

Progress Report SP 2000-003

Hydrological response to timber harvesting and associated silviculture in the intermediate rainfall zone of the northern jarrah forest

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Project Team

granted

Program Leader

granted

Directorate

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Context

This is a long-term experiment established in 1999 to address part of Ministerial Condition 12-3 attached to the *Forest Management Plan 1994-2003*. Ministerial Condition 12-3 states that the department shall monitor and report on the status and effectiveness of silvicultural measures in the intermediate rainfall zone (900-1,100 mm/yr) of the jarrah forest to protect water quality.

Aims

- Investigate the hydrologic impacts of timber harvesting and associated silvicultural treatments in the intermediate rainfall zone of the jarrah forest in a changing hydroclimate.

Progress

- Monitoring of groundwater levels, streamflow, stream salinity and stream turbidity continued in Yarragil 4L, 4X, 6C, and Wuraming catchments in the Swan Region.
- Yarragil 4L catchment was thinned in summer/autumn 2019 to a target 11m²/ha in collaboration with Forest Products Commission and timber harvesting contractors, 36 years after the first thinning.
- Most of the harvested timber has been transported from Yarragil 4L to the timber market, including smaller timber that was unable to be utilised after the first thinning in the mid 1980s. The remaining harvested timber will be removed next summer during dry soil conditions.
- A paper examining the relative contribution to streamflow generation in jarrah forest streams has been submitted to *Hydrological Processes*.
- A paper reviewing the long-term hydrological response to thinning in Yarragil 4L is being redrafted and will be submitted for publication.
- Groundwater bores were re-measured in spring 2018 at experimental catchments in the Warren Region including Crowea, Iffley, Poole, March Road and April Road. More than 120 bores were measured, with 90 still being in contact with groundwater.

Management implications

- Experimental catchments provide a unique long-term record of the hydrological response of the jarrah forest to climate change and forest management practices.
- Monitoring in these catchments contributes to reporting on KPI 10 for the *Forest Management Plan 2014-23* that relates to stream condition and groundwater level within fully forested catchments.
- Monitoring of experimental catchments helps inform the effects of silviculture treatments on water balance.
- Re-thinning of Yarragil 4L provides an opportunity to examine the effects of the silvicultural treatments on the groundwater and surface water hydrology, biodiversity, and vegetation structure and composition of the catchment.

Future directions

- Continue monitoring of groundwater levels, streamflow and water quality in the Yarragil catchments.
- Suppress stump and ground coppice regrowth in Yarragil 4L to increase the intensity and duration of the hydrological response.
- Conduct a crop-tree protection operation in Yarragil 4L prior to a silvicultural burn.
- Remeasure post-thinning stand density in Yarragil 4L.

- Collaborate with universities and other agencies to enhance the research potential from Yarragil 4L thinning study.