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**TASMANIAN COMMUNITY  
FOREST AGREEMENT**

**RESEARCH INTO  
ALTERNATIVES TO  
CLEARFELLING IN OLD  
GROWTH FORESTS**

**FINAL REPORT**

**Technical Support Group, October 2010**

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Australian Government



Tasmania

## Introduction

This document reports on the outputs from the \$2 million research programme - *Research into Alternatives to Clearfelling in Old Growth Forests* - funded by the Australian Government under the Tasmanian Community Forest Agreement (TCFA) and described in the programme's 2006 Operating Plan.

[http://www.daff.gov.au/\\_data/assets/pdf\\_file/0016/50326/alternatives\\_to\\_clearfelling\\_op.pdf](http://www.daff.gov.au/_data/assets/pdf_file/0016/50326/alternatives_to_clearfelling_op.pdf)

## Background

Clause 30 of the TCFA commits the governments to jointly fund a package of forest operations and management, industry development and research and development activities. Clause 76(i) of the TCFA committed the Australian Government to a contribution of \$2 million towards research into alternatives to clearfelling to help facilitate a significant reduction in the use of clearfell harvesting in old growth forests. The intended consequence of the programme was to phase in non-clearfelling techniques so that, by 2010, no more than 20 per cent of the area of old growth forest harvested each year on public land in Tasmania would be clearfelled.

This contribution supplements the \$11.1 million being invested by the Tasmanian Government into further research and implementation, including training and support for harvesting contractors and complements separate TCFA investments in intensive forest management and hardwood industry development.

## Objective

The objective of the programme was to identify, commission and report on research into alternatives to clearfelling old growth forests on public land in Tasmania.

## Programme

The research programme covered silviculture, biodiversity, forest health, safety, productivity and social and economic issues. The programme was delivered by appointment of two research fellows, engagement of several specialist consultants and exchanges of experience between Tasmanian, Canadian and American VR (variable retention) practitioners and trainers. The programme commenced in late 2005 and was essentially completed by October 2010.

## Outputs

Outputs of the programme included:

- a) Research and field trials, including economic analysis, of alternatives to clearfelling (see Appendix 1);
- b) A growing list of science publications stands at 20 journal publications, 16 reports and non-refereed publications, 4 theses and 22 conference presentations (see Appendix 2);

- c) Assistance to Forestry Tasmania in convening a panel of international experts in forest conservation and management (<http://www.forestrytas.com.au/science/tasmanian-community-forestry-agreement-project-reports/science-panel>);
- d) A research base as the focal point for an international conference – *Old Forests New Management* - as part of a review of the Warra-based research programme and recommendations on future directions (<http://www.forestrytas.com.au/science/tasmanian-community-forestry-agreement-project-reports/old-forests-new-management-conference>);
- e) A science-based review and formal evaluation of the programme by Forestry Tasmania. (<http://www.forestrytas.com.au/uploads/File/pdf/pdf2009/a%20new%20silviculture%20web%20version.pdf>)
- f) This report from the Technical Support Group to the Implementation Committee.

## Benefits

The funding provided by the *Research into Alternatives to Clearfelling in Old Growth Forests* programme has enabled substantial progress on researching the forest management issues involved in clear felling of old growth forests and alternative harvesting approaches in order to assist forest managers reduce the extent of clearfelling in old growth forests.

In Tasmania's tall old growth forests, the main silvicultural alternative to clearfelling has been the development of variable retention silviculture as described in the Variable Retention Manual ([http://www.forestrytas.com.au/assets/0000/0596/VR\\_Manual9.pdf](http://www.forestrytas.com.au/assets/0000/0596/VR_Manual9.pdf)). This research programme has provided assurance that the VR technique can be safely and effectively implemented in old growth forests and is supported by soundly-based science, validated by peer-reviewed papers. This work has been fully evaluated in 2009 in a major report titled *A New Silviculture for Tasmania's Public Forests* (<http://www.forestrytas.com.au/uploads/File/pdf/pdf2009/a%20new%20silviculture%20web%20version.pdf>)

Since the inception of the TCFA in 2005 and up until June 30 2010, 38 coupes, totalling 1 400 ha, have been harvested using the variable retention (VR) technique.

The variable retention technique is now proven for use in tall old growth forests. Forestry Tasmania believes it has a capacity, within operational, economic and safety constraints, to undertake around 1000 ha of variable retention on State forest annually.

The current priority is to use this capacity to meet the TCFA target to achieve non-clearfell silviculture in a minimum of 80 per cent of the annual old growth harvest area on public land. In the longer term there may be more ecologically beneficial ways of allocating that capacity over the whole commercial native forest estate rather than focussing it overly on defined old growth forest.

## Programme Management

The programme's governance framework has been headed by a high-level, joint Australian and Tasmanian Government implementation committee (IC) of:

- Dr Hans Drielsma, Executive General Manager, Forestry Tasmania, Tasmanian Government
- Mr Tony Bartlett (until 2008)/ Mr John Talbot (from 2009), General Manager, Forest Industries, Department of Agriculture, Fisheries and Forestry (DAFF), Australian Government

The IC has overseen the programme and has been informed by a Technical Support Group of:

- Mr John Hickey, Forestry Tasmania
- Dr John Davidson, Bureau of Rural Sciences (until 2009)
- Dr Steve Read, Forestry Tasmania
- Dr Mark Neyland, Forestry Tasmania.

The terms of reference for the Technical Support Group were to:

- analyse and provide advice to the IC on research and extension outputs as they are finalised;
- support the review of the Warra research programme and help convene the 2007 International Conference for this purpose; and
- draft annual activity reports for consideration by the IC and provision to Ministers.

During the rollout of the programme, consultation occurred with forest industry stakeholders including the Forests and Forest Industry Council and Timber Communities Australia through a Variable Retention Advisory Group (VRAG), and with forest practices specialists and researchers through the CRC-Forestry. Consultation with operational staff was facilitated through a Variable Retention Implementation Group (VRIG).

## Communications

Communication activities have focussed on timely and regular announcements of key outcomes. These have included:

- A major communication strategy around the *Old Forests New Management* conference.
- Several public talks as part of Forestry Tasmania's *Forestry Talks* series.
- Two television segments as part of the Southern Cross *Going Bush* series televised in Tasmania in 2009 and 2010.
- Two field meetings with stakeholders represented on the Variable Retention Advisory Group (VRAG).
- One field meeting with policy, regulatory and research stakeholders convened by the Cooperative Research Centre for Forestry.
- Briefings to Commonwealth and State Ministers and other politicians around the public launch of *A New Silviculture for Tasmania's Public Forests* in May 2009.
- A segment on ABC Tasmania's *Stateline* program in 2009.
- Permanent interpretative displays (field trials, research summaries) at the Tahune AirWalk including a DVD presentation on research at the adjacent Warra Long Term Ecological Research site.
- A well-maintained website of key publications arising from the programme <http://www.forestrytas.com.au/science/tasmanian-community-forestry-agreement-project-reports>.

## Financial Acquittal

The programme's research items, outcomes and budgeted versus actual expenditure is outlined in Appendix 1.

It shows that \$2.2 million has been spent across the five key subject areas. The modest cost overrun was due to the extensive sampling required for evaluation of effects on biodiversity and has been met from the Tasmanian Government's contribution to the TCFA.

All research projects have met reporting goals. Two of the key researchers recruited for the programme are continuing their research through post-doctoral and PhD studies with some supporting funds provided under the programme. No further funding commitments are required.

**APPENDIX 1. THE PROGRAMME OF RESEARCH ITEMS, OUTCOMES AND BUDGETED VERSUS ACTUAL EXPENDITURE.**

<b>Item</b>	<b>Description</b>	<b>Outcome</b>
<b>Silviculture</b>		
Engage researcher in variable retention (VR) silviculture	Monitor outcomes from operational VR coupes and facilitate the identification and development of best practices	Substantially completed. Researcher appointed and tasks substantially achieved. Sets of operational VR coupes and reference Clearfell, Burn and Sow (CBS) coupes established and monitored (harvesting, burn, seed crop, seedbed, windthrow, firebreaks, regeneration), with progressive adaptation of coupe design, especially for burning outcomes. Monitoring of regeneration is on-going.
Visit by operational experts in VR from Pacific North-West	Provide advice on best practice solutions from VR implementation in the Pacific North-West	Completed. Symmetree Consultants <sup>1</sup> visited in 2006 and provided valuable strategic and operational advice on VR implementation.
Development of updated VR silviculture and thinning manuals	Prepare a preliminary silviculture manual to guide harvesting and regeneration practices at initial trial sites. Progresses to final, comprehensive manual arising from experience during the program, to be accompanied by a revised thinning manual.	Completed. Version 9 of the Variable Retention Manual as endorsed by Variable Retention Implementation Group is now available, and includes operational experience obtained over several years.
Visit by key research/operational staff to VR management areas in Pacific North-West	Enable access to best practice examples in : <ul style="list-style-type: none"> <li>• Planning, harvesting and site operation; and</li> <li>• Biodiversity monitoring</li> </ul>	Completed. Three Forestry Tasmania staff-members and one DAFF staff-member visited Pacific Northwest of Canada (British Columbia) and USA (Washington and Oregon) in 2006, bringing substantial feedback and ideas for Tasmanian implementation of VR, captured in presentations to operational staff and managers and on Alternatives to Clearfelling web-page.
<b>Budget: \$0.78 million</b>		<b>Actual: \$652,333</b>

<sup>1</sup> <http://symmetree.ca/index.php>

<b>Item</b>	<b>Description</b>	<b>Outcome</b>
<b>Biodiversity</b>		
Engage biodiversity researcher for VR-related issues	Coordinate analyses of biodiversity responses to Warra trials and evaluate habitat in VR coupes for birds and hollow-dwelling mammals	Completed in September 2010. Researcher appointed and tasks substantially achieved. Formal goals and guidelines for VR articulated, and program of on-going biodiversity monitoring of key taxa implemented, together with assessment process for biodiversity outcomes on operational coupes. Work on forest influence will continue on external funds from October 2010.
Engage data manager for Warra site	Curate data for silvicultural systems trial, set up metadata base, facilitate data storage and retrieval	Completed. Data manager appointed for 2006-2008 and data-collection, metadatabase for Warra trial and data-storage systems established.
Biodiversity Assessment	Complete 1- and 3-year post-harvest biodiversity assessments at Warra site	Substantially completed. Assessment covered the key taxa (flora, birds, litter beetles, bryophytes and lichens), with experimental monitoring of other taxa (bats, small mammals, fungi). Final year of bryophyte monitoring is on-going.
	<b>Budget: \$0.76 million</b>	<b>Actual: \$1,275,172</b>
<b>Forest Health</b>		
Assessing health and integrity of aggregates at age three	Forest health surveillance to ground check aerial surveys	Completed. Undertaken by existing surveillance teams as part of normal operations. Rapid aerial surveys of aggregates now routine.
Assessing risk to landscape from incomplete burning of VR coupes	Develop existing work and combine with Warra site data and experience from operational coupes	Completed. Substantial work on feasibility of burning VR coupes led to development and implementation of "slow-burning" technique now used operationally in combination with amended coupe design, although labour and planning costs are high and window of opportunity narrow.
Assessing VR browsing risks	Additional assessment work required	Completed. Monitoring in VR coupes showed that browsing issues are not very different from CBS coupes, although costs are slightly higher.
	<b>Budget: \$0.12 million</b>	<b>Actual: \$73,867</b>

<b>Item</b>	<b>Description</b>	<b>Outcome</b>
<b>Safety</b>		
Evaluation of a range of trial sites	Employment of a consultant for a detailed review and evaluation of these sites	Completed. Safety consultant employed, and reporting to subcommittee of the Tasmanian Government's Forest Industry Safety Standards Committee. No new safety issues found to be associated with VR coupes.
Harvesting technology improvement	Review of technology improvements that may facilitate safe, cost effective VR harvesting	Not required. No need for project identified.
	<b>Budget: \$0.08 million</b>	<b>Actual: \$38,459</b>
<b>Productivity</b>		
Timber yield modelling	Model the timber yield implications of VR using sensitivity analyses to determine the feasibility of maintaining 300 000 m <sup>3</sup> /y sawlog target from State forests.	Completed. Range of retention levels and regrowth suppression modelled. VR is consistent with maintaining the legislated supply of high-quality eucalypt sawlogs from State forests as long as it is targeted at mapped old growth forest and retention levels do not become excessive.
Long term soil impacts	Compare 2001 and 2006 soil chemical and physical properties on the same clearfell site to determine whether lower intensity burning is warranted	Substantially completed. Data collected and under analysis by silvicultural researcher for comparison of spatial and temporal impacts of different types of firebreak on soil quality and site productivity in paired VR and CBS coupes. Substantial attention given in operational coupe design and assessment to minimising soil impact of firebreaks around aggregates.
	<b>Budget: \$0.08 million</b>	<b>Actual: \$54,582</b>
<b>Social and Economic</b>		
Economic evaluation of operational VR coupes	Review of cost data, including unit costs to growers, contractors and processors, with net present value analyses	Completed. Operational costs for all Warra trial coupes collected. Analyses of cost data summarised in <i>New Silviculture</i> report to Government. <a href="http://www.forestrytas.com.au/uploads/File/pdf/pdf2009/a%20new%20silviculture%20web%20version.pdf">http://www.forestrytas.com.au/uploads/File/pdf/pdf2009/a%20new%20silviculture%20web%20version.pdf</a>

<b>Item</b>	<b>Description</b>	<b>Outcome</b>
Implications of VR for the Leatherwood resource	Undertake Beekeeping resource consultancy	Completed. Spatial analysis of the potential leatherwood resource by resource planners at Forestry Tasmania in consultation with the beekeeping industry, plus a simulation of planned timber harvesting, showed that implementation of VR in old growth forests will have a small positive effect on leatherwood accessibility, and will benefit retention of leatherwood in the long-term.
Research high value markets for old growth timber	Undertake Economic consultancy	Completed. An external consultant found that future supply of large-dimension logs with specific properties will decrease, but currently there is little price differentiation. Some higher-value markets were identified in Australia and overseas, and factors required for market success were analysed.
Social acceptability study	Undertake Social Acceptability consultancy.	Completed. A project with University of Melbourne, funded separately under an Australian Research Council grant, used visualisation techniques to assess individual (public) responses to silvicultural systems.
Public engagement	Interpretation of the Warra trials	Completed. Interpretation developed for <i>Old Forests, New Management</i> conference: <ul style="list-style-type: none"> <li>• Established permanent displays at Tahune Air Walk in the Southern Forests</li> <li>• Alternatives to Clearfelling webpage (<a href="http://www.forestrytas.com.au/science/tasmanian-community-forestry-agreement-project-reports">http://www.forestrytas.com.au/science/tasmanian-community-forestry-agreement-project-reports</a>),</li> <li>• Facilitated public presentations (See Communications).</li> </ul>
	<b>Budget: \$0.18 million</b>	<b>Actual: \$105,908</b>
<b>Total Programme</b>	<b>Budget: \$2.00 million</b>	<b>Actual: \$2,200,321</b>

## APPENDIX 2. TCFA ALTERNATIVES TO CLEARFELLING RESEARCH PUBLICATIONS

The publications listed here describe research on forest ecology and forest management funded by the *Research into Alternatives to Clearfelling in Old Growth Forests* component of the Tasmanian Community Forestry Agreement which commenced in 2005, or research that was performed at sites established for or maintained by this programme.

This listing includes 20 journal publications, 16 reports and non-refereed publications, 4 theses (2 Doctoral and 2 Honours) and 22 conference presentations/papers<sup>2</sup>.

### Journal publications

Baker SC, Grove SJ, Forster L, Bonham KJ, Bashford D (2009) Short-term responses of ground-active beetles to alternative silvicultural systems in the Warra Silvicultural Systems Trial, Tasmania, Australia. *Forest Ecology and Management* 258: 444-459

Baker, S., Neyland, M. & Grove, S. (2010). Using aggregated retention to maintain and restore mature forest values in managed forest landscapes. Project summary. *Ecological Management and Restoration*. 11(1): 82

Baker SC, Read SM (2010, *submitted*) Variable retention silviculture in Tasmania's wet forests: ecological rationale, adaptive management and synthesis of biodiversity benefits. *Australian Forestry*

Ford RM, Williams KJH, Bishop ID, Hickey JE (2009) Public judgements of the social acceptability of silvicultural alternatives in Tasmanian wet eucalypt forests. *Australian Forestry* 72: 157-171

Ford RM, Williams KJ, Bishop ID, Hickey JE (2009) Effects of information on the social acceptability of alternatives to clearfelling in Australian wet eucalypt forests. *Environmental Management* 44: 1149-62

Ford RM, Williams KJ, Bishop ID, Webb TJ (2009) A value basis for the social acceptability of clearfelling in Tasmania, Australia. *Landscape and Urban Planning* 90: 196-206

Gates GM, Ratkowsky, D. A. and Grove SJ (2005) A comparison of macrofungi in young silvicultural regeneration and mature forest at the Warra LTER Site in the southern forests of Tasmania. *Tasforests* 16: 127-152

Gates GM, Ratkowsky DA, Grove SJ (2009) Aggregated retention and macrofungi: a case study from the Warra LTER site, Tasmania. *Tasforests* 18: 33-54

Hickey JE, Neyland MG, Grove SJ, Edwards LG (2006) From little things big things grow: The Warra Silvicultural Systems Trial in Tasmanian wet *Eucalyptus obliqua* forest. *Allgemeine Forst und Jagdzeitung* 177: 113-119

Hingston AB, Grove S (2009) From clearfell coupe to old-growth forest: Succession of bird assemblages in Tasmanian lowland wet eucalypt forests. *Forest Ecology and Management* 259: 459-468

Hopkins AJM, Harrison KS, Grove SJ, Wardlaw TJ, Mohammed CL (2005) Wood decay fungi and beetle assemblages associated with living *Eucalyptus obliqua* trees: early results

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<sup>2</sup> Publication list as at February 2011

from studies at the Warra Long Term Ecological Research Site, Tasmania. *Tasforests* 16: 111-126

Kantvilas G, Jarman SJ (2006) Recovery of lichens after logging: preliminary results from Tasmania's wet forests. *The Lichenologist* 38: 383-394

Lauck B, Swain R, Bashford R (2008) The response of the frog *Crinia signifera* to different silvicultural practices in southern Tasmania, Australia. *Tasforests* 17: 29-36

Lefort P, Grove SJ (2009) Early responses of birds to clearfelling and its alternatives in lowland wet eucalypt forest in Tasmania, Australia. *Forest Ecology and Management* 258: 460-471

Neyland M, Hickey J, Beadle C, Bauhus J, Davidson N, Edwards L (2009) An examination of stocking and early growth in the Warra silvicultural systems trial confirms the importance of a burnt seedbed for vigorous regeneration in *Eucalyptus obliqua* forest. *Forest Ecology and Management* 258: 481-494

Neyland MG, Hickey JE, Edwards LG (2009) Safety and productivity at the Warra silvicultural systems trial. *Tasforests* 18: 1-16

Nyvold U, Dawson JK, Hickey JE (2005) An assessment of timber values from alternative silvicultural systems tested in wet *Eucalyptus obliqua* forest in Tasmania. *Tasforests* 16: 19-34

Ratkowsky DA, Gates GM (2008) Macrofungi in early stages of forest regeneration in Tasmania's southern forests. *Tasforests* 18: 56-66

Rothe A, Hickey JE, Clark SB (2008) Effects of sapling density on *E. obliqua* sapling architecture in a clearfell and a dispersed retention coupe. *Tasforests* 17: 45-56

Williams K, Ford R, Bishop ID, Loiterton D, Hickey J (2007) Realism and selectivity in datadriven visualisations: A process for developing viewer-oriented landscape surrogates. *Landscape and Urban Planning* 81: 213-224

### **Reports and non-refereed publications**

Baker S, Grove SJ, McElwee D, Neyland M, Read S, Scott R, Wardlaw T (2009) *Ecological goals, biodiversity outcomes, and performance measures for aggregated retention coupes*. Division of Forest Research and Development Technical Report 03/2009. Forestry Tasmania, Hobart

Chuter R (2007) *Feasibility of burning debris from wet eucalypt forests harvested to an aggregated retention prescription*. Division of Forest Research and Development Technical Report 10/2007. Forestry Tasmania, Hobart, Tasmania

Forestry Tasmania (2009) *Draft Variable Retention Manual. Version 9*. Forestry Tasmania, Hobart, Tasmania

Forestry Tasmania (2009) *A new silviculture for Tasmania's public forests: a review of the variable retention program*. Forestry Tasmania, Hobart, Tasmania

Garandel M, Deltombe M, Baker S, Neyland M (2009) *Observation of vascular plant seedling responses to burning and aggregated retention silviculture*. Division of Forest Research and Development Technical Report 02/2009. Forestry Tasmania, Hobart

Grove SJ, Neyland MG (2005) How 'natural' is the response of biodiversity to clearfelling and to alternative silvicultural systems in Tasmanian wet eucalypt forest? *International*

*Forestry Review* 7: 325. Abstract of oral presentation at XXII IUFRO World Congress, Brisbane, Queensland

Hickey JE (2005) Alternatives to clearfell silviculture in tall old-growth forests in Tasmania. *The International Forestry Review* 7: 40. Abstract of oral presentation at XXII IUFRO World Congress, Brisbane, Queensland

Howard G (2008) *Safety implications of aggregated retention harvesting*. Report to the Variable Retention Safety and Training sub-committee of the Forest Industry Safety Standards Committee

Law B, Law P (2010) *Baseline sampling of bats in aggregated retention coupes and other silvicultural treatments at Warra*. Unpublished report to Forestry Tasmania, 15 pp.

Leaman T, Gao R, Hickey J (2008) *Changes to oldgrowth forest management in Tasmanian State forests and the implications for the leatherwood nectar resource*. Report to the TCFA Research Implementation Committee

Leech M (2008) *Researching high-value markets for eucalypt timber from oldgrowth forests in Tasmania*. Report to the TCFA Research Implementation Committee

McElwee D, Baker S (2009) *Regeneration burn escapes into unharvested forest from aggregated retention and clearfelled coupes 2007-2009*. Division of Forest Research and Development Technical Report 15/2009. Forestry Tasmania, Hobart, Tasmania

McLarin M (2008) *Modelling of timber yield implications of Variable Retention*. Report to the TCFA Implementation Committee

Native Forests Branch (2009) *Variable Retention Manual*, Forestry Tasmania, Hobart.

Scott R (2007) *Calculating retention and influence levels for variable retention coupes in tall wet eucalypt forests*. Division of Forest Research and Development, Technical Report No. 9/2007. Forestry Tasmania, Hobart, Tasmania

Scott R, Baker S (2008) Update on variable retention research. *Forest Practices News* 8: 10-11

## **Theses**

Gates GM (2009) *Coarse woody debris, macrofungal assemblages, and sustainable forest management in a Eucalyptus obliqua forest of southern Tasmania*. Doctoral thesis, University of Tasmania, Hobart, Tasmania

Hindrum L (2009) *The effects of mechanical disturbance and burn intensity on the floristic composition of two-year old aggregated retention coupes in southern Tasmania*. Honours Thesis, University of Tasmania, Hobart, Tasmania

Neyland MG (2010) *The response of the vegetation to a range of alternatives to clearfelling of tall wet eucalypt forests at the Warra silvicultural systems trial, Tasmania, Australia*. Doctoral thesis, University of Tasmania, Hobart, Tasmania

Strutt O (2007) *Edge effects on bryophytes in the retained aggregates of a harvested wet eucalypt forest coupe in southern Tasmania*. Honours thesis, University of Tasmania, Hobart, Tasmania

### Conference papers

Baker S (2009) Retencion variable in los bosques antiguos de Tasmania. Cuarto Seminario de Biometria y Produccion de Nothofagus, University of La Plata, Argentina

Baker SC, Grove SJ, Read SM, Wardlaw TJ (2008) Variable retention and biodiversity: Forestry Tasmania's goals and monitoring program. Proceedings of the *Old Forests, New Management* Conference, Hobart, Tasmania

Baker S, Chuter A, Spencer C, Edwards L, Wotherspoon K, Koch A, Munks S (2008) Habitat tree retention in alternatives to clearfelling. Proceedings of the *Old Forests, New Management* Conference, Hobart, Tasmania

Baker S, Grove S (2009) Biodiversity responses to alternatives to clearfelling at the Warra Silvicultural Systems Trial, Tasmania, Australia. Poster, 13<sup>th</sup> World Forestry Congress, Buenos Aires, Argentina

Baker SC, Spencer C, Chuter A, Koch A, Edwards LG, Munks S (2008) Habitat tree retention in alternatives to clearfelling. Proceedings of the *Old Forests, New Management* Conference, Hobart, Tasmania

Baker S, Deltombe D, Garandel M, Neyland M (2009) Vascular plant seedling responses to burning and aggregated retention silviculture. Poster, 10<sup>th</sup> International Congress of Ecology, Brisbane, Australia

Baker S, Grove S (2009) Biodiversity responses to alternatives to clearfelling at the Warra Silvicultural Systems Trial, Tasmania, Australia. Oral presentation, 10<sup>th</sup> International Congress of Ecology, Brisbane, Australia

Gates G, Ratkowsky D, Grove SJ (2008) How well does aggregated retention cater for early and late successional macrofungi? Proceedings of the *Old Forests, New Management* Conference, Hobart, Tasmania

Grove S, Hopkins A, Harrison C, Yee M, Stamm L, Wardlaw T, Mohammed C (2008) Coarse woody debris, old trees and biodiversity conservation in production forests. Proceedings of the *Old Forests, New Management* Conference, Hobart, Tasmania

Grove SJ, Baker SC, Bashford R, Forster L, Bonham K, Lewis-Jones R, Brown G (2008) Early responses of ground-active beetle assemblages to clearfelling and its alternatives at Warra, Tasmania. Proceedings of the *Old Forests, New Management* Conference, Hobart, Tasmania

Kantvilas G, Jarman J, Minchin P (2008) Lichens and bryophytes: Little plants, big message. Proceedings of the *Old Forests, New Management* Conference, Hobart, Tasmania

Lefort P, Grove SJ (2008) Early responses of bird assemblages to clearfelling and its alternatives at Warra, Tasmania. Proceedings of the *Old Forests, New Management* Conference, Hobart, Tasmania

Neyland MG (2005) Seedling regeneration, growth and density of *Eucalyptus obliqua* following variable retention harvesting in wet eucalypt forests in Tasmania, Australia. Poster paper presented at the XXIII IUFRO conference, Forests in the Balance: Linking Tradition and Technology, Brisbane, Australia

Neyland MG (2005) Understorey islands as a means of conserving structural and plant diversity within harvested wet eucalypt forests in Tasmania. Paper presented at the XXIII IUFRO conference, *Forests in the Balance: Linking Tradition and Technology*, Brisbane, Australia

- Neyland M, Ziegeler D (2008) The impact of harvesting disturbance on the floristics of the Warra silvicultural systems trial. Proceedings of the *Old Forests, New Management* Conference, Hobart, Tasmania
- Neyland M, Hickey J, Bauhus J, Beadle C, Davidson N, Edwards LG (2008) Stocking and early growth of the regeneration in the Warra silvicultural systems trial, Tasmania, Australia. Proceedings of the *Old Forests, New Management* Conference, Hobart, Tasmania
- Neyland, M.G., (2010) *Silvicultural performance of alternatives to clearfelling in lowland wet eucalypt forests: Findings from long-term research at Warra, Tasmania*. Presentation to the VI Southern Connections Congress held in Bariloche, Argentina, February 15 to 19, 2010
- Read SM, Grove S, Baker S (2009). Long-Term Ecological Research at Warra: science to policy, science to land management. Invited paper, 10th International Congress of Ecology, Brisbane, Australia
- Rothe A, Neyland M, Hickey J (2008) Is single tree selection suitable for Tasmania's wet eucalypt forests? Lessons from the European experience. Proceedings of the *Old Forests, New Management* Conference, Hobart, Tasmania
- Scott R (2008) Developing variable retention silviculture in Tasmania. Proceedings of the *Old Forests, New Management* Conference, Hobart, Tasmania
- Stephens H, O'Reilly-Wapstra J, Baker S, Munks S, Potts B (2009) Aggregated retention and mammal conservation in old growth forests. Poster, 10th International Congress of Mammalogy, Mendoza, Argentina
- Yee M, Gao R, Grove SJ, Hickey J (2008) Measuring forest maturity within an experimental forest landscape to inform conservation planning in Tasmania. Proceedings of the *Old Forests, New Management* Conference, Hobart, Tasmania