Fact sheet 9: Forests and water

Valuing the ecosystem service of clean water supply and purification by forests

Key points

- Forests provide clean water for consumers, agriculture, and the environment. They contribute to the recharge of aquifers that store water, continuing to discharge water into streams and wetlands during dry times. They also help regulate the flow of floodwater.
- Victoria's parks contain catchments that filter, purify and supply water for drinking, food production, industries, recreation, as well as environmental health and the nutrient cycle.
- It is possible to assess the quantity of water provided by an ecosystem, analyse its quality and pollutant levels, and calculate the value of these services in monetary terms.
- DELWP is valuing the benefit of clean water supply and purification that forests provide to us as part of a wider economic assessment.
- Calculating the benefits that forest ecosystems provide, in monetary terms, provides a comprehensive view of how ecosystems support production and consumption in our economy. This will help set the policy, management and investment priorities that will underpin our regional forest agreements.

Economic assessment of benefits of clean water supply and purification

Forests have unique intrinsic value, but they also provide valuable services to people. Victoria's forests provide clean water for consumers, agriculture, and the environment. They also help regulate the flow of floodwater. They are a vital part of the water cycle.

Research project title

Economic assessment of Victoria's forests

Who is doing this work?

Victorian Government Department of Environment, Land, Water and Planning

As part of the RFA modernisation program, the Department of Environment, Land, Water and Planning (DELWP) is undertaking an assessment of forest values, including an economic assessment of the benefits of clean water supply and purification.

The research team will produce a snapshot of current annual benefits. They will identify and qualitatively describe the ecosystem services according to economic and environmental data. They will also map the ecosystem services and their value for each RFA region.

Victoria's water catchments

Victoria has around 7 million hectares of forested public land. A range of different management arrangements apply on this land, with a number of forested areas jointly managed or co-managed with Traditional Owners.

The forests and parks contain catchments that supply water for drinking, food production, industries, recreation, as well as environmental health and the nutrient cycle. They provide cost-effective clean water, with the value of water-filtration services.

The quantity and quality of water we have depends on the health of our forests. It is possible to assess the quantity of water provided by an ecosystem and analyse its quality and pollutant levels. It is also possible to calculate the value of these services in monetary terms. Researchers can look at how an ecosystem affects the production of clean water, and can work out the cost if we had to replace the water purification service that the ecosystem provides.

Image: DELWP Image library

Water supply

Victoria's water supply catchments capture water and distribute it through water industry infrastructure such as pipes, pumps, channels and water storage facilities. Forested catchments, being some of the highest rainfall areas of Victoria, contribute to the recharge of underlying aquifers. These then act as a store for groundwater, continuing to discharge water into streams and wetlands during dry times. The released water is cleaner and suitable for drinking, food production, agriculture, hydropower, and other industries.

The water runoff from 86 of Victoria's national and state parks was estimated in 2005 to be 7,100 Gigalitres per year, or about a third of Victoria's total water runoff. In 2015, the market value of water runoff supplied in nine of the highest yielding Victorian national parks was estimated at $244 million each year. Water is particularly significant for the economies of communities in eastern Victoria (from the Alpine and Lake Eildon national parks), western Victoria (from the Grampians National Park) and Greater Melbourne (from the Yarra Ranges and Baw Baw national parks).

In 2005, the market value of water supplied in the Alpine National Park's seven river systems was estimated at around $12 million a year. In addition, about $45 million of production would be foregone per year if water used for irrigation were not supplied by the Alpine National Park. Other uses of water in industrial and household consumption, hydroelectricity and aquaculture raise the economic contribution of the park's water to as much as $110 million a year.

Water filtration and purification

Forests, woodlands and wetlands in Victoria's parks provide valuable services. They improve water quality by naturally filtering and purifying it, reducing the amount of soil sediment, pollutants and organic matter that would otherwise reach our waterways. This benefits agricultural producers and water consumers as clean water is critical for human health.

Parks in non-metropolitan areas reduce the amount of soil sediment entering regulated rivers by 92 per cent, and in Melbourne they reduce nitrogen loads by 85 per cent, compared with other land use such as cleared grazing land. The reduced sediment load from nine of the highest water-yielding national and state parks is valued at $50 million a year, based on the avoided costs of additional water storage that would be required if the ecosystem did not provide these services.

Maintaining or improving the condition of forest catchments can decrease the cost of water treatment. Large-scale fires, loss of vegetation cover, trampling by introduced animals, introduction of pathogens or disease, and other activities can degrade or disturb ecosystems, which reduces water quality and increases movement of

sediment into the water supply. Without forests and parks, we would need more water treatment plants to maintain our high water-quality standards.

Floodwater regulation

Native vegetation in forests and parks helps reduce damage from floods by helping regulate the flow of water in catchments. Healthy vegetation in forests, woodlands, grasslands and wetlands absorbs rain, regulates water movement, and releases water at more natural velocities and volumes, providing flood protection and reducing soil loss and erosion from rain events.

Peak water flows vary widely in parks, but it is estimated they could increase by 40 per cent on average (depending on location), under a scenarios of land-clearing for grazing. The value of stormwater retention of parks in Melbourne alone is estimated at $46 million per year.

Image: DELWP Image library

Research stages

The research team will assess the economic value of Victoria's forest assets in three stages.

In stage 1, the researchers will use an environmental-economic accounting framework to systematically identify and classify the ecosystem services produced by forest assets and the benefits people gain from Victorian forests. Stage 2 will involve computer modelling and spatial mapping of ecosystem services to determine the annual quantity of ecosystem services produced by forests (such as in megalitres of clean water), and their distribution across Victoria by RFA region. In Stage 3, the researchers will then apply economic valuation techniques to calculate the value in monetary terms of the annual benefits to people from an accounting and economic welfare perspective.

Working out the benefits that forests ecosystems provide, in monetary terms, helps us to get a more comprehensive view of how ecosystems support production and consumption in our economy. This will help set the policy, management and investment priorities that will underpin our regional forest agreements.

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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