SUBMISSION NO. 151

SUBMISSION: Inquiry into future water supplies for Australia's rural industries and communities

Executive Summary

- Research has shown logging reduces water yield and quality. Regeneration fires exacerbate both the chance of future burns by drying out forests, while escaped burns lead to further reductions in water yield.
- Extending the current harvest rotation from 60 to 200 years increases the catchments net present value by $81 million, while shorter 20-year rotations would decrease it by $525 million and require building a $250 million water treatment plant.
- Water quantity and quality would be optimised by ceasing to log water catchments.
- The logging industry should pay for water lost due to logging.
- Catchment Management decisions need to look at our present requirements as well as at those of the future. Logging in catchments has a cumulative effect on water yield effecting volumes for decades or even centuries.
- If we are to get water management right it is important that the Committee not only assess the balance, sutainability and appropriateness of water allocations between different users but also implement changes in relevant programs, legislation and policy. These Commonwealth changes need to ensure a national coordinated response to protecting catchments ensuring maximum supply and quality of water from these areas.

1. Introduction

Water is Australia's most precious and scarce resource. The Wilderness Society considers that three major factors will potentially have dire effects on Australia's water supply. Namely: increasing public demand in both rural and city regions; climate change; and continuous land clearing and logging in water catchments.

This submission primarily deals with the issue of logging in water catchments and the potential changes in Commonwealth programs, legislation or policy to ensure maximum yield and quality from catchment areas.

A key challenge facing Australia is the management of water resources to ensure that we have sufficient clean clear water in the future. To do this sustainably we need to look beyond old solutions, such as the building of dams and continually harvesting more water from river systems.

As our demand for water continues to increase and with the added pressure recent drought years have placed on available supply, concerns within the general community

are growing. Many farmers face the possibility of no water being allocated to them in the coming season unless the country receives average or above average rainfalls.

One of the most comprehensive studies undertaken by the Department of Conservation and Environment in 1991 on the availability of water for consumption use in Victoria found that all of Victoria would run out of water in the next 35 years if our demand increased at its current rate, which at the time the report was written was 2% (DCE, 1991). It appears through a variety of means, our demand for water has declined to 1% growth per annum. Despite this alleviating some of the pressure, many rural areas run the risk of severe shortages in the future.

Global warming will potentially reduce stream flow due to reduced rainfall, increased evaporation and increased plant transpiration. Stream flow reductions due to logging act in addition to those of climate change.

In order to achieve long-term water sustainability we must focus not only on demand management, but more importantly, on resource management in order to achieve maximum resource yield and quality for all end users.

The concept of integrated catchment management encompasses the holistic management of all aspects of catchment health including land-use, water quality, nutrient, salinity, vegetation and biodiversity management; recognising the inter-linkages between them. It also embodies triple bottom line concepts of achieving economic, environmental and social objectives.

It is generally agreed that, Australia-wide, insufficient long-term funds are being committed to Integrated Catchment Management (ICM). (Parliament of the Commonwealth of Australia, House of Representatives Standing Committee on Environment and Heritage, 2000). It is estimated that potential agricultural production foregone due to land and water degradation could be as high as $0.6 Billion a year in Victoria. (DNRE Land & Water Management).

ICM is an imprecise science. It relies on drawing together the knowledge and experience of scientists, farmers, ecologists and water managers.

It is important that this Inquiry look closely at how supply from water catchments can be increased. A recent Water Resource Strategy undertaken in Melbourne found that if catchments were logged, a decrease in water yield would result. The price paid to remove logs from catchments does not include the cost of lost water. The government should ensure that the timber industry, like agricultural and livestock farmers, pay for their water consumption. This can be worked out using the Kuczera curve see Graph 1: Correlation of annual water use and forest stand age page 4.

Principles governing the implementation of catchment management in Chapter 5 on Water in the Victorian Infrastructure Planning Council document of 2002 state that:

- A duty of care not to damage the natural resource base (remedying any damage incurred) by users and managers of the natural resource;

- Beneficiary pays, where it is not possible to identify the cause of damage; and

- Government contributions, where activities generate public benefits for both existing and future users. The Government has undertaken to meet the cost of statewide planning, resource; monitoring and assessment, research and investigation where they are crucial to sustainable resource management.

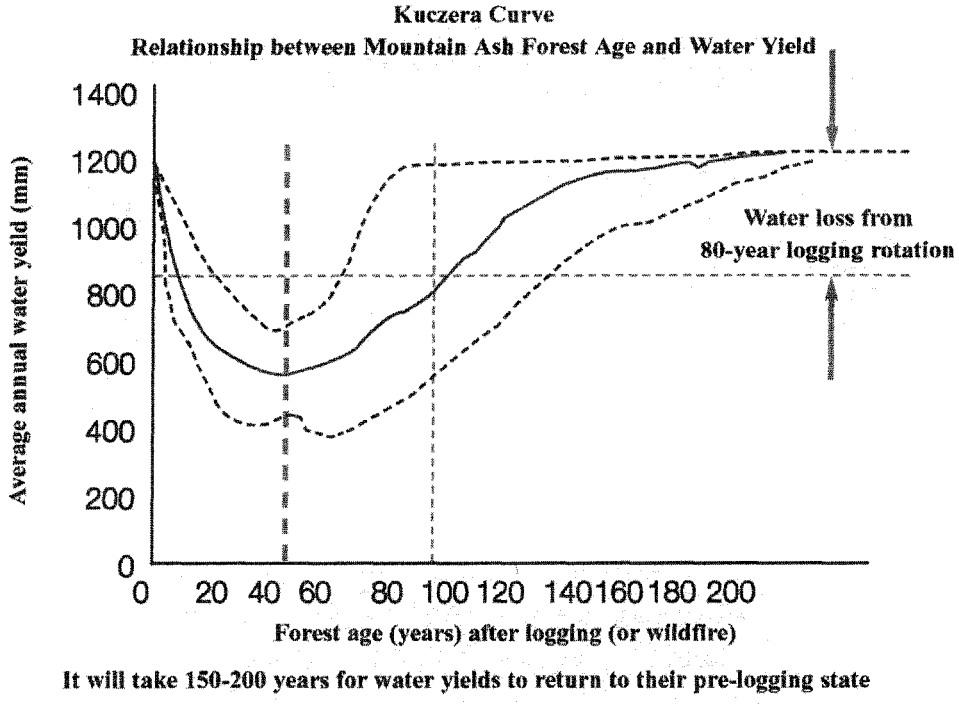
The logging taking place in many of Victoria's water catchments is leading to severe damage to catchments in Victoria and substantial reductions in water supply. This reduction is known and can therefore be incorporated into pricing of trees removed from the area. It is vital that the government undertake research assessing a pricing and transition of logging out of these areas and into plantations.

Instead of responding in the typical way by harvesting more water, or building more dams, we could extract more water from catchments simply by ending logging in water catchments. Research in Victoria has shown that if logging were phased out of the Thomson catchment over the next 15 years there would be an increase of 20,000 ML by 2050. If the Yarra Tributary catchments were included this would increase to 30,000 ML by 2050. A Statewide catchment protection could potentially provide substantial volumes of water across Australia.

2. Effect logging catchments has on water yield and quality

2.1 Research on water yield in Alpine Ash/Mountain Ash/ Mixed Species Forests

Several research studies undertaken across Australia looked at the effect logging has on water yield. The range of this effect is determined by forest type, soil, rainfall and soil depth (SKM, 2000). The most comprehensive study undertaken as far as yield is concerned was done by Kuczera (1985) after the 1939 wildfire in the Central Highlands. This study found that burnt or logged areas experience a reduction in water yield.



Graph 1: Correlation of annual water yield and forest age

Once logging takes place and the area is burnt, there is an initial increase in water yield as rain falling runs straight off cleared areas and into adjacent streams. However, after 5-10 years water yields begins to drop drastically as young regrowth forest begin to grow. These young forests have high evapotranspiration rates - basically they consume large volumes of water during their growing phase. It takes around 150 years for pre-logged water levels to return.

Further studies comparing the effect logging has on water yield have corroborated this early research (Vertessy *et al.*, 1998). The length of the logging rotation has a particular effect on the water yield of a catchment. In the Thomson and Yarra Tributary catchments the logging rotation is 60 years or less (NRE Wood Utilisation Plans, 1999, 2000, 2001, 2002), not 80 to 120 as recommended in the Comprehensive Regional Assessment (1998, p.22). In ash type forests, a rotation length of 50 years produces the maximum reduction in water yield.

Historically, not much has been known about the correlation between forest age and water yield in mixed species forests. However, recent research in the Tantawanglao Creek Catchment in New South Wales has shown that logging has a detrimental effect on water yield.

There are several research studies undertaken throughout Victoria and NSW which highlight the detrimental effect logging has on water yield [Coranderrk (O'Shaughnessy & Jayasuriya, 1991; O'Shaughnessy *et al.*, 1995; Doeg and Koehn, 1990); West Kiewa

Study (Lawrence, 1990; O'Shaughnessy & Bren, 1998), Delegate River Study (Wilby & Gell, 1994) and a study on aquatic plants to measure stream flow decline, the Otways Moran Study (SKM, 2000)].

Catchment Studies undertaken in wet forests
Karuah Catchment (North East NSW), Baratta catchment, Bollygum catchment, Corkwood catchment, West Kiewa (North East Victoria), Delegate River Study (Victoria East Gippsland

Catchment Studies undertaken in Mixed species forests
Tantawangalo Creek catchments (South East NSW) and Yambulla catchment

In many instances it is difficult to provide models of how water supply is detrimentally effected, however in the case of forest this is not the situation. Substantial research undertaken by the CRC for catchment Hydrology has shown exactly how much water is lost when you log a water catchment.

It is commonly stated by the Department of Natural Resources and Environment that yield variation is difficult to detect if under 20% of a catchment is logged (NRE1,1996; cnr, 1995; NRE, 2001; NREb, 2001), research however contradicts this showing that smaller percentages still have a substantial effect, for example in the West Kiewa when less than 14% of a catchment was logged there was a measured 10% reduction in stream flow when forests where 16 years old.

2.2 Research on water quality in Alpine Ash/Mountain Ash/ Mixed Species Forests

The Victorian Infrastructure Planning Council states that water quality is intrinsically linked to the health of Waterways and Catchment Management. Rivers coming out of logged areas have increased turbidity levels, resulting in reduced water quality. Although several practices are employed by NRE to ameliorate these impacts, the attempts to evaluate the effectiveness of these measures is minimal.

Many streams are not protected by buffers, these streams are termed non-permanent streams, which may not flow for up to 90% of the year. Logging takes place right up to the edge of these streams, resulting in an increase in temperature as well as sediment load. Solar radiation, responsible for stream temperature, will increase in these exposed streams, consequently effecting the breeding cycles of many temperature sensitive species.

Forestry practices contribute significantly to the sedimentation of streams and lakes. It is generally considered that roading has the most severe effect on sediment levels, with estimates concluding that 90 t/ha/y (tonnes/ha/year) entered rivers from the construction, use, and maintenance of forest roads (Grayson *et al.*, 1993).

An Industry report corroborated this, showing snig-track erosion rates to be around 70 t/ha/yr (Croke *et al.*, 1999). Erosion rates from log landings were about 120 t/ha/y, although total log landing area was small (Croke *et al.*, 1999).

Regeneration burns further compound the decline in water quality due to an increase in hydrophobicity, which follows high intensity fires. Hydrophobicity can impede water infiltration and/or percolation rates beneath forests; eucalypt forests appear particularly prone to this phenomenon.

Case Area 1: Potential Benefit from protecting Area
Research has clearly shown that logging in water catchments results in severely reduced water yields. There is intense logging along the Archeron, Tagerty and Rubicon River as well as Snobs Creek all of which flow into the Goulburn. There is also logging along Big River which flows into Lake Eildon. Lake Eildon is being run down to 6% for Urban consumption with the pipes being moved into the middle of the lake in order to remove that last volumes remaining. Decreased logging along these rivers will result in increased flows into Lake Eildon as well as the Murray River.

Case Area 2: Potential Benefit from protecting Area
A cessation of logging in catchments would result in increased flows from catchments providing more water for farmers, the general public as well as potential increases in environmental flows for rivers such as the Thomson and Tyers River (both rivers flow from intensively logged catchments). The Tyers drains into the Latrobe river which Feeds Lake Wellington. Reduced river flow levels have been implicated as a cause of the increase in toxic algal blooms in the Gippsland Lakes. This in turn has had an effect on the local fishing industry and tourism in East Gippsland.

Case Area 3: Potential Benefit from protecting Area
The Water Resource Strategy undertaken in Melbourne showed how logging was responsible for the reduction of 20,000 mega-litres from the Thomson and 10,000 mega-litres from the Yarra Tributaries. Long-term predictions show that this may increase to 60,000 mega-litres in the future. This loss is equivalent to the volume of water consumed by 250,000 household, 10% of Melbourne total water consumption.

2.3 Economics behind logging in water catchments

Water lost due to logging has an economic value. A study of future options for harvesting timber and water from the Thomson Catchment (largest of Melbourne's catchments) showed that the value of clean fresh water from the catchment outweighs that of the timber in the forest. Extending the current harvest rotation from 80 to 200 years increases the catchment's net present value by $81 million, while shorter 20-year rotations would decrease it by $525 million and require building a $250 million water treatment works (Prime Ministers Science, Engineering, and Innovation Council, 2002). Present logging rotations are 60 years or less, according to the Department of Primary Industries' Wood Utilization Plans.

The logging industry does not pay for the water lost as a result of logging, it is paid for by the Victorian community. The logging industry has therefore gained subsidised access to water because the overall decline in supply is not factored into the price of logs removed. This means that alternative sources, such as plantations and farm forestry, must unfairly compete with catchment timber resource.

As water becomes scarcer and the value of the water increases, the argument to close catchments to logging will increase in strength. Social equity overwhelmingly favours water – the value of water accrues to the whole community, whereas the value of woodchips and timber accrues to only a few.

The government sets the price/value of timber - it is not set according to market forces. A report produced by KPMG (1998) found that the government was selling our public forests for a third of their market value. The native forest industry has been given an uncompetitive financial advantage over the plantation industry.

At the very least, the logging industry should pay for water used as a result of logging. This price should be included in the royalty price. This increase in price would remove one of the primary barriers presently preventing the industry transitioning out of water catchments and into plantations.

2.4 The Effect of fire on water yield and regenerating forests

In wet old growth forests logging promotes bushfires by drying them out. Moist understorey features such as damp ferns and moss that covered fallen logs are lost, soil is exposed and dries out encouraging the return of species that favour drier conditions (Ingalsbee, 2001, Siegert *et al.,* 2001, Cochrane et al. 1999).

Research has shown that wetter forests are converted to drier, more fire-prone forest types after clearfell logging for periods of decades or possibly centuries (Meuck et al 1992). Other researchers have found that logging produces vegetation that sustains fires.

The study undertaken by Kuczera in 1985 shows that fires reduce water yield. In many instances regeneration fires escape out of logged areas, which would further reduce water yield.

3. Potential Changes in Policy, Programs and or Legislation

- Promoting a position that favours national catchment management rather than purely state based legislation with a potential body overseeing.

- Ensuring funding for ICM : Government contributions, where activities generate public benefits for both existing and future users. Encourage a Federal undertaking to meet the cost of statewide planning, resource; monitoring and assessment, research and investigation where they are crucial to sustainable catchment management.

4. Conclusion

Research has conclusively shown that logging adversely affects water yield. As water becomes scarcer in future years, it will become increasingly important to protect this resource. Water is far more valuable to the community than native forest timber, for which there are potential plantation alternatives. Australia's plantation estate of more than 500,000 hectares is expected to over take woodchip requirements by 2005/2009.

Plantations are 4 times more productive than native forests in terms of volume of wood produced per mega-litre of water required. Native forests require a 1 mega-litre of water to produce 2 tonnes of wood while plantations require the same volume of water to produce 9 tonnes of wood.

The pricing of timber removed from catchment areas needs to include the price of lost water. This price change would help remove the financial barriers presently hindering a transition out of catchments and into plantations.

Government bodies or water authorities could either buy out the sawlog licenses, compensating saw millers, employees and contractors, or procure wood requirement from plantations should they be available. The protection of water catchments would not only result in increased water yield but would also have environmental gains.

A cessation of logging in water catchments would increase water yield to rural communities. Catchments need to be protected to prevent changes in water quality, volume, salinity and nutrient levels. Maintaining an intact healthy catchment will assist rural communities in their attempt to buffer themselves against drought.

The Victorian State Planning Council document 2002 discussed a couple of principles that could be applied nationally to catchments. Managers should have a duty of care to not damage the resource, but where damage occurs the responsible party, if identifiable, should pay. It was also recommended that improvements should be paid for by government. Assisting a transition out of catchments and into plantations would not only improve catchment health, it would result in increased water yields to all.

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