



Australian Native Forests and Water

(IFA Forestry Policy Statement Number 5.1)

Key Statement

Native forested catchments produce high quality drinking water as well as essential environmental flows for riverine systems. Adoption of sustainable forest management principles is key to ensuring these non-timber forest values are delivered in perpetuity. Both water yield and quality can be adversely affected by high intensity wildfires or inappropriate forestry practices. However, silvicultural and other forest management strategies can be used to maintain or enhance water quantity and quality in forested catchments.

The Issue

The management of water quality and quantity is an important objective in forested catchments. Soil erosion, following disturbance associated with land management or wildfire, can significantly reduce water quality. On high-rainfall sites, the conversion of mature, eucalypt forests to a uniformly-aged regrowth forests through harvesting and regeneration and/or wildfire, can reduce water yield from a catchment. The extent of the impacts varies according to the proportion of the catchment affected by the disturbance event and the post-harvest silvicultural treatments.

Background

All land surfaces form catchments for surface and/or sub-surface water. Most Australian rivers and streams are characterised by high variability and a marked seasonality of flow. Stream flow can vary greatly on a daily, monthly or yearly basis. The acceptable range of parameters determining water quality for human, domestic and agricultural uses is well documented. However, only limited knowledge exists about the tolerances of the full range of aquatic and riverine organisms to changes in parameters of both water quantity and quality.

In Australia, forested catchments are the major sources of high quality water. Both the quantity and quality of water in streams are determined by soil type, vegetative cover, land use and catchment conditions. The quality and quantity of water from forested catchments can be affected by natural events and/or management actions.

Water yield from a catchment is strongly dependent on rainfall. Measurements in mixed eucalypt forests in the Cropper Creek Hydrologic Project in Victoria indicate that, where annual rainfall is less than about 900 mm, little streamflow occurs but, as rainfall approaches 2000 mm per annum, about 50% is returned as streamflow. In Western Australia, the average yield in water supply catchments has been about 6% of rainfall (range 1—25%). The effects on water yield from disturbances in forested catchments become discernable where average annual rainfall is generally above 1000 mm, and in average or wetter years. They produce little effect on water yield in very dry years or in areas where the average annual rainfall is lower.

Research from the Mountain Ash (*Eucalyptus regnans*) forests of the Central Highlands of Victoria, for example, has shown that, although stream flow initially increases immediately following removal of forest cover by either wildfire or timber harvesting, it declines significantly with development of the vigorous dense regrowth. In these forests, the minimum stream flow occurs at about age 27 years and stream flow only returns to pre-disturbance levels after 150 years. Once the forest reaches a mature state at 180—240 years, total stream

flow almost doubles from that of young regrowth forests, as interception and transpiration of water by the forest declines. Initial research into the Sydney Blue Gum (*Eucalyptus saligna*) forests of the NSW central coast has shown similar results. Experiments have shown that significant increases in water yield can be achieved strip-thinning regrowth forests.

Similar increases in water yield have been recorded in Western Australia following the removal of forest cover for bauxite mining or by fire or timber harvesting. Subsequent rehabilitation of mined areas or regrowth of natural forests caused reductions in water yield over time, but thinning of the dense regrowth forest (from about 35 to 15 m²/ha) increased flows significantly for about 8 to 12 years.

A decrease in water quality may be experienced if turbidity increases above natural levels as a result of erosion of the soil following fire or other major disturbance to the soil surface. The most significant disturbance factors associated with forest management and timber harvesting comes from establishing roads and poor maintenance of roads. Maintenance of high standards of road drainage and observance of strict criteria set out in the relevant codes of practice for timber harvesting and road construction minimise such impact.

Water quality can also be adversely impacted when a rising water table following the permanent loss of forest cover in a catchment causes an increase in the amount of salts flushed from the soil. When a reduction of forest cover brings about a loss of shading by riparian vegetation, stream water temperature may increase and impact on water quality and stream biota.

Policy

The Institute of Foresters of Australia (IFA) advocates that forested water-supply catchments be managed according to the principles of sustainable forest management in order to maintain water quality and quantity.

The IFA supports and encourages:

- The recognition in forest management plans of community expectations about water quality and quantity as well as maintaining the economic benefits from forestry;
- The protection of water quality by maintaining streamside reserves of an appropriate width depending on the order (size) of the stream, topography, soil type and adjacent land use;
- The adoption of strategies, such as limiting the area treated in any one year and dispersing treated areas in space and time, to minimise the impacts of timber harvesting or other forest operations on water yields from water-supply catchments
- The implementation of management practices, including thinning, longer rotations or regular prescribed burning, to maintain or enhance water yield in domestic water-supply catchments;
- Adoption of forest management practices which minimise adverse impacts on water catchments from high-intensity wildfires; and
- Limiting reductions in tree density in catchments where salinity is a potential problem to the extent that salt is not mobilized or ground-water tables permanently raised to within two metres of the soil surface.

The IFA considers that:

- Sustainably managed forests generally provide the best form of vegetative cover for water catchments where protection of water quality is of primary importance;
- Appropriate management plans and codes of practice for timber harvesting and road construction should be observed to protect water yield and quality;

- Water yield decreases in some mature wet sclerophyll forests following extensive disturbance that results in regrowth forests;
- Water yield can be increased through the application of silvicultural treatments; and
- Research into the relationships between land use, forest management and water yield and quality needs to be ongoing.

Further Information

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