

# Fact sheet 8: Valuing forest carbon

## Assessing the current and future value of forests in storing carbon

### Key points

- Forests regulate our climate by removing carbon from the air (carbon sequestration) and storing it.
- The benefit that Victoria's forests provide in mitigating climate change by sequestering carbon needs to be quantified and valued.
- Monitoring carbon stored in forests is a vital part of tracking greenhouse gas emissions, and sustainable management of forests.
- Improved estimates are needed on how forests contribute to carbon sequestration, including determining the quantity of carbon stored in Victorian forests and how much they sequester each year.
- The results will provide better information on forests' contribution to the Victorian economy and community.
- Good management of forests and restoration programs will protect stocks of stored carbon and can increase carbon sequestration in the future.
- Understanding Victoria's forest carbon cycle, the opportunity and value of potentially increasing carbon storage capacity of forests, and benefits of long-term protection of existing forests storing carbon are important for Victoria's sustainable forest management.

### Research project title

Economic assessment of Victoria's forests (current state)

### Who is doing this work?

Victorian Government Department of Environment, Land, Water and Planning

Australian National University Fenner School of Environment

### Assessing carbon sequestration and storage

The Department of Environment, Land, Water and Planning (DELWP) is assessing forest values as part of the regional forest agreements (RFAs) modernisation program. An economic assessment of the current benefits of Victoria's forests will include valuation of the benefits of climate change mitigation through carbon sequestration and storage.

The project will use an environmental-economic accounting framework to identify and describe ecosystem services produced by Victorian forests, and value the benefits they provide to people. This will include determining the quantity of carbon stored in Victorian forests and how this has changed over time. Researchers will model and map this across Victoria by RFA region, and apply economic valuation techniques to calculate the monetary value of the benefits carbon storage provides people in Victoria and globally.

The results will provide better information about the contribution forests make to the Victorian economy and community. This will help modernise Victoria's forest management system.

### Forest carbon storage

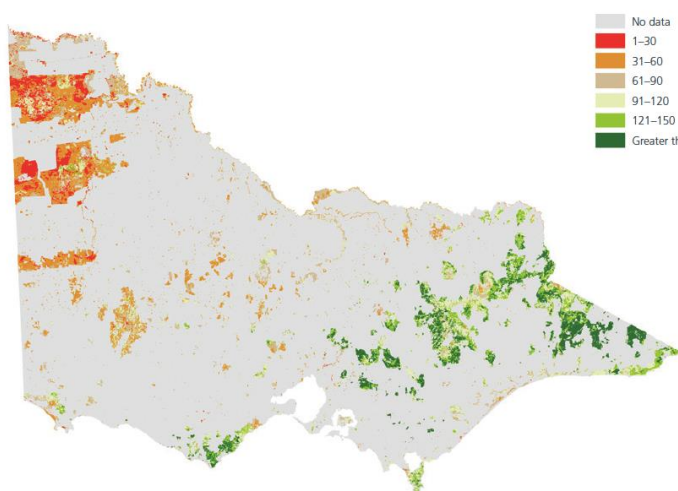
Forests around the world regulate the planet's climate by removing carbon from the air and storing it as carbon in their trunks, branches, foliage and roots, and as dead organic matter in forest debris. Known as carbon sequestration, this occurs through photosynthesis. The storage of carbon in carbon 'sinks' is vital to reducing climate change caused by the release of carbon dioxide through human activities.

Forests are an important part of the global carbon cycle because they can sequester a lot of carbon over long periods. Growing forests accumulate carbon; carbon-neutral forests accumulate carbon through photosynthesis but lose carbon by dying or decomposing; forests subject to heavy soil disturbance or frequent wildfires release carbon. Sustainably managed forests generate harvested wood products, and can potentially store carbon in long-lived products. Good management of forests (including preventing soil erosion, large-scale severe fires, vegetation disease, impacts of introduced

species and human pressure) and restoration programs (such as revegetation) will protect stocks of stored carbon and can increase carbon sequestration in future. Victoria's Land Use, Land-Use Change and Forestry sector is a net sink of carbon emissions, except in years with major bushfires (including 2003, 2007 and 2009).

### A valuable service

The network of Victorian land-based parks is a major carbon sink, storing more than 270 million tonnes of carbon (almost 1 billion tonnes of carbon dioxide equivalent, or CO<sub>2-e</sub>). The total carbon stored per hectare is generally 40 per cent higher, on average, in state forests than in parks and reserves. The Alpine National Park alone stores around 70 million tonnes of carbon. The Murray-Darling Depression stores the lowest average amount of carbon at 12.5 tonnes per hectare. Large parks (such as the Murray-Sunset and Wyperfeld National Parks) store large amounts of carbon due to their size. The tall, wet forests in the east of the state (such as the Yarra Ranges National Park) store much more carbon per hectare than similar-sized parks in dry regions. The mountain ash forests of the Central Highlands contain the highest density of carbon in the world – storing about 1,867 tonnes of carbon per hectare, which is more than the Amazon forest in Brazil.



**Tonnes of carbon per hectare stored in Victorian parks (Image: Valuing Victoria's parks, 2015)**

Revegetation programs in Victorian parks could capture and store 21,000 tonnes of CO<sub>2-e</sub> on average each year. The sequestration from two revegetation programs alone could be valued at more than \$1 million a year (using a market price of \$15 per tonne of CO<sub>2-e</sub>). If all of the carbon stored in Victoria's parks were released, the cost to offset these emissions would be around \$15 billion.

Based on Australia-wide surveys between 2008 and 2012, community understanding about how forests store carbon is high, and increasing. In the most recent survey, more than 90 per cent of people knew that trees absorb

carbon dioxide. About 71 per cent (up from 52 per cent in 2008) knew that 'carbon is stored in wood, even after the tree is harvested'. There was a decrease in the proportion of people who agreed that 'we should not be cutting down any trees for wood products' between 2009 and 2012, and an increase in the proportion of people who agreed that 'we should use more wood because it is more environmentally friendly than alternative materials'.

### How will the research help forest management?

The Victorian Government's *Climate Change Act 2017* has a target of net zero greenhouse gas emissions by 2050. Forests are an important element of the global carbon cycle, hence monitoring the amount of carbon stored in forests is a vital part of tracking greenhouse gas emissions, and sustainable management of forests.

Climate change is likely to have a negative impact on the health of Victoria's forests. In future, southern Australia is expected to have higher average temperatures, more hot days and more heatwaves, more intense extreme rainfall, and harsher fire weather (see Fact sheet 7: Climate change). Such changes would make it much more difficult to maintain stocks of forest carbon at current levels. It is unclear whether storage of carbon in state forests will increase or decrease based on current predictions, but recent research suggests that active forest management and the storage of carbon in wood products can help reduce greenhouse gas emissions.

Australia has an international commitment to reduce greenhouse gas emissions. All managed forests are subject to carbon accounting, and countries will be allowed to exclude emissions resulting from major natural disturbances, such as bushfires, from their carbon accounting. This increases the importance of accounting for forest emissions in Victoria's parks and other public land, and means that carbon stored in Victorian parks are potential economic liabilities (if carbon is released through environmental degradation or disturbances) or an asset (if further carbon sequestration occurs).

There is a need to improve the estimates of how Victoria's parks network, including forests, contribute to carbon sequestration. While there have been estimates of how much carbon is stored in Victoria's parks, the actual amount stored – and hence the true ecosystem service provided by forests – may be significantly more than previously thought. For example, recent measurements suggest the volume of carbon in the Central Highlands is two to five times higher than the conservative estimates of models.

Understanding Victoria's forest carbon cycle, increasing the carbon storage capacity of forests, and enhancing the long-term protection of existing forests storing carbon are critical challenges for Victoria's sustainable forest management and the contribution of Victorian forests to the global carbon cycle. Estimates of total forest biomass

are vital to monitoring regional and local carbon storage and emissions and could inform the development of climate change mitigation strategies.

### 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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