scion
FORESTS ■ PRODUCTS ■ INNOVATION

Forest ecosystem services

New Zealand planted forests environmental facts.

New Zealand's around 1.7 million hectares of planted forests contribute an export return of more than $5 billion per year from wood and fibre based products. A large amount of lumber is also used locally.

Our forests are increasingly being recognised for the other products, services and benefits they can provide over and above wood, fibre and fuel. Together, these benefits are called ecosystem services and are worth far more in total than the wood, fibre and fuel alone.

Forest Ecosystem Services

The concept of ecosystem services was developed as part of the Millennium Ecosystem Assessment project in the early 2000s to analyse and quantify the true and total value of an ecosystem. We have applied the concept to New Zealand's planted forests.

There are four types of ecosystem services (Figure 1) all of which contribute to a range of human outcomes.

Provisioning services. These are the familiar, tangible and direct products extracted from the forests to be used or sold. They are the logs, wood, fibre and fuel. They also include crops such as ginseng or truffles, which may be planted or developed in the forest, and kōura (freshwater crayfish) grown in fire ponds.

Regulating services. These include the ability of the forest to store carbon, reduce erosion, improve water quality, and reduce the effects of floods. Steep land planted in trees will also have less erosion than if it were in pasture.

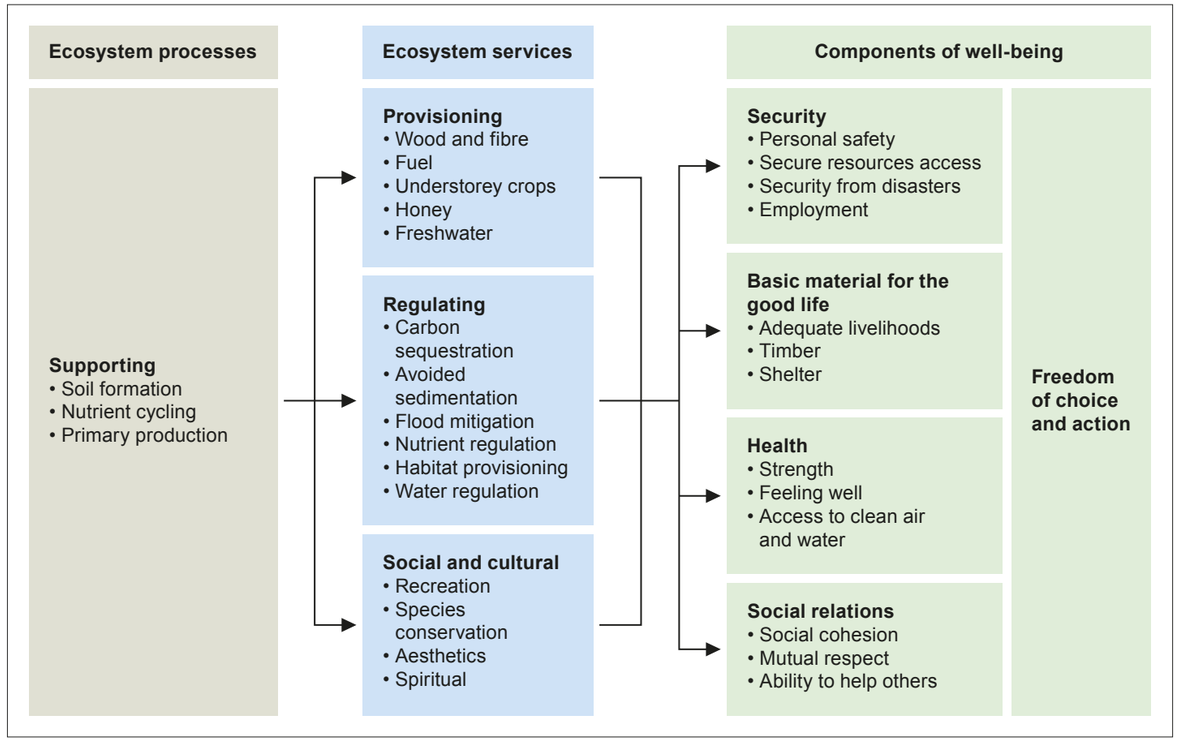


Figure 1: *Milliennium Ecosystem Assessment.*

Cultural services. Non-material social and cultural benefits are also provided by planted forests. These include recreational opportunities, aesthetic enjoyment and spiritual enrichment, as well as a biodiversity and conservation appreciation. New Zealand planted forests are often open to a range of activities, such as walking, mountain biking, horse riding, hunting, running, water sport events, motorsport, and exercising dogs.

Supporting services. The biological and physical processes in a forest drive the other three services. Examples of these include soil formation, nutrient cycling, water regulation, and oxygen production.

Important ecosystem services from New Zealands's planted forests

Carbon. The amount of carbon stored in New Zealand's planted forests was 454 million tonnes in 2012. Based on a carbon price of NZ$18 per tonne, this is worth approximately NZ$81 billion (2016). Planting 1 million hectares of new forests would store a further 254 million tonnes and help New Zealand meet about half of its agricultural greenhouse gas emission reduction commitments over the next 20 years.

Erosion Control. Replacing pasture with trees can decrease soil erosion rates by over 90%, considerably lowering the downstream risk of siltation, flood damage, or the costs of water purification. The value of avoided sedimentation through erosion control in New Zealand is estimated to be $6.50 per cubic metre of sediment.

Biodiversity. There are 168 rare and threatened species living in our planted forests including kiwi, karearea (native falcon), and Hochstetter's frog. It is estimated that 40% of New Zealand's karearea population lives in planted forests where they enjoy an open environment of harvested sites for nesting and hunting.

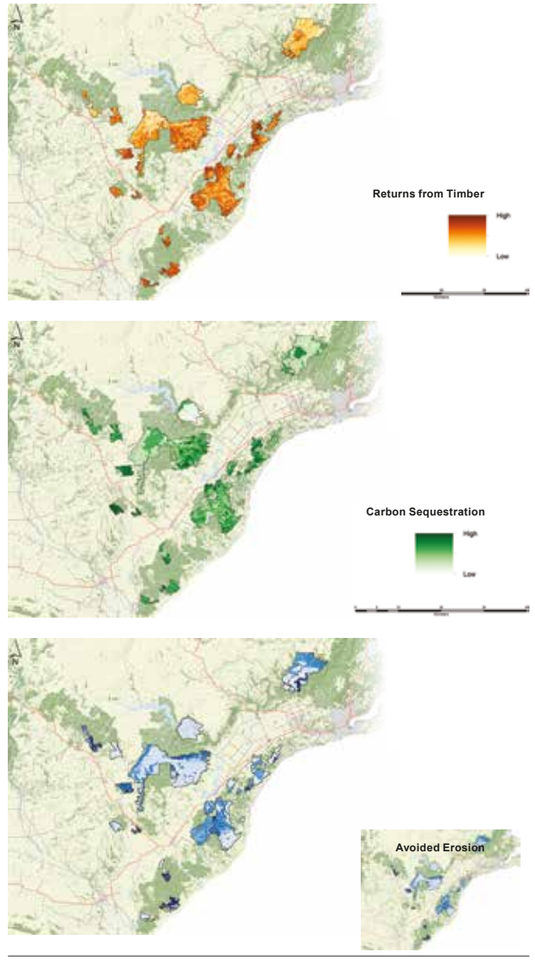
Water Quality. The shaded and clear watercourses which run through our planted forests are an ideal environment for invertebrates; fish such as koaro and bullies; and birds such as the rare blue duck, the whio.

Understorey crops. The dappled shade under a middle aged forest canopy can provide ideal conditions for growing high value food or medicinal crops such as ginseng, goldenseal, or a variety of mushroom species much prized by international markets.

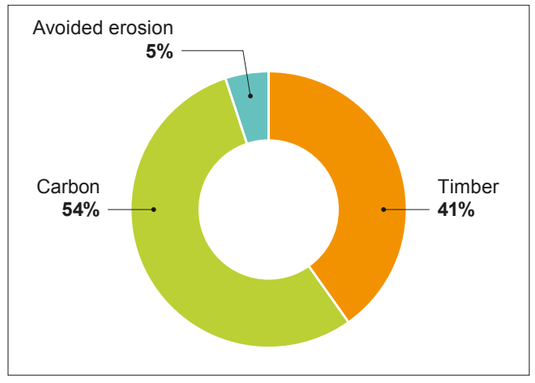
Recreation. The value of recreation (walking and mountain biking) in Whakarewarewa Forest in Rotorua contributes about $13 million per year to the local economy, significantly more than the value of timber harvested. Other forests, such as Hanmer, Woodhill, Bottle Lake, Naseby, and Hira all make significant contributions to their local communities from recreation.

The full value of planted forests

Not all ecosystem service are provided by all forests, but often multiple services can be identified and valued across forest sites. The value of these services can vary across sites.



Spatially explicit estimates of the values of timber, carbon and avoided erosion in the Wenita forest estate. Darker shades indicate higher values while lighter shades have relatively lower values. All values are specific to the Wenita forest estate only.



Contributions of different services to the value of the Wenita forest estate.

The sum of the contributions of different services to the total value of the forest shows that the full value or benefit of planted forests can be greater than that of timber alone.

Including an evaluation of the ecosystem services for an area of land gives a more accurate comparison of different land uses. This helps with decisions on optimal land use that will balance all of the environment, social and economic opportunities and features within a landscape, and across land uses.

Key links

New Zealand Planted Forests Portal. http://www.nzplantedforests.org/

Key references

Yao RT, Barry LE, Wakelin SJ, Harrison DR, Magnard LA, Payn TW 2013. *Planted forests*. In: Dymond J ed. *Ecosystem services in New Zealand: conditions and trends*. Lincoln, Manaaki Whenua Press. pp. 62–78.

Contact information

Scion
Email publications@scionresearch.com
Telephone +64 7 343 5899
Website www.scionresearch.com

About Scion

Scion is the Crown research institute that specialises in research, science and technology development for the forestry, wood and wood-derived materials and other bio-material sectors.

Scion's purpose is to create economic value across the entire value forestry chain, and contribute to beneficial environmental and social outcomes for New Zealand.

SCION™
FORESTS ▪ PRODUCTS ▪ INNOVATION

supported by forestgrowers commodity levy

August 2017