their dependence on attributes of the environment they live in. In Victoria, data, mapped across Victoria's bio-regions, are used to set benchmarks and targets for conservation work.

A team at the Department of Environment, Land, Water and Planning (DELWP) will use the outputs from the rainforest mapping project and integrate this into the EVC database. The team will also undertake minor updates to the EVC maps, including simplifying EVC 'mosaics' (map units comprising complex patterns of several EVCs).

To inform forest planning decisions, the updated EVC database will be assessed against conservation targets set out in the RFAs, including:

- the amount of each EVC (at a bioregional level) that is in a park or reserve

- the proportion of each EVC that has been lost since European settlement

- the conservation status of EVCs

The outcomes of this assessment will be used to inform forest planning and management decisions, such as setting targets for protection.

How will these projects help conserve biodiversity?

This research and the research outlined in **Factsheet 5: Threatened Species** and **Factsheet 7: Climate Change** will give DELWP a long-term, whole-of-landscape understanding of the distribution and abundance of endangered ecosystems and biodiversity, and their changes over time.

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

Accessibility

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