FORESTS ■ PRODUCTS ■ INNOVATION

Biodiversity

New Zealand planted forests environmental facts.

Spider orchid *Corybas oblongus*

There are some 1.7 million hectares of planted forests in New Zealand, 90% of which are in radiata pine.

The mix of planted forest and native ecosystems remnants that make up these forests are home to many other species, including at least 120 threatened indigenous species.

The flora and fauna found in planted forests include shade tolerant and understorey plants, aquatic organisms, insects, carnivorous snails, other invertebrates, lizards, frogs, birds and bats.

West Coast green gecko *Naultinus tuberculatus*

Threatened species

Plants. More than 20% of New Zealand's native plant fauna have been recorded in planted forests. This includes threatened orchids, ferns, shrubs and small trees and herbs. The periodic disturbance due to harvesting creates habitats for species that colonise disturbed ground. Subsequent canopy closure allows the development of a microclimate favourable to shade-tolerant plants.

Birds. Common and threatened insect-eating birds are found in planted forests. Lack of nectar and fruit sources means fewer species such as tui and kereru are seen. Kiwi inhabit all parts the forest, from slash piles to mature stands, with high populations in Northland. Bush falcon (karearea) also favour planted forests for their high prey density and availability of nesting sites in clear-felled pine blocks. The largest breeding population is found in the Kaingaroa Forest in the central North Island.

Bats. The nationally critical/vulnerable long-tailed bats are found in planted forests from Northland to South Canterbury, with the heaviest populations in and around the central North Island. The much rarer short tailed bats also use radiata forests in the central North Island for feeding, commuting and roosting. Bats choose home ranges near native forest remnants and in areas with older trees that provide roosting sites.

Powelliphanta sp.

Invertebrates. Indigenous invertebrate diversity in planted forests is very high. This includes endangered carnivorous *Powelliphanta* land snails, which are found in North and South Island plantations, and peripatus – ancient worms with legs.

The terrestrial invertebrates of New Zealand are extremely diverse and many species have not been studied and identified. Each habitat type is likely to have its own specific invertebrate fauna. While some invertebrates have been classified as threatened, there is insufficient data on more than 1000 taxa to assess their status.

Amphibians. The at risk/declining Hochstetter's frog (southern Northland to King Country, Coromandel, Bay of Plenty and East Cape) and vulnerable Archey's frog (the Coromandel and King Country) have been found within planted forests and associated indigenous remnants.

Lizards. Both geckos and skinks have been found associated with planted forests around the country. New Zealand has at least 110 species of indigenous geckos and skinks. The distribution and habits of many are poorly known, additional species are still being discovered, and others are being established through genetic studies. Almost half of New Zealand's reptiles are threatened or endangered by a combination of habitat loss and predation.

Aquatic ecosystems. The dense understory of native shrubs and ferns in most riparian areas in planted forests replicate the water conditions found in native forests. Streams in planted forests support a full range aquatic inhabitants including galaxiids, eels (tuna) and freshwater crayfish (kōura) creating a community similar to native forest streams.

Archey's frog *Leiopelma archeyi*

Valuing biodiversity in planted forests

Biodiversity in our planted forests make a valuable contribution to New Zealand.

How we value biodiversity. One approach is to ask how much people are willing to pay for something, e.g. would you pay $30/year to hear more kiwi? Another is to ask people to choose between a series of alternatives. For example, for $30, would you prefer to see more falcon or hear more kiwi? These choice experiments can identify the trade-offs individuals make between different options.

Research using a choice experiment approach suggests New Zealanders are willing to pay to see more biodiversity in local forests. The presence of native birds is especially highly valued.

A per hectare value for biodiversity can be calculated for an area or region by taking into account the area in planted forest, the population and the amount they are willing to pay for increased biodiversity.

Using values for biodiversity. Estimating the value of biodiversity allows forest owners and managers to report on the value of enhanced biodiversity to the local community and to manage the trade-offs in revenues from timber production and environmental values. The values can also guide the implementation of biodiversity programmes such as the 20-year Biodiversity Action Plan (2000 to 2020), and inform the formulation of future policies at local, regional and national levels.

Velvet worm *Peripatus sympatrica*

Managing biodiversity

Government legislation and policy. The Resource Management Act 1991 protects areas of significant indigenous vegetation and habitats of indigenous fauna. The New Zealand Biodiversity Strategy 2000-2020 (2000), and the New Zealand Biodiversity Action Plan, (2016) are part of New Zealand's international responsibility under the Convention on Biological Diversity.

Forest certification systems. The Forest Stewardship Council (FSC) and Programme for the Endorsement of Forest Certification (PEFC) certify forests meet verified standards of forest management, including maintaining, conserving and enhancing biodiversity throughout the entire forest estate.

Management programmes must take into account local environmental, ecological and cultural conditions, thereby reflecting and responding to communities' and national concerns and priorities. Forest owners and managers need to identify, map and manage areas of significant indigenous biodiversity. Management programmes should take into account local environmental, ecological and cultural conditions to reflect and respond to community and national concerns and priorities.

Examples of forest management include scheduling activities around kiwi and karearea breeding, fish spawning, and maintaining riparian buffers during logging. Predator control is another activity that directly improves biodiversity.

Highly modified and fragmented landscapes. Planted forests can function as a haven for some species in highly modified landscapes where they are often the only forest habitat. In fragmented landscapes, planted forests can become parts of corridors that facilitate species movement between otherwise isolated native forest patches and other habitats.

Building a better body of knowledge. A lot is known about some species found in planted forests, while very little research has been carried out on others. Much more work remains to be done to catalogue and maximise the biodiversity values of planted forests, and to minimize the effects of forest management activities on less visible forest dwellers.

The number of species recognised in planted forests will increase with further research, as will our knowledge of how they contribute to and interact in the planted forest environment.

Those working in planted forests and using them for recreation can help build knowledge by using apps such as NatureWatch and the Biodiversity in Plantation Forests project. These allow people to record their sightings of plants, animals and insects, and their locations.

Key links

rarespecies.nzfoa.org.nz

http://naturewatch.org.nz/

naturewatch.org.nz/projects/biodiversity-in-plantations

New Zealand Biodiversity Strategy 2000-2020

New Zealand Biodiversity Action Plan

http://www.mfe.govt.nz/more/biodiversity/overview-biodiversity/resource-management-act-and-biodiversity
http://naturewatch.org.nz/

Key references

Pawson, S. M., Ecroyd, C. E., Seaton, R., Shaw, W. B., & Brockerhoff, E. G. (2010). New Zealand's exotic plantation forests as habitats for threatened indigenous species. *New Zealand Journal of Ecology*, 342-355.

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About Scion

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

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

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