

from principles to practice



the new zealand sustainable forest management story



## E NGA MANA, E NGA REO, TENA KOUTOU KATOA.

IN NEW ZEALAND A SIZEABLE PROTECTED FOREST CO-EXISTS HAPPILY WITH A THRIVING WOOD PRODUCTS INDUSTRY. ELSEWHERE IT COULD BE A PARADOX, BUT IN NEW ZEALAND IT IS A REALITY.

Nearly 20 years ago, New Zealanders recognised that multiple uses of forest assets neither fully met conservation nor large scale commercial needs. So the management of the two was separated:

- Indigenous forests are fully protected on land owned by the State. Privately owned indigenous forests are managed sustainably under legislation;
- Plantation forests of exotic species are managed commercially and sustainably by private owners.

This result was made possible by early governments who fast-tracked plantation forest development so New Zealand no longer had to rely on native species for domestic timber and export income. Since then, plantation forestry has evolved into a major industry sector that produces large volumes of wood-based products in record time. The commercial utilisation of indigenous forests is reserved for certain targeted and high value needs and accounts for 0.1 percent of New Zealand's total wood production.

Sustainable management plays a large part in this success story.

Since the early 1990s, when environmental groups and the forestry industry first reached a mutually acceptable Accord, the consideration of environmental, social and indigenous people's needs has been paramount when planning and managing plantation forests.

Sustainably managed forestry is vital to New Zealand. Within an open and deregulated economy, it creates thousands of jobs and generates billions of export dollars – all without direct government assistance or subsidy. Plantation forests also provide clean water, erosion control and carbon absorption. Under their canopies are many species of indigenous flora and fauna. And their beauty and recreational opportunities delight New Zealanders and visitors alike.

According to the widely accepted definition, sustainability is about meeting the needs of the present without compromising the ability of future generations to meet their own needs.

In this publication we share some of the ways in which sustainable forest management has enriched the lives of New Zealanders and will continue to do so for decades to come. We have a good story to tell, and we want to share it.



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### THE 'PERFECT' PLANTATION CROP

Radiata pine (*pinus radiata*, Monterey Pine, New Zealand Pine), seed was imported from California in the 1840s to grow animal shelter belts. Today, one third of the world's total radiata pine stock is found in New Zealand.

Radiata pine grows faster here than anywhere else, with an average age to harvest of under 30 years. It adapts to different site conditions and responds well to silviculture treatments.

Once harvested, radiata pine has excellent nailing, gluing and painting properties and can be used for many purposes.

- Forests cover one third of New Zealand land (24% natural forest, 7% planted forest).
- Since the first mass plantation plantings in 1920, the area of natural forest has increased 11%.
- Half a million hectares of planted forest have been established since 1990.
- 77% of native forest is State-managed for conservation, heritage and recreation.
- 23% of native forest is privately owned.
- Commercial production from New Zealand's privately owned indigenous forests accounts for less than 0.1% of total production of wood fibre.
- Almost all plantation forests are commercially owned and managed.
- *Pinus radiata* is the most popular plantation species – 90% of the total.

The first Maori in New Zealand cleared vast areas of land for hunting, then came the European settlers who burned and harvested forests to create farms, ships and buildings.

Despite laws to encourage tree planting, mass forest clearance was so rapid that by 1913, some indigenous species faced imminent extinction. In 1918 timber exports were restricted, and in 1925 the Government introduced financial incentives to create plantations of imported species and reduce the pressure on native forests.

Resulting mass plantings in the 1920s and 1930s, and again in the 1960s, created a robust exotic plantation forestry industry that was soon able to

supply all New Zealand's domestic timber needs and secure the future of the remaining natural forest.

In 1986-87 the Government's forest assets were split between the Department of Conservation (to manage protected native forests) and the New Zealand Forestry Corporation (to manage plantation forestry operations). This ring-fenced most of New Zealand's native forests for conservation and restricted the commercial harvesting of native timber.

Subsequently, most State forests were sold to commercial interests in a complete restructuring of forestry industry ownership that accelerated economic performance.



### EMPLOYMENT

- The New Zealand forest products industry employs 24,000 people directly, 100,000 indirectly.
- Between 2000 and 2001, direct employment increased 3.2%.
- Every full time job in the industry creates nearly four further jobs.

Forestry has provided New Zealanders with employment and other social benefits for over 200 years. As well as creating thousands of jobs directly, forestry and wood production generate many more indirectly in the communities they foster.

Rural areas in particular have benefited. Afforestation of poor quality pastoral land has supplemented farmers' incomes as livestock returns have fluctuated. And with the 'new' pine forests – those due for harvest in the next 20 years – concentrated in places of high unemployment such as Northland and Tairāwhiti (East Coast), forestry will bring important economic and social advances.

### FOREST PRODUCTS EXPORTS

- New Zealand supplies 1.1% of the world's and 8.8% of Asia Pacific's forest products trade.
- Export revenues exceed NZ\$3.6 billion annually – twice that of 10 years ago.
- Forestry is New Zealand's third largest export industry.
- Australia is the biggest export market (NZ\$1 billion).

While New Zealand has just 0.05% of the world's forest resource, it is a top 20 global forest products supplier – the result of its intensive sustainable forest management policies.

Nineteenth century timber exports concentrated on Europe and Australia. Today, pine from New Zealand is sent to many other countries, including the United States, Japan and Korea, with developing markets like China and India playing an increasingly important role.



#### WHERE NEW ZEALAND FORESTRY WANTS TO BE

	TODAY	2025 GOALS
Planted forest	1.8 million hectares	3.5-4 million hectares
% of land area	7%	14%
Harvest	20 million cubic metres	40 million cubic metres
Annual sales	NZ\$5 billion	NZ\$20 billion
Exports	NZ\$3.6 billion	NZ\$14 billion
Employed directly	24,000	60,000
Employed indirectly	100,000	250,000
% GDP	4%	14%

#### THE FUTURE

- NZ\$445.5 million of new wood processing investments confirmed for 2003-2005.
- The annual plantation harvest is set to double by 2025.
- NZ\$3 billion additional investment required to process half of the increased production by 2015.

Forestry expects to be New Zealand's leading export industry and a top five global supplier by 2025.

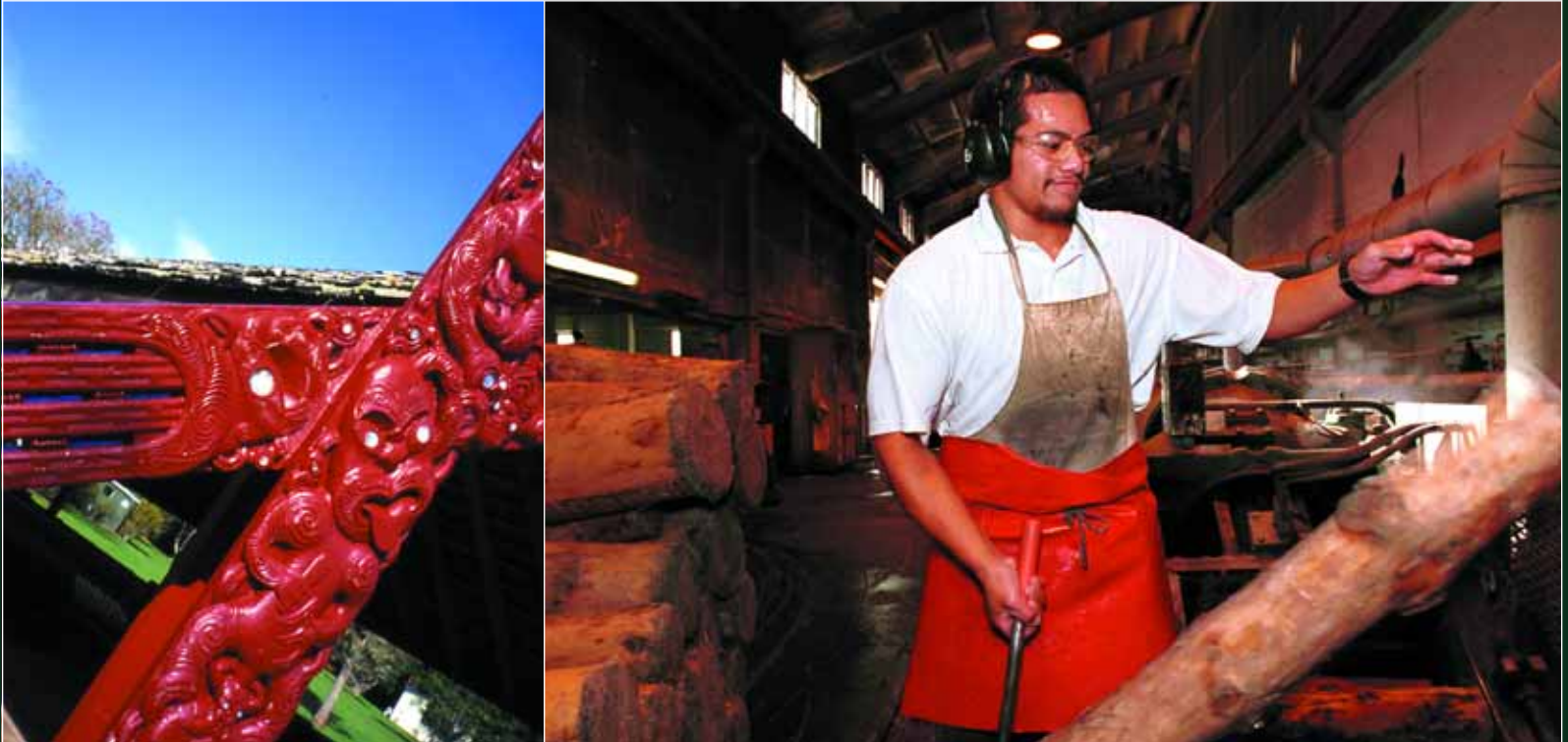
These goals are aggressive but attainable due to a combination of the burgeoning global population, expanding demand for sustainably produced wood products and vast areas of new forest reaching age of harvesting at the right time.

Third party certification of sustainable management practices will play a vital role in those expansion plans. Half New Zealand's plantations are already third party certified. The Forest Stewardship Council (FSC) system is the most widely applied, and the introduction of national industry-wide standards is imminent.

Industry, environmental, social and Maori interest groups joined forces in 2001 to develop national performance standards using an FSC framework. They released the first draft for public comment in late 2002.

It is planned to seek FSC endorsement of the standards by late 2003.

MAORI – THE TANGATA WHENUA (PEOPLE OF THE LAND) – PLAY A SIGNIFICANT AND INCREASING ROLE IN FORESTRY. THEY HAVE A SPIRITUAL CONNECTION WITH THE NATURAL WORLD (TE TAIAO) AND SEE THEMSELVES AS THE GUARDIANS (KAITIAKI) OF THE LAND AND ITS RESOURCES.



The modern sustainable plantation forestry industry provides great potential for the economic advancement of the Maori people.

- 14% of planted forest in New Zealand is on Maori land.
- Maori could ultimately own over 40% of the planted estate.
- Maori own one third of the land containing indigenous forest.
- One in four forestry workers is Maori.

#### TREATY OF WAITANGI 1840

The Treaty has come to be regarded as the founding document of New Zealand. Signed by certain Maori chiefs in 1840, it guaranteed Maori ownership of their traditional land, forest and fish resources in exchange for the acceptance of the authority of the British crown. The Treaty was ineffective until the mid-1970s, when settlements of past injustices and unlawful land acquisition began in earnest, and they are continuing today.

These binding settlements will change the face of forestry ownership. Many include large tracts of plantation and indigenous forest formerly in government ownership now worth billions of dollars.

Several transfers have made iwi significant forest owners. For example, 123,000 hectares of net stocked areas was recently transferred to Ngai Tahu ownership in the South Island.



### LICENCE FEES

While Treaty claims are being settled, Maori earn income from forest licence fees. When State forests were privatised in the 1980s and 1990s, what was sold was not the land – which remained in government hands – but the cutting rights. The land is prevented from sale until the Maori land claims are resolved. While the treaty claims are being settled the licence fees are held in a Trust jointly governed by the Crown and Maori.

Licence fees have accumulated to over NZ\$320 million. The income earned from those funds is used to assist Maori with 'preparation, presentation and negotiation' of forestry claims.

In 2000, NZ\$243 million was held in accumulated rentals.

### AFFORESTATION

Some Maori farmers are converting unproductive pastoral land to forest. A government study shows a further 200,000 hectares of Maori-owned pasture and scrub is suitable for plantation forestry.

To assist Maori, the Government has funded a number of afforestation projects. Those include the Taitokerau Forests venture, which is developing forests on Maori owned land in Northland, and the East Coast Forestry Project, which is promoting large scale commercial forestry to achieve the sustainable management of 60,000 hectares of eroded land in the East Coast region.

### EMPLOYMENT

Since the 1920s, the number of Maori in the forestry workforce has steadily increased. In 2001, over 8,100 Maori were employed in the industry directly, one quarter of all forestry workers.

The training achievement of Maori is impressive. In 2002 Maori achieved 27% of the qualifications earned in the industry. Maori comprise 37% of all apprenticeships.



WHILE THE GOVERNMENT AND LOCAL ENVIRONMENTAL GROUPS WERE IN CONFLICT DURING THE 1970S OVER NATIVE FOREST LOGGING, RELATIONS IMPROVED AS HARVESTING FROM THESE FORESTS WAS REDUCED.

The resulting co-operation has greatly assisted the expansion of New Zealand's forestry industry over the last 20 years.

A partnership has developed – first, between conservationists, the Government and the forestry industry and latterly, with the national certification initiative, with Maori and social groups – over the best way forward for the forestry industry.

From an industry perspective, two landmark agreements assume key importance – the 1991 New Zealand Forest Accord and the 1995 Principles for Commercial Forest Plantation Management in New Zealand.

These documents continue to influence the planning and operation of New Zealand forestry on a day-to-day basis.

#### THE NEW ZEALAND FOREST ACCORD

This world-leading agreement was signed in 1991 by 12 New Zealand conservation groups, the New Zealand Forest Owners' Association, New Zealand Timber Industry Federation, New Zealand Farm Forestry Association and New Zealand Wood Panel Manufacturers' Association.

Under the Accord, conservation groups acknowledge the importance of plantation forests and agree to support sustainable plantation management. For their part, forest owners undertake not to replace areas of native forest with new plantations.

#### PRINCIPLES FOR COMMERCIAL PLANTATION FOREST MANAGEMENT

The spirit of co-operation between conservationists and forestry continued with the signing of this document in 1995 by the New Zealand Forest Owners' Association, the New Zealand Farm Forestry Association and major environmental groups.

The Principles complement the Forest Accord by supporting New Zealand's aim to achieve environmental excellence in plantation forestry while protecting remaining native forests.

The Principles acknowledge that:

- plantation forestry has an important economic value for the national and regional economies.
- well managed forests present positive environmental benefits and any potential negative impacts can be minimised.

The document also includes a series of practical guidelines for shaping commercial plantation management from an ecological, social and economic point of view.





“Plantation managers will, to the best of their ability, conduct forestry operations in an energy and resource efficient manner, minimising and disposing of waste in an environmentally acceptable way.”

Principles for Commercial Plantation Forest Management

### HUGE CARBON SINK

Continuing forest expansion since 1990 – particularly on converted farmland – makes New Zealand one of the few countries in the world capable of achieving a positive carbon balance through afforestation.

In fact, it is thanks to the forest industry's provision of carbon sinks that New Zealand has been able to ratify the Kyoto Protocol.

- One hectare of radiata pine absorbs 26 tonnes of carbon dioxide annually.
- New Zealand's forests absorb nearly 24 million tonnes of carbon dioxide annually.

### ENERGY AND WASTE

Wood processing is New Zealand's second highest industrial energy consumer. As harvest sizes increase, the industry's energy requirements (mainly for process heat) will grow accordingly.

- Wood processing consumes 50PJ of energy (12% of the national total) annually.
- By 2020, that is expected to rise to 83PJ annually.

However the modern forestry and wood processing industry already sources a significant proportion of energy requirements from wood residues.

Estimates by Forest Research of the technical potential for woody biomass for New Zealand indicate that an additional 50PJ/year by 2005 could be available from increasing volumes of forest residues. The highly rated research centre aims to effectively utilise bioenergy in commercial markets through its work on:

- advanced bioenergy supply chain technologies,
- thermochemical biomass conversion technologies,
- biomass based distributed energy systems,
- the environmental and socio-economic implications of bioenergy.

AFTER NEW ZEALAND BROKE FROM THE ANCIENT CONTINENT OF GONDWANALAND, ITS NATIVE SPECIES EVOLVED SEPARATELY FROM THE REST OF THE WORLD FOR SOME 85 MILLION YEARS. AS A RESULT, MANY ARE UNIQUE TO NEW ZEALAND AND THEIR PROTECTION IS A NATIONAL PRIORITY.

IN RECENT YEARS, NEW ZEALAND HAS MADE A SIGNIFICANT CONTRIBUTION TO THE INTERNATIONAL DEBATE ON THE PROTECTION OF BIODIVERSITY AND HAS ESTABLISHED A GOOD TRACK RECORD IN ATTEMPTING TO PROTECT THAT DIVERSITY.

OVER THE LAST DECADE NEW ZEALAND HAS BECOME SIGNATORY TO SEVERAL INTERNATIONAL AGREEMENTS COVERING BIODIVERSITY, INCLUDING AGENDA 21 AND THE CONVENTION ON BIOLOGICAL DIVERSITY.



#### THE ROLE OF PLANTATIONS

New Zealand researchers believe plantation forests make a major contribution to preserving biodiversity.

They house a wide range of indigenous birds, vegetation and insects, and new forest plantings on previous pastoral land are more ecologically rich than the environment they replace.

- Research shows the biodiversity of older pine stands in the central North Island is comparable to that of native podocarp and kauri forests.

- A 1992 study showed that the greatest native bird concentration in New Zealand was in a single mature radiata pine stand that supported up to 652 pairs of native bird species per 100 hectares.
- Forest Research studies have recorded 270 vascular plant species (over 200 indigenous), 370 mostly indigenous beetles and rare and protected species of bat and frog in pine plantations.
- A 1996 NIWA (National Institute on Water and Atmospheric Research) study showed that the diversity of fish species is higher in streams draining from plantation forests than in those draining from natural forests or pasture.

#### ENDANGERED SPECIES

Major forestry corporations implement management plans whenever endangered or threatened species are found on their estates. Actions might include surveying the population, limiting burning, training staff and contractors, protecting habitat from harvesting damage, controlling predators and erecting signs.

Such plans have helped to protect several rare species, including the kiwi, Hochstetter's frog, the New Zealand falcon and the kokako.

"The parties agree that the protection of New Zealand's indigenous biodiversity and, where appropriate, its restoration, are important objectives." Principles for Commercial Plantation Forest Management



## BIOSECURITY

New Zealand's geographical isolation means many serious forestry pests have not become established here. Western gall rust, which is a problem in California, the natural home of radiata pine, is unknown in New Zealand.

However, lack of controls in earlier times and the recent increase in imports and international visitors have admitted several unwanted forest fungi, weeds and pests.

Over 160 overseas forest and timber pests threaten native and plantation forests, 38 affecting radiata pine. The European shoot moth, nun moth, pine

pitch canker, gypsy moth and painted apple moth are just a few.

The dothistroma needle-blight fungus, for example, which affects pine tree growth, requires a NZ\$1.6 million annual control programme, largely funded by industry.

Government, industry and research organisations work closely together to devise and implement strict biosecurity measures to protect New Zealand forests from further incursions, and to control existing pests.

These activities include:

- An NZFOA aerial and ground surveillance programme.
- Ministry of Agriculture and Forestry forest protection operations such as quarantining, border checks, forest stand inspections and pest outbreak monitoring.
- Forest Research's Health and Biosecurity projects.
- The New Zealand Forest Health Research Collaborative, which identifies and funds research projects.



“Forestry operations shall be conducted in a manner that safeguards stream margins and water bodies with the objective of achieving healthy aquatic ecosystems.”

Principles for Commercial Plantation Forest Management



## THE ENVIRONMENTAL IMPACT OF FORESTRY ON WATER AND SOIL IS HOTLY DEBATED WORLDWIDE.

In New Zealand, early foresters tended to pay less attention to the environmental impact of their activities. By contrast, the modern industry works to a clear set of guidelines, as set out in the Forestry Accord and the Principles for Commercial Plantation Forest Management, and regularly commissions environmental studies to determine and monitor the effects of plantation forestry on water and soil quality.

## WATER QUALITY

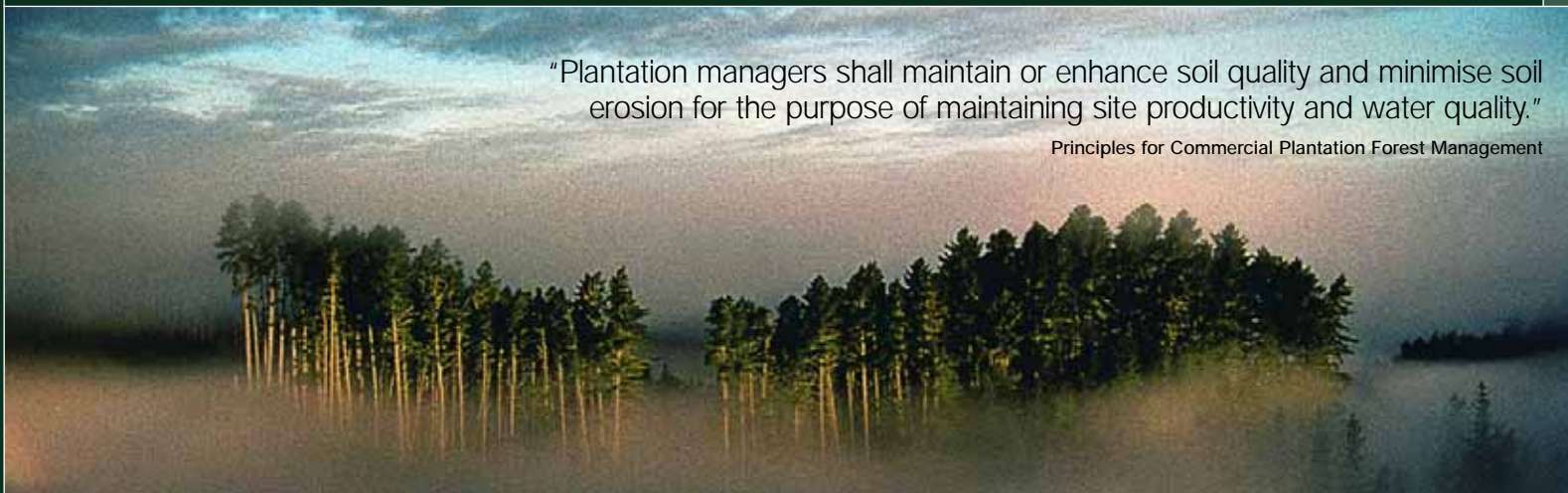
Local research shows that, compared to other land uses, New Zealand plantation forests produce high quality water.

Best management practices ensure forest operations do not degrade water quality. Actions include avoiding disturbances close to stream channels, reducing the erosive power of water on bare surfaces and protecting the infiltration capacity of forest soils.

Establishing riparian zones next to streams adjoining harvesting areas is common. This stabilises stream banks, improves biodiversity, maintains stream shade and provides a buffer between the water and the harvesting.

“Plantation managers shall maintain or enhance soil quality and minimise soil erosion for the purpose of maintaining site productivity and water quality.”

Principles for Commercial Plantation Forest Management



## AFFORESTATION

Until quite recently, an average 60,000 hectares of New Zealand rural land has been converted each year from pasture, tussock or scrub to forestry plantations. Research by NIWA shows that, on balance, the potentially negative impacts are minimised by industry-wide acceptance of sustainable forest management practices.

- Water quality improves with the removal of the nutrients and disease-causing organisms entering streams from grazing animals.
- Hillside erosion is slowed or halted, reducing the amount of sediment entering streams and improving the water clarity downstream.
- Plantation trees shade small streams and contribute leaf litter and wood, returning them to near-native forest conditions and encouraging native fish and insect life.

Other New Zealand studies have determined there is no difference between native fish communities living in plantation forest streams and those in native forest streams. While harvesting may negatively impact on aquatic habitats, streams recover quickly.

## SOIL QUALITY

New Zealand forest owners recognise that soil quality is important to the productivity of current and future tree crops and to local aquatic environments.

New Zealand pine improves the porosity and nutrient and organic matter levels of previously degraded soil, to the extent that many soils supporting a third crop of radiata pine will increase productivity in subsequent rotations.

Pine trees, especially those over eight years old, are as good as indigenous species at improving soil quality, preventing landslides and controlling soil erosion. In several areas, plantation forests have been established primarily for that purpose.

- On the hilly, windy West Coast of the North Island, a long strip of radiata pine has helped stabilise sand dunes that once threatened to drift on to nearby farmland.
- To the north of Auckland, plantations have reclaimed land ravaged in the late 19th century by gum diggers, who mined the valuable fossilised resin ('gum') from kauri trees to sell for use in the manufacture of paints, varnishes and polishes.

However, some aspects of forest operation, particularly roading and harvesting, can cause soil erosion and compaction, especially in sloping forests that combine weathered volcanic soil with high intensity rain.

Preventing or reducing soil erosion is, therefore, a major focus. Roads are run along hill ridges instead of in the middle of slopes; earth is stored away from streams; road run-off is deflected away from water bodies; and earthworks take place during dry periods.



### THE RESOURCE MANAGEMENT ACT (RMA)

The RMA passed in 1991 replaced most existing legislation related to resource, land, air and water issues. It broke new ground by:

- Legislating for land air and water in a single Act.
- Being effects-based rather than excluding specific activities.
- Placing the onus for judging and tackling environmental issue on local communities.

Implementation of the RMA has not always been plain sailing. While legitimate stakeholder interests need to be protected, industry frequently charges that the Act causes unnecessary delays and increases costs. The industry is therefore working closely with central and local government to identify areas of improvement in the Act's implementation. A draft industry code of best practice is in development and seminars have been held with local government to encourage more efficient processes. By improving dialogue and best practice on all sides it is hoped to streamline RMA procedures and lead to better local outcomes, both for the industry and stakeholders.

### RECREATION

Many plantations are located in some of the most scenic areas of New Zealand and most commercial forest owners allow public access.

For safety reasons, some areas have restricted access or require a permit to carry out certain activities. The largest forestry companies issue over 160,000 entry permits a year.

Popular pursuits include bush walking, mountain biking, driving off road, picnics, hunting and horse riding.

### COMMUNITY CONSULTATION

The framework of regulations, consents and codes of practice ensures community consultation and consideration of environmental and social impacts. In addition, most companies have their own procedures and guidelines for managing local environmental and social issues.

One influential code is the Forest Code of Practice (FCoP). Published in 1990 after three years of industry consultation, the Code assists organisations to "plan, manage and carry out forest operations in a sustainable manner." It provides checklists and rating systems for highlighting and assessing potential problems in the field as well as risk mitigation and reduction advice.



## EDUCATION AND TRAINING

The forestry and wood products industry aims to increase the skills levels of its workforce in order to increase productivity, promote safety and meet international best practice standards. Today, there are nearly 9000 trainees (double the figure four years ago) and 335 apprentices in the industry.

Forest Industries Training, a training organisation funded jointly by government and industry, determines training needs and standards in close consultation with industry representatives.

National Certificates, National Diplomas and university degrees cover everything from forestry business management, silviculture and operations management to tree felling, harvesting and log making. Many qualifications combine formal with on-site education. To ensure consistency and quality, Certificates and Diplomas are registered through the New Zealand Qualifications Authority (NZQFA) framework, which also accredits independent training suppliers.

Most companies provide on the job training, with many linking their training to the NZQFA framework.

## HEALTH AND SAFETY

While increasing mechanisation and technological advances have reduced or replaced many repetitive and dangerous manual tasks, the industry continues to strive for excellence in workplace safety.

Health and safety practices are governed by several pieces of legislation including the Health and Safety in Employment Act 1992 and the Hazardous Substances and New Organisms Act 1996.

Many national education and awareness initiatives have been introduced. They include:

- Regular dialogue and co-operation with government agencies responsible for safety and with unions.
- The industry's longstanding 'Forest Safe' campaign.
- The industry's comprehensive drug and alcohol programme.
- The Safety Indicator System – a web-based management tool developed by industry with the support of the Accident Compensation Corporation which allows companies to benchmark their safety performance across the whole sector and also internationally.

Further safety programmes are also implemented at company level, with employee action groups, safety audits, regular communications and training schemes. These programmes have achieved encouraging results.

## HUMAN FACTORS & ERGONOMICS

The Centre for Human Factors and Ergonomics (COHFE) at Forest Research in Rotorua does research work to improve forestry worker safety, health and performance. Success stories include:

- Introducing high visibility clothing that dramatically reduced the number of 'unseen' incidents.
- Helping local manufacturers produce a special boot that greatly reduces slips, trips and falls.
- Designing a protective extension for boots that reduces chainsaw cuts to feet.
- Devising a Forest Stress Scale to improve safety and enhance industry recruitment and retention rates.

Current projects range from studying the effects of dehydration, examining musculoskeletal disorders, improving vision in forest vehicles and tackling all terrain vehicle safety.



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