

The importance of looking at the big picture

A key concept in the Forest Management course that I teach to our third year forestry students is understanding the difference between stand-level analysis and forest estate-level analysis. Although foresters carry out operations in stands they do so in the context of managing the whole forest; i.e. they are primarily concerned with the benefits and costs to the total entity. Forest management deals with the question "How should the total estate be managed to maximise net benefits given existing and future constraints including output requirements and resource limitations?"

Foresters have a good understanding of the concept and have long been concerned with working circles and management plans. New Zealand forestry has been fortunate to have had a strong tradition in forest estate modelling led by individuals such as Brian Allison and Oscar Garcia. This has ensured that the necessary analytical tools have been available.

Although foresters understand the difference between forest-level analysis and stand-level analysis, the concept is poorly understood outside the profession. In the case of environmental benefits, the common perception is that while forests provide benefits during the growth phase, most of these benefits are lost at harvesting. While this might be partially true at the stand-level it is certainly not true at the estate level.

Piers Maclaren has long been a champion in the battle to change these perceptions. In explaining how a forestry carbon sink works (in his book *Environmental Effects of Planted Forests*) he notes that "A common source of confusion arises because of a failure to distinguish a stand of trees from a forest. Whereas it is true that a stand takes up carbon during its life and this carbon is released or removed at clearfelling, plantation forests in New Zealand are not usually clearfelled – a forest consists of stands of different ages. Kaingaroa Forest, for example, contains considerably more carbon than the scrub that preceded it in the 1920s. This is despite the continuous logging of component stands of that forest." Piers has long advocated the need to do carbon accounting at the estate level.

The need to do the same for other environmental services is being increasingly recognised. For example, in the February 2005 Journal, Tim Davie and Barry Fahey noted the "...overall concern in hydrology over scale: that some processes observed at the hillslope and small-catchment level may not be as important when scaled up to larger catchments." David Hamilton observed the need to develop knowledge about catchment scale implications of forestry on nutrient yields. In this Journal, Tim Payn and Peter Clinton mention plans of extending their nutrient balance model to run within a spatial framework to predict the consequences of forestry in a catchment context.

There is much discussion at the moment about the development of the Permanent Forest Sink Initiative.

Under this landowners who establish permanent forest sinks will obtain tradable Kyoto Protocol compliant emission units for the carbon sequestered in their forests. To be eligible, land must not have been covered in forest as at the start of 1990 and the forest must be "direct human induced...through planting, seeding and/or the human-induced promotion of natural seed sources." Harvesting is permitted after 35 years but must leave a continuous canopy cover.

The requirement of a minimum harvest period of 35 years effectively neutralises the advantage of radiata pine and favours alternative species. The requirement for a continuous canopy forest will limit some species and impose additional costs if the concept is applied at a stand level.

Detail for the Permanent Forest Sink Initiative is still being developed. It would be great to see the Initiative adopt a definition of continuous canopy forest that could be applied at the forest estate as well as the stand or coupe level – one that recognised that permanent forests, in which individual stands are harvested, do provide continuous benefits when viewed in totality.

An initiative defined in such a way could be a catalyst for creating an estate of alternative species of sufficient scale to provide, through operational experience and research, the necessary underpinning knowledge about:

- Which species/hybrid to plant.
- What site to plant them on.
- How they will grow.
- How much it will cost to plant and tend them.
- What volumes will be produced by different log grades.
- What the wood properties, manufacturing options and market opportunities are.

There is a touch of the proverbial chicken-and-egg about alternative species – our current knowledge of most species does not provide the confidence for a large scale estate but there is currently not the scale of resource to provide the required operational experience or financial support to provide the necessary research knowledge.

In the case of Douglas fir there has long been a substantial estate although the centre of gravity has shifted south to Otago/Southland. There is a good knowledge base that is being expanded through the well-coordinated research programme of the Douglas fir Cooperative led by Leith Knowles.

For other candidate species the challenge is how to reduce the uncertainty about growing them. A major increase in research and development effort is required if we are to fill in the critical knowledge gaps and see which of the contenders can be advanced from the "has potential" to "proven" status that will provide the confidence for creation of a large scale estate.

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