

# The root of the problem

**M**assive December floods in Golden Bay. Over half a metre of rain in 28 hours. Steep slopes. Crumbly granite soils. Heart-rending loss of the houses, gardens and roads built on fans and flood plains. Forestry cops a lot of the blame. So what's new? Let's recap.

One third of New Zealand averages an uplift of more than a millimetre per year, from tectonic movement. Obviously, the altitude of our peaks does not change that much – erosion ensures a rough equilibrium. We have steep slopes (perhaps 28° median) because, in part, they are protected by indigenous forest. So how do trees minimise erosion?

Our superseded Catchment Boards – mostly agriculturally trained – had some funny ideas. They believed that the most important factor was that trees dried out the ground. But when we get half a metre of rain on saturated soil and the whole landscape is a liquid mush, the minuscule contribution of interception by vegetation is irrelevant. Catchment Boards compounded their crazy ideas by planting deciduous poplars (even though most rainfall occurs during winter, work that out) and advocated wide spacings to allow understorey grazing. Grass has always been King.

As the late Colin O'Loughlin showed, the key factor is root-binding of the soil. It's not the total root mass per hectare, because coarse roots provide little benefit, but it's the tough stringy nets of a forest's fine roots, and the way they cling to soil particles. The relatively shallow root network of trees exerts a stabilizing effect even at deeper levels where the slipping plane may actually occur.

One problem is that radiata pine roots rot quickly and lose their soil-binding ability within a year or two after harvest, whereas replacement trees are not effective for at least six years. The "window of vulnerability" for a typical rotation is therefore 10-20% of the time, and is not helped by our traditional large harvesting coupes. Some of the general public are unhappy at the size of our clearcuts, and often compare them unfavourably to smaller Northern Hemisphere equivalents. We could certainly reduce the size, but not without with a significant economic cost. In addition, every coupe has to be serviced by its own system of roads and landings – themselves a major cause of slope instability.

When the public blithely restricts harvesting

practices for a perceived environmental benefit, they run the risk of condemning that land to a future in pasture – and that is the worst possible outcome. The equilibrium slope of New Zealand under a total pastoral cover would be a lot lower than its existing one.

The truth is, with the benefit of hindsight, many of our hillsides should never have been denuded of indigenous forests. This would definitely not have eliminated soil erosion – undisturbed native forest sometimes slips away – but it would have kept the problem at a more manageable level. The philosophy at the time was "one blade of grass is worth two trees" and yet a substantial proportion of the cleared land contributed little to the nation's economy – even with timber, because the forest was usually burnt without being first logged.

Where there is critical infrastructure in the valleys, it might be socially desirable to restore the hillsides above to indigenous cover, but who compensates the private landowner? The public should also appreciate that indigenous cover would provide almost no profit to land worth thousands of dollars per hectare (even with carbon credits). People must also take some personal responsibility for their lack of foresight in acquiring houses on floodplains, fans, or anywhere near unstable slopes.

There is also the issue of how to achieve native reforestation. At present there might be pasture, short scrub, or tall pine trees. It is an incredibly slow, expensive, and difficult task to establish such vegetation by traditional forestry methods (soil preparation, weed control, planting etc). Native trees have evolved in a forested environment and mostly do not appreciate full sunlight or the frost and drought that go with open terrain. They cannot compete with introduced grasses. Moreover, in the 50-100 years of succession that it will require to establish a mature forest cover, there is considerable risk of another catastrophic storm event. There is a better way of achieving the same result.

---

## Erratum

We regret to advise readers that the legend in Figure 5 of John Ellis's paper in the November Journal was incorrect. The description of the lines in the legend should be the same as for the previous figures. We apologize to John for this error.

The fastest and cheapest method of establishing native forests is nearly always to establish an exotic forest cover of fast-growing, pioneer species. The canopy produces dappled sunlight amenable to native seedlings, and suppresses grasses. This exotic cover need not (should not) be logged, but allowed to die out naturally or be killed upright by ring-barking or poisoning. Our native pigeons should be put to work!

These are the most effective, and cost-effective, agents we have for native establishment. To encourage them, trees like tree-lucerne should be scattered throughout.

But supposing there is no political and financial means of compensating the landowners. Is there a way that the land can retain its profitability and still meet the community's need for erosion minimisation? A forest of coastal redwoods, where suitable, might work. It could be highly profitable, is extremely shade-tolerant so can be planted as an understorey, the trees can live to a thousand years old (unlike the ephemeral radiata pine), and most importantly the roots do not rot at harvest: there is no "window of vulnerability"

with redwoods. The popular but ill-considered phrase "selective logging" has most meaning in relation to this species.

Lastly, it is important to note that the forest sector has still some work to do, particularly in regard to reducing storm impacts after logging. Logging slash is often a prominent component of the battering rams that flatten houses, and is sometimes a cause of temporary damming (followed by violent dambursts) in small creeks. Harvesting crews, at acceptable cost, can ensure that such debris is placed around the terrain in such a way that it is unlikely to find its way into a watershed. Better still, let's hope that a commercial use will be found for the huge quantities of energy-packed fibre left behind to rot on our hillsides.

Piers Maclaren



## New Zealand Institute of Forestry 2012 Conference



New Zealand Institute of Forestry  
- Te Pūtahi Ngāherehere o Aotearoa Incorporated -

### The Time and the Place for Wood and Wood Products?

Every year forestry industry professionals & investment managers, engineers, contractors, educators and researchers from all over the country consider that attending the NZIF Conference & AGM is a **MUST**.

The Conference & AGM will be held from the 1st to the 4th of July 2012 at the University of Canterbury, Ilam, Christchurch. The NZIF is proud to support Christchurch and the New Zealand School of Forestry.

Our theme for this year's conference is:

#### "Engineering value: Growing & Harvesting Forests for Novel Wood Structures"

- Forest growing - will our structural logs make the grade?
- Forest harvesting, roading and infrastructure
- Engineered wood products - Building the Future of Forestry

### At conference you will:

- Learn directly from the leading authorities. Conference speakers include the industry's most respected authorities, providing their expertise and insight including topics such as Recent Legislative Changes that Impact Forestry Professionals: Real Estate Agents Act 2008, Financial Advisors Act 2008 and an Update on Forest Valuation Standards.
- Get information you can use on the job immediately. Sessions are geared toward practical knowledge that makes even complex issues easy to understand and apply in the real world.
- Gain up-to-date knowledge on current industry topics, practices and research ideas. Conference speakers will address the three conference themes which cover the entire value chain from forest growing to wood end use.
- Select sessions for your specific needs. With comprehensive sessions and workshops to choose from, you can schedule your time to maximum advantage.
- Opportunities to meet fellow professionals to exchange information and ideas amongst the student posters and exhibitors.

A special feature of our conference is to get to the grass roots on field trips, sponsored by **Future Forests Research**. You will inspect and discuss the uses of wood in building design and construction in the Christchurch City rebuild, after the destructive earthquakes. In addition you will experience "Logging within a city forest" – log value recovery using the latest optimiser software developed by Waratah Forestry Services.

The highlight of the conference will be networking with your peers at the Pre Dinner Conference drinks, sponsored by **HSBC**, and then enjoying the awards dinner sponsored by **Rayonier Matariki Forests**.

Our Guest speaker is Joe Bennett, regular columnist in national dailies, and well-know (and loved) for his capricious sense of humour.

Visit our conference website for more information and to register today at [www.nzifconference.co.nz](http://www.nzifconference.co.nz)

We look forward to seeing you there!