



Cooperative Research Centre for Forestry
Annual Report
to the Commonwealth Government
2007-08



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Cooperative Research Centres Programme.

CRC for Forestry

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Executive summary

Chief Executive Officer: Professor Gordon Duff

The CRC for Forestry enjoys an exceptionally high level of engagement with our major stakeholders, and this year's annual report highlights the significant level of confidence that the industry places in our research outputs, and the willingness to adopt the results of the CRC's research in day-to-day operations and decision making. CRC for Forestry projects are characterised by a seamless relationship between research and operational activities, in contexts ranging from production forestry to government policy implementation.

The diversity and relevance of research outputs is reflected in this year's crop of CRC for Forestry Technical Reports. Fourteen substantial technical reports produced during the financial year cover topics ranging from plantation modelling and thinning strategies, applications of acoustic wave and infra-red scanning technologies, approaches to solid wood production, biodiversity conservation, community attitudes and evaluation of socio-economic impacts.

During the financial year several new key personnel joined the team. Mark Brown joined us from the Forest Engineering Research Institute in Canada to take on a full time role managing the Harvesting and Operations Program. The level of activity in that program has ramped up considerably, accompanied by a growing level of industry enthusiasm and confidence. Tom Fisk has taken on the newly created role of Industry Engagement Manager, which includes the previous commercialisation and utilisation portfolio. Tom has also made a significant contribution to the fledgling Harvesting and Operations Program, as well as bringing 25 years of industry experience to bear on adoption strategies across the CRC. Mark Stemm has brought a substantial breadth of private and public sector corporate and financial experience in his role as Business Manager, also recruited during the financial year. At the end of the financial year, Mark Hunt took on the role of Manager for Research Programme 1, replacing Mike Battaglia. Along with excellent scientific credentials, Mark also brings substantial research management experience and a history of conducting industry-relevant research.

Research Programme One – Managing and Monitoring for Growth and Health

The capacity to predict forest performance according to a range of environmental variables is a critical part of decision making in modern production forestry, as is the capacity to monitor the health and performance of trees at meaningful spatial scales. This programme continues to provide and refine an array of decision support tools for plantation and native forest managers. The programme uses an array of approaches including empirical tools such as remotes sensing, and predictive tools such as process based models. A real strength of the programme is the capacity to translate findings from one region and context to another. Consequently complementary research is taking place in hardwoods and softwoods, and informed by field studies covering the northern, southern, eastern and western extremes of the Australian continent.

One of the year's highlights for the programme was a workshop on sustaining plantation production, held in Perth in December. Bringing together the current state of knowledge on challenges to second (and later) rotation hardwood

plantations, the workshop was well attended by industry and highlighted many of the research advances that will assist plantation managers to recognise and overcome one of the most significant emerging issues for that part of the sector. CRC researchers are now developing decision support tools to help match inter-rotation management and establishment silviculture to site conditions.

Research Programme Two - High Value Wood Resources

The programme has achieved a number of significant milestones during the financial year, some of which are well ahead of schedule, thanks in part to the application of recent technology advances in genetics. The breeding project is well on track to identifying genetic markers for important traits in the major plantation *Eucalyptus* species, relating to both pulp yield and solid wood properties. The direct engagement of partners involved in industrial scale tree breeding means that there is strong potential for rapid uptake and application of project information.

A major conference in Melbourne highlighted much of the work being delivered by Programme 2, particularly related to high-value timber production. The conference was well attended by industry, and the conference proceedings, jointly published by the CRC, constitute a valuable information resource for the hardwood plantation sector. The year also saw the completion of a major trial analysing different treatments to optimise production of sawn boards from plantation grown *Eucalyptus nitens*. At the end of the financial year, the analysis and presentation of the results was on track and attracting significant interest from plantation growers.

Research Programme Three - Harvesting and Operations

In last years' Annual Report we identified staff recruitment as a major bottleneck to the progress of this programme. Despite the importance to the industry and the substantial costs associated with harvesting and transport (approx \$400M pa amongst the CRC's industry partners) the R&D capacity in Australia focussed on these issues has been virtually non-existent in recent years. It is therefore particularly gratifying to report that a well qualified and dedicated team was formed during the year, and hit the ground running in both research and knowledge delivery activities. The programme has also benefitted from international collaboration and visiting experts that have enabled us to accelerate knowledge delivery in some areas. The Programme delivered eight workshops during the year in each of the three largest forestry regions.

A degree of caution and scepticism in some quarters of industry has been replaced by enthusiasm, to the extent that two new partners have come on board and the level of industry cash available to the project will increase from 2008-09 onwards. Contractual details are being finalised later in 2008.

Research Programme Four – Trees in the Landscape

The programme includes a diverse set of project activities focused on developing forestry practices that meet agreed environmental certification requirements and foster constructive community engagement. Such practices will provide security for the forest industry's long-term "licence-to-operate" in the Australian landscape, and build international recognition of sustainable forest practices for product marketing. The programme is structured around three prominent themes: water, biodiversity and community engagement.

Research on water deals with three broad themes: water yield, water quality and management of riparian zones, and is carried out in three states focussing on management issues that are of high priority in each jurisdiction. Project activities have been integrated into wider water research frameworks as appropriate. All aspects of the project are progressing well, and work on water yield in Western Australia and yield and quality in Victoria is now well on track despite early setbacks. The biodiversity project has been particularly successful in attracting research students, and there are now 27 PhD and 1 MSc students attached to the project. Work on the management of insect pests, through the Industry Pest Management Group continues to deliver a highly valued service to the bluegum growing industry.

The Communities project attracted considerable media attention and praise from both sides of the forest debate following the release of the Tasmanian Forest Industry Survey in June 2008. Other draft reports produced by the project detail best practice approaches for community engagement, land-use change impacts in the green triangle, and socio-economic cost benefit analyses for plantation forestry in Tasmania and WA.

Conservation and use of old-growth forests in the 21st century - an international scientific conference was held in Hobart from 17 to 21 February 2008. Hosted by the CRC for Forestry, Forestry Tasmania and the International Union of Forest Research Organisations, the conference was sponsored by the Australian Academy of Technological Science and Engineering as part of the Sir Mark Oliphant conference series. This high profile international conference served to showcase a wide cross section of CRC for Forestry research activities, particularly those covered by Programme 4.

Context and major developments during the year

The CRC for Forestry has been established during a period of significant change and development in the Australian forestry sector. Australian forest industries currently produce a combined annual turnover of \$18 billion and employ around 83,000 people directly. Well managed native forests and plantations provide an additional array of environmental services, including areas of growing national significance such as carbon sequestration and improved water quality and in some cases, yield. While these issues were prominent at the time of establishment of the CRC, they have grown in significance and public profile in recent years, placing even greater national and international significance on the CRC's research outcomes. Water and carbon issues have occupied a particularly high public and political profile in the period covered by this report.

The rapid expansion of the plantation estate in Australia since the early 1990s largely dominated by private sector investment is beginning to impact significantly on availability of wood from this source, and the harvest is set to accelerate in the next few years. This creates both a challenge and an opportunity for the CRC to ramp up our contribution to improved harvesting and supply chain efficiency. Demand from the sector for innovation, benchmarking and technology transfer in this area has grown rapidly as more first rotation plantations reach maturity, and the growing capacity of the CRC to respond has been enthusiastically welcomed by industry partners.

National research priorities

CRC for Forestry research that addresses national research priorities are summarised in the body of this Annual Report in tabular format below (Table 1).

CRC for Forestry research addresses all four national research priority goals, covering more than half (11/21) of the associated priority goals. CRC for Forestry research strongly supports NRP Goal 1 (an environmentally sustainable Australia) by contributing to six out of seven of the associated priority goals. It also makes a major contribution to NRP Goal 3 (frontier technologies for building and transforming Australian industries), contributing to three out of five of the associated priority goals.

Table 1. Summary of CRC for Forestry contributions to national research priorities

NRP Goal	Associated priority goal	RP1	RP2	RP3	RP4	Overall CRC for Forestry research (per cent)*
1: An environmentally sustainable Australia;	1.1 Water – a critical resource	Y	N	Y	Y	33
	1.2 Transforming existing industries	Y	Y	Y	Y	100
	1.3 Overcoming soil loss, salinity and acidity	Y	N	Y	Y	36
	1.4 Reducing and capturing emissions in transport and energy generation	N	N	Y	N	8
	1.5 Sustainable use of Australia's biodiversity	N	N	Y	Y	28
	1.7 Responding to climate change and variability	Y	N	N	Y	41
2: Promoting and maintaining good health	2.4 Strengthening Australia's social and economic fabric	Y	N	Y	Y	20
3: Frontier technologies for building and transforming Australian industries	3.2 Frontier technologies	Y	N	Y	N	37
	3.4 Smart information use	Y	N	Y	Y	36
	3.5 Promoting an innovation culture and economy	N	N	Y	N	15
4: Safeguarding Australia.	4.1 Critical infrastructure	N	N	Y	N	15
	4.3 Protecting Australia from invasive diseases and pests	N	N	N	Y	3

* Percentage estimates based upon relative budget and resource allocation to programmes and projects.

Governance and management

Table 2a. CEO and governing Board members

Directors and Officers

Name	Particulars
Anne Katherine Carnell	(AO, B.Pharm, FAIM, FAIPM, MAICD). Chief Executive Officer, Australian Food and Grocery Council. Joined the Board at incorporation of the company on 30 June 2005 in a non-executive capacity. Ms Carnell is Chairman of the Board, Chairman of the Remuneration and Nomination Committee and a member of the Compliance Committee
Timothy Michael Browning	(B.Bus, Dip.C.M., MAICD). General Manager, Forestry Division, Timbercorp Limited. Joined the Board at incorporation of the company on 30 June 2005 in a non-executive capacity. Mr Browning is a member of the Compliance Committee and Communications Committee.
Johannes Hendrick Drielsma	(B.Sc.For.(Hons), M.For.Sci, PhD). Executive General Manager, Forestry Tasmania. Joined the Board at incorporation of the company on 30 th June 2005 in a non-executive capacity. Dr Drielsma is the Chairman of the Communications Committee and a member of the Remuneration and Nomination Committee.
Gary Brian Inions	(B.Sc(Hons), PhD). Managing Director, Plantation International Pty Ltd and Hansol PI Pty Ltd. Joined the Board on 13 December 2005 in a non-executive capacity. Dr Inions is a member of the Remuneration, Nomination and Intellectual Property Committee.
James Balfour Reid	(B.Sc(Hons), PhD, D.Sc, FTSE, awarded David Syme Research Medal (1989) and the Royal Society of Tasmania Medal (2000)). Dean, Faculty of Science Engineering and Technology, University of Tasmania. Joined the Board at incorporation of the company on 30 June 2005 in a non-executive capacity. Professor Reid is a member of the Remuneration, Nomination and is Chair of the Intellectual Property Committee.
Robert Geoffrey Woolley	(B.Ec, FCA). Chairman of the Forests and Forest Industry Council of Tasmania, Chairman of Tasmanian Pure Foods Ltd and Director of Tandou Ltd. Previously a partner in Deloitte Touche Tohmatsu and former Managing Director of Webster Ltd. Mr. Woolley has extensive experience in management, business recovery and a professional background in financial services. Joined the Board on 12 December 2005 in a non-executive capacity. Mr. Woolley is Chairman of the Compliance Committee.
Robert John Pearce	(B.A., Dip. Ed., J.P.) Executive Director, Forest Industries Federation of WA and Chair of NAFI. Joined the Board in 31 st October 2006 in a non-executive capacity. Mr. Pearce is a member of the Communications Committee.
Gordon Duff	(B.Sc. (Hons), PhD, FAICD). Professor Duff was previously CEO of the CRC for Tropical Savannas Management. He is also Chair of the Board of the Northern Territory Environment Protection Authority. Chief Executive Officer, CRC for Forestry Ltd.; joined the CRC for Forestry on 2 October 2006.
Mark Stemm	(Cert. Comm, B. Soc. Sc, Grad Dip, Agr. Econ, Grad Dip. Bus, FPNA) Mark joined the CRC as Company Secretary in January 2008 and was previously Manager of the Burnie campus of the University of Tasmania. He is chair of Kentish Regional Clinic Inc.

Directors' meetings

The following table sets out the number of directors' meetings (including meetings of Board advisory committees) held during the financial year and the number of meetings attended by each director (while they were a director or committee member). During the financial year, six Board meetings, four Compliance Committee, two CIPMC, and four Communications Committee meetings were held. The Remuneration and Nominations Committee did not meet during the financial year.

Table 2b. Directors' meetings

Directors

	Board	Compliance Committee	CIPMC	Communications Committee
Kate Carnell	5/5	5/5		4/4
Tim Browning	5/3	5/4		
Hans Drielsma	5/3			4/4
Gary Inions	5/5			
Bob Pearce	5/5			4/4
Jim Reid	5/5			
Rob Woolley	5/4	5/5		
Richard Ede	4/3		1/1	

The Remuneration and Nominations Committee did not meet during the reporting period.

Board advisory committees: all Board committees act in an advisory capacity only, with no delegated powers, to advise the directors on specified matters. The Chief Executive Officer is an ex-officio member of all Board committees (except, in the case of the Remuneration and Nominations Committee, where matters dealt with affect his/her personal employment contract). During the financial year the following Board advisory committees were in operation:

a) **Compliance Committee:**

Membership Rob Woolley (Chair), Kate Carnell, Tim Browning; CEO, Business Manager and Company Secretary (Secretary) and Finance and Administration Manager.

Role and frequency of meetings

The Compliance Committee meets quarterly in advance of the Board meetings to receive the draft financial statements, budget and participants' report package, oversee risk management monitoring and reporting, receive and review reports from the auditors and address any other major financial impacts of the company's business.

b) **Commercialisation and Intellectual Property Management Committee:**

Membership Jim Reid (Chair), Gary Inions, Charlie Day, Tom Fisk (Secretary), CEO and Business Manager and Company Secretary.

Role and frequency of meetings

The CIPMC met only once during the year and due to the resignation from the Board of Richard Ede, the committee appointed a new chair (Jim Reid) and member (Gary Inions) and they did not meet in the second half of the year. The committee's purpose is to review company strategies for determining appropriate "path to adoption" for each CRC research output, within the context of the CRC's intellectual property (IP) portfolio, including use of external and in-house expertise; formulation of commercialisation plans for those outputs identified as having potential beyond own-use by industry participants; and policies and associated training and documentation activities for management of IP generated by CRC for Forestry research.

c) Communications Committee:

Membership Hans Drielsma (Chair), Kate Carnell, Bob Pearce, CEO, and Communication Manager (Secretary).

Role and frequency of meetings

The Communications Committee meets quarterly in advance of the board meetings to review the company policy and strategies for communicating with management of CRC for Forestry participant organisations; staff and students of participant organisations actively engaged in conduct of CRC business; third party organisations with an interest or potential interest in the outcomes of CRC research; and the media.

The committee will also receive and review quarterly reports of progress against the communications plan, together with the forward programme, as a basis for ongoing advice to the Board; and provide advice to the CEO and Communications Manager on matters relevant to the Charter.

d) Remuneration and Nominations Committee:

Role, membership and frequency of meetings

Committee membership is dependent on the type of business which needs to be transacted. The Chair will normally be the Chair of the CRC (unless the matter to be addressed relates to the Chair's appointment, performance appraisal or remuneration). The committee is convened, and membership determined, as necessary to address matters in relation to nominations for vacant Board positions; and determination of job specifications, advertising, selection, performance appraisal and remuneration of senior company executives. No meetings were held in 2007-08.

Chief Executive Officer committees: the CEO, subject to the oversight of the board, has established the following committees with relevant interests and expertise to advise on the management of the CRC for Forestry:

a) Management Committee:

Membership CEO Gordon Duff (Chair); research programme managers Mark Hunt, Chris Harwood, Mark Brown and Brad Potts; Industry Engagement Manager Tom Fisk; Education Chair: Peter Kanowski; Business Manager Mark Stemm; Communications Manager Taylor Bildstein; Finance and Administration Manager Shelley Caswell (Secretary).

Role and frequency of meetings

The Management Committee is a decision-making body meeting in excess of six times per year to assist the CEO, and is the prime forum for managing the day-to-day activities of the CRC.

b) Education Committee:

Membership Representative from each participating university: Peter Kanowski (Australian National University, Chair), Neil Davidson (University of Tasmania, Secretary), Chris Weston (University of Melbourne), Mervyn Shepherd (Southern Cross University), Treena Burgess (Murdoch University).

Role and frequency of meetings

Meetings are held as necessary to address issues of student recruitment, management, and leadership development; and development of short courses for industry.

c) Research programme coordinating committees

Membership Chaired by an industry-based representative, and consisting of representatives drawn from each participant that is active in the relevant programme, plus the research programme manager (who also acts as Secretary).

Note: core participants and multi-core participants (acting as a group) can elect to be on each committee, supporting participants nominate one of the four.

Role and frequency of meetings

Meet at least twice yearly to address any major issues arising from research work conducted within the relevant research programme. In general the role of the PCCs is to assist the CEO in carrying out the CRC programme as broadly defined in sections 16-21 of the Participants Agreement, in the best interests of all participants. Research programme managers and PCC chairs organise the business of each PCC to most effectively achieve this aim.

d) Project steering committees

Membership Chaired by an industry-based representative, and consisting of representatives drawn from each participant active in the relevant project, plus the project leader (who also acts as secretary).

Role and frequency of meetings

Role is to oversee implementation of the project as defined in the project agreement, and to oversee that the requirements of clause 18 of the Participants Agreement are met. Meetings are normally held at least quarterly.

Private sector representation on the Board and Committees;

The composition of the Board must include a majority of members who have a background in the forest industry. All other committees (except the CEO's management and education committees) have at least one industry representative. Six of the eight board members are drawn from the private sector.

Participant changes

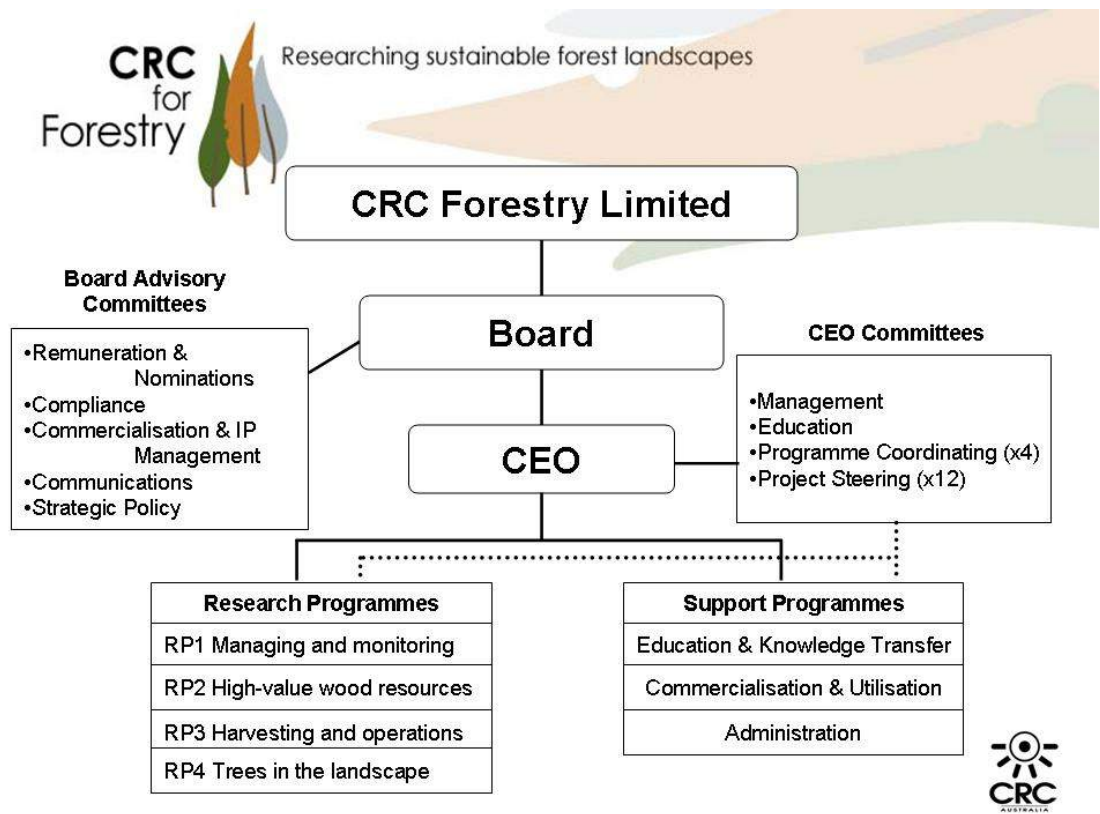
During the financial year there were no new participant, with the only two name changes, one being Forest and Wood Products Research Development Corporation, who changed their name and business (through Federal Government legislation) to Forest and Wood Products Australia and Great Southern Plantations Ltd, changing their name to Great Southern Ltd.

Table 2c. Programme managers

Name	Organisation	CRC position / role
Dr Mark Hunt	QDPIF	Manager, Research Programme One
Dr Chris Harwood	CSIRO	Manager, Research Programme Two
Mark Brown	University of Melbourne	Manager, Research Programme Three
Professor Brad Potts	University of Tasmania	Manager, Research Programme Four
Tom Fisk	CRC	Industry Engagement Manager
Professor Peter Kanowski	Australian National University	Chair, Education Committee

* The following changes to programme managers were made during the year:
-Dr Mark Hunt replaced Dr Mike Battaglia as programme one manager and Mark Brown replaced Rod Keenan as programme three manager. A new full-time position was created, that of Industry Engagement Manager, and Tom Fisk was appointed to the role. The position supersedes the previous part time position of Commercialisation and Utilisation Manager.

Organisational chart



Research programmes

One: Managing and Monitoring for Growth and Health

Manager: Dr Mark Hunt

Research activities and achievements: Research Programme One

Project 1.1 (Monitoring and Measuring)

This project comprises 3 Sub-Projects: 1.1.1: Rapid site assessment, 1.1.2: Monitoring forest health with remote sensing, and 1.1.3: Improved forest inventory using high-resolution remote sensing.

1.1.1: Rapid site assessment –Work in this Sub-project has focussed on modelling the production versus transport of soils. This has involved collecting a wide range of data including climatic, topographic and geological datasets. Models have been developed between soil type (using the Australian Soil Classification, ASC) and the Prescott index; a measure of excess water available for leaching that can be calculated from rainfall and evaporation data, and between soil type and rock type. Good discrimination of soil types was achieved using the Prescott index, whereas discrimination from rock types was poor.

Work in this sub-project has facilitated improved modelling of the relationship between temperature and weathering, and indicated the importance of temperature related effects above the snowline. It also showed the close association between changes in soil depth and the dominance of supply versus transport of soils within the landscape. In addition to differences in soil supply and transport levels, erodibility is also important. Erodibility parameters are being incorporated into the soil property models at this time.

1.1.2: Remote sensing of forest health – Methods for analysing time-series MODIS images to interpret forest health continue to be developed. Current work includes establishing ‘baseline’ conditions, from which changes in health can be determined in isolation from climatic and seasonal variations. These methods are currently being translated from the *Pinus radiata* in the Green Hills State Forest NSW, to *Eucalyptus globulus* at Wattle Range, SA.

Other remote sensing work has included the development of models of forest health from Quickbird high-resolution, and Hyperion hyperspectral satellite image data. These analyses have identified several key areas of work that need to be addressed in this project including a lack of correlation between aerial survey health assessments, and health assessments from field and satellite image data. These studies also indicate a good correlation amongst health assessments from the range of satellite image data sources being used by this project.

A workshop on statistical analysis in the open-source software package “R” was run by Andrew Robinson (UMelb) at the Clayton CSIRO Campus on behalf of the Forestry CRC on 27-28 March 2008. This was attended by approximately 25 forestry and statistical practitioners from around Australia.

1.1.3 Improved Forest Inventory through High Resolution Remote Sensing – A methodology is now in place to extract stand-level metrics from airborne laser scanning (ALS) data. Methods have been developed and implemented (in an R software package) for extracting the following stand level metrics: height percentiles, canopy density, canopy surface texture – and have been shown to be effective stand level metrics to employ in future planned work.

LiDAR data acquisition specifications over plantations and native forest for extraction of stand-level metrics are also in place. Stand level metrics have been shown to be influenced by acquisition specifications. Empirical models have been developed to remove these effects. An extension of this work that has been identified is to use the same methodology to assess the consistency of findings in two different forest types (*radiata* cf temperate eucalypt forest and *E. nitens* plantations).

Stand-level allometric modelling is currently being undertaken. The utility of canopy height and density quantiles, and canopy texture measures in describing timber volume are all being explored. Allometric models have been built for native forest and eucalypt plantations. The eucalypt plantation models require some further refinement. Canopy height and density quantiles show the most promise. Canopy texture measures are useful in complex forests where quantile signatures vary between age cohorts. These are best derived using LiDAR data.

Project 1.2 (Managing and Sustaining)

This project comprises two sub-projects: 1.2.1: Sustaining Site Resources and 1.2.2: Forest Health

1.2.1: Conceptual framework development and coding for a 1st pass coppice version of CABALA was completed. This is an important step along the road to assisting plantation managers to choose the most appropriate establishment method at 2nd rotation sites.

A workshop on “Sustaining Plantation Production: A review” was held in Perth in December 2007, which summarised the current state of knowledge of changes in site and resource availability during the 1st rotation, and implications for management of 2nd and later rotation plantations.

1.2.2: A CABALA forest health module has been developed. In order to deal with the changes in the light environment and crown architecture that are observed following pest attack considerable modifications to CABALA were required. The light interception model has been changed to allow for changes in light penetration due to loss of leaf area. Crown zones have been added to allow for pest attack in different parts of the crown. Photosynthetic upregulation can be input by the user. It is still a stand level model so models the impact of a pest attack event by considering the average level of damage experienced across a site.

The module has been tested against field data and has had limited validation - for *E. globulus* (on 6 sites) and *P. radiata* (2 sites). It performs well but there are issues with severe defoliation and bud damage (over predicts). It does predict Type 1 (growth rate returns to be comparable to that pre damage) and Type 2 damage (growth trajectories diverge from those of undamaged trees).

The effects of pre and post canopy closure defoliation in *Eucalyptus globulus* on carbon uptake, resource allocation and particularly water use were studied. The results were valuable in testing a CABALA health model and provided the first detailed information about responses to defoliation in older trees (post canopy closure). Important information about differences in natural and artificial defoliation was gained, particularly that natural defoliation causes greater damage to buds than is mimicked artificially.

Project 1.3 (Models and Information Integration)

The hydraulic constraints on water use under decreasing water availability have been quantified under the cellular automata project. Strong evidence linking whole plant hydraulics and growth rates was found. Gradients in photosynthesis and foliar respiration within dominant and suppressed canopies in relation to light availability and foliar nitrogen have been found. Strong support has been demonstrated for the light nitrogen hypothesis within eucalypt canopies. Light environments within the crowns of dominant and suppressed trees have been characterised and the carbon use efficiency of these crowns have been examined resulting in findings that suppressed trees have a lower efficiency than dominant. Significant work towards both an extensive chronosequence of above and below ground patterns of biomass allocation for *E. globulus* trees used in this study and relating to the respiration rates of woody tissues has been undertaken.

A cellular automata model of size class distributions and survival has been developed. The model captures a number of key forest processes, including demonstrating the links between size class variability and productivity, i.e. decreased size class variability in high productivity sites compared to low productivity sites, later aged declines in productivity observed later aged declines in forest productivity (directly relevant to milestone 1.3.1 “pilot project completed of software for predicting size class distributions and survival: due Dec 09).

Project 1.4 (Growth modelling and risk assessment for sub tropical hardwood species)

Field gas exchange measurements have now provided some of the necessary photosynthetic parameters for applying the model CABALA to *Eucalyptus dunnii*, *Eucalyptus pellita* and *Corymbia citriodora*. Whilst light and CO₂ response curve parameters are very similar to those used for temperate taxa, the extent of midday depression of photosynthesis in the tropics has required a rethink about how the daily integral of photosynthesis is modelled. Some diurnal work and low temperature response measurement is still necessary for the subtropical taxa.

Destructive sampling has similarly resulted in the development of allometric equations and estimates of Carbon and Nitrogen in each of the above-ground biomass pools for the three taxa. At this stage only a single age class in each taxon has been examined. The results thus far indicate that *E. dunnii* canopy structure is probably well represented by existing model parameters but *C. citriodora* reflects a different set of allometrics. At this stage it is unclear whether these results are reflected below-ground.

Estate level data relating to growth, soils and climate have been collated and reviewed for a range of experiments across Queensland to be used as validation tools.

A draft parameter set has been constructed for *Eucalyptus pellita* and validation of the model is about to start.

Major consultancies: Research Programme One

No consultancies were undertaken during the year.

Grants and their contribution to the CRC: Research Programme One

No additional grants to the programme during the year.

Changes proposed to future directions: Research Programme One

A proposal is currently circulating amongst industrial partners to seek expressions of interest in forming a network of nutrition experiments. This would be coordinated through project 1.2.1 “Managing and sustaining: site resources.” If this is successful, additional funding will be sought to allow a coordinated approach to design, management, and analysis.

Research collaborations: Research Programme One

Internal CRC Forestry Collaborations

Sub-projects 1.1.2 and 1.2.2 are now working closely together at Wattle Range, South Australia on the remote sensing of eucalypt forest health and impact modelling.

Project 1.2 Leader (Dr Caroline Mohammed) co-supervises two students in Sub-project 4.2 (on biodiversity of insects and fungi).

Staff from Sub-project 1.2.1 and Programme 2 are collaborating on assessing silvicultural treatment effects on pulp quality and yield.

Sub-project 1.2.2 has strong links with Project 4.2 through sharing the same Project Steering Committee chairman (Dr Tim Wardlaw) and sharing a PhD student (Kate Taylor in 4.2.10 working on *Mycosphaerella* research).

Project 1.3 is working with Sandra Roberts (Programme 4) on overstory/understory water use and leaf area index in the Florentine valley. Joint publications are being prepared between Projects 1.3 and 1.2 on biomass and canopy productivity in relation to defoliation.

Staff from Project 1.4 and Sub-project 1.2.1 are collaborating in order to develop a CABALA parameter set for *Eucalyptus pellita*.

Project 1.4 and Project 2.5, both working on sub-tropical eucalypt species, are sharing data and field resources to develop taper equations from thinning material in *Eucalyptus dunnii* and *Corymbia citriodora* subsp. *variegata* plantations.

Domestic collaborations

Anthony O’Grady of Project 1.3 is continuing research collaboration with Andrew Merchant (UNSW) and Mark Adams (University of Sydney) into the temporal dynamics of phloem composition.

Prof Eamus, Mel Zeppel and Cate McGuinness-Ng are working with Project 1.3 on the parameterisation of the Soil-Plant-Atmosphere model for *E. globulus* and partitioning overstory/understory water use using scintillometers.

International collaborations

Dr David Whitehead of Landcare Research, New Zealand, continued as the external science reviewer for the research programme. Dr Whitehead attended the second Annual Science Meeting in July 2007.

Steve Woodward

Company/ Research organisation University of Aberdeen

Country UK

Nature of Collaborative alliance International partner investigator on ARC grant “Linking environmental stress in pine plantations to bark stripping by browsers and fungal attack: Developing novel options for management”.

Comment 3 year project ending in 09. There have been visits of project staff to UK to analyse samples and Steve has done field work in Tas.

Enrico Bonello

Company/ Research organisation University of Ohio

Country USA

Nature of Collaborative alliance International partner investigator on ARC grant “Linking environmental stress in pine plantations to bark stripping by browsers and fungal attack: Developing novel options for management”.

Comment 3 year project ending in 09. There is visit planned for March 09 Enrico to Tasmania for project work.

Company/ Research organisation University of Aberdeen

Country UK

Nature of Collaborative alliance International partner investigator on ARC grant “Linking environmental stress in pine plantations to bark stripping by browsers and fungal attack: Developing novel options for management”.

Comment 3 year project ending in 09. There have been visits of project staff to UK to analyse samples and Steve has done field work in Tas.

Pedro Crous

Company/ Research organisation Centraalbureau voor Schimmelcultures (CBS-KNAW), Utrecht

Country Netherlands

Nature of Collaborative alliance Identification of *Mycosphaerella* species

Comment Samples of *Mycosphaerella* leaf spot on eucalypt leaves in Tasmania are identified by Crous

Two: High Value Wood Resources

Manager: Dr Chris Harwood

Research activities and achievements: Research Programme Two

Key research achievements are described by project in the text below and progress towards milestones is summarised in Table 3.

Project 2.1 (Breeding for high value wood products)

Substantial in-kind support from Forestry Tasmania and FEA Ltd enabled CRC researchers to track the processing of over 500 family-identified logs from a large progeny trial of *Eucalyptus nitens*. Tree and family identities were maintained during harvesting, debarking and sawing, enabling the genetic identity of individual sawn boards to be retained despite the large experiment size and the rapid processing by the linear sawmill. This study will enable us to directly determine the extent to which solid-wood objective traits and product values are under genetic control, and strengthen breeding for solid-wood products, as well as providing wood property data that will be used for association genetics studies on *E. nitens*.

University of Melbourne researchers completed the Single Nucleotide Polymorphism (SNP) discovery phase of our *E. globulus* association genetics project. More than 20,000 base pairs of the genetic sequence have already been screened for variation revealing hundreds of genetic polymorphisms suitable for association testing. Analysis of the 15 genes represented in the dataset has also revealed numerous genetic ‘hotspots’ that have been significantly affected by natural selection. An association between variation within the CAD2 gene (which plays a role in the biosynthesis of lignin) and growth of *E. globulus* was identified.

The development of a DArT array of 5,000 molecular markers being undertaken by the University of Tasmania research team is almost finished. The markers appear to work well for *Eucalyptus globulus*, *E. nitens* and other species of the subgenus *Symphyomyrtus*. These markers will be used to identify Quantitative Trait Loci (QTL) for wood properties in *E. globulus* across a wide range of genetic material. Sequenced DArT markers will then be used to interrogate the genome sequence of *Eucalyptus grandis* (when this becomes available in the near future; www.eucagen.org), in order to identify positional candidate genes. Such positional candidate genes can then be used in association studies (see above), to find superior alleles that can be used in breeding programmes.

Researchers at Southern Cross University completed the analysis of genetic variation at 62 positions (SNPs) within four candidate genes, in an association population of 372 trees from a Forests NSW progeny trial of *E. pilularis*. Associations between SNPs and variation in wood quality traits using data from processing studies supplied by Forests NSW is being undertaken.

Project 2.2 (Silviculture for high value solid and engineered wood products)*¹

Project scientists contributed to organizing the successful conference *Plantation Eucalypts for High-Value Timber*, which attracted over 100 participants to Melbourne in October 2007, and co-edited the published conference proceedings.

A major silvicultural trial of *Corymbia* hybrids was planted in SE Queensland. The trial tests several selected *Corymbia* hybrid families at three initial stockings. Different thinning and pruning treatments will be imposed as the stand develops. Early results will help growers optimize silviculture of *Corymbia* hybrids. Study of the impacts of silviculture and genetics on growth wood quality of the retained final-crop trees will be carried out over a longer time frame.

A thinning x pruning x fertiliser experiment in *E. nitens* at Carrjung Victoria continues to be the focus for ecophysiological studies (aboveground biomass allocation, canopy architecture, light regimes and canopy photosynthetic capacity) of growth responses to silvicultural treatments. Final-lift pruning treatments were completed and measurements to two years post initial treatment have been completed. With additional funding from the Victorian Department of Sustainability and Environment, the trial will also be the focus of studies in 2008/09 of tree water use in response to treatment.

Remeasurement of three large thinning x fertiliser trials in *E. globulus*, *E. nitens* and *E. viminalis* at Tostaree, Victoria, and application of commercial thinning (age 14 years) and fertiliser treatments was completed. Growth and wood property responses to non-commercial treatments have been previously studied; and these trials provide for similar work later in the CRC Forestry term.

Individual tree, distant independent diameter increment models were developed for *E. globulus*, *E. nitens* and *E. grandis* using data from three non-commercial thinning trials at Buffalo River, Mangalore and Shepparton, Victoria. Using an indicator variable approach, the models were formulated for prediction and comparing the growth of sawlog potential trees retained in stands thinned to 200-400 trees/ha, and their counterparts in unthinned stands.

Project 2.3 (Impact of silviculture interventions on wood quality)

A major research focus of the project during the year was trialling a number of different sawing and pre-drying methods and drying treatments to determine the best ways to reduce checking and end-splitting in sawn boards of plantation-grown *E. nitens*. These trials were completed and the results are now being analysed.

The microfibril angle (MFA) of cellulose microfibrils in the cell walls in the outer wood was significantly affected by stocking and the level of applied nitrogen fertilizer, in three 10-year-old silvicultural trials located along a rainfall gradient in Western Australia. Low MFA is a reliable indicator of

¹ Includes preparatory work for Project 2.5, High-value Wood Products from Subtropical Plantations, which will commence formally as a separate Project in July 2009

damaging levels of tension wood, which leads to degrade during board drying. Trees grown at lower stocking and receiving additional fertilizer appear to have lower levels of tension wood, a finding which has implications for growers interested in processing blue gum for sawn products.

Scientists from the University of Tasmania and FEA Ltd reported an operational trial to evaluate acoustic wave velocity measurements for grading *E. nitens* logs for production of structural timber.

Project 2.4 (Incorporating wood quality into plantation estate management)

The wood analysis and near infra-red (NIR) capability in Project 2.4 has continued to provide services to other projects, generating cellulose content data sets for use in several genetic studies. The NIR cellulose calibration has been expanded and has undergone testing in a series of validation cycles.

NIR-based radial scanning of wood cores and SilviScan samples has generated a calibration for the prediction of microfibril angle. The work was presented as a poster at the Australian Near Infrared Spectroscopy Group (ANISG) conference in April 2008.

The use of two-dimensional acoustics for the assessment of defects in standing trees of *Eucalyptus globulus* was evaluated (Yang et al 2008) and as indicated in a CRC internal report, the technique has limited ability to detect defects.

A prototype wood property prediction model that predicts SilviScan properties at a daily time step from weather and inputs from the process-based growth model CABALA, was developed as part of a PhD project at Monash University, with co-supervision from CRC staff.

Major consultancies: Research Programme Two

No consultancies were undertaken during the year.

Grants and their contribution to the CRC: Research Programme Two

No additional grants to the programme during the year

Changes proposed to future directions: Research Programme Two

No major changes to programme direction during the year

Research collaborations: Research Programme Two

Number of collaborations entered into

A formal collaboration with the University of Tasmania ARC linkage grant “Unravelling the links between growth and wood density” continued. These additional resources enabled detailed analysis of lignin composition of *E. globulus* individuals that are being used in the association genetics study in Project 2.1 (“Breeding for high value wood products”).

The collaborative arrangement with Ensis researchers (working outside of the CRC for Forestry) continued. Research collaboration with the company

Diversity Arrays Pty Ltd, and CRC for Forestry co-investment along with other funds from an ARC Discovery Grant awarded to Dr René Vaillancourt were used to successfully develop a system of DArT molecular markers for *Eucalyptus*.

Dr Harwood was guest editor of a special issue of the New Zealand Journal of Forestry Science, publishing selected papers from the Inaugural Australasian Forest Genetics Conference with the theme “Breeding for Wood Quality”.

A prototype wood property prediction model that predicts SilviScan properties at a daily time step from weather and inputs from the process-based growth model CABALA, was developed as part of a PhD project at Monash University with co-supervision from Project 2.4 leader Dr Geoff Downes.

The Carter Holt Harvey sawmill at Yarram, Victoria, the CRC for Wood Innovations and Tasmanian Kiln Dried Timbers Pty Ltd participated in sawing and drying trials evaluating methods to reduce checking in *E. nitens* sawn boards.

Number of international collaborations

Dr Steve Verry of CSIR Environmentek, South Africa, continued as the external science reviewer for the research programme. Dr Verry attended the second Annual Science Meeting in July 2007.

Commentary on milestones: Research Programme Two

The majority of research milestones due during the reporting period were achieved. There were some delays to research milestones in Project 2.4 resulting from technical staff absence, this issue has now been resolved. Relocation of key staff caused some delay to milestones in Project 2.5.

Three: Harvesting and Operations

Manager: Mark Brown

Research Programme Three: Harvesting and Operations

3.1 Research activities and achievements

The programme has almost completed the staffing of the group and representatives are now in place in all the regions targeted and staffing is sufficient to have research and implementation activities in all the regions represented by our partnership.

- o Programme leader: Mark Brown started in September 2007 at the Creswick campus of the University of Melbourne.
- o Researcher for Western Australia: John Wiedemann under secondment from WAPRES starting July 1 2008

Eight major industry workshops were delivered over the past year:

- o Harvest planning and management was a two day workshop demonstrating software and methods for improved forest operations management and planning that was delivered in three locations; Tasmania, South Australia and Western Australia
- o Harvest planning and management for cable logging systems was a one day workshop demonstrating software and methods for the use of cable logging systems that allow economical access to forest in steep terrain that was delivered in two locations; Tasmania and Western Australia
- o Evaluation of forest operations for frontline managers was a workshop that demonstrated tools and methods to effectively evaluate the performance of mechanical forest operations to better understand the efficiency, costs and performance of operations thus allowing for the implementation of continual improvement programs. This workshop was delivered in three locations; Tasmania, South Australia and Western Australia

Efforts have continued in the area of international collaboration for the enhancement or acceleration of program outputs and outcomes.

- o Mr Ernest Heidersdorf, retired research director from FPInnovations (Canada) joined the program for three weeks to deliver the machine evaluation workshop and to help refine the evaluation techniques and analysis used in the program based on his extensive experience. Armed with the overview and preliminary discussions of this visit Ernest will return for three months late in 2008 to accelerate John Wiedemann's development as a field researcher and further refine the program methods to ensure efficiency in achieving our objectives.
- o Prof. Glen Murphy has agreed to join the program for 5 months to support the execution of ground based LiDAR trials in Eucalyptus plantations in

the support of pre-harvest planning and to deliver a series of workshops to industry on value recovery in harvest operations.

- o A collaborative project is being established with Forestry Solutions for South Africa and Forestry Solutions from New Zealand to research and develop and forest harvest operations tracking and management system for the Southern Hemisphere.
- o Establishing connections with the newly established collaborative research organization, Future Forest Research, in New Zealand. We have participated in a research planning meeting for the group and met to discuss potential collaboration opportunities.

Research results have started to be delivered to industry.

- o Productivity study comparing two systems in thinning operations clearly identified one approach was lower cost than the other in the studies range of conditions.
- o Analysis of truck tare weight data has identified opportunities to reduce transportation costs up to 10% through better equipment selection.
- o Methods of manual log measurement were identified to minimize the time for measurements and maximize the accuracy of the measurements which is of particular use for good calibration of automated optimization systems now being studied.
- o Data collection and field work is currently underway on 10 other projects.

There have been notable changes to both the research and commercialization outputs and milestones for programme three that are reflected in the revised tables below. Programme three is unique within the four groups of the CRC for Forestry in that it was started from a zero base without staff. As a result the recruiting of staff from a limited and competitive international field of expertise has taken considerable time. As the staff came onboard the programme, initial activities included consultation with the Australian forest industry to better understand the current situation, future trends and identify knowledge/technology gaps for the industry. This consultation culminated with the appointment of the programme leader and resulted in a revised set of outputs and milestones that reflect the greatest opportunity and scope for the industry based on the international perspective of the newly established team and the extensive input of the Australian forest industry partners. As a final step the revised outputs and milestones were formally endorsed by the program coordinating committee along with supporting work plans and revised budgets in February 2008. In some cases the original outputs and milestones were only changed minimally and in other cases significant changes were made to make the outputs and milestones target as high an impact and scope as possible for the industry.

Four: Trees in the Landscape

Manager: Professor Brad Potts

Project 4.1: Water

Project Leader: Dr Patrick Lane

Research activities and achievements: Project 4.1

Research in the Project 4.1 is being undertaken in three states under three broad themes: water yield, water quality and management of riparian zones. Within these themes there are a number of ecosystem specific projects pertinent to partners' management issues. Ultimately the aim is to use water yield and water quality models to integrate the ecosystem specific studies and produce portable modelling tools.

Water yield

This theme has components in Victoria (native forest thinning and mixed species plantation water use), Western Australia (plantation establishment in medium to lower rainfall zones for salinity mitigation), and plantation and native forest growth and water use in Tasmania. This theme also has a number of links to other research both inside (Programme One) and outside the CRC that add value to the water CRC research. PhD research into the hydrologic effect of thinning in Victoria is based around correlating streamflow data from long-term research sites with remotely sensed vegetation data, with key activities surrounding re-instrumentation of catchments, and the capture and ground truthing of LiDAR and spectral data sets. This work also adds to and benefits from ongoing University of Melbourne research into predicting hydrologic responses to native forest disturbance. The mixed species plantation study in East Gippsland has yielded valuable data on the relative water use, water efficiency, growth and nutrient cycling in mixed *E. globulus* and *Acacia mearnsii*, and is currently nearing publication.

The experimental part of the Western Australian project is well under way with two field sites established with piezometers and neutron access tubes and growth plots in stands agroforestry plantation species ready to begin measurements of the effect of lower break of slope tree plantings on watertables. Additional sites will be established in mature plantations in conjunction with the Strategic Tree Farming project in WA over the coming year to examine the effects of dispersed tree plantings (belts) on watertables and the amount of lateral flow in groundwater induced by removal of water under the plantings. Underpinning the experimental work has been an extensive literature review of current understanding of using plantations integrated into farming systems for salinity control, and the follow-on effects for carbon capture and accounting.

The Tasmanian work has focused on analysis of data sets from the Warra long term experimental site catchments LiDAR data is being captured for the Warra catchments and significant re-analyses of historical data sets is underway.

Finally, the Croppers Creek catchment in north-east Victoria that was burnt in the 2006-07 bushfires has given us an opportunity to measure and compare the early response of burnt mixed-species eucalypt forests and second rotation pine plantations. Modelling of pre-fire *radiata pine* water use at both plot and catchment scale in a parallel project using the 3PG+/CAT modelling framework has proven successful.

Water quality

Water quality research includes:

- *Impact of control burning on water quality*, aimed at providing management guidelines for protection of water quality from prescribed fire. The results of both the catchment scale water quality impacts and plot scale erosion processes following the experimental burn are being analysed and written up. A new Phd student has commenced to extend this work to the landscape level and develop an Adaptive Management framework for water quality protection from prescribed fire. A new 0.5 FTE Postdoctoral Fellow appointment will expedite the analysis and publication of data and will link directly to other University of Melbourne research into wildfire impacts on water quality, and the major new project funded by Melbourne Water.
- *Effects of wildfire and salvage logging on water quality*. The original Croppers Creek study was to focus on the effect of harvesting on nutrient flushing. The fire confounded that study but has allowed us to investigate the response of a burnt then logged pine plantation with two burnt mixed species eucalypt catchments, one of them subject to a fuel reduction burn. All three catchments have long-term data sets for comparison. Considerable work has gone into planning infrastructure repair, re-instrumenting the catchments, and sediment and nutrient sampling. The very active erosion at the salvage logged Clem Creek catchment has produced considerable challenges, and necessitated a process modelling approach that has considerable potential for more general application to disturbed forested catchments. Data analysis is now underway with published outputs a key goal for 2008-09.
- *The effectiveness of Forest Practices Code headwater stream provisions in wet dolerite terrain at Warra*. This work extends two PhD studies looking at the impact of forest harvesting on headwater streams. The overall aim of this project is to assess the impact of clearfell, burn and sow silvicultural practices on headwater streams within coupes where standard Tasmanian Forest Practices Code (2000) provisions have been applied. Research activities have included continued macroinvertebrate sampling at seven headwater stream sites combined with concurrent stream morphological measurement and capture of LiDAR data for DEM analysis.
- *Relating forest management to stream ecosystem condition in middle and lower catchment reaches in Tasmania*. This project investigates the degree to which forestry operations in upper catchment areas have downstream effects on stream biota and channels/sediments, leading to the development of a decision support system relating planned forest management to stream ecosystem condition and the establishment of specific sites for assessing trends in stream condition over time. Disturbance analysis has been completed and sampling of

sites has commenced. There has been a project consultative group formed to bring together the Industry stakeholders, funder and researchers.

- *A state-wide monitoring network to assess the effect of forest harvest on the morphology and habitat quality of headwater streams in Tasmania.* Surveys of erosion in pine catchment streams has been carried as preliminary work, with a survey programme planned for late 2007.

Management of riparian zones

All of the water quality sub-projects contribute information to the management of riparian zones in that the degree of connectivity between the source of runoff, sediment and nutrients and the stream network is central to water quality management. The Tasmanian Riparian Forestry project extends this theme into agricultural land to investigate the effect of planting riparian areas to reduce accessions sediment and nutrients while returning an economic benefit to the landholder. Water quality measurements have commenced, a summary of the riparian guidelines in various codes of forest practice in Australia has been published, and planting of the “experimental” buffer is beginning. The project’s link to the CERF “Landscape Logic” activities has resulted in an expanded model testing design.

Reasons for milestones not being reached

While we are on track for most milestones. C&U Milestone 4.1.1 will be delayed due to the late appointment of the Research Fellow, resulting in the project being a year behind schedule. Good progress is now being made. Research Milestone 4.1.1 has been partially completed, with some of the Tasmanian data still to be fully analysed. Forestry Tasmania has recently employed a researcher to facilitate the data analysis.

Grants and their contribution to the CRC: Project 4.1

No direct grants have been awarded during the reporting period, however, three grants awarded to CRC for Forestry research partner The University of Melbourne will contribute to CRC for Forestry water research outcomes.

A five year grant from Melbourne Water’s “Wildfire and Water Security Research Programme” will link directly with current CRC for Forestry water projects focusing upon the management of native forests for water outcomes, and control burning (this grant has been gained by the University of Melbourne by Gary Sheridan and Patrick Lane, who are also CRC researchers). A second project funded by the economics group within the Victorian Government Department of Sustainability and Environment (DSE), aimed at continuing development of models for water use and growth dynamics, will contribute directly to the Project 4.1 (“Water”) aims of integrated catchment modelling (this grant has been gained by Patrick Lane and Tom Baker of the University of Melbourne, who are also CRC researchers). A third allied project is a CSIRO Flagship Collaboration Fund grant won by Patrick Lane (UoM) and Richard Benyon (CSIRO) to measure and model native mixed-species eucalypt forest water balance.

Research collaborations: Project 4.1

Number of research collaborations entered into

There are no formal collaborations at this stage directly through the CRC for Forestry, although there are a number of partner organisations or research provider collaborations that will directly advantage the CRC for Forestry. There are several linkages with research projects:

- University of Melbourne held Land and Water Australia grant on fire impacts on hydrology (Project DSE1);
- University of Melbourne research projects for the DSE;
- University of Melbourne FWPA project PN04.4009 on predicting commercial plantation water use
- University of Melbourne project funded by Melbourne Water on predicting bushfire risk to water supply
- University of Melbourne CSIRO Flagship Collaboration Fund project on native mixed-species water use

In Tasmania, Project 4.1 (“Water”) has also established collaboration with the CERF project “Landscape Logic” and the Tasmanian Community Forestry Agreement plantation hydrology project.

The Forests Products Commission (Western Australia) has a number of collaborations that add value to the CRC through enhanced knowledge of Western Australian tree growth-environment-hydrologic-salinity dynamics that will form both background and parallel studies to CRC for Forestry research. These include projects on:

- carbon sequestration and tree growth with The University of Western Australia; and
- collaboration with the University of Western Australia on Rural Industries Research and Development Corporation - Joint Venture Agroforestry Programme projects CAL-6A and FPC-2A.

The University of Melbourne has collaborations with CSIRO Land and Water and the Victorian Department of Primary Industries on an FWPA project (predicting and managing the impacts of commercial plantations on catchment water balances). This is a clear value-adding link to the CRC for Forestry.

The University of Melbourne also has collaborative projects with the DSE and Land and Water Australia regarding the impacts of bushfires on hydrology, which link back to C&U milestone 4.1.4 (“Present results of studies of forest management impacts on water yield, quality and stream health to forest managers in two or more regional workshops”).

A linkage exists with Forestry Tasmania through the Tasmanian Community Forestry Agreement plantation hydrology project, and the new alignment with the Landscape Logic CERF project in Tasmania.

Number of international collaborations

CRC for Forestry partners the (Tasmanian) Forest Practices Authority and CSIRO have collaborative links with the United States Department of Agriculture (USDA) through Dr Dan Neary (Project Leader, Watershed and Riparian Ecosystems) of the USDA Forest Service. Dr Neary visited subproject 4.1.5 (commercial forestry in the riparian zone), providing expert advice to this

research group and insight into his other hydrology work in the United States. Plans are underway for Dr Neary to rejoin this CRC for Forestry research group in 2008 on a fellowship.

Progress developing collaborative linkages within the CRC across all activities

Collaborative linkages within the CRC include:

- co-supervision of Sandra Hawthorne by Neil Sims from Programme 1 directly increasing cross-cutting of the CRC remote sensing research activities
- link through Croppers Creek work with Jody Bruce and John Gallants' soil property modelling for water use modelling in project 1.1.1
- the significant links between a number of projects in Programme 1 and Programme 4 that are using LiDAR

Changes proposed to future directions:

The future directions may include a new project aimed more explicitly at catchment-scale plantation water, with a strong link to growth and carbon dynamics. Emphasis will be placed (where possible) on integrating results from current projects into common modelling domains, and developing knowledge transfer

How the research overall has contributed to national research priorities

1: Water – a critical resource

The research of the Project 4.1 (Water) is contributing to this priority goal by improving our ability to predict hydrologic impacts of forestry activities and develop tools to minimise deleterious impacts and enhance environmental outcomes. Improved accounting of landuse impacts is crucial for all levels of government, and industry requires tools for sound management decisions in an increasingly regulated environment. Importantly, the research also links directly with other forest hydrology research carried by CRCF members and elsewhere that increases the ability of the CRC to contribute to this goal.

3: Overcoming soil loss, salinity and acidity

Identifying causes and solutions to land degradation using a multidisciplinary approach to restore land surfaces.

Research within Project 4.1 (Water) aims to develop sustainable land management practices that are appropriate for Australian conditions and mitigate major land degradation processes. In particular, soil loss and salinity is being considered. The Western Australian research is set in a salinity mitigation framework. Developing new models for predicting erosion in forested landscapes under a range of disturbances is a central aim of the water quality work in project 4.1.3. This work will improve our understanding of runoff and erosional processes in south eastern Australian forests.

7: Responding to climate change and variability

Increasing our understanding of the impact of climate change and variability at the regional level across Australia, and addressing the consequences of these factors on the environment and on communities.

Responding to climate change requires good understanding of current biophysical responses to environmental and anthropogenic inputs. The work in project 4.1 will assist in defining the existing responses under variable climate sequences, and in the development of models to predict responses under future climate scenarios. For example, a drying, hotter climate may demand more targeted management forests (both native and planted) for water and carbon outputs. Such management options can only be achieved if the process dynamics are well known at a range scales. Increased bushfire frequency and severity is predicted. Threat management through changed prescribed fire regimes will require sound understanding between fire severity, landscape fire mosaics and water quality impacts.

Linkages with research users and external linkages (including cooperative arrangements with other CRCs)

Project 4.1 (Water)

This project has strong linkages with research users in the Victorian Department of Sustainability and Environment, Forestry Tasmania, and plantation companies such as Hancocks Victorian Plantations and Gunns Ltd. These are direct links that are routinely activated through workshops, seminars and publications. The project members have links to the eWater CRC and the CRC for Plant-Based Management of Dryland Salinity. As set out in earlier sections there are a number of linked research projects.

Project 4.2: Biodiversity (linked with Project 4.4, IPMG)

Project Leaders: Professor Brad Potts/Associate Professor Giles Hardy

Research activities and achievements: Project 4.2

Research in the Project 4.2 ("Biodiversity") is undertaken in 10 subprojects grouped under three themes. The project also links with the Industry Pest Management Group (IPMG; Project 4.4) based in Western Australia, focusing on integrated pest management in *E. globulus* plantations in south-west Western Australia and the Green Triangle. IPMG is funded with additional industry contributions and has a strong focus on extension work.

The project has grown to include 27 PhD and 1 MSc student; either on CRC funded scholarships (13) or affiliated with the project. These students are spread across three Universities (18 University of Tasmania, 7 University of Melbourne, 2 Murdoch University). During the 2007-08 financial year, project 4.2 and 4.3 (IPMG) scientists and students published 31 refereed journal articles (plus 12 in press) relevant to the project milestones, 2 conference proceedings, 5 book chapters, 7 reports; produced 87 conference presentations (6 of which were invited or keynote addresses) and 18 media events; and held 22 field days/workshops (see Appendix 2). Key research activities and achievements are indicated below.

Monitoring and management of biodiversity in forestry landscapes

The highlight of the Biodiversity project for 2007-08 was the major international conference '*Old Forests, New Management: Conservation and use of old-growth forests in the 21st Century*' (Hobart, 17-21 February 2008). This conference was hosted by the CRC for Forestry and Forestry Tasmania and was accepted under the prestigious Sir Mark Oliphant International Frontiers of Science and Technology Conference Series by the Australian Academy of Technological Sciences and Engineering (ATSE). Over 270 delegates from 17 countries attended the conference, with 21 Australian Universities/Research Institutes and 13 other Australian Government organizations represented as well as industry bodies. The Conference began with the recording of a special edition of the ABC radio's "National Interest" program, hosted by the ABC's Peter Mares. Entitled "Science, nurture and nature: the great forestry debate" and received a high level of media coverage. A hardcopy of the conference proceedings of abstracts was provided to all delegates and is publicly available on the conference website. A special edition of the international journal *Forest Ecology and Management* with selected papers from this conference is currently being organised. The conference brought together a large body of CRCF research with researchers and students from the Biodiversity project presenting or co-authored 21 oral presentations and 32 posters. The biodiversity benefits of alternative silvicultural systems to replace clearfelling in wet eucalypt forests is a key CRCF research area. The conference provided international benchmarks for these systems and clearly linked new research directions with climate change and carbon sequestration issues.

The 3-year post-harvest sampling / survey of birds, vascular plants, ground beetles, lichens and bryophytes in all remaining treatments in Forestry Tasmania's Silvicultural Systems Trial in wet eucalypt forest have been finished. Protocols for biodiversity assessments of operational variable

retention coupes were developed and implemented in eight coupes burnt and regenerated in 2007. Helicopter survey methods were developed for (i) assessing the number of stags and hollow-bearing trees in retained aggregates and comparable unharvested forest and (ii) mapping the extent and severity of fire damage to retained aggregates and unlogged edges in operational variable retention coupes. Data are currently being digitised in preparation for analysis.

The sustainable management of the coarse woody debris (CWD) habitat in the production forest landscape is an important issue as interest increases in the use of harvest residues and 'downers' (i.e. CWD) for bioenergy generation. Completed and current PhD projects within this subproject have progressively demonstrated the high biodiversity value of commercially overmature trees and the large-diameter, internally-rotted logs (CWD) arising from them. Models tracking CWD dynamics over time have been refined based on better knowledge of key parameters such as decomposition rates. These models enable the assessment of the relative contributions of fuelwood harvesting and choice of silviculture to long-term availability of CWD at the coupe-level. They can also track key subsets of CWD, such as the large-diameter, mid-decay-stage logs that the research indicates to be of most value for biodiversity. Fuelwood harvesting causes an immediate loss of CWD at time of harvest, an effect that is likely to lead to the local loss of some CWD-dependent species over subsequent decades. However, choice of silviculture is also important, because the models demonstrate that future supply of 'high-quality' CWD for biodiversity depends ultimately on the local availability of commercially overmature trees. Coarse woody debris levels cannot be expected to be maintained under repeated cycles of clearfelling, even in the absence of fuelwood harvesting. Alternatives to clearfelling, such as aggregated retention, offer a greater prospect of maintaining CWD biodiversity because patches of mature or overmature trees (future high-quality CWD) are retained. These models are now being used to develop CWD management prescriptions applicable at the time of first harvest.

The biodiversity implications of plantation established on remnant forest in the agricultural landscape and strategies for the management of native forest remnants are being studied across four states. This research involves a CRC funded post-doc and eight PhD students, with field trials established within industrial plantation estates of partner organisations. Student projects underway include studies of the health of isolated trees in paddocks and plantations, the ecological and physiological attributes of the forest edge in different matrices, the importance of native forest remnants in sustaining insect, bird and reptile biodiversity in pasture and plantation, and the regeneration niche of eucalypts in remnants. Studies of remnants in Tasmania have shown improvement in the condition of native forest remnants can occur as a result of the change from grazing to plantation in their surrounding matrix. Various treatments have now been applied to native forest remnants in both Western Australia and Tasmania to determine strategies for their better management.

There are strong collaborative links between scientists and planners at the Forest Practices Authority of Tasmania (FPA), Forestry Tasmania (FT), the University of Tasmania (UTas) and the Tasmanian Government Department of Primary Industries and Water (DPIW) for research to back the management of Tasmanian forest species of high conservation significance, including threatened species. The results of studies relating to hollow dependent fauna

have been published in scientific journals and communicated to industry via a one-day seminar. Studies that contribute to the management of the tree hollow resource in off-reserve areas continue. Threatened fauna projects include three student projects and an externally funded project looking at the effectiveness of current prescriptions for the conservation of eagle nest sites. Threatened flora projects undertaken include a genetic study of the threatened *Eucalyptus gunnii* subspecies *divaricata* and a study of the habitat preferences, distribution and population dynamics of *Sarcochilus australis* (Gunns tree orchid) undertaken as honours projects. Several project participants are involved in using the results of projects (both flora and fauna related) in the development of management actions to be delivered to forest planners via strategic management plans and other decision support tools.

A key knowledge transfer initiative for the Biodiversity project was the publication and wide uptake of EucaFlip, a portable all-weather photo-guide to the Tasmanian eucalypts. This field guide aimed to improve eucalypt identification by forest workers and the general public and enhance the quality of biodiversity data available to forest and biodiversity managers in Tasmania. Eucaflip is being used by the Tasmanian Forest Practices Authority for training courses. An associated education kit was also developed and launched with Eucaflip by the Tasmanian Education Minister. More than 60 schools from all over Tasmania have requested kits, and the use of EUCAFLIP has now been written into the new curriculum for high schools in Tasmania.

Gene pool management

With the expansion of eucalypt plantations across Australia, there is a risk of genetic contamination of native forests through pollen flow and hybridisation. The framework for assessing the risk of such exotic gene flow has been developed and used to identify species of high risk of pollination by *E. nitens* plantations in Tasmania. Artificial crossing of native species with *E. nitens* pollen has been undertaken to determine barriers to hybridisation and provide profiles for hybrid identification. Open-pollinated seed collections have now been made from two populations of conservation value (*E. rodwayi* and *E. perinniana*) predicted to be at risk from hybridisation due to their close proximity to mature *E. nitens* plantations. Low levels of hybridisation were detected in each case, providing a base line for monitoring future changes as plantation estates mature. An ARC grant interacting with this project has resulted in the publication of major overviews of the risks associated with gene flow from (i) *E. globulus* plantations across southern Australia and (ii) *Corymbia* plantations in subtropical and temperate zones. *E. globulus* plantations are being planted within the native geographic range of the *E. globulus* complex. The degree of genetic differentiation within *E. globulus* and the potential for genetic contamination of local native gene pools from plantings of exotic provenances is an important issue under study.

The source of genetic stock for artificial seeding of forestry coupes is a major issue for managers of production native ash forest. As part of a PhD study, over 800 *Eucalyptus regnans* old-growth trees from throughout the geographic range of the species have been sampled for DNA studies. Nuclear microsatellite data have been used to characterise the genetic differences between populations. Four hundred of the trees were also characterised for their maternally-inherited chloroplast DNA. High chloroplast DNA diversity was found in putative forest glacial refugia; lower haplotype diversity was

found in areas likely to have been recolonized since the Last Glacial Maximum. Thus, the data argue for long term persistence of *E. regnans* in certain regions, such as east Gippsland, and the recent recolonisation of other regions, such as the central highlands of Victoria. Work has also commenced on a similar molecular study of *E. obliqua*. Both *E. regnans* and *E. obliqua* are important to the forest industry in Tasmania and Victoria and the data from these studies will be used to better define seed transfer guidelines. *Eucalyptus globulus* is one of the most important eucalypt species for pulpwood plantations in temperate regions of the world, including Australia. Over 1,100 native trees from the *E. globulus* complex have now been fingerprinted with microsatellite loci, providing information that will contribute to the development of a gene pool management strategy for this internationally important species. Already the genetic uniqueness of an outlying population from this complex in South Australia has been demonstrated and this information has been used to inform planning decisions.

Sustainable management of key pests

Considerable research activity has been aimed at the development of integrated management strategies for browsing mammals following the banning of 1080 poison in Tasmanian State Forest. A report on the effectiveness of three different repellents in preventing browsing of *Eucalyptus nitens* seedlings has been prepared. Sentrex was the most effective repellent to both possums and pademelons. This repellent has now been tested in large-scale field trials (in conjunction with funding gained from the TCFA Alternative to 1080 Programme) along with other non-lethal strategies for reducing browsing. These other strategies include use of genetically less susceptible stock, manipulation of fertiliser regime in the nursery and use of stockings on seedlings. The first year trials (on 8 sites) are now complete and analysis is underway. Preliminary results suggest that while there were effects of genetic stock and nursery fertiliser, the largest effects were found with the fertiliser and stocking treatment. Consequently two treatments are now being tested in combination on large-scale operational sites (6 sites) in a second year of trials. Also, in conjunction with the TCFA, a series of captive trials tested the preference of possums sourced from different parts of the state to genetically more resistant stock. Results clearly showed that regardless of where possums are sourced from, they show similar preferences. Additional trials investigated if flexing of seedlings would change plant chemistry and morphology and reduce possum feeding. Flexing did not produce significant changes in leaf chemistry or plant morphology and feeding trials found no significant differences between flexed and control seedlings in browsing by brushtail possums, although possums did consume fewer leaves and ate less stem tissue of flexed seedlings than of control seedlings. Preliminary results from a trial looking at selective culling of different browser species and the effects on levels of browsing damage in plantations have indicated that culling possums alone does not reduce browsing to satisfactory levels. Browsing damage was only stabilised after additional culling of pademelons and Bennett's wallaby. A new PhD project has commenced studying early developmental changes in defensive chemistry in *E. globulus* and understanding of how eucalypts recover from browsing.

Trap trees are being investigated as a more environmentally friendly alternative to control eucalypt leaf beetles than aerial spraying using either a broad-

spectrum synthetic pyrethroid or softer biological insecticides. A further seven experimental sites were established in spring 2007, to add to those established in 2006, where susceptible *E. regnans* and *E. delegatensis* trap trees are embedded in *E. nitens* plantations under varying designs. Understanding of within and between tree variability in the uptake of imidacloprid, was a significant focus of 07/08, with work continuing on new delivery methods and results using dyes indicating that uptake by branches is uneven until some distance from the injection hole. Furthermore, significant differences exist between leaf ages in the uptake of imidacloprid with young leaves averaging only half the concentration of old leaves. Despite this variability field infusions of 4-year-old *E. regnans* and *E. delegatensis* trees were very successful, with chemical assays showing high levels of persistence of the insecticide beyond the 3rd month. Bioassay results for the first two months after infusion, promisingly showed 100% of the beetles killed, but the third month has a slightly lower mortality rate. Field observations have also found a considerable number of dying or dead beetles under the infused trees. Also promising was that in caged choice trials, beetles will still choose to feed on and receive a lethal dose of the treated foliage despite having, as an alternative, untreated *E. nitens* foliage in the cage. An indication of the dose level of imidacloprid that the trap trees require to render their foliage toxic to chrysomelid leaf beetles is now being evaluated.

A major genetic resource has now been established to study the genetic control of *Mycosphaerella* leaf disease (MLD) in *E. globulus* and the first results have been obtained. Growing *E. globulus* on warm, moist sites is considered risky because of the likelihood of severe outbreaks of this foliar disease. On such sites the only management option has been to plant *E. nitens* instead of *E. globulus*. Four large family trials were established, two in 2005 and two in 2006, in north west Tasmania in known MLD hot spots. These trials contain between 233 and 376 families and were established specifically to study the genetic control of MLD and identify germplasm of improved resistance for planting in high risk zones. All trials were assessed for MLD damage in spring 2007. Analyses have shown that significant genetic variation exists for MLD susceptibility both within and between populations of *E. globulus* and, at least in the northwest of Tasmania, that this genetic-based variation appears to be relatively stable across sites. Comparison of selected populations in breeding and deployment programs with range-wide native stand families suggests that it is possible to identify more resistant stock for deployment in high risk areas.

Reasons for milestones not being reached: Project 4.2

The only milestone due over this period was Research Milestone 4.2.1 (Review of biodiversity values of silvicultural regimes in native forest and forest components such as coarse woody debris), due December 2007. This milestone was met by workshops reviewing the research and management implications for coarse woody debris (August 2007) and tree hollows (October 2007), but particularly the hosting of the international conference ‘*Old Forests, New Management: Conservation and use of old-growth forests in the 21st Century*’ held in February 2008. The later timing of the conference was necessary to optimise participation from both a national and international perspective.

Grants and their contribution to the CRC: Project 4.2

Research in this project is facilitated by close interaction with several Bushfire CRC projects and ARC grants held by in-kind scientists. An ARC linkage grant studying fundamental aspects of exotic gene flow contributed basic information to CRC for Forestry projects aimed at on-ground implementation of risk management strategies. An ARC linkage project on the genetics of defensive chemicals and resistance breeding interacts with the CRC for Forestry project aimed at development of improved strategies from browsing control that integrate lethal and non-lethal options.

Project scientists were also awarded two new grants during the previous financial year that directly contribute to the research programme on non-lethal alternatives to 1080. Two grants were received from the TCFA Research into Alternatives to the Use of 1080 Fund. The first project is entitled "manipulating seedling palatability for non-lethal browsing management" (O'Reilly-Wapstra, Potts, McArthur, Miller). The second project, entitled "do all possums show the same aversions for genetically resistant seedling stock?" was (O'Reilly-Wapstra, Potts, Wiggins).

Several scientists (Hardy, Burgess, Davidson and Close) involved in the Biodiversity project were involved with the successful bid by Murdoch University for a State Centre of Excellence in "Climate change and woodland and forest health" which includes interaction with the University of Tasmania and the CRC for Forestry's Biodiversity project.

As mentioned previously, additional funding for the major international conference '*Old Forests, New Management: Conservation and use of old-growth forests in the 21st Century*' (Hobart, 17-21 February 2008) was provided by a grant (Potts and Read) from the Sir Mark Oliphant International Frontiers of Science and Technology Conference Series managed by the Australian Academy of Technological Sciences and Engineering (ATSE). This grant also meant that the conference became part of the prestigious Sir Mark Oliphant International Frontiers of Science and Technology Conference Series.

Several CRC PhD students to have also obtained small grants to provide additional funding for their PhD research (see Appendix 2). The project also collaborated on a FWPRDC grant obtained by Associate Professor Greg Nolan of the School of Architecture at the University of Tasmania to review processes for incorporating biodiversity impacts into life cycle assessments. This grant forms a unique interface between CRC for Forestry research programmes two (High Value Wood Resources) and four (Trees in the Landscape), and the final report has been submitted (Hamilton *et al.* 2008 in Appendix 2).

Any changes proposed to future research directions

No

Research collaborations: Project 4.2

Number of research collaborations entered into

Individual scientists within this project maintain active collaboration with national and international research groups that contribute to the research objectives of the project.

Key research links at the national level have been established with the Bushfire CRC (“fire chronosequence”). Bushfire CRC projects studying the effects of fire on forest health and establishing a wildfire chronosequence link with CRC for Forestry projects in the area of management of forest remnants and biodiversity impacts of alternatives to clear-felling, respectively. Through CRC staff, research links occur with a Utas National Heritage Trust project looking at “decline in forest remnants” as well as the Centre for Phytophthora Science and Management at Murdoch University. Several scientists involved with Project 4.2 (“Biodiversity”) are also members of the ARC Environmental Futures Network. Project 4.2 (“Biodiversity”) staff also interact with the Threatened Species Unit of DPIW to enhance Tasmania’s threatened species and risk assessment database, and co-supervise PhD projects. Tree hollow work involves collaboration with Dr Philip Gibbons from ANU who is a member of the FPA Hollows Working group. Research on Wedge-tailed eagles and hollows is being co-funded by Roaring 40’s and the regional NRM groups respectively. The project also collaborates on TCFA research into alternatives to the use of 1080, and with Bayer Environmental Sciences on systemic insecticides. The Warra long term ecological research (LTER) site where silvicultural treatment studies are being undertaken is part of the International LTER network with specific collaborative projects underway with the Kellogg and Hubbard-Brook LTR sites in the USA and the Taiwan LTR network. Several scientists in the project are also members of the International *Eucalyptus* Genome Network (EUCAGEN) and UTas also has a collaborative project with the University of Tsukuba, Japan studying gene flow in *E. globulus*. Collaboration on eucalypt pest and disease research also occurs with the University of Pretoria, South Africa.

Nature of collaborations and how they add value to the CRC

The collaborations indicated maintain strong linkages with international science networks. In the case of the EUCAGEN, in-kind scientists have been involved in the preparation of an international submission for the USA Department of Energy to undertake a public domain sequence of the *Eucalyptus grandis* genome that has been successful. The involvement of Project 4.2 (“Biodiversity”) scientists in this network allows information relevant to managing eucalypt genetic resources to flow back to Australia. Collaboration with the University of Tsukuba, Japan is allowing a large-scale molecular study of pollen dispersal in *E. globulus*. The collaboration with scientists funded by the TCFA working at UTas has allowed expansion of pilot projects to test ‘best bet’ non-lethal strategies for reducing marsupial browsing. Collaboration with Bayer Environmental Science has allowed greater testing of systemic insecticides for use in the development of trap tree technology. The disease research group at the Forestry and Agricultural Biotechnology Institute (FABI) of the University of Pretoria are amongst the leaders in eucalypt fungal taxonomy and genetics and collaboration with this group is enhancing progress with disease spread and fungal community research, particularly involving *Mycosphaerella* species.

Progress on developing collaborative linkages within the CRC across all activities: Project 4.2

Collaboration within this project is being enhanced by sharing student supervision across scientists from different research nodes as well as having academic and industry based supervisors where appropriate. Strong linkages with one of the projects within Research Programme One (Project 1.2: Managing and sustaining) are also being developed with in-kind scientists contributing to both projects in Western Australia and Tasmania and shared PhD projects. Molecular data collected as part of Research Programme Two activities will contribute to knowledge of key forest tree gene pools for which management strategies are being developed and visa versa. Contribution of in-kind staff to both 4.1 and 4.2 maintains linkages between Water and Biodiversity research related to water quality.

Linkages with research users and external linkages (including cooperative arrangements with other CRCs): Project 4.2

Strong linkages with research users have been established through:

- The make-up of the project steering committee, which includes representatives of all core partners in the project
- Establishment of the IPMG project in Western Australia
- Involvement of industry scientists with the research (e.g. from Forestry Tasmania and the Forest Practices Authority) and
- As supervisors of PhD students.

Strong links with the Tasmanian Forest Practices Authority, other government agencies and major forest companies allow a conduit for the implementation of research results from this project, achieving stakeholder adoption of research results such as prescriptions for monitoring and managing biodiversity (C& U Output 1.2; see page 14, Schedule 1). Many project scientists are also active on many local and national scientific committees. Linkages with two projects in the Bushfire CRC have been established through PhD projects. An important pathway to research adoption in this project is through the representation of project staff on key committees (see Appendix 2). For example, the project is well represented on three of the Australian Forestry Council, Research Working Groups that review research and provide advice to Government on forestry research priorities.

Project 4.3: Communities

(Linked with Project 4.5: “Land use change”). Project Leader: Dr Jacki Schirmer

Research Activities and Achievements

4.3 Communities

Results of the Tasmanian Forest Industry Survey (Subproject 4.3.1) were released in June 2008, and attracted considerable media attention in Tasmania, with TV, radio and newspaper media reports on the results, and media releases from The Wilderness Society and Forest Industries Association of Tasmania commenting on the report. Results of the report are now forming the basis for communication and planning about forest industry employment and spending for Tasmanian forest industry partners and government agencies, and are being used by the Federal government in assessing the social impacts of the forest industry.

The report ‘A brief guide to effective community engagement in the Australian plantation sector’ was published in May 2008 (Subproject 4.3.3). This report is being used by forest industry partners to help improve community engagement practices.

Two preliminary reports – one examining Tasmania, and the other Western Australia - titled ‘Socio-economic costs and benefits of plantation forestry: statistical profile of Tasmania/Western Australia’ – were completed and distributed as an internal report in December 2007. These reports analyse demographic and land use change statistics for the study regions being examined in Tasmania and Western Australia.

A survey was delivered to residents of Kyogle Shire in northern NSW, asking their views on land use change and forestry (Subproject 4.3.4.).

A questionnaire to be delivered to 6,000 residents across Tasmania and Western Australia was designed with assistance from the project’s Advisory Groups in each state. The survey was delivered in July 2008, and a report will be produced in late 2008.

The project’s Advisory Groups include a range of stakeholders from the agricultural sector, local government, forest industry and regional development organisations. Meetings were held with Advisory Groups to advise on project progress and ask advice on various research design issues, in late 2007.

A two-day research planning meeting was held in February 2008, to assist in collaborative planning between subprojects of the Communities projects. The work undertaken in the planning meeting helps in linking the results of the four subprojects as they progress in coming years.

Planning and activities undertaken in 2007-08 have ensured the research activities are proceeding on schedule.

4.5 Socioeconomic impacts of land use change in the Green Triangle and Central Victoria

Project 4.5 is related to Project 4.3 (Communities), and runs from 2006 to 2008. Project 4.5 examines the socioeconomic impact of land use changes in the Green Triangle and Central Victoria. Funders include existing CRC for Forestry partners (including FWPRDC and the Government of Victoria via the

Department of Primary Industries, Victoria), a partner who has become a member of the CRC for Forestry for the duration of the project (the Green Triangle Regional Plantation Committee) as well as external partners (including Central Victorian Farm Plantations, four Victorian shires, the Corangamite Catchment Management Authority and the Glenelg Hopkins Catchment Management Authority). It is an important project as it enables the comparison of the impact of a range of different types of land use change. It assists in achieving CRC for Forestry goals by enabling better comparison of plantation forestry with other types of land use change, thereby providing the ability to understand if the changes resulting from plantations differ substantially from those resulting from other types of land use change. The project funding has enabled an expansion of staffing in the Communities project to assist with the additional work, creating a larger pool of resources to undertake work overall in the project. This additional flexibility assists the Communities project towards meeting milestones.

Progress during 2007-08 included:

- Release of the report 'Living with land use change: different views and perspectives' in March 2008
- Completion of a draft research report 'Understanding residents' views on land use change', which was peer reviewed and in final revisions in June 2008 prior to public release planned for August 2008. This survey is based on results of a survey delivered to 3,000 residents of the study region in 2006-07, and a subsequent follow-up survey of over 400 residents undertaken in December 2007.
- A draft research report 'Impacts of land use change to farm forestry and plantation forestry: a landholder survey' was completed in June 2008. It is now being peer reviewed prior to revision and publication. The report details results of a survey of landholders who have change land use to farm forestry and plantation forestry, undertaken in April 2008.
- A survey to be delivered to farmers across the region identifying the employment generated by different agricultural land uses was designed and tested, and is being implemented in the second half of 2008.
- A range of statistical data on land use and socio-economic change in the region were analysed. The data were presented and discussed in a series of 11 discussion groups in the study region in June 2008, and are currently being analysed further before production of final research reports in late 2008. Delays in release of critical ABS statistics led to delay in completion of this project component (see 'reasons for Milestones not being reached' for further details).

Reasons for Milestones not being reached

Project 4.3

All Milestones have been met to date for Project 4.3. A request has been made to change dates of some future Milestones, however, with reasons given in the 'Milestones' section. The reasons for requesting a delay of 6 months in some Milestones is that there was a six month delay in appointing PhD students to two subprojects, making it difficult to meet these deadlines. Despite this, C&U Milestone 4.3.1 has been met on time, as has Research Milestone 4.3.1. A delay has been requested for Research Milestone 4.3.2 from June 2008 to December 2008, as the research student was appointed after a six month delay. This

Milestone will be met, with a draft report to be produced in December 2008 and a final report in February 2009.

Project 4.5

All but the final two Milestones of Project 4.5 have been met. These final two Milestones were delayed due to delay in release of ABS statistics from the 2006 *Census of Population and Housing* required to undertake the final analysis. The possibility of this delay was included in the Project Agreement, as it was anticipated such a delay could occur. The Steering Committee have recommended a delay in meeting the final Milestone such that it will be completed in November 2008.

Nature of major consultancies and their collaboration to the CRC

A major consultancy was undertaken by ANU researchers involved in Project 4.3 Subproject 4.3.1, for the Forest Industries Branch of the Department of Agriculture, Fisheries and Forestry. The consultancy, finished in June 2008, recommends indicators for monitoring the social and economic impacts of forestry. The consultancy utilised some research outputs produced by Project 4.3, ensuring the Federal government utilises the data produced by Project 4.3. The consultancy also involved purchase of ABS data which will subsequently be utilised for Project 4.3, and undertaking a survey of forest industry workers which will be used as the basis for a Project 4.3 research report in 2008. This consultancy has provided highly useful collaboration opportunities between the CRC and the Federal government Department of Agriculture, Fisheries and Forestry.

Nature of grants and how they contribute to the CRC

As discussed in the 'Research Activities and Achievements' section, the external funding received for Project 4.5 has enabled considerable expansion of the research undertaken on social dimensions of forestry by the CRC, beyond what could be achieved by Project 4.3 alone.

How the research overall has contributed to national research priorities

2: Transforming existing industries

Research of Project 4.3 (Communities) and Project 4.5 (Socioeconomic impacts of land use change) enables an understanding of the socio-economic implications of transformation of rural industries (including plantation forestry, dairy farming, cropping, grazing and lifestyle farming), including the impact of changing technology on rural population levels, employment availability and spending patterns in rural areas.

Research of Project 4.3 (Communities) assists the sustainable use of forests by better understanding people's perceptions about forest landscapes and understanding why they use these landscapes in particular ways.

Promoting and maintaining good health

Project 4.3 (Communities) provides an understanding of the factors affecting how people perceive landscape change, as well as how sociodemographic characteristics of communities change as a result of changes in the plantation industry, and the effectiveness of different community engagement strategies. The ways people perceive landscape change and the ways communities change

over time are key influencing factors on wellbeing. Developing effective community engagement strategies can have a positive impact on wellbeing through improved relationships between forest industry and communities.

4: Strengthening Australia's social and economic fabric

Research of Project 4.3 (Communities) and 4.5 (Socio-economic impacts of land use change) involves examining how changes to forestry affect rural communities and hence how these changes impacts on the social and economic fabric of rural communities and the ability of members of these communities to live productive and fulfilling lives

Any changes proposed to future directions

No.

Project 4.4: Industry Pest Management Group (IPMG)

Research activities and achievements

IPMG was established as a CRC project in June 2006, co-funded by additional industry contributions. This project links with the “sustainable management of key pests” theme of Project 4.2 (“Biodiversity”), but has a strong focus on extension work aimed at adoption of research results for integrated pest management in *E. globulus* plantations in south-west Western Australia and the Green Triangle. Funding currently supports a post-doctoral position that is based in Albany, Western Australia (a major *E. globulus* plantation node).

This project coordinates regular monitoring of natural enemy and insect herbivore activity in *E. globulus* plantations, develops protocols for assessment of insect pests for project partners and provides regular technology transfer through field days and training of company personnel.

In the last year, one field guide, two posters, eight reports were produced for IPMG members, and six management notes were updated (see Appendix 2; output by M. Matsuki, Loch and Matsuki, and Bradshaw & Matsuki), a web-based pest and disease database was upgraded: and the development of a database on observational information on pests and pathogens were commenced. The project held two workshops, eight IPMG meetings and 20 staff training/industry support. A review of the structure and goals of IPMG has been held. A study of molecular phylogeny and phylogeography of *Eucalyptus* weevil was conducted by an honours student at Murdoch University. Pheromone traps for adult autumn gum moths (*Mnesampela privata*) were tested in south-west WA.

Research collaborations: Project 4.4

A research collaboration, with Dr Paul Walker of the University of Tasmania, allowed the project to test chemical baits for spring beetles from October to November and pheromone traps to capture adult autumn gum moths in Western Australia from March to June.

Although no international research collaborations have been formally entered into, the Project Manager Dr Treena Burgess is involved in the following related collaborative projects:

1. Professors Michael Wingfield and Brenda Wingfield, and Dr Bernard Slippers (FABI, University of Pretoria): fungal population genetics, insect ecology, fungal phylogenetics and taxonomy, biosecurity.
2. Dr Pham Quang Thu (Director of Forest Health, Forestry Research Institute Vietnam): biosecurity project testing the susceptibility of tropical eucalypt species (non-production) to pathogens absent from Australia.
3. Dr Zhou XuDong (Professor, China Eucalypts Research Centre, China): insect ecology.
4. Dr Daping Xu (Director Research Institute of Tropical Forestry, Guanzhou, Guandong Province, China): biosecurity project testing the susceptibility of tropical eucalypt species (non-production) to pathogens absent from Australia

Dr Burgess is currently appointed as an international expert to the FORTHREATS project (European network on emerging diseases and invasive species threats to European forest ecosystems), which is funded under the European Union's Sixth Framework Programme (priority 8.1: see glossary).

Table 3a. Research outputs and/or milestones

Research output / milestone number	Description	Contracted achievement date	Achieved (yes or no)	Reasons why not achieved (if applicable)	Strategies to achieve unmet milestones
Milestone 2.1.1	Breeding objectives for solid-wood and veneer production developed for <i>E. nitens</i> .	June 2008	No	Late recruitment of PhD student, with PSC agreeing to 12 months extension	Milestone current underway and expected date is June 2009
Milestone 2.2.5	Empirical growth and yield functions developed and parameterised for <i>E. globulus</i> and <i>E. nitens</i> .	June 2008	No	Late start to project	Milestone will be met by November 2008
Milestone 2.3.1	Levels of decay and other important wood properties in response to pruning and thinning treatments determined in silvicultural trials of <i>E. nitens</i> in Tasmania.	June 2008	Partially completed – detailed study at one site completed		Further trials on trees grown at other sites planned to be completed by June 2009
Milestone 2.3.2	Degree of silvicultural control of tension wood determined for <i>E. globulus</i> in southern mainland Australia (Vic and WA).	June 2008	Yes. CRC Technical Report No. 182	N/A	N/A
Milestone 2.4.1	Improved sampling protocols developed for pulpwood value prediction for <i>E. globulus</i> , <i>E. nitens</i> and <i>E. dunnii</i> based on radial scanning of pith-to-bark wood samples.	June 2008	No	Delays in developing radial calibrations due to staff changes	Anticipate completion by June 2009
Milestone 3.1.5	Report/assessment of field trial (1) Design of field trial (2)	December 2007	No	Milestone has been replaced by new milestones agreed to by Participants	Refer table 3.1a with program 3.1 revised Milestones from commencement
Milestone 3.2.4	Integration of planning and operation/harvesting systems.	December 2007	No	Milestone has been replaced by new milestones agreed to by Participants	Refer table 3.1a with program 3.1 revised Milestones from commencement
Milestone 3.2.5	Stage two, roading tool development (optimisation of roading).	December 2007	No	Milestone has been replaced by new milestones agreed to by Participants	Refer table 3.1a with program 3.1 revised Milestones from commencement

Research output / milestone number	Description	Contracted achievement date	Achieved (yes or no)	Reasons why not achieved (if applicable)	Strategies to achieve unmet milestones
Milestone 4.1.1	Review long-term hydrological data for selected experimental forest catchments.	December 2007	Partial	Largely completed for Victorian catchments, analyses still underway for Tasmanian components	To be completed by June 2009.
Milestone 4.2.1	Review of biodiversity values of silvicultural regimes in native forest and forest components such as coarse woody debris.	December 2007	Yes	N/A	N/A
Milestone 4.3.1	Preliminary socio-economic profile of the costs and benefits of plantation forestry in 2 regions.	December 2007	Yes	N/A	N/A
Milestone 4.3.2	Analysis and explanation of community attitudes and values in 2 regions.	June 2008	No	Late recruitment of PhD student, with PSC agreeing to 6 months extension	Milestone current underway and expected date is December 2008

Table 3a.1. Research outputs and/or milestones for program 3 revised from commencement of program

Research output / milestone number	Description	Contracted achievement date	Achieved (yes or no)	Reasons why not achieved (if applicable)	Strategies to achieve unmet milestones
Milestone 3.5.1	Harvest planning workshop series (3-two day workshops + 1-one day workshop)	December 2007	Yes	N/A	N/A
Milestone 3.2.3	Define harvester head calibration procedure for harvesting operations	May 2008	Yes	N/A	N/A
Milestone 3.5.2	Operation level machine evaluation and costing workshop (3-three hour workshops)	May 2008	Yes	N/A	N/A
Milestone 3.1.3	International Links with - FPInnovations	June 2008	Yes	N/A	N/A
Milestone 3.1.3	International Links with - Forestry Solutions	June 2008	Yes	N/A	N/A
Milestone 3.1.3	International Links with - Forme	June 2008	Yes	N/A	N/A

Table 3b. Commercial and Utilisation outputs and/or milestones

Research output / milestone number	Description	Contracted achievement date	Achieved (yes or no)	Reasons why not achieved (if applicable)	Strategies to achieve unmet milestones
Milestone 1.1.1	Commercial product and licensed service providers available for airborne LIDAR and large format aerial photography for assess stand attributes. Workshop to inform of potential applications.	December 2007	Yes	N/A	N/A
Milestone 2.1.2	Training provided in solid-wood breeding objectives and assessment techniques for <i>E. nitens</i> incorporated into STBA TREEPLAN® genetic assessment software, and into alternative delivery platforms for non-STBA industry.	June 2008	No	Delay to match delay in associated research milestone, which has been set back to June 2009	Anticipate completion by June 2009
Milestone 2.3.1	Members trained in silvicultural prescriptions that will minimise tension wood formation in <i>E. globulus</i> plantations in southern mainland Australia.	June 2008	No	Absence of key Project staff during the year	To be completed by June 2009
Milestone 4.3.1	Engagement strategies implemented as pilot projects with industry members in 2 regions.	June 2008	No	Late recruitment of PhD student, with PSC agreeing to 12 months extension	Milestone current underway and expected date is December 2008

Table 3c. Education outputs and/or milestones

Research output / milestone number	Description	Contracted achievement date	Achieved (yes or no)	Reasons why not achieved (if applicable)	Strategies to achieve unmet milestones
Milestone 1.2.1	First three Honours students enrolled and completed.	December 2007	Yes	N/A	N/A

Commercialisation and utilisation

Communications Manager: Ms Taylor Bildstein
Industry Engagement Manager: Tom Fisk

Commercialisation, utilisation, and Industry Engagement strategies and activities:

The C&U programme has worked to confirm appropriate paths to adoption for the research outputs of the CRC for Forestry. During 2007-08, policy documents were finalised and approved by the Board that recognised that all industry partners in the CRC for Forestry expect to take major value from their investment via direct application of new technology to their existing businesses, demonstrating the importance of the CRC's extension activities. Recognising the importance of ensuring appropriate adoption pathways are in place and working, a full time industry engagement manager was appointed during the year. Mr Tom Fisk brings to the CRC 25 years experience in decision making and operational management roles in the forestry sector. This experience means that he is well placed to judge the most effective approaches to technology transfer and uptake from an industry perspective and assist in driving this process forward through an extensive network of industry contacts.

Industry partner staff are actively involved in one or more field based research programmes and so they are well-positioned for rapid technology transfer. More structured sharing of information is carried out through field days, seminars and workshops. A number of early research results were shared with and adopted by industry partners to assist them in their businesses during the reporting period.

The C&U plan for 07-08 included several workshops and pilot projects, during which staff of most industry partners were trained in technologies that are likely to improve various aspects of their businesses (see section 'end-user involvement').

No patents were filed.

Intellectual property management

The IP management policy and the C&U strategy were significantly revised and updated during the reporting period. The IP Management policy was finalised during the year by the Commercialisation and IP Management Committee, and approved by the Board. This broad strategy is to treat all IP as confidential until it is assessed for its potential to be commercialised and used by partners. As many outputs are expected to contribute to the broader national benefit, related information will be released for unrestricted dissemination. For example, many of the outputs in 2007-08 from Research Programme Four (Trees in the Landscape) relate to water, biodiversity and communities. As all research is in an early phase and still associated with substantial technical risk, and the broad strategy here described is in place, detailed individual commercialisation plans did not need to be developed.

All research is screened prior to project start-up and during the research phase for the type of IP to be generated, for example: for confidential information/trade secrets, copyrights, tangible research property, and patents. Where IP is also identified as potentially commercialisable, specific commercialisation assessments will be undertaken. During the reporting period, all assessments of potentially commercialisable IP indicated that, due to the early phase of the research, substantial research risks remain. As the research matures and commercialisable IP develops, this IP will be kept confidential until specific commercialisation plans are developed. During the reporting period, the CRC's IP register was reviewed and updated in consultation with the Program Managers and Business Manager.

Day-to-day management of IP, commercialisation and utilisation is provided by the Management Group under the direction of the CEO. The Industry Engagement Manager has also been closely involved with IP management issues, but increasingly concentrates on utilisation. The Communications Manager is also a key member of the C&U team. A new public website, intranet and content management system is being developed, which is expected to improve delivery of information and services.

Communication Report:

Communications strategy

A detailed strategy was developed during the year, reviewed by the Communications Committee and approved by the Board. The Strategy includes the development of a new members website, newsletters, publication of journals and media releases. The communications strategy is now in place. The main areas of achievement this year in communication were:

2006-2007 Highlights and Achievement Report

The report has been produced, printed and distributed. There were 3,300 copies sent to participants and other interested parties. Positive feedback has been received.

Both the 2006 and 2007 Highlights and Achievements have been placed online.

Redesign of websites

BOAB Interactive have been selected to work on the development of the system, and has been recommended by the Communication Managers from other CRCs. As well as other features, the content management system offered by BOAB Interactive offers the capacity to deliver the latest edition of models, such as CABALA, online. Using the internet to deliver these tools could help projects to meet milestones and save the distribution costs associated with updates delivered on CD or DVD.

Structural and graphic design has commenced with the following progress being made in each area:

Website development - public section

The following developments occurred with the public website:

The new public website is operating with the major features of this site including:

Newsletter templates have been designed for *CRC for Forestry News* (newsletter one sent December 2007), *The Monitor* (RP1 newsletter four sent January 2008), *The Log* (RP3 newsletter one sent November 2007) and *The Wood From The Trees* (RP2 newsletter four due March 2008). A newsletter template is currently being designed for BioBuzz (issue five due March 2008). A newsletter template for the Communities Project will be designed next.

The Land Use Change Project (4.5) has its own visual identity, separate to that of the CRC. This decision was made in order to assist community engagement with the project, as project scientists felt that many potential participants in the attitudes and values surveys would be less likely to trust a project branded “forestry”. A URL has been purchased, www.landusechange.net.au and this redirects to the Land Use Change webpages, which the CRC hosts.

A complete list of technical reports from the CRC for Forestry and previous CRCs has been put online in citation format, with links to those of the full text documents that could be located and which were classified as publicly available.

One of the major field sites (Pittwater, Tasmania) has been developed and published, including a description of the location, the projects conducted at that site, and a list of scientists working there, including photos, which partners they work for and a description of their research interests. Please see <http://www.crcforestry.com.au/sites/pittwater/index.html>

A number of documents have been placed online, the most recent of which are featured at the top of the list at <http://www.crcforestry.com.au/publications/recent/index.html>

Website development – member’s site and intranet

The public website has been developed using an off-the-shelf content management system (CMS) from Boab Interactive. The self-service intranet section of the website is currently being developed by this company. Development costs for the CRC for Forestry are reduced as Boab Interactive plans to include the self-service intranet component as a new module in their system. Other CRCs will be able to purchase a license to use this new module as part of their systems.

The new developments allow users to manage their own accounts, profile (including image) and passwords; subscribe to newsletters and RSS feeds; and to upload documents, images, web links and events.

Once reviewed and updated, the intranet and public site will be merged and content will be migrated from the old members' website to the new site. There are 2,100 documents on the member's website to be moved across to the new design.

Newsletters

Several newsletters were released during the year. The highlights of these were:

The Monitor 3 (<http://www.crcforestry.com.au/monitor3.htm>) contained interesting content, citing the industry perspective on Timbercorp's involvement with the CRC.

Each of the research programmes have delivered newsletters according to the schedule in the communications milestones and timeline; with the exceptions being Research Programme One, which did not deliver a newsletter in December 2006 and so delivered a very large version in June 2007; and Research Programme Three, completed their first news letter (The Log) in this year.

During the year the CRC has adopted a whole-of-CRC electronic newsletter to place of individual programme newsletters, to be released two to three times per year. The newsletter has an attractive entry page with summaries of featured items, with links to full-text items, which should not exceed one page in length. This material could also be used for web pages.

With the new approach, programme newsletters would be prepared by programme staff and therefore more scientific in nature, while the whole of CRC newsletter would be more general, with broader stakeholders in the audience.

Individual projects and programmes newsletters will continue within-programme/project newsletters but will not receive the same high level of editorial support. Material can be selected from within-programme/project newsletters to be adapted for the whole-of-CRC newsletter.

The first Research Programme Three newsletter was also completed during the year.

Invitation to write a feature for *40 Degrees South* magazine

The CRC for Forestry was invited to submit a feature to *40 Degrees South*, a Tasmanian brand/lifestyle magazine with a Tasmanian readership of 50,000 and an international readership of 100,000.

Old Forests New Management conference media

A major communication undertaking for the year was the Old Forests New Management conference held in Hobart in February 2008. International speakers attended, with a very high level of media attention and focus occurring.

The development of the conference was significant with the Communication Manager being part of conference organising committee. Media attention included, *The National Interest* on Radio National to host a forum about the science behind the management of old forests as part of the *Old Forests New Management* conference schedule.

A thirty three 33 page report was tabled that showed that the conference received a very high level of media coverage, mostly from local and national radio. Selected highlights mentioned were:

Fran Kelly's interview with Jerry Franklin on Radio National Breakfast (Tuesday 19 February),

Bush Telegraph interview with Sally Aitken and Craig Nitschke (Thursday 21 February),

Interviews in multiple languages (Ivan Tomasselli in Portuguese on SBS Radio; Fred Duncan, Antonio Lara, Pablo Peri and Juan Armesto in Spanish on SBS Radio's science and environment segment); Peter Kanowski on Radio Australia for an Indonesian audience about the National Forestry Masters Program and Peter's trip to Indonesia in 2007 to look at illegal deforestation.

These results show that it is possible to get stories about forest science in the media and the CRC should nurture these established contacts and feed occasional stories to them over coming months.

End-user involvement and CRC impact on end-users

End-users are involved during project planning, and in many projects their on-ground assistance is essential for achieving research objectives. Such a process ensures end-user expectations match research outputs and that end-users are ready to receive and adopt outputs when they become available.

In terms of adoption of CRC outputs the following table 4 summarises the formal technology transfer activities that occurred during the year.

In all the CRC either hosted, co-hosted or played a major role in the organisation and presentation of 2 major conferences (one accepted under the prestigious Sir Mark Oliphant Conference series), 15 workshops, numerous training sessions, field days and other educational activities. These were attended by, or delivered to, hundreds of representatives from CRC industry partners, non-partner organisations and members of the public from all forestry regions around Australia and some from overseas.

In addition, in a less formal way, CRC scientists and staff maintain an almost daily contact with representatives from industry partner organisations ensuring a constant flow of knowledge and a continual strengthening of the relationship between the CRC and its industry stakeholders. Joint supervision of research students by industry partner representatives and joint research projects with industry scientists and operational staff further strengthen this relationship and help to ensure that all parties maintain a strong engagement.

Add to this the regular interaction between the CRC and regulatory authorities such as The Forest Practices Authority in Tasmania and CRC representation on and / or input into various advisory and policy formulation committees and it becomes apparent that the impact the CRC on the industry is multi-dimensional.

As a consequence of all these activities the CRC's network of influence is strengthened continuously as research projects mature and tangible benefits are realised by our industry stakeholders in so many different ways.

Table 4. Involvement of end users in CRC activities

Industry or other research users and the basis of their interaction (e.g. core participant)	Type of activity and location of activity	Nature and scale of benefits to end-users (e.g. increase in exports, productivity, employment etc)	Actual or expected benefit to user (where possible, include benefits accruing in \$ terms)
Partners: Some plantation industry and research partners Others: forestry and statistical practitioners from around Australia	Statistical Analysis Workshop held at the Clayton CSIRO Campus in March 2008.	Workshop on the use of the open-sourced statistical package "R" and its applications in a forestry context	R is widely used and open sourced. It is very up-to-date and considered a standard across the research community in many fields. As it is open sourced it can be accessed and used in all organisations and thus enables researchers working collaboratively across organisations to better communicate with and assist each other in statistical interpretation of results. This workshop has enhanced the opportunity for collaboration and improved the quality of data analysis amongst participating partners.
Partners: Most plantation industry based partners and all research partners involved in Programme 1 Others: none	Workshop on "Sustaining Plantation Production: A Review" held in Perth in December 2007.	Summarised the current state of knowledge of changes in resource availability during the 1 st rotation and implications for management of the 2 nd and later rotation	Application of this knowledge will prevent plantation failure and allow plantation design to be tailored to prevailing environmental conditions from one rotation to the next. The results, when incorporated into appropriate models, will permit scenario testing allowing the effects of climate variation or silvicultural management to be incorporated into predictions of survival and performance and thus impact on the scheduling of forest management interventions and harvesting.
Partners: most plantation based industry partners Others: forestry professional from around Australia	Assisted in the organisation of the conference "Plantation Eucalypts for High-Value Timber: Enhancing investment through research and development" in Melbourne in October 2007 and co-edited the proceedings.	Information provided at conference and available in proceedings informs growers about investment structures, marketing and management of eucalypt plantations for high-value wood products	A platform for making better investment and management decisions for the existing estate of eucalypt plantations in Australia being grown primarily for solid-wood products and for promoting its further expansion
Partners: industry partners across Australia Others: forestry professionals from non-partner organisations	3 two day workshops on harvest planning in Tasmania, South Australia and Western Australia and a 2 one day workshop on harvest planning for cable harvesting in Tasmania in December 2007.	Increased awareness of and up-skilled attendees in methods and computer software that can be used to improve the planning and management of forest operations.	A better understanding of the implications down the value chain of sub-optimal decisions made in the planning phase of forest development and operations and an understanding of how to avoid the resultant cost imposts by the application of appropriate planning tools.
Partners: industry partners across Australia Others: forestry professionals from non-partner organisations and harvesting contractors and their employees	3 half day workshops on machine evaluation in Tasmania, South Australia and Western Australia in May 2008.	Demonstrated the tools and methods that are available to effectively evaluate the performance of highly capital intensive forestry equipment.	A better understanding of the efficiency, costs and performance of operational activities allowing for the implementation of continual improvement programs targeting better utilisation of high value equipment and resources, ultimately resulting in reduced costs of production.

Table 4. Involvement of end users in CRC activities

Industry or other research users and the basis of their interaction (e.g. core participant)	Type of activity and location of activity	Nature and scale of benefits to end-users (e.g. increase in exports, productivity, employment etc)	Actual or expected benefit to user (where possible, include benefits accruing in \$ terms)
Partners: IPMG industry partners from Western Australia Others: none	Workshop on the relationship between insect damage and tree growth held in Albany in April 2008.	Increased understanding of the impact of insect damage on the growth of plantation trees and yield by research foresters, field coordinators, tree farm supervisors, and plantation managers	Improved plantation management practices. This might include reduction in unnecessary use of insecticides which would result in savings. Even when insecticides are used, the use of insecticides would be more effective and efficient. Thus, this would involve greater increases in yield per \$ spent applying insecticides.
Partners: IPMG industry partners from Western Australia and the Green Triangle Others: none	Workshop on experimental design, sampling design and data analysis for research foresters held in Albany in May 2008.	Increased understanding of experimental design for application in forestry research trials and design of sampling protocols such as inventory, forest health assessments, and PSP plots by research foresters	More efficient and effective research trial designs and more robust data collection techniques ensuring that field based research trials are scientifically sound. Increased quality of research outputs by plantation companies per \$ spent on in house research projects.
Partners: IPMG industry partners from the Green Triangle Others: none	Training sessions for the population assessment of the Eucalyptus weevil at Hamilton and Penola in February 2008.	Increased skills of operational forestry staff to enable appropriate assessment programs to be undertaken.	Improved plantation management and protection practices. Using the protocol, management decisions will be made before damage happens, and thus, if there are any losses of productivity due to <i>Eucalyptus</i> weevil, the loss will be reduced.
Partners: industry partners from Tasmania Others: Forest Practices Authority (Tasmania) (FPA) staff	Continuous involvement with the FPA through input into and support of workshops, field days, training sessions and contributions to updates of the Forest Practices Code and supporting guides.	Increased skills of forestry planning and operational staff throughout Tasmania.	Improved forest management practices.
Partners: none Others: landowners in the Midlands of Tasmania, NRM South, Private Forests Tasmania	A field day / workshop on native forest restoration outlining techniques for restoring degraded native dry forest types in the Midlands in Oatlands in March 2008.	Improved knowledge of forest management techniques among landowners and the integration of these techniques with other farm management activities.	Better land management through the application of more sustainable practices resulting in improved farm income in the long term and improved conservation status of these forest types.
Partners: industry partners from Tasmania Others: Forest Practices Authority (Tasmania) (FPA) staff	Co-hosted with the FPA a two day workshop and field day to update forest managers, planners and researchers on work on the 'hollow' resource in our forests in Hobart in October 2007.	Improved knowledge of this resource and its importance in the protection of 'priority fauna' as described in the RFA.	Improved forest management practices.

Table 4. Involvement of end users in CRC activities

Industry or other research users and the basis of their interaction (e.g. core participant)	Type of activity and location of activity	Nature and scale of benefits to end-users (e.g. increase in exports, productivity, employment etc)	Actual or expected benefit to user (where possible, include benefits accruing in \$ terms)
Partners: industry partners from Victoria and Tasmania Others: Parks Victoria, Vicforests	Workshop on Eucalypt gene pools, adaptation and regeneration practices in Melbourne in September 2007.	Transfer of knowledge on genetic diversity and processes in key dominants of Tasmanian and Victorian production and other forests. Improved seed transfer guidelines for Tasmanian and Victoria native eucalypt forests.	Improved forest management practices.
Partners: industry partners from Tasmania Others: staff from other land and resource management organisations and agencies in Tasmania	Workshop on progress and directions for research on genetic invasion from E. nitens in Tasmania in Hobart in April 2008.	Improved knowledge among Tasmanian land and forest managers of the potential for genetic contamination of native forests from plantations assets.	Improved forest management practices.
Partners: industry partners from Tasmania Others: Forest Practices Authority (Tasmania) (FPA) staff	Workshop on old trees and the development of coarse woody debris in cool temperate eucalypt forests in Hobart in August 2007.	Better understanding of the role of coarse woody debris in maintaining biodiversity in production forests.	Improved forest management practices.
Partners: representative from one industry partner Others: forestry professionals from non partner organisations and post graduate students	Teaching module on Forest Operations as part of the National Forestry Masters Programme at the Creswick Campus of the University of Melbourne in June / July 2008.	Increased knowledge of forest operations management.	More effective and efficient management of forest operations. Utilising international expertise to improve the operational skills of Australian forestry professionals.
Partners: most industry and research partners Others: national and international scientists and other professionals comprising 270 delegates from 17 countries	Co-hosted and participated in the presentation of the conference "Old Forest, New Management: Conservation and use of old-growth forests in the 21 st Century" in Hobart in February 2008. Conference accepted under the prestigious Sir Mark Oliphant conference series.	Considerable national and international exposure for a large body of CRCF research in particular research into the biodiversity impacts of alternative silvicultural systems to replace clearfelling in wet eucalypt forests.	The conference provided international benchmarks and clearly linked new research directions with climate change and carbon sequestration issues.

Education and training

Chair: Professor Peter Kanowski

Manager: Dr Neil Davidson

Table 5. Education and training milestone

Output / milestone number	Description	Contracted achievement date	Achieved (yes or no)	Reasons why not achieved (if applicable)	Strategies to achieve unmet milestones
Milestone 1.1.1	First 21 CRC PhD students enrolled	April 2007	Yes	N/A	N/A

PhD and masters students: recruitment and associated milestones

Thirty three higher-degree students (30 PhD and three masters by research), receiving full or top-up scholarships from the CRC for Forestry, were enrolled and working on core CRC research by the end of the reporting period. An additional 22 PhD students and three honours students were affiliated with the CRC (ie, conducting research beneficial to the forest industry but not specifically addressing the objectives of the CRC). A further ten students that were PhD students with the previous forestry CRC (the CRC for Sustainable Production Forestry), affiliated to the CRC-F, graduated in 2007/08 (see below).

Industry involvement in supervision

Just under half of CRC for Forestry research students (27 of 55 students) had at least one industry partner supervisor in 2006-07 and a total of ten industry partners were represented on supervisory panels. There were a total of 90 supervisors of CRC for Forestry students, of which 24 were industry staff.

Graduate destinations

The first graduates recruited by the CRC for Forestry will not complete their degrees until 2008. However, some students from the CRC for Sustainable Production Forestry (which ceased operations on 30 June 2005 and is affiliated with the CRC for Forestry) are still completing their PhDs; ten of these students graduated in 2007-08 and their work destinations were:

- Joanne Burton – Coordinator for Healthy Waterways.org, QLD
- Dr Jules Freeman – Post doctoral fellow University of Tasmania (Molecular genetics of eucalypts)
- Dr Matthew Hamilton – Postdoctoral Fellow, University of Tasmania (Quantitative genetics of eucalypts)
- Dr Katherine Harrison – Lab Manager/ University of Tasmania School of Agricultural Science

- Dr Anna Hopkins – Postdoctoral Fellow (Forest Pathology) Scion Forest Biosecurity and Protection, NZ Forest research Institute Ltd, New Zealand
- Dr Megan Jones - Research Associate, DPI&F Animal Research Institute, NSW
- Dr Prue Loney – Science Student Advisor, Faculty of Science Engineering and Technology, University of Tasmania
- Marian McGowan – Project Officer, Integrated Marine Observing System (IMOS) a company deploying instruments to monitor ocean change
- Dr Isa Medra – Contract research in ecology for The School of Environment, Griffith University

Nine (equivalent to 16 per cent) of the current CRC for Forestry students were previously, or are still, employed by forestry businesses.

End-user involvement in developing undergraduate courses

While the CRC for Forestry has not been directly involved in the development of undergraduate courses, it was a supporting partner in the development of the new National Forestry Masters Programme (<http://www.forestry.org.au/masters>). The National Forestry Masters Programme is funded by a DEST Collaboration and Structural Reform Fund (CASR) grant, and will be the principal national vehicle for the delivery of professional forestry education. The course has been devised in close partnership with employers, industry groups and government bodies to set a new standard in relevant, accessible and practical training for professional foresters. National Forestry Masters Programme students can enrol via any of four of the CRC for Forestry university partners. The CRC's support for this initiative will ensure the involvement of end-users in the development and delivery of constituent courses, and will also serve as a vehicle for skills delivery to industry by CRC staff.

Nature of seminars/workshops/courses run for industry

Thirty four communications events were run for industry, including conferences, symposia, seminar series and workshops. This includes:

- The Annual Science Meeting which featured an afternoon of poster presentations from students and scientists to industry representatives across the whole of the CRC;
- The “management of mycosphaerella leaf disease: a synthesis of recent research” workshop, which focussed upon the direction that future research should take;
- IPMG held industry workshops, field days, seminars and training sessions on average twice per month in areas such as Albany, Bunbury, Hamilton, Casterton, Manjimup and Penola.
- A headwater stream symposium and field day to inform industry staff of forest management issues and research outcomes related to water quality, stream processes and buffer management.

- The Australian Forest Growers Conference: key organisers and presenters included CRC staff.
- Each CRC for Forestry research programme runs workshops for industry that attract attendances ranging from a few key industry staff (e.g. highly specific workshops) to those which covered a broad cross-section of the industry (e.g. Annual Science Meeting).
- The CRC also runs training courses for industry (see Table 5).

Skills development

Twenty-two research students participated in the CRC for Forestry's 2007 Annual Science Meeting (the other students were unavailable for good reason), and in satellite student training programmes addressing research leadership and management, and communication and media skills.

As mentioned earlier, the new National Forestry Masters Programme will make a major contribution to skill development in the industry.

Glossary of terms

ALS	Airborne laser scan
ARC	Australian Research Council
C&U	Commercialisation and Utilisation (Programme)
CABALA	A linked carbon, water and nitrogen computer model of forest growth for silvicultural decision support
Calorimetry	The measurement of quantities of heat (source: <i>New Shorter Oxford English Dictionary</i> , 1993)
CAL	ie CAL 6A: projects that originated with the then Western Australian Department of Conservation and Land Management.
CASR	Collaboration and Structural Reform Fund
CERF	Commonwealth Environment Research Facilities Programme
CIPMC	Commercialisation and Intellectual Property Management Committee
CSIRO	The Commonwealth Scientific and Industrial Research Organisation (Australia)
DArT	Diversity arrays technology (a generic genotyping technology)
DEST	The Australian Government Department of Education Science and Training
DPIW	Tasmanian Government Department of Primary Industries and Water
DSE	Department of Sustainability and Environment (Victoria)
DSS	Decision support system
Ensis	A joint venture between CSIRO and Scion (New Zealand).
FABI	Forestry and Agricultural Biotechnology Institute, University of Pretoria
FEA Ltd	Forest Enterprises Australia Ltd
FFIC	Forests and Forest Industry Council of Tasmania
FIAT	Forest Industries Association of Tasmania
FORTHREATS	European network on emerging diseases and invasive species threats to European forest ecosystems. For more information on this project please refer to http://www.ulb.ac.be/sciences/lubies/forthreats.html
FPA	Forest Practices Authority, Tasmania
FT	Forestry Tasmania
FWPRDC	Forest and Wood Products Research and Development Corporation (ceased operations on 3 September 2007, replaced by Forest and Wood Products Australia Limited).

GSP	Great Southern Plantations, a partner to the CRC for Forestry, changed its name to Great Southern Limited during the reporting period.
Gunns	Gunns Limited
IEGN	International <i>Eucalyptus</i> Genome Network
IP	Intellectual Property
IPMG	Industry Pest Management Group
ISSN	International standard serial number
IUFRO	International Union of Forest Research Organisations
LiDAR	Light detection and ranging
LTER	Long term ecological research. There is an LTER site located at Warra in southern Tasmania.
MODIS	Methods for Analysing time series
MLD	Mycosphaerella leaf disease
NIR	Near infrared
NIRS	Near infrared scanning
NS	Norske Skog
Orthophotography	The process of aerial photographs that have been rectified to produce an accurate image of the Earth by removing tilt and relief displacements which occurred when the photo was taken (source: web2.gov.mb.ca/mli/glossary/m_z.html)
PCC	A CRC for Forestry programme coordinating committee
PFT	Private Forests Tasmania
PSC	A CRC for Forestry project steering committee
SSC2007	Spacial Science Institute Biennial International Conference (held 14-18 May, Hobart)
SMEs	Small to medium enterprises. A small business employs up to 20 people. Medium businesses employ between 20 and 200 people (source: DEST contact officer, 2006)
TCFA	Tasmanian Community Forest Agreement
UTas	University of Tasmania

Financial information

Finance and Administration Manager: Mrs Shelley Caswell

Financial report on the account

Insert the CRCs financial report on the account here (2004 CRCs only)

Refer Section 6.3.1 of the Guidelines

Financial report on the company

Insert the CRCs financial report on the company here (2004 CRCs only)

Refer Section 6.3.2 of the Guidelines

Auditor's statement

Insert the Auditor's Statement on the CRCs Financial Information (CRC Internet System financial tables) here

Refer Sections 6.4 and 6.5 and Attachment A of the Guidelines



CRC Forestry Limited

ACN 115 064 910

Annual financial report for the year ended 30 June 2008

Annual financial report for the year ended 30 June 2008

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Directors' report

The directors of CRC Forestry Limited submit herewith the annual financial report of the company for the year ended 30 June 2008. In order to comply with the provisions of the Corporations Act 2001, the directors report as follows:

The names and particulars of the directors of the company during or since the end of the year are:

Directors

Name	Particulars
Anne Katherine Carnell	(AO, B.Pharm, FAIM, FAIPM, MAICD). Chief Executive Officer, Australian Food and Grocery Council. Joined the Board at incorporation of the company on 30 June 2005 in a non-executive capacity. Ms Carnell is Chairman of the Board, Chairman of the Remuneration and Nomination Committee and a member of the Compliance Committee
Timothy Michael Browning	(B.Bus, Dip.C.M., MAICD). General Manager, Forestry Division, Timbercorp Limited. Joined the Board at incorporation of the company on 30 June 2005 in a non-executive capacity. Mr Browning is a member of the Compliance Committee.
Johannes Hendrick Drielsma	(B.Sc.For.(Hons), M.For.Sci, PhD). Executive General Manager, Forestry Tasmania. Joined the Board at incorporation of the company on 30 th June 2005 in a non-executive capacity. Dr Drielsma is the Chairman of the Communications Committee and a member of the Remuneration and Nomination Committee.
Gary Brian Inions	(B.Sc(Hons), PhD). Managing Director, Plantation International Pty Ltd and Hansol PI Pty Ltd. Joined the Board on 13 December 2005 in a non-executive capacity. Dr Inions is a member of the Remuneration, Nomination and Commercialization and Intellectual Property Committee.
James Balfour Reid	(B.Sc(Hons), PhD, D.Sc, FTSE, awarded David Syme Research Medal (1989) and the Royal Society of Tasmania Medal (2000)). Dean, Faculty of Science Engineering and Technology, University of Tasmania. Joined the Board at incorporation of the company on 30 June 2005 in a non-executive capacity. Professor Reid is a member of the Remuneration, Nomination and is Chair of the Commercialization and Intellectual Property Committee.
Robert Geoffrey Woolley	(B.Ec, FCA). Chairman of the Forests and Forest Industry Council of Tasmania, and previously a partner in Deloitte Touche Tohmatsu and former Managing Director of Webster Ltd. Mr Woolley has extensive experience in management, business recovery and a professional background in financial services. He is currently Chairman of Tasmanian Pure Foods Ltd and a Director of Tandou Ltd. Joined the Board on 12 December 2005 in a non-executive capacity. Mr Woolley is Chairman of the Compliance Committee.
Robert John Pearce	(B.A., Dip. Ed., J.P.) Executive Director, Forest Industries Federation of WA and Chair of NAFI. Joined the Board on 31 st October 2006 in a non-executive capacity. Mr. Pearce is a member of the Communications Committee.
Richard Michael Ede	(MSc(Hons), PhD, MAICD). Director, Ensis Investment. Joined the Board on 6 January 2006 in a non-executive capacity. Dr Ede was Chairman of the Commercialisation and IP Management Committee until his resignation.

The above named directors held office during the whole of the financial year and since the end of the year expect for:

- Richard Michael Ede – resigned 6 February 2008

Company Secretary

Mark Andrew Stemm (Cert. Comm, B. Soc. Sc, Grad. Dip. Agr. Econ, Grad. Dip. Man, FNPA), replaced Professor Gordon Duff, CEO of CRC Forestry as Company Secretary on the 6th February 2008.

Principal activities

CRC Forestry Limited is a company limited by guarantee (the amount of each members guarantee is \$10) incorporated on 30th June 2005 to manage the CRC for Forestry, a seven year forestry research organisation established under the Commonwealth Government's Cooperative Research Centre Programme. The principal activities of the CRC are sustainable forest landscape research in four main areas –

- Managing and Monitoring for Growth and Health – improved ability to select planting sites and manage for increased profitability of plantation investments, through higher yields and lower costs of production.
- High-Value Wood Resources – increased use of planting stock with improved genetic potential, managed to optimise production of high value wood for fibre and solid wood markets.
- Harvesting and Operations – adoption of harvesting and logistical practices that reduce delivered wood costs, contributing to industry profitability, while maintaining conformity with codes of practice and certification standards.
- Trees in the Landscape – improved security of access to land and forest resources for the forest industry, sustaining levels of investment in the establishment of new plantations, through demonstrated ability to manage in an environmentally and socially sustainable manner.

Review of operations

Comparative figures are available this year and show that despite the slow start in the 2006-2007 financial year the majority of research projects are now on track and that some of the previous under spend is being taken up. The major sources of funding are the Commonwealth Government's CRC Programme and the Participants in the CRC for Forestry.

Changes in state of affairs

During the year there was no significant change in the state of affairs of the company other than that referred to in the financial statements or notes thereto.

Subsequent events

There has not been any matter or circumstance, other than that referred to in the financial statements or notes thereto, that has arisen since the end of the year, that has significantly affected, or may significantly affect, the operations of the company, the results of those operations, or the state of affairs of the company in future years.

Future developments

Disclosure of information regarding likely developments in the operations of the company in future years and the expected results of those operations is likely to result in unreasonable prejudice to the company. Accordingly, this information has not been disclosed in this report.

Indemnification of officers and auditors

During the year, the company paid a premium in respect of a contract insuring the directors of the company (as named above), the company secretary and all executive officers of the company against a liability incurred as such a director, secretary or executive officer to the extent permitted by the Corporations Act 2001. The contract of insurance prohibits disclosure of the nature of the liability and the amount of the premium.

The company has not otherwise, during or since the end of the year, indemnified or agreed to indemnify an officer or auditor of the company or of any related body corporate against a liability incurred as such officer or auditor.

Directors' meetings

The following table sets out the number of directors' meetings (including meetings of committees of directors) held during the year and the number of meetings attended by each director (while they were a director or committee member). During the year, 5 board meeting, 5 compliance committee, 4 communication committee, 1 commercialisation and intellectual property committee meetings were held. The remuneration and nomination committee did not meet during the year.

Directors	Board of directors		Remuneration and Nomination committee		Compliance committee		Communications Committee		Commercialisation Committee	
	Held	Attended	Held	Attended	Held	Attended	Held	Attended	Held	Attended
Anne Katherine Carnell	5	5			5	5	4	4		
Timothy Browning	5	3			5	4				
Johannes Drielsma	5	3					4	4		
Richard Ede	4	3							1	1
Gary Inions	5	5								
James Reid	5	5								
Robert Woolley	5	4			5	5				
Robert Pearce	5	5					4	4		

Auditor's independence declaration

The auditor's independence declaration is included on page 6 of the annual report.

CRC Forestry Limited
Auditor's Independence Declaration

Deloitte

Deloitte Touche Tohmatsu
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The Board of Directors
CRC Forestry Limited
Private Bag 12
HOBART TAS 7001

27th August 2008

Dear Board Members

CRC Forestry Limited

In accordance with section 307C of the Corporations Act 2001, I am pleased to provide the following declaration of independence to the directors of CRC Forestry Limited.

As lead audit partner for the audit of the financial statements of CRC Forestry Limited for the financial year ended 30 June 2008, I declare that to the best of my knowledge and belief, there have been no contraventions of:

- (i) the auditor independence requirements of the Corporations Act 2001 in relation to the audit; and
- (ii) any applicable code of professional conduct in relation to the audit.

Yours sincerely

Deloitte Touche Tohmatsu
DELOITTE TOUCHE TOHMATSU


David Harradine
Partner
Chartered Accountants



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ABN 74 490 121 060

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Independent Auditor's Report to the members of CRC Forestry Limited

Report on the Financial Report

We have audited the accompanying financial report of CRC Forestry Limited, which comprises the balance sheet as at 30 June 2008, and the income statement, cash flow statement and statement of recognised income and expense for the year ended on that date, a summary of significant accounting policies, other explanatory notes and the directors' declaration as set out on pages 9 to 22.

Directors' Responsibility for the Financial Report

The directors of the company are responsible for the preparation and fair presentation of the financial report in accordance with Australian Accounting Standards (including the Australian Accounting Interpretations) and the *Corporations Act 2001*. This responsibility includes establishing and maintaining internal control relevant to the preparation and fair presentation of the financial report that is free from material misstatement, whether due to fraud or error; selecting and applying appropriate accounting policies; and making accounting estimates that are reasonable in the circumstances.

Auditor's Responsibility

Our responsibility is to express an opinion on the financial report based on our audit. We conducted our audit in accordance with Australian Auditing Standards. These Auditing Standards require that we comply with relevant ethical requirements relating to audit engagements and plan and perform the audit to obtain reasonable assurance whether the financial report is free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial report. The procedures selected depend on the auditor's judgement, including the assessment of the risks of material misstatement of the financial report, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial report in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by the directors, as well as evaluating the overall presentation of the financial report.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

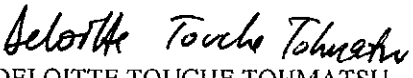
Auditor's Independence Declaration

In conducting our audit, we have complied with the independence requirements of the *Corporations Act 2001*.

Auditor's Opinion

In our opinion, the financial report of CRC Forestry Limited is in accordance with the *Corporations Act 2001*, including:

- (a) giving a true and fair view of the company's financial position as at 30 June 2008 and of its performance for the year ended on that date; and
- (b) complying with Australian Accounting Standards (including the Australian Accounting Interpretations) and the *Corporations Regulations 2001*.


DELOITTE TOUCHE TOHMATSU


David Harradine
Partner
Chartered Accountants
Hobart, 27th August 2008

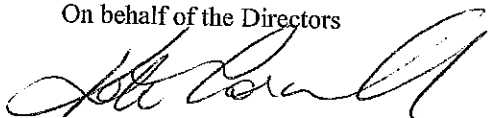
Directors' declaration

The directors declare that:

- (a) in the directors' opinion, there are reasonable grounds to believe that the company will be able to pay its debts as and when they become due and payable; and
- (b) in the directors' opinion, the attached financial statements and notes thereto are in accordance with the Corporations Act 2001, including compliance with accounting standards and giving a true and fair view of the financial position and performance of the company.

Signed in accordance with a resolution of the directors made pursuant to s.295(5) of the Corporations Act 2001.

On behalf of the Directors



Anne Katherine Carnell
Chair/Director
Melbourne, 27 August 2008

Income statement for the year ended 30 June 2008

	Note	2008 \$	2007 \$
Revenue			
Revenue	2	5,754,497	4,645,960
Other income	2	232,890	325,145
Total Revenue		5,987,387	4,971,105
Expenses			
Research provider expenses		4,812,356	4,045,181
Employee related expenses		592,572	506,130
Depreciation		15,836	15,646
Rental and maintenance		101,671	103,809
Corporate and other expenses		464,952	300,339
Total Expenses		5,987,387	4,971,105
Profit before income tax		0	0
Income tax expense		0	0
Profit for the year		0	0

Notes to the financial statements are included on pages 14 to 22.

Balance sheet as at 30 June 2008

	Note	2008 \$	2007 \$
Current assets			
Cash and cash equivalents	12(a)	2,081,683	1,837,042
Trade and other receivables	4	38,651	211,068
Other	5	441,910	536,581
Total current assets		2,562,244	2,584,691
Non-current assets			
Plant and equipment	6	25,895	50,377
Total non-current assets		25,895	50,377
Total assets		2,588,139	2,635,068
Current liabilities			
Trade and other payables	7	82,504	316,353
Other	7 a)	2,492,238	2,308,327
Total current liabilities		2,574,742	2,624,680
Non-current liabilities			
Provisions	8	13,397	10,388
Total non-current liabilities		13,397	10,388
Total liabilities		2,588,139	2,635,068
Net assets		0	0
Equity	15		
Reserves		0	0
Retained earnings		0	0
Total equity		0	0

Notes to the financial statements are included on pages 14 to 22.

Cash flow statement for the year ended 30 June 2008

	Note	2008 \$	2007 \$
Cash flows from operating activities			
Receipts from customers		6,103,199	6,006,390
Payments to suppliers and employees		(6,021,920)	(5,282,210)
Net cash provided by operating activities	12 (c)	81,279	724,180
Cash flows from investing activities			
Interest received		163,362	109,098
Payment for property, plant and equipment		-	(12,310)
Proceeds from sale of property, plant and equipment		-	-
Net cash provided by investing activities		163,362	96,788
Cash flows from financing activities			
Net cash provided by financing activities			-
Net increase in cash and cash equivalents		244,641	820,968
Cash and cash equivalents at the beginning of the year		1,837,042	1,016,074
Cash and cash equivalents at the end of the year	12(a)	2,081,683	1,837,042

Notes to the financial statements are included on pages 14 to 22.

Statement of recognised income and expense for the financial year ended 30 June 2008

	Note	2008 \$	2007 \$
Net income recognised directly in equity			-
Profit for the year			-
Total recognised income and expense for the year			-

Notes to the financial statements are included on pages 14 to 22.

Notes to the financial statements for the year ended 30 June 2008

Note	Contents	Note	Contents
1	Summary of accounting policies	9	Leases
2	Profit from operations	10	Economic dependency
3	Remuneration of auditors	11	Segment information
4	Current trade and other receivables	12	Notes to the cash flow statement
5	Other current assets	13	Financial instruments
6	Plant and equipment	14	Key management personnel remuneration
7	Current trade and other payable	15	Related party transaction
8	Non-current provisions	16	Additional company information

1. Summary of accounting policies

Statement of compliance

The financial report is a general purpose financial report which has been prepared in accordance with the Corporations Act 2001, Accounting Standards and Interpretations, and complies with other requirements of the law. Accounting Standards include Australian equivalents to International Financial Reporting Standards ('A-IFRS').

The financial statements were authorised for issue by the directors on 27 August 2008.

Adoption of new and revised Accounting Standards

In the current year, the Company has adopted all of the new and revised Standards and Interpretations issued by the Australian Accounting Standards Board (the AASB) that are relevant to its operations and effective for the current annual reporting period. The Company has also adopted the following Standards as listed below which only impacted on the company's financial statements with respect to disclosure:

- AASB 101 'Presentation of Financial Statements (revised October 2006)
- AASB 7 'Financial Instruments Disclosure'

Basis of preparation

The financial report has been prepared on the basis of historical cost. Cost is based on the fair values of the consideration given in exchange for assets.

The following significant accounting policies have been adopted in the preparation and presentation of the financial report:

- (a) **Cash and cash equivalents**
Cash comprises cash on hand and demand deposits. Cash equivalents are short-term, highly liquid investments that are readily convertible to known amounts of cash, which are subject to an insignificant risk of changes in value and have a maturity of three months or less at the date of acquisition.
Bank overdrafts are shown within borrowings in current liabilities in the balance sheet.
- (b) **Date of incorporation**
The company was incorporated on 30 June 2005, comparative information from the 2006-2007 financial year is presented in this report.
- (c) **Employee benefits**
A liability is recognised for benefits accruing to employees in respect of wages and salaries, annual leave, long service leave, and sick leave when it is probable that settlement will be required and they are capable of being measured reliably.
Liabilities recognised in respect of employee benefits expected to be settled within 12 months, are measured at their nominal values using the remuneration rate expected to apply at the time of settlement.
Liabilities recognised in respect of employee benefits which are not expected to be settled within 12 months are measured as the present value of the estimated future cash outflows to be made by the Company in respect of services provided by employees up to reporting date.

Defined contribution plans

Contributions to defined contribution superannuation plans are expensed when employees have rendered service entitling them to the contributions.

(d) Financial assets

Investments are recognised and derecognised on trade date where the purchase or sale of an investment is under a contract whose terms require delivery of the investment within the timeframe established by the market concerned, and are initially measured at fair value, net of transaction costs except for those financial assets classified as at fair value through profit or loss which are initially measured at fair value.

Other financial assets are classified into the following specified categories: financial assets 'at fair value through profit or loss', 'held-to-maturity investments', 'available-for-sale' financial assets, and 'loans and receivables'. The classification depends on the nature and purpose of the financial assets and is determined at the time of initial recognition.

Trade receivables, loans, and other receivables that have fixed or determinable payments that are not quoted in an active market are classified as 'loans and receivables'. Loans and receivables are measured at amortised cost using the effective interest method less impairment. Interest income is recognised by applying the effective interest rate.

(e) Goods and services tax

Revenues, expenses and assets are recognised net of the amount of goods and services tax (GST), except:

- i. where the amount of GST incurred is not recoverable from the taxation authority, it is recognised as part of the cost of acquisition of an asset or as part of an item of expense; or
- ii. for receivables and payables which are recognised inclusive of GST.

The net amount of GST recoverable from, or payable to, the taxation authority is included as part of receivables or payables.

Cash flows are included in the cash flow statement on a gross basis. The GST component of cash flows arising from investing and financing activities which is recoverable from, or payable to, the taxation authority is classified as operating cash flows.

(f) Government grants

Government grants are assistance by the government in the form of transfers of resources to the company in return for past or future compliance with certain conditions relating to the operating activities of the entity. Government grants include government assistance where there are no conditions specifically relating to the operating activities of the company other than the requirement to operate in certain regions or industry sectors.

Government grants relating to income are recognised as income over the periods necessary to match them with the related costs. Government grants that are receivable as compensation for expenses or losses already incurred or for the purpose of giving immediate financial support to the company with no future related costs are recognised as income of the period in which it becomes receivable.

Government grants relating to assets are treated as deferred income and recognised in profit and loss over the expected useful lives of the assets concerned.

(g) Impairment of assets

Financial assets, other than those at fair value through profit or loss, are assessed for indicators of impairment at each balance sheet date. Financial assets are impaired where there is objective evidence that as a result of one or more events that occurred after the initial recognition of the financial asset the estimated future cash flows of the investment have been impacted.

For financial assets carried at amortised cost, the amount of the impairment is the difference between the asset's carrying amount and the present value of estimated future cash flows, discounted at the original effective interest rate.

The carrying amount of financial assets including uncollectible trade receivables is reduced by the impairment loss through the use of an allowance account. Subsequent recoveries of amounts previously written off are credited against the allowance account. Changes in the carrying amount of the allowance account are recognised in profit or loss.

With the exception of available-for-sale equity instruments, if, in a subsequent period, the amount of the impairment loss decreases and the decrease can be related objectively to an event occurring after the impairment was recognised, the previously recognised impairment

loss is reversed through profit or loss to the extent the carrying amount of the investment at the date the impairment is reversed does not exceed what the amortised cost would have been had the impairment not been recognised.

At each reporting date, the Company reviews the carrying amounts of its assets to determine whether there is any indication that those assets have suffered an impairment loss. If any such indication exists, the recoverable amount of the asset is estimated in order to determine the extent of the impairment loss (if any). Where the asset does not generate cash flows that are independent from other assets, the Company estimates the recoverable amount of the cash-generating unit to which the asset belongs. Where a reasonable and consistent basis of allocation can be identified, corporate assets are also allocated to individual cash-generating units, or otherwise they are allocated to the smallest company of cash-generating units for which a reasonable and consistent allocation basis can be identified.

Recoverable amount is the higher of fair value less costs to sell and value in use. In assessing value in use, the estimated future cash flows are discounted to their present value using a pre-tax discount rate that reflects current market assessments of the time value of money and the risks specific to the asset for which the estimates of future cash flows have not been adjusted. If the recoverable amount of an asset (or cash-generating unit) is estimated to be less than its carrying amount, the carrying amount of the asset (cash-generating unit) is reduced to its recoverable amount. An impairment loss is recognised immediately in profit or loss, unless the relevant asset is carried at revalued amount, in which case the impairment loss is treated as a revaluation decrease.

Where an impairment loss subsequently reverses, the carrying amount of the asset (cash-generating unit) is increased to the revised estimate of its recoverable amount, but only to the extent that the increased carrying amount does not exceed the carrying amount that would have been determined had no impairment loss been recognised for the asset (cash-generating unit) in prior years. A reversal of an impairment loss is recognised immediately in profit or loss, unless the relevant asset is carried at fair value, in which case the reversal of the impairment loss is treated as a revaluation increase).

(h) **Income tax**

Current tax

Current tax is calculated by reference to the amount of income taxes payable or recoverable in respect of the taxable profit or tax loss for the period. It is calculated using tax rates and tax laws that have been enacted or substantively enacted by reporting date. Current tax for current and prior periods is recognised as a liability (or asset) to the extent that it is unpaid (or refundable).

Deferred tax

Deferred tax is accounted for using the comprehensive balance sheet liability method in respect of temporary differences arising from differences between the carrying amount of assets and liabilities in the financial statements and the corresponding tax base of those items. In principle, deferred tax liabilities are recognised for all taxable temporary differences. Deferred tax assets are recognised to the extent that it is probable that sufficient taxable amounts will be available against which deductible temporary differences or unused tax losses and tax offsets can be utilised. However, deferred tax assets and liabilities are not recognised if the temporary differences giving rise to them arise from the initial recognition of assets and liabilities (other than as a result of a business combination) which affects neither taxable income nor accounting profit. Furthermore, a deferred tax liability is not recognised in relation to taxable temporary differences arising from goodwill.

Deferred tax assets and liabilities are measured at the tax rates that are expected to apply to the period(s) when the asset and liability giving rise to them are realised or settled, based on tax rates (and tax laws) that have been enacted or substantively enacted by reporting date. The measurement of deferred tax liabilities and assets reflects the tax consequences that would follow from the manner in which the company expects, at the reporting date, to recover or settle the carrying amount of its assets and liabilities.

Deferred tax assets and liabilities are offset when they relate to income taxes levied by the same taxation authority and the company intends to settle its current tax assets and liabilities on a net basis.

Current and deferred tax for the period

Current and deferred tax is recognised as an expense or income in the income statement, except when it relates to items credited or debited directly to equity, in which case the deferred tax is also recognised directly in equity, or where it arises from the initial accounting

for a business combination, in which case it is taken into account in the determination of goodwill or excess.

In accordance with a Private Tax Ruling issued by the Australian Taxation Office, Commonwealth funding provided to CRC Forestry Limited will be derived for the purposes of section 6-5 of the Income Tax Assessment Act 1997 (C'th) as and when it is expended on permitted activities ("Activities") pursuant to the Commonwealth Agreement dated 26 October 2005. On this basis, and on the basis that other differences arising between taxation and accounting treatments are insignificant, current tax assets (or liabilities) and deferred tax assets (or liabilities) have not been recognised in the financial report.

(i) Payables

Trade payables and other accounts payable are recognised when the company becomes obliged to make future payments resulting from the purchase of goods and services.

(j) Plant and equipment

Plant and equipment, leasehold improvements and equipment under finance lease are stated at cost less accumulated depreciation and impairment. Cost includes expenditure that is directly attributable to the acquisition of the item. In the event that settlement of all or part of the purchase consideration is deferred, cost is determined by discounting the amounts payable in the future to their present value as at the date of acquisition.

Depreciation is provided on plant and equipment. Depreciation is calculated on a straight line basis so as to write off the net cost or other revalued amount of each asset over its expected useful life to its estimated residual value. Leasehold improvements are depreciated over the period of the lease or estimated useful life, whichever is the shorter, using the straight line method. The estimated useful lives, residual values and depreciation method is reviewed at the end of each annual reporting period.

The following estimated useful lives are used in the calculation of depreciation:

- Plant and equipment 3 - 10 years

(k) Provisions

Provisions are recognised when the company has a present obligation, the future sacrifice of economic benefits is probable, and the amount of the provision can be measured reliably.

The amount recognised as a provision is the best estimate of the consideration required to settle the present obligation at reporting date, taking into account the risks and uncertainties surrounding the obligation. Where a provision is measured using the cashflows estimated to settle the present obligation, its carrying amount is the present value of those cashflows.

When some or all of the economic benefits required to settle a provision are expected to be recovered from a third party, the receivable is recognised as an asset if it is virtually certain that recovery will be received and the amount of the receivable can be measured reliably.

(l) Revenue recognition

Rendering of services

Revenue from a contract to provide services is recognised by reference to the stage of completion of the contract.

Interest revenue

Interest revenue is recognised on a time proportionate basis that takes into account the effective yield on the financial asset.

(m) Leased assets

Leases are classified as finance leases when the terms of the lease transfer substantially all the risks and rewards incidental to ownership of the leased asset to the lessee. All other leases are classified as operating leases. Operating lease payments are recognised as an expense on a straight-line basis over the lease term, except where another systematic basis is more representative of the time pattern in which economic benefits from the leased asset are consumed.

2 Profit from operations

	2008 \$	2007 \$
Revenue		
CRC Programme funds:		
Received during the year (and included on Cash Flow Statement)	4,200,000	3,300,000
Less amount allocated to deferred government grant (included in Balance Sheet)	204,334	624,250
	3,995,666	2,675,750
Core Participant funds	1,268,693	1,489,010
Supporting Participant funds	490,138	481,200
Total Revenue	5,754,497	4,645,960
Other Income		
Miscellaneous income	35,528	30,547
Consultancy income	-	12,000
Contribution of asset	-	-
Other contracts & agreements	34,000	173,500
Interest income - bank deposits	163,362	109,098
Profit/loss on sale of fixed asset	-	-
Total Other Income	232,890	325,145
Gains/losses and other expenses		
Loss on decommission of asset	8,646	-
Operating lease expenses	100,488	98,800
Employee benefits expenses		
Post employment benefits	57,597	54,482
Termination benefits	3,009	5,008
Other employee benefits	531,966	446,640
	592,572	506,130
3 Remuneration of auditors		
Auditor of the parent entity		
Audit of the financial report	12,000	11,500
Other accounting consultancy	-	5,900
	12,000	17,400
The auditor of CRC Forestry Limited is Deloitte Touche Tohmatsu.		
4 Current trade and other receivables		
Trade receivables (i)	26,640	142,655
Goods and services tax (GST) recoverable	12,011	68,413
Ageing of past due not impaired	38,651	211,068
(i) The average credit period on sales of goods is 30 days, no interest is charged on trade receivables.		
<u>Ageing of past due not impaired</u>		
30-90	14,400	12,600
5 Other current assets		
Advance payments to research providers:		
Australian National University	0	5,640
CSIRO	27,308	14,193
Murdoch University	107,870	113,473
Queensland Department of Primary Industry & Fisheries	11,606	65,737
Southern Cross University	104,673	17,303
University of Melbourne	20,556	0
University of Western Australia	4,415	0
University of Tasmania	165,482	312,735
	441,910	529,081
Prepayments	0	7,500
	441,910	536,581

6 Plant and equipment (at cost)

	2008	2007
	\$	\$
Plant and equipment (at cost)	51,439	63,651
Less accumulated depreciation	25,544	13,274
Total net book value	25,895	50,377
Reconciliation of net book value		
Balance at beginning of the year	50,377	53,713
Additions	8	12,310
Disposals	8,646	-
Asset contributions from other parties	-	-
Gross balance at end of the year (at cost)	41,731	66,023
Less depreciation expense	15,836	15,646
Net book value at end of the year	25,895	50,377

7 Current trade and other payables

Trade payables (i) & (ii)	1,143	252,513
Accrued expenses	81,361	63,840
	82,504	316,353

(i) The average credit period on purchases of goods and services from the suppliers is 30 days. No interest is charged on the trade payables for the first 30 days from the date of the invoice. Thereafter, some creditors charge interest on the outstanding balance. The company has financial risk management policies in place to ensure that all payables are paid within the credit timeframe.

(ii) Trade Payables includes an amount of \$1,143 owing to Australian National University, this being the difference between the total advance payments and the amount expended.

7 Current non-trade liabilities

a)

Deferred Government Grant	2,492,238	2,308,327
	2,492,238	2,308,327

8 Non-current provisions

Employee benefits	13,397	10,388
	13,397	10,388

9 Leases

Operating leases

Leasing arrangements

CSIRO and the University of Tasmania have entered into a Licence Agreement, the terms of which relate to the site costs for the CRC and the University to occupy a certain number of offices and access laboratory space in the CSIRO's Tasmanian Research Centre, College Road, Sandy Bay, Tasmania. The Licence Agreement can be terminated by either party on giving 12 months notice. As the company is not a signatory to the agreement, no amount has been provided for in the financial statements, however the matter is disclosed here for information of users of this report.

Expected future operating lease payments

Not longer than 1 year

Longer than 1 year and not longer than 5 years

Longer than 5 years

	2008	2007
	\$	\$
Not longer than 1 year	102,752	102,752
Longer than 1 year and not longer than 5 years	351,034	453,786
Longer than 5 years	-	-
	453,786	556,538

10 Economic dependency

A significant volume of the company's revenue is via an agreement with the Commonwealth Government to fund the CRC for Forestry for the period 26 October 2005 to 30 June 2012.

11 Segment information

CRC Forestry Limited operates in the forest research industry in Australia.

12 Notes to the cash flow statement

	2008 \$	2007 \$
(a) Reconciliation of cash and cash equivalents		
For the purposes of the cash flow statement, cash and cash equivalents includes cash on hand and in banks and investments in money market instruments, net of outstanding bank overdrafts. Cash and cash equivalents at the end of the year as shown in the cash flow statement is reconciled to the related items in the balance sheet as follows:		
Cash and cash equivalents	106,354	64,609
At call deposit account	1,975,329	1,772,433
	<u>2,081,683</u>	<u>1,837,042</u>
(b) Financing facilities		
Mastercard facility – (available and unused)	160,000	20,000
(c) Reconciliation of profit for the year to net cash flows from operating activities		
Profit for the year		-
Gain on sale of non-current assets		-
Depreciation and amortisation of non-current assets	15,836	15,646
Decommission of asset	8,646	-
Interest income received and receivable	(163,362)	(109,098)
(Increase)/decrease in assets:		
Current receivables	172,417	(108,613)
Other current assets	24,671	118,399
Increase/(decrease) in liabilities:		
Current payables	(233,849)	178,506
Other current liabilities	183,911	624,250
Non-current provisions	3,009	5,090
Net cash from operating activities	<u>81,279</u>	<u>724,180</u>

13 Financial instruments

(a) Financial risk management objectives

The Compliance Committee manages the financial risks relating to the operations of the company.

The company does not enter into or trade financial instruments, including derivative financial instruments, for speculative purposes. The use of financial derivatives is not approved by the board of directors. The company manages its capital to ensure that it continues as a going concern.

(b) Significant accounting policies

Details of the significant accounting policies and methods adopted, including the criteria for recognition, the basis of measurement and the basis on which income and expenses are recognised, in respect of each class of financial asset, financial liability and equity instrument are disclosed in note 1 to the financial statements.

(c) Fair value of financial instruments

Directors consider that the carrying amount of financial assets and financial liabilities recorded at amortised costs in the financial statements approximates their fair value.

(d) Interest rate risk management

Maturity profile of financial instruments

The company does not have any significant exposure to interest rate risk. The following table details the company's exposure to interest rate risk as at 30 June 2008:

	Weighted average effective interest rate	Variable interest rate (Less than one year)	Fixed maturity dates						Non interest bearing	Total
			Less than 1 year	1-2 years	2-3 years	3-4 years	4-5 years	5+ years		
2008	%	\$	\$	\$	\$	\$	\$	\$	\$	\$
Financial Assets:										
<i>Cash and cash equivalents</i>										
Cash at bank and on hand	5.00	106,296								106,296
At call term deposit	7.15	202,713								202,713
Investment (Aug 08)	7.60		161,205							161,205
Investment (Oct 08)	7.85		1,111,411							1,111,411
Investment - CBA - (Sept 08)	8.60		500,000							500,000
Sub Total										2,081,625
<i>Loans and receivables</i>										
Trade receivables	n/a								26,640	26,640
Other receivables	n/a								12,011	12,011
Sub Total										38,651
Total		309,009	1,772,616	0	0	0	0	0	38,651	2,120,276
Financial liabilities:										
<i>At amortised cost</i>										
Trade payables	n/a								1,143	1,143
Other payables	n/a								81,361	81,361
Employee benefits	n/a								13,397	13,397
Total		0	0	0	0	0	0	0	95,901	95,901

	Weighted average effective interest rate	Variable interest rate (Less than one year)	Fixed maturity dates						Non interest bearing	Total
			Less than 1 year	1-2 years	2-3 years	3-4 years	4-5 years	5+ years		
2007	%	\$	\$	\$	\$	\$	\$	\$	\$	\$
Financial assets:										
<i>Cash and cash equivalents</i>										
Cash at bank and on hand	5.00	64,609								64,609
At call term deposit	6.15	110,606								110,606
Investment (Aug 07)	6.35		609,291							609,291
Investment (Oct 07)	6.40		1,052,537							1,052,537
Sub Total										1,837,043
<i>Loans and receivables</i>										
Trade receivables	n/a								142,655	142,655
Other receivables	n/a								68,412	68,412
Sub Total										211,067
Total		175,215	1,661,828	0	0	0	0	0	211,067	2,048,110
Financial liabilities:										
<i>At amortised cost</i>										
Trade payables	n/a								252,513	252,513
Other payables	n/a								63,840	63,840
Employee benefits	n/a								10,388	10,388
Total		0	0	0	0	0	0	0	326,741	326,741

(d) Credit risk management

Credit risk refers to the risk that a counterparty will default on its contractual obligations resulting in financial loss to the company. The company has adopted a policy of only dealing with creditworthy counterparties and obtaining sufficient collateral where appropriate, as a means of mitigating the risk of financial loss from defaults. The company exposure and the credit ratings of its counterparties are continuously monitored and the aggregate value of transactions concluded are spread amongst approved counterparties. Credit exposure is controlled by counterparty limits that are reviewed and approved by the Compliance Committee annually. The company measures credit risk on a fair value basis.

Trade accounts receivable consist of a small number of customers, spread across diverse industries and geographical areas. Ongoing credit evaluation is performed on the financial condition of accounts receivable and, where appropriate, credit guarantee insurance cover is purchased.

The company does not have any significant credit risk exposure to any single counterparty or any company of counterparties having similar characteristics.

14 Key management personnel remuneration

	2008	2007
	\$	\$
Short-term employee benefits	224,289	277,618
Post-employment benefits	22,635	23,411
Other long-term employee benefits	5,464	2,084
Termination benefits	-	-
	252,388	303,113

15 Related party transaction

During the financial year there were no related party transactions undertaken by the company.

16 Additional company information

CRC Forestry Limited is a company limited by guarantee (the amount of the members guarantee is \$10), incorporated and operating in Australia.

Registered office

CSIRO Tasmanian Research Centre, College Road, Sandy Bay, Tasmania, Australia, 7005

Principal place of business

CSIRO Tasmanian Research Centre, College Road, Sandy Bay, Tasmania, Australia, 7005

APPENDIX 1

Publications:

Refereed journal articles:

- Alcorn, P.J., Pyttel, P., Bauhus J., Smith, G.B., Thomas, D.S. James, R., Adrienne Nicotra, A. (2007). Effects of initial planting density on branch development in 4-year-old plantation grown *Eucalyptus pilularis* and *Eucalyptus cloeziana* trees. *Forest Ecology and Management* 252: 41-51.
- Alcorn, P.J., Bauhus J., Thomas, D.S. James, R.N., Smith, G.B. and Nicotra, A. (2008) Photosynthetic response to green crown pruning in young plantation-grown *Eucalyptus pilularis* and *E. cloeziana*. *Forest Ecology and Management* 255: 3827-3838.
- Alcorn, P.J., Bauhus J., Smith, G.B. Thomas, D.S. James, R.N., and Nicotra, A. (2008) Growth response following green crown pruning in plantation-grown *Eucalyptus pilularis* and *E. cloeziana*. *Canadian Journal of Forest Research* 38:770-781
- Beadle, C.L. Volker, P., Bird, T., Mohammed, C.L., Barry, K., Pinkard, E.A., Wiseman, D., Harwood, C., Washusen, R., Wardlaw T., and Nolan, G. (2008). Solid wood production from temperate eucalypt plantations with particular reference to Tasmania. *Southern Forests: a Journal of Forest Science*. Volume 70 (in press).
- Bundock P.C., Potts B.M. and Vaillancourt R.E. (2008). Detection and stability of quantitative trait loci (QTL) in *Eucalyptus globulus*. *Tree Genetics and Genomes* 4: 85-95.
- Hamilton M, Joyce K, Williams D, Dutkowski G, Potts B (2008) Achievements in forest tree improvement in Australian and New Zealand. 9. Genetic improvement of *Eucalyptus nitens* in Australia. *Australian Forestry* 71, 82-93.
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- Hamilton MG, Greaves BL, Potts BM, Dutkowski GW (2007) Patterns of longitudinal within-tree variation in pulpwood and solid-wood traits differ among *Eucalyptus globulus* genotypes. *Annals of Forest Science*. 64, 831-837.
- Schimleck L R., Rezende G.D.S.P., Demuner B.J. and Downes G.M. (2007) Estimation of whole-tree wood quality traits using near infrared spectra of increment cores. *NIR News* 18(8),
- Wang, Y., LeMay, V. and Baker, T.G. (2007) Modelling and prediction of dominant height and site index of *Eucalyptus globulus* plantations using a nonlinear mixed-effect model approach. *Canadian Journal of Forest Research* 37: 1390 - 1403.
- Baker, S.C., Barmuta, L.A., McQuillan, P.B. and Richardson, A.M.M. (2007). Estimating edge effects on ground-dwelling beetles at clearfelled non-riparian stand edges in Tasmanian wet eucalypt forest. *Forest Ecology and Management* 239: 92-101.
- Barbour RC, Crawford AC, Henson M, Lee D, Potts BM and Shepherd M (2008) The risk of pollen-mediated gene flow from exotic *Corymbia* plantations

into native *Corymbia* populations in Australia. *Forest Ecology and Management* 256, 1-19.*

Barbour RC, Otahal Y, Vaillancourt RE and Potts BM (2008) Pollen-mediated gene flow from exotic *Eucalyptus globulus* plantations in Australia. *Biological Conservation* 141, 896-907.*

Bundock, PC, Potts, BM, Vaillancourt, RE (2008). Detection and stability of quantitative trait loci in *Eucalyptus globulus*. *Tree Genetics and Genomes* 4, 85-95.*

Close DC, Davidson NJ, Shields C and Wiltshire J (2007) Reflectance and phenolics of green and glaucous leaves of *Eucalyptus urnigera*. *Australian Journal of Botany* 55: 561-567. *

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- Östrand F, Wallis IR, Davies NW, Matsuki M, Steinbauer M J (2008) Causes and consequences of host expansion by *Mnesampela privata*. *Journal of Chemical Ecology* 34:153–167.*
- Östrand, F., Elek, J. A. and Steinbauer, M. J. (2007) Monitoring autumn gum moth (*Mnesampela privata*): relationships between pheromone and light trap catches and oviposition in eucalypt plantations. *Australian Forestry* 70 (3), 185-191. # (CRCSPF funded)
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- Steane DA, Nicolle DB and Potts BM (2007) Phylogenetic positioning of anomalous eucalypts using ITS sequence data. *Australian Systematic Botany* 20 (5): 402-408. *
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- Chuter AE, Jordan GJ, Dalton PJ, Wapstra M (in press) Spore germination and early gametophyte development of the soft tree fern *Dicksonia antarctica*. *Tasforests* 17 *
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- Collett, N.G. and Elms, S. (in press). The control of Sirex wood wasp using biological control agents in Victoria, Australia. *Agricultural and Forest Entomology*

- Grove, S.J. (in press). Beetles and fuelwood harvesting: a retrospective study from Tasmania's southern forests. *Tasforests*
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- Miller A, O'Reilly-Wapstra JM, Fitzgerald H, Paterson S, Walsh A, Wardlaw T and Potts BM (2008) Effectiveness of repellents for reducing damage by browsing mammals. *Australian Forestry*
- Nevill P, Reed A, Bossinger G, Vaillancourt R, Larcombe M, Ades P (2008) Cross species amplification of *Eucalyptus* microsatellite loci. *Molecular Ecology Resources*
- Nicolle D, Potts BM, McKinnon GE (2008) *Eucalyptus cordata* subsp. *quadrangulosa* (Myrtaceae), a new taxon of restricted distribution from southern Tasmania. *Papers and Proceedings of the Royal Society of Tasmania* *
- Potts BM, McGowen MH, Williams DR, Sutor S, Jones TH, Gore PL and Vaillancourt RE (2008). Advances in reproductive biology and seed production systems of *Eucalyptus*: The case of *Eucalyptus globulus*. *Southern Hemisphere Forestry Journal* (in press) *
- Richardson, A, Hopgood-Douglas, S, Munks, S, Doran, N, Peters, D 2008. 'Predicting the distribution of a threatened freshwater burrowing crayfish: *Engaeus granulatus* in central northern Tasmania' *Freshwater Crayfish* 16.#
- Werkman T, Davidson NJ, Close DC (in press) Is decline in high altitude eucalypt forests related to rainforest understorey development and altered soil bacteria following the long absence of fire? *Austral Ecology*

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- Cannon, T. and Innes, T. (2008). Markets for the wood products from non-durable hardwood sawlog plantations. Pp 110-125 in *Plantation Eucalypts for High-Value Timber: Enhancing investment through research and development*. A.G. Brown and C.L. Beadle (Eds). RIRDC Publication No 08/113 Rural Industries Research and Development Corporation, Canberra.
- Downes G.M., Catela F. and Meder R. (2007) Developing and evaluating a Global NIR Calibration for the prediction of Kraft Pulp Yield in Eucalypts. IUFRO Group 2.08.03 "Improvement and Culture of Eucalypts", Keynote speaker, Durban, South Africa 22-26 October 2007
- Forrester D.I. and Baker T.G. (2007). Growth response to thinning in a productive *Eucalyptus globulus* plantation in Victoria, Australia. Pp. 30-37 in Jiang Xiaomei, Ye Kelin, Lu Jianxiong, Yin Yafang and Zhao Youke (eds), *Plantation Eucalyptus: Challenge in Product Development*, Proceedings of the International Conference on Plantation Eucalyptus, 28 November - 1 December 2005, Zhanjiang, Guangdong, China. Science Press. Beijing.

Volker, P. (2008). Management of hardwood sawlog species. Pp 69-80 in *Plantation Eucalypts for High-Value Timber: Enhancing investment through research and development*. A.G. Brown and C.L. Beadle (Eds). RIRDC Publication No 08/113 Rural Industries Research and Development Corporation, Canberra.

Washusen, R. and Innes, T. (2008). Processing plantation eucalypts for high-value timber. Pp 92-109 in *Plantation Eucalypts for High-Value Timber: Enhancing investment through research and development*. A.G. Brown and C.L. Beadle (Eds). RIRDC Publication No 08/113 Rural Industries Research and Development Corporation, Canberra.

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Downes G.M., Drew D.M., Battaglia M. and Schulze E.D. (2008) Measuring and modelling stem growth and wood formation: An overview. Keynote address, Eurodendro May 2008, Hallstatt, Austria

Drew D.M. and Downes G.M. (2008) The use of precision dendrometers in research on daily stem size and wood property variation. Poster presentation Eurodendro May 2008, Hallstatt, Austria

Drew D.M., Downes G.M. Read J. and Battaglia M (2008) Cambium: A process approach to simulating daily xylem development in Eucalypts. Poster presentation Eurodendro May 2008, Hallstatt, Austria

Downes G.M. and Drew D. (2007) Climatic and genotypic influences on growth, wood formation and utilisation. IUFRO Group 2.08.03 "Improvement and Culture of Eucalypts", Keynote speaker, Durban, South Africa 22-26 October 2007

Drew D., Hohls, D. and Downes G.M. (2007) Analysing high resolution stem growth data and re-mapping wood property data onto time axes using a database management system. IUFRO Portland Oregon, Forest Growth and Timber Quality: Crown Models and Simulation Methods for Sustainable Forest Management Aug 2007

Drew D., Downes G.M., Read J. (2007) Simulating daily xylem development in hardwoods using outputs from the process-based model CaBala. IUFRO Portland Oregon, Forest Growth and Timber Quality: Crown Models and Simulation Methods for Sustainable Forest Management Aug 2007

Wimmer R., Downes G. and Weigl M (2008) Better wood for better products – from understanding to application. Wood Matters Conference, London, May 2008

Barber P, Ruthrof K, Archibald R, Behn G, Bougher N, Bowen B, Cai Y, Calver M, Colquhoun I, Dell B, Drake P, Edwards B, Eslick H, Fleming T, Froend R, Harris J, Haswell D, Henson J, Hewison A, Long N, Malcolm A, McCaw L, Scott P, Stone C, Taylor K, Wentzel K and Hardy G (2007) The severe and disturbing decline of an iconic Mediterranean ecosystem endemic to Western Australia. Pages 13-14 in Rokich D, Wardell-Johnson G, Yates C, Stevens J, Dixon K, McLellan R and Moss G (Editors), *Proceedings of the MEDECOS X1 2007 Conference, 2-5 September*, Perth, Australia. Kings Park and Botanic Garden, Perth, Australia.#

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Myburg Z, Potts BM, Marques CMP, Kirst M, Gion J-M, Grattapaglia, D and Grima-Pettenati, J (2007) Genome mapping and molecular breeding in *Eucalyptus*: Molecular domestication of a major fiber crop. In: Kole CR (ed). *Genome Mapping & Molecular Breeding in Plants*. Vol. 7: Forest Trees. pp.115-160. Springer, Heidelberg, ISBN: 978-3-540-34540-4*

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Grove, S.J., Yee, M. and Borrer Coss, L. (in press). Tailoring forest management to the habitat needs of the giant velvet worm (*Tasmanipatus barretti*). In Lefroy, E. (ed.). *Biodiversity - balancing conservation and production: case studies from the real world. Proceedings of the conference at the University of Tasmania, 27 April 2007*. University of Tasmania, Hobart, TAS.

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Bradshaw B & Matsuki M (2007) WA insect activities and operations calendar. Confidential report (poster) to IPMG members of the CRC for Forestry.

Elek, J., Patel, V. and Allen, G. (2007) Confidential Report for Forestry Tasmania, CRC for Forestry and Bayer CropScience. Lethal trap tree trials 2006 –07: Effects of systemic injections of imidacloprid into *Eucalyptus nitens*, *E. regnans* and *E. delegatensis* on foliage uptake and preferences of *Paropsisterna bimaculata* (Coleoptera: Chrysomelidae). Technical Report 08/2007, 22 pp.

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Matsuki M (2008) Comparison of Initiator Tablet and Shield with respect to protecting blue gum seedlings from “spring” beetles in SW WA. Confidential report to IPMG members of the CRC for Forestry. 12pp.

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Matsuki M (2008) Distribution and phenology of *Heteronyx* and related nocturnal scarab beetles in blue gum plantations in the Green Triangle: Summary of the light trapping program in 2006 – 07. Confidential report to IPMG members of the CRC for Forestry. 16pp.

Matsuki M (2008) Effects of Shield on damage by larvae of *Eucalyptus* weevil in SW WA. Confidential report to IPMG members of the CRC for Forestry. 5pp.

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Farrell R., Innes T. and Nolan, G. (2008) Sorting plantation *Eucalyptus nitens* logs with acoustic wave velocity. Forestry and Wood Products Australia Project No. PN07.3018.
http://www.fwprdc.org.au/content/pdfs/new%20pdfs/FWPA_PN07%203018_a_coustic_sorting.pdf

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Hamilton M, Brown M, Nolan G (in press) 'Comparing the biodiversity impacts of timber and other building materials.' Forest and Wood Products Australia (FWPA), FWPRDC Project PR07.1050, Melbourne, Victoria.*

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Smith T (2007) Habitat requirements and population dynamics of Gunn's tree orchid, *Sarcochilus australis*. Honours thesis, University of Tasmania.

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Keynote or invited conference presentations

Bossinger, G. (2007). Molecular Tree Improvement: Working our way down the 'to do' list. Compromised wood workshop, 29-31 Jan. 2007, Christchurch, New Zealand.

Bowman D (2008) Old trees, flammable forests and global climate change. Invited presentation to 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia.

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Potts BM, McGowen MH, Williams, DR, Suitor, S, Jones, TH, Gore, PL and Vaillancourt RE (2007). Advances in reproductive biology and seed production systems of *Eucalyptus*: The case of *Eucalyptus globulus*. Invited paper presented at the *IUFRO Working Group 2.08.03 – Eucalypts and Diversity: Balancing Productivity and Sustainability*, Durban, South Africa, 22-26 October 2007. 15 pp (CD ROM)

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Bailey T, Davidson NJ, Close DC, Unwin G (2007) Recreating the eucalypt regeneration niche in degraded remnants in production landscapes Poster presentation to Ecological Society of Australia conference, Perth Convention Centre, Perth, Western Australia, November 2007

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Close DC, Davidson NJ (2007) Temperate overstorey eucalypt decline in the absence of fire. Ecological Society of Australia, November (Perth, WA)

Duncan F, Gilfedder L and Davey C (2008) Native grasslands in northwest Tasmania and the role of forest managers in their conservation and management. Poster presented at the International Grasslands Conference, June 2008, Hohhot, China.

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- McKinnon G, Potts B. (2007) Fine-scale structure of gene introgression in a mixed eucalypt population. Talk abstract in Proc. ASBS annual symposium Darwin Sep 24-28, 2007, p32 *
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- O'Dwyer C (2007). Management of the grassy woodland for the Golden Sun Moth *Synemon plana* Walker (Lepidoptera: Castniidae) at Mount Piper Nature Conservation Reserve, Broadford, Victoria. Combined 8th Invertebrate Biodiversity and Conservation / Society of Systematic Biologists Conference held at the University of QLD, St Lucia Campus, 2-7 Dec 2007.
- Potts BM, McGowen MH, Williams, DR, Sutor, S, Jones, TH, Gore, PL and Vaillancourt RE (2007). Advances in reproductive biology and seed production systems of *Eucalyptus*: The case of *Eucalyptus globulus*. Invited paper presented at the IUFRO Working Group 2.08.03 – *Eucalypts and Diversity*:

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Conferences hosted

Dr Chris Beadle was a member of the Conference Organizing Committee and co-edited the proceedings of the RIRDC-supported conference *Plantation Eucalypts for High-Value Timber: Enhancing investment through research and development*, held at Moorabin, Victoria, October 9-12, 2007.

Dr Chris Beadle was a member of the Conference Organising Committee of the Sir Mark Oliphant International Frontiers of Science and Technology-sponsored IUFRO Conference *Old Forests, New Management* held in Hobart between 17-21 February 2008. He is Managing Editor of a Special Issue of Forest Ecology and Management based on selected papers from the conference

Conferences or symposia hosted

CRCF/IUFRO/FT 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia
<http://www.cdesign.com.au/oldforests2008/>

Conference Abstracts

Bailey T, Davidson N, Close D (2008) Recreating the eucalypt regeneration niche in degraded remnants in production landscapes. Poster abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 130

Baker S, Chuter A, Spencer C, Edwards L, Wotherspoon K, Koch A, Munks A (2008a) Habitat tree retention in alternatives to clearfelling. Poster abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 131

Baker, S., Grove, S., Read, S. Wardlaw, T. (2008) Variable retention and oldgrowth biodiversity: Forestry Tasmania's goals and monitoring program. Abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 101

Baker S, Lewis-Jones R, Kelly T, Alexander S, Richardson A (2008b) Beetle assemblages in streamside reserves are edge-affected compared to unlogged forest. Poster abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 132

Barbour R, O'Reilly-Wapstra J, *et al.* (2008a) Genetics of dominant trees can drive forest community structure and ecosystem processes: The case of *Eucalyptus globulus*. Abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 68

Barbour R, Vaillancourt R, Potts B (2008b) Will pollen-mediated gene flow from industrial Eucalyptus plantations impact on the genetic integrity of native eucalypt forests in Australia? Poster abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 134

Bowman D (2008) Old trees, flammable forests and global climate change. Invited presentation in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 44

Brown M, Grove S (2008) Long-term ecological research at Warra, Tasmania: The first fifteen years, and what next? Abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 46

Cawthen L, Munks S (2008) Den use by the common brushtail possum *Trichosurus vulpecula fuliginosus* in logged and unlogged dry forest in SE Tasmania. Poster abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 137

Close DC, Davidson NJ (2008) Temperate overstorey eucalypt decline is related to altered vegetation dynamics and nutrient cycling in the long absence of fire. Abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 72

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Duncan F, Chuter A, Leaman T, Roberts N, Davies S, Walls A (2008) Where's Wally's wattle? Management of old-growth stands of *Acacia pataczekii* in north-east Tasmania. Poster abstract in Proceedings of 'Old Forests, New

Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 140

Duncan F, Chuter A, Brown M, Grove S (2008) Effectiveness of wildlife habitat strips in maintaining vegetation structure and composition in Tasmanian wet eucalypt forest. Poster abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 139

Duncan F, Collado L, Cruz G (2008) Forest management and regulation in Gondwana's southern outposts: Tasmania and Tierra del Fuego. Abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 120

Flynn E, Jones S, Munks S (2008) Assessing the effect of habitat type and disturbance on population size and structure, and physiological parameters, in the common brushtail possum (*Trichosurus vulpecula*) Poster abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 142

Gates G, Mohammed C, Davidson N, Wardlaw T, Ratkowsky D (2008) Macrofungal diversity as a tool in the sustainable management of coarse woody debris. Poster abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 143

Gates GM, Ratkowsky DA, Grove SJ (2008) How well does aggregated retention cater for early and late successional macrofungi? A case study from the Warra silvicultural systems trial, Tasmania. Abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 56

Griffin R, Hardner C, Buxton P, Potts B (2008) The breeding system of the forest giant *Eucalyptus regnans*. Abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 63

Grove S, Baker S, Bashford D, Forster L, Bonham K, Lewis-Jones R, Brown G (2008a) Early responses of ground-active beetle assemblages to clearfelling and its alternatives at Warra, Tasmania. Abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 103

Grove S, Barry C, Stamm L (2008b) Estimating decay rates for *Eucalyptus obliqua* coarse woody debris in Tasmania using a chronosequence approach. Poster abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 150

Grove S, Hopkins A, Harrison K, Yee M, Stamm L, Wardlaw T, Mohammed C (2008c) Coarse woody debris, old trees and biodiversity conservation in production forests. Abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 43

Grove S, Stamm L (2008) Projections for coarse woody debris in Tasmanian wet eucalypt forest under a range of disturbance regimes. Poster abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 149

Grove S, Yee M, Gao R (2008d) Engendering ecological research at broad spatial and temporal scales through establishing an Experimental Forest Landscape. Poster abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 147

Grove S, Yee M, Nash S (2008e) Saproxylic beetles and industrial fuelwood harvesting: retrospective studies in Tasmania's Southern Forests. Poster

abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 148

Hopkins A, Grove S, Harrison K, Yee M, Wardlaw T, Mohammed C (2008a) Successional pathways in the development of wood decay in Tasmanian *Eucalyptus obliqua*: from living tree to rotten log. Poster abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 151

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Hovenden MJ (2008) Does the increasing concentration of atmospheric CO₂ mean more productive forests? Abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 79

Jennings S, Duncan F, Pannell J (2008) Succession-based management of blackwood swamp forests in north-west Tasmania. Poster abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 152

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Koch A, Munks S (2008) Research informs the improvement of hollow tree retention measures in Tasmania's production forests. Abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 89

Lefort P, Grove S (2008) Early responses of bird assemblages to clearfelling and its alternatives at Warra, Tasmania. Abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 102

McKinnon G, Potts B (2008) Genetic diversity in *Eucalyptus globulus* is affected by hybridisation with the rare species, *Eucalyptus cordata*. Abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 66

Munks S, Bell PB, Richards K (2008a) Conservation of threatened invertebrates in Tasmania's production forests. Abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 88

Munks S, Wapstra M, Koch AK (2008b) Managing the tree hollow resource in the matrix: From guiding principles to on-ground practices. Abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 117

Nevill P, Bossinger G, Ades P (2008) Phylogeography and refugia of disjunct populations of *Eucalyptus regnans* of south-eastern Australia. Abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 62

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trial. Abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 99

Scott R (2008) Developing variable retention silviculture in Tasmania. Abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 49

Sohn J, McElhinny CM, Grove S, Turner P, Bauhus J (2008) Variation in coarse woody debris attributes in Tasmanian tall wet *Eucalyptus obliqua* forest. Poster abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 162

Stamm L, Grove S (2008a) A five-point decay-class system for coarse woody debris in Tasmanian wet eucalypt forests. Poster abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 164

Stamm L, Grove S (2008b) A framework for modelling downed woody debris dynamics, and a case study from Tasmania. Poster abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 165

Steane D, Jones R, Jones T, Foster S, Dutkowski G, McKinnon G, Vaillancourt R, Potts B (2008) A species exposed: The hidden diversity in *Eucalyptus globulus*. Abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 65

Tassell S, Richardson A (2008) Just scratching the surface? The impact of the superb lyrebird (*Menura novaehollandiae*) in Tasmanian forest ecosystems. Poster abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 168

Todd MK, Munks S, Richardson A, Bell P, Bowman D, Kavanagh R (2008) Ecology and habitat use of the Tasmanian masked owl *Tyto novaehollandiae castanops*. Poster abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 170

Turner P, Grove S, Airey C, McElhinny C, Scanlan I, Power J, Strutt O, Sohn J (2008) Establishment of a set of wildfire chronosequence benchmark plots in southern Tasmania. Poster abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 171

Turner PAM, Grove SJ, Barry C, Airey CM (2008) Rethinking the paradigm of stand-replacing wildfire in Tasmania's southern forests. Abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 71

Unwin GL, Lord J and Lyons, A (2008) Integrated farm forestry: Stand structure and diversity in five silvicultural regimes including oldgrowth *Eucalyptus obliqua* forest in northern Tasmania. Abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 110

Wapstra M, Duncan F, Roberts N (2008) Managing threatened flora in wood production forests in Tasmania: a pragmatic approach. Poster abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 172

Wilkinson G (2008) Age discrimination – a regulatory dilemma for the management of old-growth. Abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 124

- Wilkinson G, Strich P, Ades P, Potts B (2008) Local adaptive differentiation within *Eucalyptus obliqua*. Poster abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 173
- Worth J, Vaillancourt R, Jordan G, McKinnon G (2008) Chloroplast DNA reveals genetic legacy of ice ages in the rainforest species *Nothofagus cunninghamii*. Abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 67
- Yaxley B, Grove S, Richardson A, Wotherspoon S (2008) Biology and conservation ecology of selected saproxylic beetle species in Tasmania's southern forests. Poster abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 175
- Yee M, Gao R, Grove S, Hickey J (2008) Measuring forest maturity within an experimental forest landscape to inform conservation planning in Tasmania. Abstract in Proceedings of 'Old Forests, New Management' Sir Mark Oliphant Conference. Hobart, Tasmania, Australia p. 91

Other presentations

- Baker T. (2007). Australia's plantations and eucalypt plantation silviculture. Presentations to Forest Science Institute Vietnam and Forestry University of Vietnam. January 2007. Hanoi.
- Baker T. (2007). More wood from less land: How intensive should plantation management get? The University of Melbourne, School of Forest and Ecosystem Science Australia's Forests in a Changing World Open Lecture Series, Melbourne, September 2007. Melbourne.
- Baker T. and Volker P. (2007). Silvicultural management of temperate eucalypt plantations for high-value solid wood production. Poster presentation to Plantation Eucalypts for High Value Timber Conference: Enhancing Investment through Research and Development 9-12 October 2007, Melbourne.
- Baker T., Volker P. (2007). Eucalypt plantations for high value solid-wood products. Presentation to DSE Research Conference, November 2007, Melbourne
- Downes, G. (June 2008) Seminar titled "Wood properties: Measurement, Variability and Modelling", given at the University Fur BodenKultur (BOKU), Vienna, Austria (hosted by Prof Dr Rupert Wimmer)
- Downes, G. (June 2008) Seminar titled "Wood properties: Measurement, Variability and Modelling", Max Plank Institute, Jena, Germany (hosted by Prof Dr E. Detlef Schulze)
- Downes, G. (May 2008). "Measuring and modelling stem growth and wood". CRC for Forestry, Hobart, Tasmania
- Hamilton M. (November 2007) Breeding eucalypts for solidwood production (presented to a delegation of Chilean forest owners and company managers, CRC for Forestry, Hobart, Tasmania.
- Harwood, C. (May 2008). Effects of site and silvicultural treatments on pulpwood and solid-wood quality of *Eucalyptus globulus* in Western Australian plantations. CRC for Forestry, Hobart, Tasmania
- Bailey T, Davidson NJ, Close DC, Unwin G (2007) Recreating the eucalypt regeneration niche in degraded remnants within the production landscape.

Poster presented at CRC for Forestry Annual Science Meeting. 9-10th July 2007. (Barossa Valley, South Australia)

Baker S (2007) Measures to retain the hollow resource in wet forest areas. Oral presentation at CRCF/FPA Workshop 'The Hollow Resource and its Management - Symposium and Field day', 8-9th October (Hobart, Tasmania)

Baker SC (2007). Retaining the hollow resource in wet eucalypt forest. Presentation at the Hollows Symposium, Hobart, Tasmania, Australia, 8-9 October 2007.

Barbour R (2007) Quantifying the risk of pollen-mediated gene flow from eucalypt plantings in Australia. Poster presented at CRC for Forestry Annual Science Meeting. 9-10th July 2007. (Barossa Valley, South Australia)

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Cawthen, L (2007) Denning requirements of the brushtail possum. Oral presentation at CRCF/FPA Workshop 'The Hollow Resource and its Management - Symposium and Field day', 8-9th October (Hobart, Tasmania)

Chuter, A, Spencer, C Mortality of trees retained in clumps. Oral presentation at CRCF/FPA Workshop 'The Hollow Resource and its Management - Symposium and Field day', 8-9th October (Hobart, Tasmania)

Davidson N (2007) Farm Forestry; A technical and business handbook. Poster presented at CRC for Forestry Annual Science Meeting. 9-10th July 2007. (Barossa Valley, South Australia)

Davis L (2007) Plantations in the matrix. Poster presented at CRC for Forestry Annual Science Meeting. 9-10th July 2007. (Barossa Valley, South Australia)

Gates G (2007) CWD as a habitat for macrofungi. Oral resenatation at CRC for Forestry Workshop 'Old trees and the development of coarse woody debris in cool temperate eucalypt forests: a synthesis of recent research in a conservation management context', 8th August (Hobart, Tasmania)

Gates G (2007) Defence of dead wood. Poster presented at CRC for Forestry Annual Science Meeting. 9-10th July 2007. (Barossa Valley, South Australia)

Gates GM (2007) Macrofungal studies in different silviculture regimes at the Warra LTER site, southern Tasmania. Lecture to students at Göteborg University, 30 October 2007.

Glancy N (2007) Selecting *Eucalyptus nitens* for resistance to mammalian herbivores. Poster presented at CRC for Forestry Annual Science Meeting. 9-10th July 2007. (Barossa Valley, South Australia)

Grove S, Hopkins A and Harrison K (2007) The role of fungi and invertebrates in hollow formation. Oral presentation at CRCF/FPA Workshop 'The Hollow Resource and its Management - Symposium and Field day', 8-9th October (Hobart, Tasmania)

Grove, S.J. (2007). *Findings from other coarse woody debris related research projects*. Oral resenatation at CRC for Forestry Workshop 'Old trees and the development of coarse woody debris in cool temperate eucalypt forests: a

synthesis of recent research in a conservation management context', 8th August (Hobart, Tasmania)

Grove, S.J. Read, S. and Brown, M.J. (2008). Warra LTER site: the first fifteen years. Oral presentation to Taiwan Forest Research Institute, 21 April, Taipei, Taiwan.

Hamilton M (2007) Buildings and biodiversity: Incorporating biodiversity impacts into Life Cycle Assessments (LCAs). Poster presented at CRC for Forestry Annual Science Meeting. 9-10th July 2007. (Barossa Valley, South Australia)

Harrison, K. and Grove, S.J. (2007). *The role of invertebrates and wounding in rot formation in living trees, and the value of living trees for saproxylic beetles.* Oral resentation at CRC for Forestry Workshop 'Old trees and the development of coarse woody debris in cool temperate eucalypt forests: a synthesis of recent research in a conservation management context', 8th August (Hobart, Tasmania)

Hopkins A (2007) Rot and fungal biodiversity in older trees and in CWD, and preconditions for hollow inception. Oral resentation at CRC for Forestry Workshop 'Old trees and the development of coarse woody debris in cool temperate eucalypt forests: a synthesis of recent research in a conservation management context', 8th August (Hobart, Tasmania)

Horton B (2007) Fungi, fire and forest health: ectomycorrhizal community ecology of Tasmanian *Eucalyptus delegatensis* forest. Poster presented at CRC for Forestry Annual Science Meeting. 9-10th July 2007. (Barossa Valley, South Australia)

Ingram S, Garnier-Gere P, Ades P (2007). Provenance by environment interactions in *Eucalyptus regnans*. Presentation at the CRCF workshop on 'Eucalypt gene pools, adaptation and regeneration practices', 7 September 2007. (University of Melbourne, Melbourne)

Jones R (2007) Managing the gene pool of the *Eucalyptus globulus* species. Presentation at the CRCF workshop on 'Eucalypt gene pools, adaptation and regeneration practices', 7 September 2007. (University of Melbourne, Melbourne)

Jones R (2007) Gene pool management of the *Eucalyptus globulus* species complex. Poster presented at CRC for Forestry Annual Science Meeting. 9-10th July 2007. (Barossa Valley, South Australia)

Koch A (2007) Characteristics of hollow-bearing trees in dry and wet *Eucalyptus obliqua* forest and the relationship between hollow bearing trees and CWD. Oral resentation at CRC for Forestry Workshop 'Old trees and the development of coarse woody debris in cool temperate eucalypt forests: a synthesis of recent research in a conservation management context', 8th August (Hobart, Tasmania)

Koch A (2007) Tree hollows in dry and wet *E. obliqua* forest. Oral presentation at CRCF/FPA Workshop 'The Hollow Resource and its Management - Symposium and Field day', 8-9th October (Hobart, Tasmania)

Koch A (2007) Use of hollows in dry and wet *E. obliqua* forest. Oral presentation at CRCF/FPA Workshop 'The Hollow Resource and its Management - Symposium and Field day', 8-9th October (Hobart, Tasmania)

Marie Yee M (2007) Giant velvet worm research and the implications of its findings for forest management Oral resentation at CRC for Forestry Workshop 'Old trees and the development of coarse woody debris in cool temperate

eucalypt forests: a synthesis of recent research in a conservation management context', 8th August (Hobart, Tasmania)

McLarin, M. and Grove, S.J. (2007). *Forest landscape modelling, using a coarse woody debris example*. Oral resenatation at CRC for Forestry Workshop 'Old trees and the development of coarse woody debris in cool temperate eucalypt forests: a synthesis of recent research in a conservation management context', 8th August (Hobart, Tasmania).

Munks S (2007) Introduction to research on the hollow resource in Tasmania, including a study of the availability and characteristics of hollow bearing trees in the dry SE forests. Oral resenatation at CRC for Forestry Workshop 'Old trees and the development of coarse woody debris in cool temperate eucalypt forests: a synthesis of recent research in a conservation management context', 8th August (Hobart, Tasmania)

Munks S and Koch A (2007) Mortality of trees retained in clumps. Oral presentation at CRCF/FPA Workshop 'The Hollow Resource and its Management - Symposium and Field day', 8-9th October (Hobart, Tasmania)

Munks S and Koch A (2007) Occurrence of tree hollows in the SE dry forests of Tasmania. Oral presentation at CRCF/FPA Workshop 'The Hollow Resource and its Management - Symposium and Field day', 8-9th October (Hobart, Tasmania)

Munks S and Koch A (2007) Overview of the issues in Tasmania. Oral presentation at CRCF/FPA Workshop 'The Hollow Resource and its Management - Symposium and Field day', 8-9th October (Hobart, Tasmania)

Nevill P (2007) A phylogenetic study of *Eucalyptus regnans* and implications for gene pool management. Poster presented at CRC for Forestry Annual Science Meeting. 9-10th July 2007. (Barossa Valley, South Australia)

Nevill P (2007) The development of gene pool management strategies for *Eucalyptus regnans*. Presentation at the CRCF workshop on 'Eucalypt gene pools, adaptation and regeneration practices', 7 September 2007. (University of Melbourne, Melbourne)

Nevill P (2008) Gene pool management in tall eucalypt forests in south-eastern Australia. 2nd April, 2008 INRA (Arcachon, France)

Neyland M (2007) Forestry Tasmania's seed transfer guidelines. Presentation at the CRCF workshop on 'Eucalypt gene pools, adaptation and regeneration practices', 7 September 2007. (University of Melbourne, Melbourne)

Potts B, Ades P, Steane D (2007) Local adaptation in *Eucalyptus obliqua*. Presentation at the CRCF workshop on 'Eucalypt gene pools, adaptation and regeneration practices', 7 September 2007. (University of Melbourne, Melbourne)

Powell C (2007) The role of the matrix in shaping ground-dwelling arthropod diversity and community composition of native remnants embedded within a pastoral and blue gum (*Eucalyptus globulus*. Labill) plantation landscape. Poster presented at CRC for Forestry Annual Science Meeting. 9-10th July 2007. (Barossa Valley, South Australia)

Quentin A (2007) Effects of *Chrysomelidae agricola* chewing to artificial defoliation on growth and biomass allocation of *Eucalyptus globulus* seedlings? Poster presented at CRC for Forestry Annual Science Meeting. 9-10th July 2007. (Barossa Valley, South Australia)

- Reed A (2007) Cold tolerance in *E. delegatensis*. Presentation at the CRCF workshop on 'Eucalypt gene pools, adaptation and regeneration practices', 7 September 2007. (University of Melbourne, Melbourne)
- Richards K (2007) Current provisions for the management of the hollow resource in the Tasmanian Forest Practices Code. Oral presentation at CRCF/FPA Workshop 'The Hollow Resource and its Management - Symposium and Field day', 8-9th October (Hobart, Tasmania)
- Richards K, and Chris Spencer C (2007) Key findings from work on threatened stag beetles in Tasmania including CWD characteristics important for threatened species and the value of retained habitat. Presentation at CRCF Workshop 'Old trees and the development of coarse woody debris in cool temperate eucalypt forests: a synthesis of recent research in a conservation management context', 8th August (CRC for Forestry, Hobart)
- Steane D, Dutkowski G, McKinnon G, Freeman J, Potts B and Vaillancourt R. (2007) Adaptive and neutral genetic variation in *Eucalyptus globulus*. Presentation at the CRCF workshop on 'Eucalypt gene pools, adaptation and regeneration practices', 7th September 2007. (University of Melbourne, Melbourne)
- Todd M (2007) Habitat Use and Ecology of the Tasmanian Masked Owl *Tyto novaehollandiae castanops* Poster presented at CRC for Forestry Annual Science Meeting. 9-10th July 2007. (Barossa Valley, South Australia)
- Wapstra, M and Munks, SA 'Monitoring the implementation of provisions for hollow retention: Three case studies and some general statements' Oral presentation at CRCF/FPA Workshop 'The Hollow Resource and its Management - Symposium and Field day', 8-9th October (Hobart, Tasmania)
- Wardlaw T (2007) Browsing management without 1080 – what are the options and do they work? CRC for Forestry Annual Science Meeting. 9-10th July 2007. (Barossa Valley, South Australia)
- Wardlaw T (2007) Consequences of management to reduce stem decay in young regrowth on future CWD. Oral presentation at CRC for Forestry Workshop 'Old trees and the development of coarse woody debris in cool temperate eucalypt forests: a synthesis of recent research in a conservation management context', 8th August (Hobart, Tasmania)
- Wardlaw, T. and Burton, D. (2008) Selective culling in eucalypt plantations. Oral presentation at Tasmanian Community Forestry Agreement Alternatives to 1080 Workshop, 7th April, Launceston.
- Wiggins, N (2008). Do all possums show the same aversions to genetically resistant seedling stock? Oral presentation to the Community Forestry Agreement Alternatives to 1080 Workshop, 7th April. (Launceston, Tasmania)
- Wilkinson G (2007) Forest practices code - linking research to operations. CRC for Forestry Annual Science Meeting. 9-10th July 2007. (Barossa Valley, South Australia)
- Wiltshire R and Potts B (2007) Eucaflip. Poster presented at CRC for Forestry Annual Science Meeting. 9-10th July 2007. (Barossa Valley, South Australia)
- Wright T (2007) Comparing the water relations of native vegetation in an agricultural and plantation landscape. Poster presented at CRC for Forestry Annual Science Meeting. 9-10th July 2007. (Barossa Valley, South Australia)
- Yee M (2007) Value of CWD as habitat for saproxylic beetles, and importance of old trees in priming CWD as habitat. Oral presentation at CRC for Forestry

Workshop ‘Old trees and the development of coarse woody debris in cool temperate eucalypt forests: a synthesis of recent research in a conservation management context’, 8th August (Hobart, Tasmania)

Newsletters

One edition of the Wood from the Trees Research Programme 2 newsletter was published on-line <http://www.crcforestry.com.au/newsletters/wood-from-trees/index.html>

Steane D (ed) (2007) Biobuzz: Newsletter of the CRCF Biodiversity project. Issue 4 (October 2007) pp. 20.

Steane D (ed) (2008) Biobuzz: Newsletter of the CRCF Biodiversity project. Issue 5 (April 2008) (web)

Technical Notes

Davies S 2007 ‘Revised Tasmanian Tree Fern Management Plan’ *Forest Practices News* 8 (2), p. 27.

Duncan F, Roberts N 2008 ‘Where’s Wally’s Wattle? Monitoring prescriptions in ‘old growth’ stands of *Acacia pataczekii* in a selective harvest coupe’ *Forest Practices News* 8 (4), pp. 8-9.

Horton BM (2007) An ecological exploration of ectomycorrhizal fungi in *Eucalyptus delegatensis* forest, Tasmania. *Australasian Mycological Society Newsletter* 6, 2.

Koch A and Munks S (2008) What’s so important about holey trees? Hollows symposium and field day *Forest Practices News* 8 (4), 10-12.

Read S (2008) Report on Old Forests, New Management conference. IUFRO News Vol. 37, Issue 3, March 2008

Read S (2008) Old Forests, New Management. *Forest Practices News* 8 (4), 1-2.

Roberts N, Duncan F and Chuter A (2007) Gene flow from hardwood plantations into native eucalypts. *Forest Practices News* 8, 7-9.

Todd M 2007 ‘Hollows and owls – a new Forestry CRC PhD study on the Tasmanian masked owl *Tyto novaehollandiae castanops*’ *Forest Practices News* 8 (2), p. 28.

Wilkinson G (2008) Old growth ain’t old growth – the importance of structural diversity across the landscape *Forest Practices News* 8 (4), 3-4.

Media activities: radio, TV, online, newspaper and magazine articles

Bossinger G (2007) “Decoding the gum tree genome” interview on ABC *Radio National Bush Telegraph* 18/07/2007,

Potts BM and Vaillancourt RE (2007) Interviewed by Stephen Pincock for ABC Science Online “Eucalypt genome to be sequenced” 5/7/2007 <http://www.abc.net.au/cgi-bin/common/printfriendly.pl?science/news/stories/2007/1970391.htm>

Potts BM and Vaillancourt RE (2008) Contributed to feature article in Quantas In-flight magazine June 2008 ‘Single Gum Theory’ by Ian Connellan pages 65-

<http://www.qantas.com.au/infodetail/flying/inTheAir/inflightMagazine/environment.pdf>

Potts BM et al. (2007) Interview and press release in Australian Life Scientist "A genome among the gum trees: The genome of the *Eucalyptus* tree is to be sequenced. 5/7/2007 <http://www.biotechnews.com.au/index.php/id;1045340497>

Bildstein T (2008) Old Forest New Management Conference press releases and associated media activity (more than 45 news items; see Communications project report)

Bildstein T (2008). 'The National Interest - Science, nurture and nature the great forestry debate', ABC Radio National, hosted by the ABC's Peter Mares, 22nd February 2008 and broadcasted broadcast on 22nd and 24th February, Recorded in the Bond Store, Hobart as an open forum at the Old Forest New Management Conference, February 2008.

Bossinger G (2007) "Decoding the gum tree genome" interview on ABC Radio National Bush Telegraph 18/07/2007

Davidson NJ (2008) Interview on tree decline, Southern Cross 6.00 p.m. news on Friday 14/3/08,

Davidson NJ (2008) Paragraph outlining objectives of the Midlands field day, Mercury newspaper Thursday 13/3/08,

Davidson NJ (2008), Article on tree decline, TasCountry newspaper Thursday 27/3/08.

Davidson NJ (2008), Interview on tree decline in Tasmania, Commercial FM radio on Friday 14/3/08

Davidson NJ (2008), Interview on tree decline in the Midlands, ABC Rural radio Tuesday 25/3/08

Gates G (2008) "European fungal forays and follies". Westport News, New Zealand, 12 May 2006; Otago Daily Times, New Zealand, 15 May 2008.

Grove S, Wardlaw T, Potts BM, et al. (2008) Interviewed and featured in "Going Bush", a five-episode television program produced by Forestry Tasmania and Southern Cross Television hosted by Nick Duigan and Andrew Hart.

Jones, R (2008). Press release "South Australian Bluegums thousands of years old". Interview with ABC Bush telegraph (5/5/08), Port Pirie (SA) Rural Report (28Apr08), articles in The Advertiser, AAP Newswire, Ballarat Courier, Central Western Daily, Daily Advertiser, Townsville Bulletin, Herald Sun, Northern Argus & The Land News.

Potts BM (2007) Sir Mark Oliphant grant announcement and photo. UTAS Research News no. 3, 31st July 2007. <http://www.research.utas.edu.au/>

Potts BM and Vaillancourt RE (2007) Interviewed by Stephen Pincock for ABC Science Online "Eucalypt genome to be sequenced" 5/7/2007

<http://www.abc.net.au/cgi-bin/common/printfriendly.pl?science/news/stories/2007/1970391.htm>

Potts BM and Vaillancourt RE (2007) Report "600 million bits of gum history" in Australian Geographic (p. 15 Oct-Dec Issue) by Ian Connellan based on phone interview with Potts and Vaillancourt

Potts BM and Vaillancourt RE (2008) Contributed to feature article in Qantas In-flight magazine June 2008 'Single Gum Theory' by Ian Connellan pages 65-70

<http://www.qantas.com.au/infodetail/flying/inTheAir/inflightMagazine/environment.pdf>

Potts BM et al. (2007) Interview and press release in Australian Life Scientist “A genome among the gum trees: The genome of the *Eucalyptus* tree is to be sequenced. 5/7/2007 <http://www.biotechnews.com.au/index.php/id;1045340497>

Todd, M (2008) UTAS press release ‘Australian Geographic supports endangered Tasmanian owl research’

Wiltshire RJE and Potts BM (2007) Launch of eucaflip reported in the Mercury, ministers website <http://www.media.tas.gov.au/release.php?id=22096>, FT Branchline http://www.forestrytas.com.au/forestrytas/media_releases/enews_041007/enw_euca_flip_041007.htm

Field days and workshops hosted

Washusen, R. and Harwood, C. (2008). Industry Workshop discussing key results from processing study on plantation-grown *Eucalyptus nitens* logs. FIAT offices, Hobart, March 29, 2008.

Baker T, Collopy J (2007). Australia’s plantations and eucalypt plantation silviculture. Presentations and tour for Chilean farm forestry delegation September 2007.

Forrester DI (2007). Field tour visit to Carrajung thinning, pruning and fertilising trial by attendees of conference for Plantation Eucalypts for High Value Timber 2007, Moorabbin, Melbourne. 11 October, 2007.

Baker T (2007). CRC Forestry P2 industry engagement tour SW Victoria /Green Triangle. November 2007.

Lavell S, Baker T. (2008) Gippsland Agroforestry Network field day at Tostaree research plantation trials, February 2008. Department of Primary Industries.

Sexton, T., Shepherd, M. Henry, R., Henson, M. Smith, H. and Thomas, D. Association genetics for improved solid wood quality in Blackbutt (*Eucalyptus pilularis*). Poster presented to the Forestry CRC Annual Meeting. Barossa Valley, SA. 8-11 July., 2007.

Ades P (2007) CRCF workshop on ‘Eucalypt gene pools, adaptation and regeneration practices’, 7th September 2007. (University of Melbourne, Melbourne)

Archibald R, Burgess T, Howe C. (2007) WA biodiversity project meeting, 16 August 2007, Albany, WA.

Archibald R & Davidson N. (2007) Field tour of WA biodiversity project sites, 1 December 2007, Albany, WA.

Archibald R, Burgess T, Bialkowski, K. (2008) WA biodiversity project meeting, 10 April 2008, Albany, WA.

Baker, S.C. (2008). Variable retention and biodiversity. Presentation at the Warra field day at ‘Old Forests, New Management’ Sir Mark Oliphant Conference. Hobart, Tasmania, Australia

Barbour R (2008) Workshop “Progress and directions for research on genetic invasion from *E. nitens* plantations in Tasmania’. DPIW, NPWS, FPA, FT and Gunns Ltd. 16th April 2008 (Lands Building, Hobart).

Davidson NJ, Close DC (2008). NRM workshop ‘Demonstrating methods to reverse tree decline’, at The Stables, Oatlands, 12/3/08

Grove SJ (2007) CRCF Workshop ‘Old trees and the development of coarse woody debris in cool temperate eucalypt forests: a synthesis of recent research in a conservation management context’ 8th August (Cooperative Research Centre for Forestry, Hobart)

Grove, S.J. (2008). *Old forest biodiversity*. Field presentation at Warra LTER site for Old Forests, New Management conference, 17-21 February, Hobart, TAS.

Grove, S.J. and Baker, S.C. (2008). Native forestry- and conservation-related research at Warra. Field day for key representatives of local environmental groups, 23 May.

Matsuki M (2007) Industry Pest management Group meeting and field day at Hamilton, Vic on 26th July.

Matsuki M (2007) Industry Pest management Group meeting at Albany, WA on 16th August.

Matsuki M (2007) Industry Pest management Group meeting at Casterton, Vic on 15th November.

Matsuki M (2008) Industry Pest management Group meeting at Casterton, Vic on 17th January.

Matsuki M (2008) Industry Pest management Group meeting at Albany, WA on the 12th February.

Matsuki M (2008) Industry Pest management Group meeting at Casterton, Vic on the 18th February 2008.

Matsuki M (2008) Industry Pest management Group meeting at Casterton, Vic on the 13th March

Matsuki M (2008) Industry Pest management Group meeting at Albany, WA on the 10th April

Matsuki M (2008) Workshop on the relationship between damage and tree growth. 9th April (Albany, WA).

Matsuki M (2008) Workshop on experimental design, sampling design, and data analysis for research foresters. 21-22 May (Albany, WA).

Miller, A (2008) Tasmanian Community Forestry Agreement Alternatives to 1080 Field Day, Launceston, 8th April

Munks, S (2007) CRCF/FPA Hollows Symposium, Hobart, Tasmania, Australia, 8-9 October 2007.

Any other communications product aimed at transferring know-how or practical information to industry and other end-users

Bailey T (2007). Applying an understanding of the seedling establishment niche in native dry forests to restoration of degraded remnants. Oral presentation to Biodiversity field day, Penola SA, 12/7/07

Close DC, Davidson NJ, Horton BM (2008) Temperate overstorey eucalypt decline is related to altered vegetation dynamics and nutrient cycling in the long absence of fire. Bell Miner Associated Dieback Working Group (July Lismore, SCU)

Close DC (2007) Expert Comment on Review of the value of Paddock Trees and their Management 28 August 2007 by Amelia Koch, Forest Practices Authority

Davidson NJ (2007). Native vegetation condition assessment: Remnants, Oral presentation to Landscape Logic workshop, University of Tasmania Cradle Coast Campus, 18/10/07

Davidson NJ (2007) Tree decline in the Absence of fire. Talk to Research Working Group 6, Fire Management, Grand Chancellor Hotel, 18/9/07

Davidson NJ (2007) Tree decline in the absence of fire. Talk to Institute of Foresters of Australia, Field trip to Arm River, 18/11/07

Davidson NJ (2007). Forest remnants: Importance to biodiversity conservation, Invited presentation to the Biodiversity Expert Review Panel (BERP) for the Tasmanian Forest Practices System. Hobart 27/10/2007

Davidson NJ (2007). Issues for management of forest remnants on private land. Oral presentation at Hollows Symposium, CSIRO CRC-Forestry/Forest practices Authority workshop, CSIRO conference Room, 8/10/07.

Davidson NJ (2008). Patch-scale restoration of degraded native forest remnants. Oral presentations in the field at 'Weedington' for Tree decline workshop 'Demonstrating methods to reverse tree decline', Oatlands, 12/3/08

Davidson NJ, Close DC, Bailey T and Churchill C (2008). What we know about tree decline in the Midlands of Tasmania. Oral presentation to Tree decline workshop 'Demonstrating methods to reverse tree decline', at The Stables, Oatlands, 12/3/08

Davis, L (2007). Health and reproductive fitness of remnant trees in the plantation matrix. Oral presentation to Biodiversity field day, Penola SA, 12/7/07

Grove, S.J. (2007). *Coarse woody debris*. Oral presentation at Forest Practices Authority seminar for Biodiversity Expert Review Panel, 27 September, Hobart, TAS.

Grove, S.J. (2007). *Debris? That's my home you're talking about*. Oral presentation at Forest Tasmania for 'Forestry myth-busting' seminar, 31 October, Hobart, TAS.

Matsuki M (2007) Induction of new WAPRes staff on IPMG activities and resources (including the CRC members' website). July. (Manjimup, WA).

Matsuki M (2007) Training for the weevil phenology assessment has been completed with four companies in August (WA).

Matsuki M (2007) Training for the weevil phenology assessment has been completed with four companies in September (WA).

Matsuki M (2008) GSL staff induction, 21st May. (Albany, WA)

Matsuki M (2008) Training sessions for the weevil population assessment with Great Southern Limited, ITC, and Timbercorp in Hamilton, Vic 19th of February and with Timbercorp in Penola, SA 20th of February.

Potts BM (2007) Forest genetics issues relevant to the Forest Practices Code. Invited presentation to the Biodiversity Expert Review Panel (BERP) for the Tasmanian Forest Practices System. Hobart 27/10/2007

Powel C (2007). Insect biodiversity in native forest remnants within plantations. Oral presentation to Biodiversity field day, Penola SA, 12/7/07

Taylor, K (2007). Using molecular techniques to understand the expansion of *Mycosphearella* within eucalypt plantation in southern Australia. Oral presentation to Biodiversity field day, Penola SA, 12/7/07

Wright T (2007). Microclimatic effects on water relations at the boundary between native forest remnants and plantation and pasture. Oral presentation to Biodiversity field day, Penola SA, 12/7/07.

Relevant Committees

Allen GR, Collett N, Hardy G - Australian Forestry Council, Research Working Group 7 (Forest Health)

Baker, S. - Hollows Working Group

Burgess T - International expert appointed to the European network on emerging diseases and invasive species threats to European Forest ecosystems under the Sixth framework Programme, Priority 8.1

Collett N - Victorian Forest Health Advisory Committee (appointed by Victorian Govt to oversee forest health issues in Victoria and make recommendations to the minister)

Close DC - Chair the Industry Reference Group (National group including representatives from WA, NSW and Tas) for Bushfire CRC project 'Eucalypt decline in the absence of fire'

Davidson N – Warra LTR Research Committee

Grove, S. –Research Working Group 4 (Primary Industries Standing Committee – Forest and Forest Products Subcommittee)

Hardy G - WA Dieback Consultative Council and Research Working Group both established by WA Minister of Environment.

Munks S, Jordan G - Tasmanian Government Threaten Species Scientific Advisory Committee

Munks S - FPA Biodiversity Expert Review Panel (Executive Officer)

Munks S - Threatened species recovery team (threatened fish)

Munks S – Hollows Working group and Fauna Strategic Planning Group

O'Reilly-Wapstra J - Technical panel advising The Tasmanian Community Forest Agreement Research into Alternatives to the Use of 1080

Munks S - National Research Working Group 4

O'Reilly-Wapstra J - Technical panel advising The Tasmanian Community Forest Agreement Research into Alternatives to the Use of 1080

Potts BM, Ades, P - Australian Forestry Council, National Research Working Group 1 (Forest genetics and breeding)

Potts BM, Ades P. Vaillancourt RE - Technical committee of the Southern Tree Breeding Association

Potts BM – [Giant Trees Consultation Committee advising Forestry Tasmania](#)

Awards/grants

Horton, B (2007) Holsworth Wildlife Endowment \$5000

Horton, B (2007) Ecological Society of Australia, Jill Landsberg Trust \$6000

Horton, B (2007) Maxwell Jacobs Trust \$2500

Nevill P (2008) was awarded an S. F. Pond Trust Travelling Scholarships in 2008 worth \$5000 for overseas travel associated with his research

Nevill P (2007) was awarded 3rd place, Best presentation, University of Melbourne ILFR Postgraduate Conference

Stephens, H.C. O'Reilly-Wapstra, J.M. Potts, B.M (2008) Does aggregated retention provide suitable habitat for mammal conservation in old growth forests? Holsworth Wildlife Research Fund \$7500.