Cooperative Research Centre for Forestry

Annual Report

to the Commonwealth Government

2005-06

Established and supported under the Australian Government's Cooperative Research Centres Programme.

CRC for Forestry

Private Bag 12, Hobart, Tasmania 7001 Australia.

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1. Executive summary

This annual report is the first for the CRC for Forestry, following a successful application under the CRC Programme's Round nine. Funding is for seven years, from July 2005 to June 2012. Pledged resources to the CRC are the CRC programme funds of $26.6 million, Participant costs of $10.5 million, other cash $2.6 million, plus in-kind resources of $46.7 million. Total resources over seven years are more than $86 million. The CRC for Forestry continues work of the two previous forestry-based CRCs, the CRC for Temperate Hardwood Forestry (1991-1997) and the CRC for Sustainable Production Forestry (1997-2005).

The major activity during this first year of the CRC for Forestry has been the planning and start up of all research projects and the set up and implementation of the administrative processes required to deliver the commitments made to the Commonwealth Government and to all of our participating organisations and research providers.

Throughout this annual report when we refer to our research programmes and projects these are as defined in the Participants Agreement (Schedule 1, Centre Details, page 92), with the exception being that Project 4.4 (Landscape design) has been absorbed into projects 4.3 (Communities) and 3.1 (Harvesting and operations).

Research Programme One: Managing and monitoring for growth and health

The programme has established a network of experimental sites shared by a number of projects to ensure that cross-project interactions are maximised. These field experiments have provided a useful conduit for partner interaction, especially the interaction of research providers and industry partners. Field sites have now been installed for the study and verification of methods for remotely sensing changes in forest health in New South Wales and Tasmania and provide a common focus for project activities involving soil assessment, remote sensing and forest health work. An experimental plantation in Tasmania is being used jointly for work to model the impacts of defoliation on tree growth and on the factors that give rise to variation in tree sizes in trees within a plantation. A network of 11 silvicultural trials set up in south-western Western Australia will provide data for modelling the impacts of water stress and changes in soil fertility through successive rotations and will be used for vegetation competition work. The programme is, at its core, involved in the use of bio-information to improve forestry practices and it will be this integrative science that delivers the most benefit. While these interactions offer exciting future outcomes, individual research projects already yield benefits for industry, such as the use of LiDAR for improved native forest inventory.

The production of 33 publications from the scientists in this research programme during the year 2005-06 is testimony to the soundness of the science base.

Research Programme Two: High value wood resources

This research programme is heavily reliant upon access to older field trials that have been established and maintained by our participating organisations. Examples of these are:

- CRC for Forestry molecular studies, which have been designed to improve our capacity to breed for wood traits and profit from access to the progeny trials of *Eucalyptus globulus* (blue gum) owned by Gunns Limited;
- A 22-year-old *Eucalyptus nitens* (shining gum) thinning and pruning trial owned by Forestry Tasmania supports investigations into early and non-destructive means of assessing wood properties and also allows us to determine the effect of these management regimes on product value; and
- A series of 10-year-old plantations in Western Australia are available to study site conditions and wood quality. Initial results from the sawing of logs harvested from the *E. nitens* trial show that pruned trees produce wood without major decay defect or

degradation from growth strain. This finding increases our confidence that plantations of this species are capable of producing high value wood products.

Research Programme Three: Harvesting and operations

This technical area has not previously been addressed by a forestry CRC and much of the year has been occupied refining the research objectives to accommodate the diverse interests of the participants that harvest from native forests or from intensively managed plantations. The need for national capacity building in this area was explicitly recognised by our participants during the development stage of the CRC and an extensive international recruitment campaign has been conducted. The position of senior scientist remains unfilled and an interim solution has been found by contracting in expertise from the United States. A series of short term studies have been completed in Tasmania and Victoria on harvesting, transport costs and equipment availability; and work on debarking technology and use of information collected by harvesting machines is commencing.

Research Programme Four: Trees in the landscape

The projects within this research programme come together through the study of the disparate interactions between tree crops and the wider environment in which they are grown.

Project 4.1 (Water) makes use of access to long-term experimental sites, in Victoria, Tasmania and Western Australia and works to close a number of significant gaps in current knowledge of forest-based hydrologic analyses. Site instrumentation, experimental treatments and conceptual models have been developed for water quality studies, water yield models have been evaluated and knowledge gaps have been identified.

Project 4.2 (Biodiversity) aims to develop strategies and indicators for monitoring and managing biodiversity in production landscapes. Sub-projects encompass three themes:

- Monitoring and management of biodiversity. Five postdoctoral projects have commenced across Australia studying the biodiversity impacts of plantation establishment on remnant or retained native vegetation;
- Gene pool management where DNA samples have been collected for study of fine scale adaptations of major eucalypt species in the wet forests of Tasmania and Victoria, and operational guidelines for managing contamination from exotic plantations are being piloted in Tasmania; and
- Sustainable management of key pests, where activities include trialling of new lethal trap tree technology for leaf eating beetles in Tasmania, studies on the impact of spraying on eucalyptus weevil in Western Australia and testing of strategies to take advantage of genetic resistance to *Mycosphaerella* leaf disease which affects blue gum plantations.

Project 4.3 (Communities) is a new initiative designed to provide objective knowledge about the impact of forestry land uses in human communities. During the year a series of public seminars attended by over 500 people, plus national and international conference presentations have helped to inform debate.

Commercialisation and utilisation

This programme has worked to confirm appropriate paths to adoption for the research outputs of the CRC for Forestry. A list of 26 potentially commercialisable products has been identified for assessment against a new Rapid Commercial Assessment template. If this hurdle is passed, the Australian Institute of Commercialisation's Gateway process will be used for more detailed evaluation. Case studies of two of the more promising products have been used to refine the process and scope the skill, time, and financial resources required.

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. The extension activities organised through the Utilisation Programme are therefore of great importance. A process of forward planning of CRC for Forestry commercialisation and utilisation activities is now in place. All industry partner staff are actively involved in one or more field based research

programmes and so positioned for rapid technology transfer. More structured sharing of information is carried out through two field days, 40 seminars and 12 workshops during year one.

In order to service the wider stakeholders in the forest industry, communication has been given a higher priority than in previous forestry CRCs. A key achievement is that the work of the CRC for Forestry has been published in major forest industry publications and general media during the year (see appendix three) and is well on the way to building its brand and becoming established as a credible source of accurate forest science information.

Education

Recruitment of post-graduate students by the Education Programme progresses well. Ten CRC for Forestry-funded PhD students and one Masters of Science by research student began their studies in 2005-06.

Impediments to achievement

No serious impediments have been experienced towards achievement of major objectives. Where we have experienced challenges working according to initial timelines, these can generally be attributable to three causes:

- Staff recruitment has been slow in some research programmes and unavoidable changes in key positions delayed the planning process for some projects. The only major outstanding issue is science leadership in Research Programme Three, and plans are in place to address this early in year two. Delays filling some student positions have not yet impacted upon timelines, but will do so if recruitment is not achieved in year two. If necessary, the CRC for Forestry will convert some scholarships into research assistant positions or post-doctorate positions in order to address these research needs.
- We have a number of new participants that are not fully familiar with the responsibilities and opportunities presented by a geographically dispersed CRC such as ours. A policy of holding one or more board, management committee and general meetings at each geographic node has facilitated engagement with these participants.
- The CRC for Forestry has had a need to roll out new and more complex administrative procedures. The process of incorporation; adoption of individual projects as the basis for planning, reporting and accounting; and a generally more complex set of obligations to our participating organisations has made for a challenging year for the CRC administration unit. Solutions have been found in all cases and it is hoped that over time we can streamline these processes without any substantial loss of rights or control. Having most participating organisations delegating signing authority to CRC Forestry Limited (after appropriate consultation) and simplified decision making at the project steering committee level are two of the ways we are addressing this.

Awards, special commendations, highlights

The CRC for Forestry was formally launched on 25 July by the Australian Government Minister for Fisheries, Forestry and Conservation. Representatives from all major science, industry and government organisations involved with the forestry industry in Australia converged on Hobart, Tasmania to celebrate the launch and discuss research priorities for the new CRC; and invited guests were welcomed by the Governor at Government House afterwards.

The company was incorporated on 30 June; the Participants Agreement was signed on 25 October; the Commonwealth Agreement was signed on 26 October. The first Annual General Meeting of CRC Forestry Limited was held on 6 December. Details of the Board and organisational structure of the CRC for Forestry are in section two “Governance structure and management”.

Ms Kate Carnell was elected by the directors to be the Chair of the Board. Professor Rod Griffin was appointed as Chief Executive Officer (CEO) on a one-year contract terminating 1 July 2006 and assigned with the task of setting up the company and its research programme.

Mrs Jo Neilson, Company Secretary, joined the company at incorporation on 30 June. Mrs Neilson, who previously held the Business Manager position with the Cooperative Research Centre for Sustainable Production Forestry, has been centrally involved in succession planning and will ensure continuity of experience as Acting CEO until the new CEO commences in October 2006.

Research programme managers and project leaders were appointed, although it was necessary to find replacement leaders for projects 1.1 (Monitoring and measuring) and 4.1 (Water). Please refer to section eight "Specified personnel" for names of staff members appointed. As noted, appointment of senior staff in Research Programme Three has proven difficult, to the extent that it will be necessary to have a major review of this research programme during year two.

The Annual Science Meeting of all staff, students and industry representatives is a key event for developing a strong sense of morale and unity within the CRC for Forestry. The first such meeting is scheduled for July 2006, and much work has been done towards an interesting and productive three-day event.

Towards the end of this reporting period, the administration team was close to finalising applications to join the CRC for Forestry from three new members (Queensland Department of Primary Industries and Fisheries [QDPIF], Midway Pty Ltd and South Australian Forestry Corporation). QDPIF's contribution as a core participant is attracting additional funds from three of our industry partners and will add critical mass to our north eastern activities (in northern New South Wales and southern Queensland). The focus of this work will be growth modelling of sub-tropical eucalypt species under Research Programme One and study of the wood properties and processing potential of these species under Research Programme Two. A consortium of interested parties has funded expansion of Project 4.3 (Communities) to study the socio-economic impacts of land use change in the Green Triangle and Central Victoria, while additional Forest and Wood Products Research and Development Corporation funds will help progress the assessment of processing attributes of *E. nitens* trees harvested under Project 2.3 (Wood quality and processing).

2. Governance, structure and management

The names and particulars of the directors of CRC Forestry Limited during the financial year are:	
Directors	
Name	Particulars
Anne Katherine Carnell	(AO, B.Pharm, FAIM, FAIPM, MAICD). Chief Executive Officer, Australian Divisions of General Practice; joined the Board at incorporation of the company on 30 June in a non-executive capacity. Ms Carnell is Chairman of the Board, Chair 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 in a non-executive capacity. Mr Browning is a member of the Compliance Committee and Communications Committee.
Patricia Caswell	(BA(Hon), B.Ed). Chief Executive Officer, Victorian Association of Forest Industries. Joined the Board at incorporation of the company on 30 June in a non-executive capacity and resigned at the first Annual General Meeting of the company on 6 December.
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 June in a non-executive capacity. Dr Drielsma is Chair of the Communications Committee and a member of the Remuneration and Nominations Committee.
Richard Michael Ede	(MSc(Hons), PhD, MAICD). Director, Ensis Investment; joined the Board on 6 January in a non-executive capacity. Dr Ede is Chair of the Commercialisation and IP Management Committee.
Ian Stewart Ferguson	(B.Sc.For, MF, DF). Fellow of Australian Academy of Technological Sciences and Engineering; Professor Emeritus, University of Melbourne; Director of Hancock Victorian Plantations Pty Ltd, Tiaki Plantation Co., and Timber Training Centre, Creswick; joined the Board at incorporation of the company on 30 June in a non-executive capacity and resigned at the first Annual General Meeting of the company on 6 December.
Gary Brian Inions	(B.Sc(Hons), PhD). Managing Director, Plantations International Pty Ltd and Hansol PI Pty Ltd; joined the Board on 13 December in a non-executive capacity. Dr Inions is a member of the Remuneration and Nominations Committee.
Ian Charles Ravenwood	(GradDip.Sci, MBA). North West Plantation Manager, Gunns Limited. Joined the Board at incorporation of the company on 30 June in a non-executive capacity and resigned at the first Annual General Meeting of the company on 6 December.
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 in a non-executive capacity. Professor Reid is a member of the Remuneration and Nominations Committee.
Robert Geoffrey Woolley	(B.Ec, FCA). Chair of the Forests and Forest Industry Council of Tasmania; previously a partner in Deloitte Touché Tohmatsu; 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 in a non-executive capacity. Mr Woolley is Chairman of the Compliance Committee.

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, seven board meetings, one compliance committee, one commercialisation and IP management, and three remuneration and nominations committee meetings were held. The Communications Committee met once on an informal basis.

Table 1: Directors' meetings

Directors

	Board	Compliance Committee	Commercialis-ation and IP Management Committee	Communicat-ions Committee	Remuneration and Nominations Committee
Kate Carnell	7 / 7	1 / 1		1 / 1	2 / 3
Tim Browning	6 / 7	1 / 1		1 / 1	
Trish Caswell	4 / 5				
Hans Drielsma	6 / 7			1 / 1	1 / 1
Rick Ede	2 / 2		1 / 1		
Ian Ferguson	3 / 5				
Gary Inions	2 / 2				1 / 1
Ian Ravenwood	5 / 5				
Jim Reid	7 / 7				1 / 1
Rob Woolley	2 / 2	1 / 1			

Other (non-director) committee members

	Board	Compliance Committee	Commercialis-ation and IP Management Committee	Communicat-ions Committee	Remuneration and Nominations Committee
Charlie Day			1 / 1		
Greg Johannes			1 / 1		
Richard Breidahl					2 / 2
Glen Kile					2 / 2

Chief Executive Officer (as ex-officio member of all board committees)

	Board	Compliance Committee	Commercialis-ation and IP Management Committee	Communicat-ions Committee	Remuneration and Nominations Committee
Rod Griffin	7 / 7	0 / 1	1 / 1	1 / 1	n/a

Secretary

	Board	Compliance Committee	Commercialis-ation and IP Management Committee	Communicat-ions Committee	Remuneration and Nominations Committee
Jo Neilson	6 / 7	1 / 1			
Shelley Caswell	1 / 1				
Phil Smethurst			1 / 1		
Taylor Bildstein				1 / 1	

Committees – membership, role and frequency of meetings

1. 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 established:

a) Compliance Committee:

Membership Rob Woolley (Chair), Kate Carnell, Tim Browning; Jo Neilson (secretary).

Role and frequency of meetings

The Compliance Committee was established in February, (and 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 IP Management Committee:

Membership Rick Ede (Chair), Charlie Day, Greg Johannes, Philip Smethurst (secretary).

Role and frequency of meetings

The Commercialisation and IP Management Committee (CIPMC) was established in February (and meets quarterly in advance of the board meetings) to review the company strategies for determining appropriate "path to adoption" for each CRC research output, within the context of the CRC's intellectual property 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 intellectual property generated by CRC for Forestry research.

The committee will also consider recommendations from the CEO regarding the job specification for the Commercialisation Manager, scheduled for recruitment in 2006-07; receive and review quarterly reports of progress against plan, together with the forward programme, as a basis for ongoing advice to the board; and provide advice to the CEO and Commercialisation Manager on matters relevant to the charter.

c) Communications Committee:

Membership Hans Drielsma (Chair), Tim Browning, Taylor Bildstein (secretary).

Role and frequency of meetings

The Communications Committee was established in February (and 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 Coordinator 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. In 2005-06, two meetings of the committee were held in relation to nominations for vacant directorships and one meeting in relation to selection and remuneration of the new CEO.

2. 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: Rod Griffin (Chair); research programme managers: Michael Battaglia, Chris Harwood, Leon Bren and Brad Potts; Utilisation Manager: Philip Smethurst; Education Chair: Peter Kanowski; Company Secretary: Jo Neilson; Finance and Administration Manager: Shelley Caswell (Secretary).

Role and frequency of meetings

The committee is a decision-making body meeting monthly to assist the CEO to carry out his role as a direct appointment of the Board, and is the prime forum for managing the day-to-day activities of the CRC. Committee members represent the CRC as a whole and not an individual research programme or research provider.

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), Carol Morris (Southern Cross University), Giles Hardy (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 (PCCs: one for each of the four research programmes):

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. It is expected that research programme managers and PCC chairs will organise the business of each PCC to most effectively achieve this aim.

d) Project steering committees (PSCs: one for each of the 12 research projects):

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 expected to be held at least quarterly.

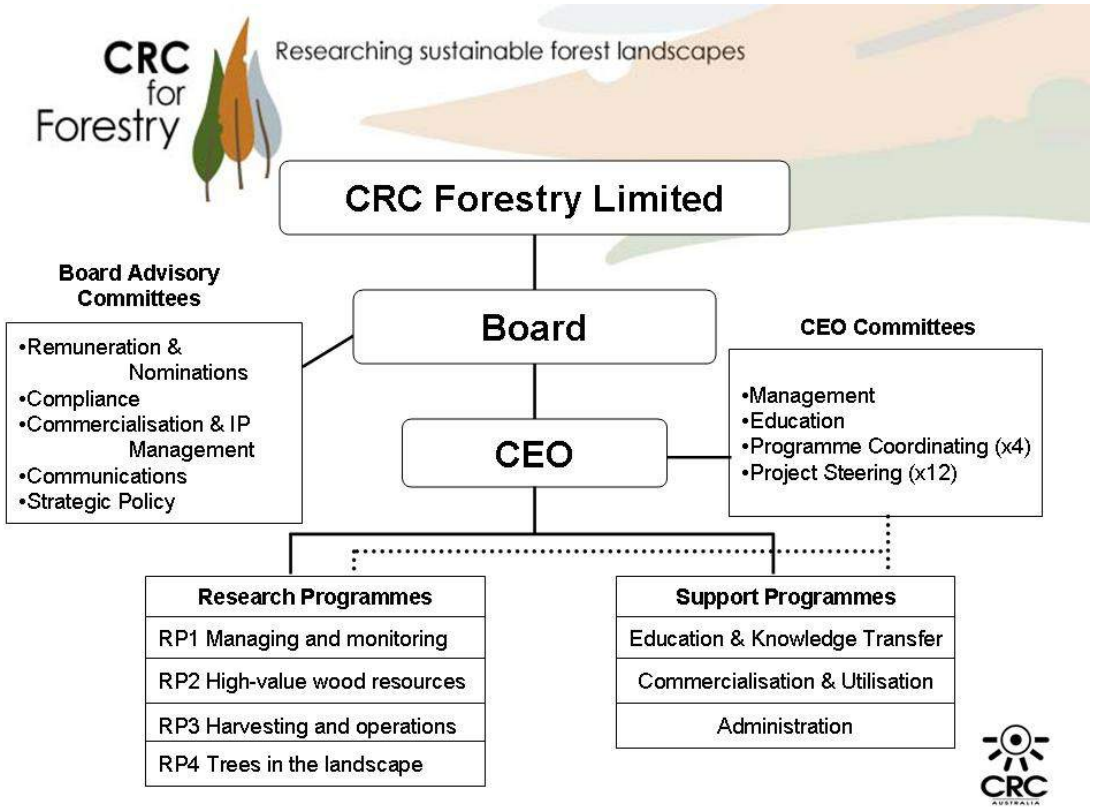
Extent of private sector representation on the board and committees

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.

Changes to participants during the financial year

During the financial year there were no changes to participants as listed in the Commonwealth Agreement.

Figure 1: Organisational chart



3. Context and major developments during the year

During the year there were no major changes in market conditions that would impact upon the ability of the CRC for Forestry to meet its objectives.

For key staff appointments please refer to section 8 “Specified personnel”.

A vehicle for use by researchers based in Albany, Western Australia, was the only item of major equipment purchased.

4. Commercialisation, technology transfer and utilisation

Commercialisation and utilisation (C&U) strategies and activities

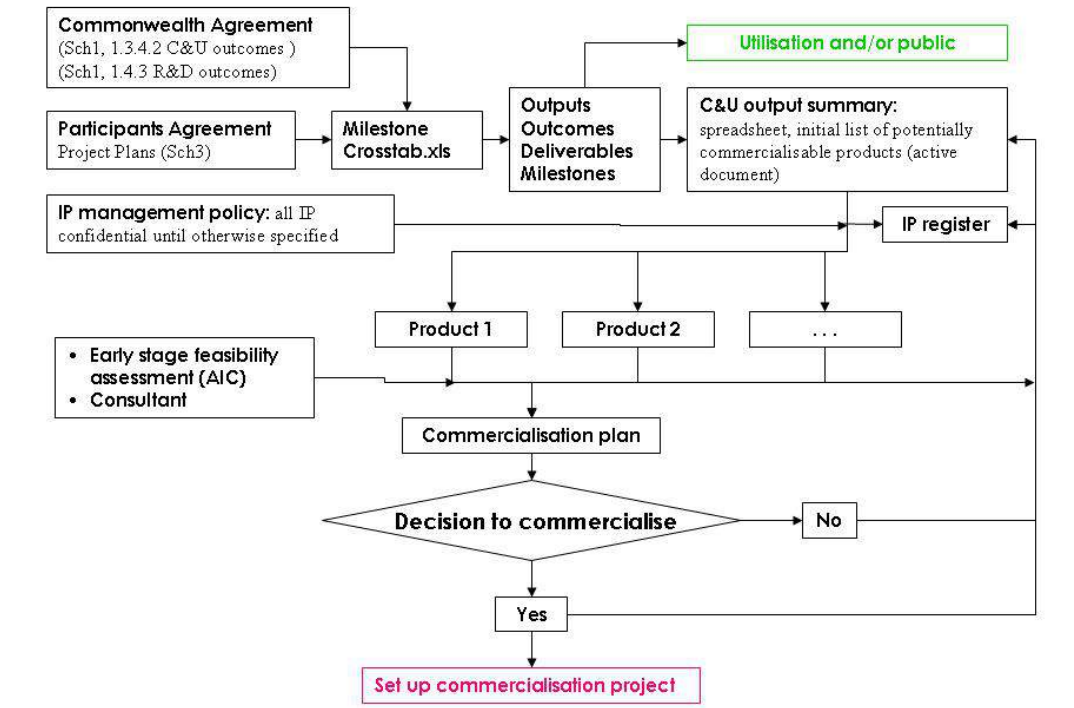
Processes in place have been adequate and effective in delivering intended benefits to industry and other users during 2005-06.

For an overview of the role of the Commercialisation and IP Management Committee please refer to section two, “Governance, structure and management”.

Day-to-day management of C&U issues is provided by the C&U support programme, which is under the direction of the CEO. The Utilisation Manager has also been closely involved with commercialisation and IP management issues, but plans to concentrate increasingly on utilisation as technologies produced from within the CRC for Forestry become ready for adoption. The Communications Coordinator is also a key member of the C&U team.

A schematic overview of our commercialisation strategy is included in Figure 2.

Figure 2: CRC for Forestry’s General Strategy for IP Management and Commercialisation



During 2005-06, 26 potentially commercialisable products were identified by scanning the expected outputs from our research programmes. We commenced the assessment of two of these products using the Early Stage Feasibility Assessment process of the online Gateway tool of the Australian Institute of Commercialisation.

A consultant is also being engaged to design and implement a rapid commercial assessment template that will provide initial screening and prioritise these 26 potential products (and any new potential products that might be identified); and identify the components of the technologies that should be kept confidential. This assessment will precede more detailed commercial assessment and planning. Of the two products assessed so far, significant technical risks remain, and we have identified gaps in our knowledge of potential markets.

We will establish an IP management policy and IP register during the coming year. Technologies that are not assessed as commercialisable become available for utilisation by our partners and some (on approval by the relevant project participants) are also made available beyond the CRC for Forestry partners, including the public.

A C&U plan has been developed that identifies intended C&U activities for the coming year, which will aid the prioritisation of C&U funds and planning for C&U delivery. No C&U milestones were due in 2005-06 and for this reason a summary of achievements against C&U milestones and outputs in a table as described on page 7 of the Annual Report guidelines has not been provided with this annual report.

One example of progress towards later milestones is provided from Research Programme Two ("High value wood resources"), which addresses CRC Outcome 3 ("increased use of planting stock with improved genetic potential, managed to optimise production of high value wood for fibre and solid wood markets"). CRC for Forestry Outputs 3.1 to 3.3 will be generated by Research Projects 2.1 (Breeding), 2.2 (Silviculture), 2.3 (Wood quality and processing) and 2.4 (Wood quality and management).

While there were no specific C&U milestones to be met in the reporting period, good progress has been made towards the C&U outcomes in Research Programme Two.

Information about the wood properties of over 2,000 *E. globulus* trees sampled for the molecular genetics association study (Project 2.1: Breeding) will be provided to the relevant CRC for Forestry partners (Gunns Ltd and the Southern Tree Breeding Association) during the second year of the CRC for Forestry's operations. Results from the processing studies on plantation-grown *E. nitens* in Tasmania (Project 2.3: Wood quality and processing), associated information on growth and log properties (Project 2.2: Silviculture) and non-destructive evaluation methods (Project 2.4: Wood quality and management) will be obtained during the third year. Researchers will present initial results and their implications for silvicultural management and processing through a series of seminars with groups of industry partners. Research results will be particularly important for Forestry Tasmania, which manages over 20,000 hectares of *E. nitens* plantations for solid-wood products. Information on the effects of site and stocking on *E. globulus* wood properties that affect pulpwood value, and implications for optimising silviculture for pulpwood production, will be forthcoming within the next year and will be presented in seminars to industry partners growing pulpwood plantations of this species.

Additional commentary for 2005-06:

1. Milestones: commercialisation activities are on target.
2. Commercialisation arrangements: no commercialisation arrangements needed to be made with industry this year, beyond those included in the Commonwealth and Participants Agreements.
3. Uptake by industry: several industry partners regularly used the pest database, and some have started to adopt the assessment and management methods for native remnants.
4. Spin-off companies: no spin-off companies were established.
5. Technology transfer: information dissemination via seminars, websites, external publications, and internal newsletters commenced. No training or pilot projects were initiated.
6. Patents: no patents were filed.

IP management

The more commercial focus of the CRC for Forestry relative to earlier forestry CRCs requires more rigorous attention to the identification and management of IP. Policies and procedures to this end are still under development and will be used as a basis for staff and student training during year two. Priority has been given to developing and testing processes for

identifying project outputs with commercialisation potential. IP management practices for these outputs will differ from those where in-house utilisation or placement in the public domain are more appropriate paths to adoption.

End user involvement

Via the project steering committees (PSCs), research programme coordinating committees, and board committees, our forest industry partners are heavily involved in developing and carrying out research, commercialisation and utilisation plans. For example, several end-user members of the CRC for Forestry had substantial involvement in major experiments during 2005-06 by making available field trials and in-kind staff time for sampling programs in Research Programme Two. The PSCs are required to endorse C&U plans on a six-monthly basis. It is too early at this stage to assign monetary benefits.

Some technologies developed within the CRC for Forestry started to become available for adoption during 2005-06. These and other activities involving end-users are summarised in Table 2.

Table 2: 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: most industry partners and research partners Other: ▪ Forestry SA ▪ Green Triangle Regional Plantation Committee ▪ Greening Australia ▪ Department of Sustainability and Environment ▪ Agriculture, Western Australia.	Field trips and workshops on biodiversity and remnant native forests: ▪ Albany, Western Australia October. ▪ Penola, South Australia March. ▪ Melbourne, Victoria June.	▪ Review of systems, for assessing the health, condition and biodiversity of remnant stands in the plantation matrix ▪ Linkages and knowledge development ▪ Improved production and environmental outcomes.	▪ Assistance in satisfying certification standards ▪ Better appreciation of different systems of assessment used by CRC for Forestry partners and opening discussions on developing a uniform national system.
Partners: ▪ Industry Pest Management Group (IPMG) ▪ Most WA and Green Triangle-based industry partners ▪ Murdoch University.	The Albany (Western Australia)-based IPMG conducted the following activities in the Western Australian and Green Triangle plantation areas: ▪ regular field days (6) ▪ meetings (6) ▪ workshops (4).	▪ Delivering the latest information about pest management and risks ▪ Minimising economic loss due to pests and diseases by sharing information, collaboration among members and conducting research ▪ Improved production and environmental outcomes.	Environmental and economic benefits derived from better operational methods for managing pests and diseases. This information was delivered to our partners, who manage a large component of the Australian blue gum plantation estate.
Partners: ▪ Forestry Tasmania ▪ Forest Practices Authority.	Pilot projects and research backing management plans for threatened flora and fauna.	Improved planning and environmental outcomes.	Assistance in satisfying certification standards**.**
Partners: ▪ Most Tasmanian-based partners ▪ STBA	Research, seminars and inspections of wood quality from eucalypts grown in solid wood regimes.	Increased awareness of genetics and silvicultural links to solid wood properties.	Improved planning for solid wood regimes, and decreased commercial risk.
Partners: All partners **Other:** Public	Public seminars on the socio-economic impacts of plantation forestry delivered in several states; December – May.	▪ Improved understanding of this issue. ▪ Scientific contribution to public debate.	▪ Improved community engagement. ▪ Reduced commercial risk.
Partners: All	Industry and science seminars are presented regularly on a variety of topics and presented in various states.	Builds the knowledge base for forest planning.	▪ Improved research and operational planning and increases security of resource.

5. Research collaboration

5.1 Research Programme One: Managing and monitoring for growth and health

Please refer to Schedule 1 of the Commonwealth Agreement: page 15 (Outputs 2.1, 2.2, 2.3), page 21 (1.4.2 research programme description and specified personnel) and pages 27-28 (CRC Outcome 2).

Research Programme Manager: Dr Michael Battaglia

No milestones were due in the first year of the CRC for Forestry for this research programme, however notable progress has been made towards some future milestones and other milestones are on track (see Table 3).

Nature of major consultancies and their contribution to the CRC

Nil during this first year of operations.

Nature of any grants and how they contribute to the CRC for Forestry

ARC Linkage Agreement LP0454287 (cellular automata model of forest stands to predict size-class distribution and survival): this project is contributing the knowledge of tree-tree interaction for resources and the importance of site variability in generating size class distributions in forests. This will be used as the basis of the vegetation interaction models for C&U milestone 2.3.1 (see Schedule 1: page 16).

ARC Linkage Agreement LP0453591 (determining generic indicators of stress in eucalypt leaves for application to the remote sensing of canopy condition and productivity modelling): this project is contributing an understanding of the spectral signature of various tree stress types that will be used as the basis of C&U Milestone 2.1.3 (see Schedule 1: page 15).

FWPRDC PNO4-4003 (fertilisation and forest health: preventing or offsetting biotic leaf loss in eucalypt plantations): this project has provided the physiological basis of defoliation impact and preliminary impact modelling to assess rotation length impact on wood yield and tree performance of defoliation events.

How the research overall has contributed to national research priorities

Work to date has contributed to national research priorities in the following way:

1.1 Water as a critical resource

As a result of work to date, we are better positioned to understand the impact of afforestation on soil water capital. Further, we are now in a position to assess the differing impact of reforestation through coppice and seedling establishment – practices that differ markedly in early access to deeper soil water. Soil landscape work towards C&U Milestone 2.1.2 (see Schedule 1: page 15) will provide soil layers critical for the application of hydrological models attempting to quantify changes in Australia's water resources.

1.2 Transforming existing industries

The work on remote sensing and modelling is all directed at maintaining and improving the competitive advantage of Australia's forest industries while providing near real time assessment of impacts ensuring timely management changes. Inventory costs are in the top two or three cost components of growing wood – evidence from work to date shows that technology from the CRC for Forestry may reduce this significant cost and improve competitive advantage for forest growers.

1.3 Overcoming soil loss, salinity, acidification

Soil landscape work towards C&U Milestone 2.1.2 provides the surfaces fundamental to make regional assessment of landscape change and the likely effectiveness of land-use changes to mitigate impacts.

Any changes proposed to future directions

A new project is being initiated with the Queensland Department of Primary Industries and Fisheries, Forest Enterprises Australia, Great Southern Plantations, Forests New South Wales and CSIRO entitled "Growth modelling and risk assessment for subtropical and tropical hardwood species". The objective of this project is "the parameterisation, testing, application and training in the use of an existing Silvicultural Decision Support System (CABALA) for three key sub-tropical and tropical species (*Corymbia citriodora* subsp. *variegata* (and examination of hybrids), *Eucalyptus pellita* and *E. dunnii*)."

Forestry SA and Midway Pty Ltd both join the CRC in early 2006-07. The additional cash and in-kind resources brought by these new parties will allow work to expand in areas of interest to them.

Table 3: Research milestones and/or outputs - Research Programme One

Type of milestone and/or output	Description of future C&U milestones	If achieved, progress during 05-06 and planned activities in 06-07
Research milestone 2.1.1 (due June 2007; see page 27, Schedule 1).	Data capture and processing technology finalised for assessing stand condition from LiDAR and large format aerial photography.	Use of LiDAR for measuring native forest inventory has indicated marked improvement over existing inventory techniques.
Research milestone 2.1.2 (due June 2010; see page 27, Schedule 1).	Rapid technology available for assessing soil conditions.	Broad scale soil attributes have become available on the Australian Soil Resource Information System, including terrain features such as MrVBF (multi-resolution valley bottom flatness), which is used to identify soil deposition zones. Other soil attributes available include soil pH, drainage and soil order.
Research milestone 2.1.3 (due June 2011; see pp. 27, Schedule 1).	Methodologies defined for assessing and monitoring indicators of forest condition from remotely sensed imagery.	A sampling protocol has been identified to match ground-based and remotely sensed data, in particular data relating to forest colour. As well as contributing towards milestones, this work also markedly improves existing techniques for verification of remotely sensed forest colour, which is an area that has been poorly dealt with until now.
Research milestone 2.3.3 (due December 2011; see page 28, Schedule 1).	Incorporation of improved sub-models of understorey and weed water use into catchment hydrological models and application to predict impacts of management practises.	A network of matched plots has been established across the Western Australian plantation growing regions. This network will provide a record of changes in water and nutrient levels resulting from afforestation, and is currently providing information required to assess the impact of plantation development on catchment water yields.
Research Milestone 2.2.2 (due June 2010; see page 27, Schedule 1).	Models for predicting rotation length impacts of damage from disease and insects available as software.	The impact of leaf loss or damage on tree production can now be predicted with an easy-to-use model.
Research milestone 2.3.1 (due June 2009; see page 28, Schedule 1).	Extension of cellular automata model to predict development of social hierarchies in forest stands to include the effects of weeds.	The timing of above- and below-ground competition for resources for growth by individual trees in a blue gum plantation has been identified and correlated with subsequent growth performance of trees. In addition, gas exchange measurements have shown no differences between dominant and suppressed trees, but indicated that respiration rates may be different.
Research Milestone 2.1.4 (due March 2012; see page 27, Schedule 1).	Development of 3D visualisation systems to portray soil and stand conditions.	Discussions held with SME SonarData regarding use of their development 4D GIS as delivery platform for visualisation system.

The following columns have been removed from the table above, as they do not apply in this instance:

- Description of all 2005-06 milestones and/or outputs incl. past milestones which have not been met (and date).
- Achieved (yes/no) (all milestones are progressing according to schedule).
- Reasons why milestones and/or outputs have not been achieved.
- Strategies to achieve milestones which have not been met.

Number of research collaborations entered into

- Dr Zhiong Xu, Griffith University: use of stable isotopes to track nitrogen allocation in defoliated trees; Project 1.2 (Managing and sustaining).
- Dr Mark Adams, University of New South Wales (UNSW): physiology of dominant and suppressed trees; Project 1.3 (Modelling and information integration).
- Dr Belinda Medlyn, UNSW, use of MAESTRA model; projects 1.2 (Managing and sustaining) and 1.3 (Modelling and information integration).
- Dr Steven Livesley and Mr Peter Miele, University of Melbourne, model validation; Project 1.3 (Modelling and information integration).
- Dr Ross McMurtrie, UNSW, modelling competition; Project 1.3 (Modelling and information integration).

Number of international research collaborations

- Professor Mel Tyree, United States Department of Agriculture: hydraulics of dominant and suppressed trees; Project 1.3 (Modelling and information integration).
- Dr Darren Kriticos, Dr Brian Richardson, Dr Karina Potter (with Scion in 2005) and Dr Mike Watt: Scion, New Zealand: development of strategy for trans-Tasman plantation weed research and sampling strategies for defining weed populations; Project 1.3 (Modelling and information integration).
- Professor David Whitehead, Landcare New Zealand: weeds in plantation – ways of assessing resource competition; research programme review; Project 1.3 (Modelling and information integration).
- Dr Euan Mason, University of Canterbury, New Zealand: advice on hybrid modelling of weed impacts on plantation growth; Project 1.3 (Modelling and information integration).
- Dr Steve Woodward, University Aberdeen: stress in pines; Project 1.2 (Managing and sustaining).
- Professor Enrico Eonello, University of Ohio: stress in pines; Project 1.2 (Managing and sustaining).
- Professor Pedro Kraus, Director, Centraalbureau voor Schimmelcultures (fungal biodiversity centre), Netherlands: identification of leaf spots; Project 1.2 (Managing and sustaining).
- Professor Mike Wingfield, SABI Pretoria: resistance to *Mycosphaerella*; Project 1.2 (Managing and sustaining).
- Dr Jans Verbeselt and Professor Pol Coppin, Biosystems Department at Katholieke Universiteit Leuven, Belgium: forest health remote sensing to look at landscape index over time; Project 1.1 (Monitoring and measuring).
- Mr Gordon Hoskings, Hoskings Pty Ltd, New Zealand: stress in pines; Project 1.2 (Managing and sustaining).

Nature of research collaborations and how they add value to the CRC

The CRC for Forestry entered into a collaborative agreement with CSIRO Land and Water (CLW) to further develop the projects within "1.1.1 - site evaluation". The expertise at CLW, particularly in landscape modelling and mid-infrared scanning, will contribute significantly to the quality of research undertaken.

Dr Neil McKenzie attended the Second Global Workshop on Digital Soil Mapping in Rio de Janeiro, Brazil. This meeting brought together key practitioners and scientists involved in the development of quantitative spatial prediction of soil properties from local through to continental scales. The workshop resolved to prepare fine resolution grids for the main aspects of soil function (e.g. plant available water), which will be progressively supplied for

all terrestrial landscapes around the globe. Dr McKenzie also attended the International Union of Soil Sciences (IUSS) World Soil Congress in Philadelphia, United States, and was appointed Chair of the IUSS Working Group on Digital Soil Mapping. Development of global soil grids again dominated discussions among key scientists from Europe, South and North America, Africa, Australasia and Asia.

With the intention of developing collaborative projects with the CRC for Forestry in future, Dr John Gallant, CSIRO (working on CRC for Forestry Project 1.1: Monitoring and measuring) attended the Spatial Accuracy Symposium in Lisbon, Portugal and discussed aspects of terrain analysis and spatial prediction of soil attributes with Tomislav Hengl (European Union Joint Research Centre, Italy), Linda Lilburne (Landcare Research, New Zealand) and Gerard Heuvelink (Wageningen University, Netherlands).

Dr Libby Pinkard, a post-doctoral researcher in Sub-project 1.2.2 (Monitoring of forest condition with multi-spectral and hyper-spectral remote-sensing) interacted with Dr Zhiong Xu of Griffith University using labelled nitrogen as a means of understanding the physiology of tree recovery following defoliation. A student with this sub-project, Elizabeth Pietrzykowski, interacted with the Ensis remote sensing team to produce and verify a method of remotely-sensing the severity of *Mycosphaerella spp.* damage. Dr Caroline Mohammed has initiated collaboration with Dr Enrico Bonello (University of Ohio) and Dr Steve Woodward (University of Aberdeen) and Mr Gordon Hoskings from Hoskings, New Zealand in an Australian Research Council / University of Tasmania project on the physiology of stress in pines. This collaboration will add value to the remote sensing of pine health research undertaken by Sub-project 1.2.2. A number of staff from this research programme worked with Dr Belinda Medlyn (University of New South Wales) to apply the process-based model MAESTRA to assess light interception and photosynthetic impacts of defoliation.

Project 1.3 (Modelling and information integration) sponsored a one-day workshop with staff involved with vegetation management from Scion (New Zealand) and this placed the work of the CRC for Forestry within an Australasian context. Dr Karina Potter (formerly with Scion, now with Ensis, Hobart, Tasmania) coordinates the CRC for Forestry's weed work with the non-CRC work being done in this area by Ensis in Australia and New Zealand. PhD student Tanya Bailey visited Dr Mike Watt (Scion, New Zealand), Dr Euan Mason (University of Canterbury) and Professor David Whitehead (Landcare New Zealand) to review New Zealand experimental work in weed impact assessment and weed ecology.

Within Project 1.3 Dr Philip Smethurst has been liaising with Professor Nicholas Comerford (University of Florida) regarding nutrient supply and uptake models for competing root systems – work that will provide an important part of the CRC for Forestry's vegetation competition modelling.

Dr Michael Battaglia liaised with Mr Peter Miele and Dr Steven Livesly of the University of Melbourne and independent consultant Dr Peter Sands to validate two of the models (3-PG and CABALA) that will be used as a basis for modelling work in Project 1.3 (Modelling and information integration).

Dr Michael Battaglia and Dr Anthony O'Grady have been collaborating with Dr Mark Adams (University of Western Australia), Dr Ross McMurtrie (University of New South Wales) and Professor Mel Tyree (USDA Forest Services, United States of America) to assess tree-tree interactions and the role of hydraulics in determining forest production.

Some of the CRC for Forestry field sites in Sub-project 1.2.1 (Sustaining site resources) have been used as a basis for collaboration with Dr Steve Livesley (University of Melbourne) to measure and model the impact of harvest residue management on non-CO_2 greenhouse gas emissions. Sub-project leader Dr Don White has also entered into a dialogue with Western Australian Government Department of Water staff to form linkages between this work and the National Water initiative through Raising National Water Standards (a COAG initiative).

Progress on developing collaborative linkages within the CRC across all activities

Linkages within Research Programme One have already been developed with the selection of joint field sites for research.

Four of the sub-projects in Research Programme One (1.1.1, 1.1.2, 1.1.3 and 1.2.1) are undertaking research collaboratively at Greenhills (New South Wales) and Barnback (Tasmania). Talks are underway for an additional field site in Tasmania for 1.1.1, 1.1.2 and 1.3 and another in Victoria which will have links to Research Programme Four. A PhD research project based at Murdoch University links 1.2.2 and Project 4.2 (Biodiversity) investigating the risk of *Mycosphaerella* in the forest landscape.

Sub-project 1.1.3 (Remote sensing of forest inventory) researchers are collaborating with Forestry Tasmania to develop timber prediction models employing airborne laser scanner (ALS) data in wet eucalypt forests, and extending this to characterise stand structure to support biodiversity mapping. The 1.1.3 group has also established a new collaboration with Hancock Victorian Plantations (HPV) that commenced with CRC for Forestry researchers undertaking fieldwork in HPV plantations in Gippsland to collect ground-truthing data for ALS data acquired by HPV.

Projects 1.3 (Modelling and information integration) and 2.2 (Silviculture) have made an agreement about experimental material and sites to examine and model the relationship between management, growth and wood properties for *E. nitens* trials in Tasmania, and drought and spacing trials in Western Australia.

Sub-project 1.2.1 (Managing site resources) has established a network of 11 silvicultural trials across south-western Australia. Several of these sites are long term silvicultural experiments now entering their second and third rotations. Prior to their harvest, Dr Russell Washusen collected wood cores from a range of spacing treatments. These cores will form an important data set within Research Programme Two. Associate Professor Leon Bren of Research Programme Three also collected information on the effect of stocking density on handling time and harvesting costs at these sites.

5.2 Research Programme Two: High value wood resources

Please refer to Schedule 1 of the Commonwealth Agreement: page 17-19 (Outputs 3.1, 3.2, 3.3, 3.4), page 22 (research programme description and specified personnel) and pages 28-30 (CRC Outcome 3).

Research Programme Manager: Dr Chris Harwood

Key research achievements

Key research achievements are described by project in the text below and progress towards milestones are summarised in Table 4.

Project 2.1 (Breeding for high value wood products)

The molecular genetics study has progressed well during the reporting period. Gunns Ltd provided access to their *Eucalyptus globulus* progeny trial in north-western Tasmania. All trees in the trial were remeasured and wood cores were extracted from over 2,000 trees to determine wood quality traits (wood density, cellulose content and kraft pulp yield). Wood quality determination was largely completed by 30 June. Meanwhile, gene variants in two major genes influencing wood quality have been examined in a subset of 72 of these trees prior to the major genotyping exercise that will be undertaken in the coming year.

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

Forestry Tasmania's 22-year-old silvicultural trial at Goulds Country in north-eastern Tasmania tests different thinning and pruning regimes for plantation-grown *E. nitens.*

Measurements were made of tree size, crown form and branching of pruned trees grown at different stockings following thinning, and log form of felled trees was assessed. Crown and stem eccentricity data which has important implications for wood development and processing properties was collected. This information is being used for development of empirical growth models for thinned stands.

Project 2.3 (Effect of silvicultural interventions on wood quality)

Felled logs from the Goulds Country *E. nitens* trial were processed to determine wood quality and product value. By the end of June, logs had been sawn and sawn boards were being dried. Assessment at the time of sawing showed that the pruned trees had produced wood without major decay defects and with low levels of sawing defects resulting from growth strain: an important result that has improved confidence in the capacity of solid-wood plantations of *E. nitens* to produce high value wood products. The second major research activity for this project was the sampling of *E. globulus* grown at different stockings in three ten-year-old silvicultural trials located along a rainfall gradient in Western Australia. This sampling was successfully completed and enables study of the effects of stocking level and site conditions on key wood properties that influence solid-wood and pulpwood value.

Project 2.4 (Incorporating wood quality into plantation estate management)

Methods for evaluating wood quality have been tested using the *E. nitens* logs processed in Project 2.3. Growth strain and sound wave velocity measurements were made, and wood core and disk samples were taken from trees that were processed by this project. The ability of different evaluation methods to predict solid-wood value will be evaluated next year. Good progress has been made developing a global near infra-red (NIR) calibration for predicting cellulose content of *E. globulus* and *E. nitens* wood. Radial scanning technology to enable collection of near infra red spectra from wood cores prepared for Silviscan analysis is now operational (Silviscan is the Ensis system for measuring wood microscopic properties).

Reasons for milestones not being reached

Milestones 3.2.1 and 3.2.2 were set back to December 2006 by the Project 2.2 Steering Committee because of the delayed start-up of the CRC.

Nature of major consultancies and their contribution to the CRC

No consultancies were undertaken during the first year.

Nature of any grants and how they contribute to the CRC

No grants were received during the first year.

Contribution to National Research Priorities

Research addressing high value solid wood products from plantation-grown eucalypts is contributing to National Research Priorities goal “Transforming Existing Industries” under “Environmentally Sustainable Australia”. Almost all eucalypt plantations in Australia are currently grown to produce pulpwood. The research will underpin economics and reduce uncertainties in producing solid-wood products from plantations.

Changes proposed to future directions

There will be an increased emphasis on research to underpin wood quality in subtropical plantations through the development of a fifth project, Project 2.5 (High value wood resources from subtropical plantations), made possible through the pending entry of the Queensland Department of Primary Industries and Fisheries to the CRC for Forestry and additional funding from some established project partners. Additional effort will be implemented via Project 2.2 over the next three years to establish further silvicultural trials in members’ subtropical plantations so that Project 2.5 can conduct research in the last three years of the CRC for Forestry’s operations.

For research milestones 3.2.1 “database of silvicultural trials for wood quality studies established” and 3.2.2 (due June 2006) “Literature review of effect of crown symmetry /

architecture on wood development" the milestone delivery date has been set back to December 2006 by the Project 2.2 Steering Committee; this delay is caused by the delayed start-up of the CRC. DEST will be formally advised of this when variation is made to the Commonwealth Agreement in early 2006-07.

Forestry SA and Midway Pty Ltd both join the CRC in early 2006-07. The additional cash and in-kind resources brought by these new parties will allow work to expand in areas of interest to them.

Table 4: Research milestones and/or outputs - Research Programme Two

Type of milestone and/or output	Description of all 2005-06 milestones and/or outputs incl. past milestones which have not been met (and date)	Achieved (yes/ no)	If achieved, progress during 05-06 and planned activities in 06-07	Reasons why milestones and/or outputs have not been achieved	Strategies to achieve milestones which have not been met
Research milestone 3.2.1 (due June 2006; see page 29, Schedule 1)	Database of silvicultural trials for wood quality studies established.	No. Data for some trials has been assembled but database not yet set up		Delayed start-up of CRC.	Milestone delivery date set back to December 2006 by Project 2.2 PSC* because of delayed CRC start-up.
Research milestone 3.2.2 (due June 2006; see page 29, Schedule 1)	Literature review of effect of crown symmetry / architecture on wood development.	No		Delayed start-up of CRC.	Milestone delivery date set back to December 2006 by Project 2.2 PSC* because of delayed CRC start-up.
Research milestone 3.2.3 (due June 2006; see page 29, Schedule 1)	Establishment of new genetic trials under solid-wood silvicultural regimes to enable investigation of genetic differences and genotype-by-environment	Achieved in part	Two *E. nitens* progeny trials under solid-wood silvicultural regime established by Forestry Tasmania. Potential for conversion of two STBA *E. globulus* progeny trials to solid-wood regime was studied.	Agreement and protocol for conversion of STBA *E. globulus* genetic trials to solid-wood regimes still under negotiation	At least one *E. globulus* trial will be thinned and pruned to convert to solid-wood production regime in 2006-07

* PSC = project steering committee

Number of collaborations entered into

One formal collaboration with the University of Tasmania ARC linkage grant "Unravelling the links between growth and wood density". These additional resources have enabled very thorough sampling of the Gunns Ltd progeny trial of *E. globulus* for an association genetics study in Project 2.1 (Breeding).

Number of international collaborations

Dr Steve Verryn of CSIR Environmentek, South Africa, agreed to be the external science reviewer for the research programme. Dr Verryn reviewed project documentation in November, and attended the first Annual Meeting in July.

Collaboration with Chilean companies that already conduct clonal forestry using *E. globulus* is being negotiated. This will enable Project 2.2 (Silviculture) to gather information on the comparison of stand uniformity between clonal and seedling-based plantations of *E. globulus* – information that is not available within Australia.

Molecular genetics research which was planned to be a major component of Project 2.1 (Breeding) is located in a rapidly-evolving field. We are reviewing how improvements in DNA technology and collaboration with other research groups focussing on genetic control of wood quality will enable us to expand our outputs from this research using available resources. In particular a collaboration arrangement with Ensis researchers working outside of the CRC for Forestry is being negotiated and will commence during the next year. This will enable CRC for Forestry researchers to target additional wood quality genes in their association studies.

Progress developing collaborative linkages within the CRC across all activities

Collaboration with Research Programme Three will focus on the costs of harvesting and how these are affected by stand uniformity. The study of mature-age clonal plantations of *E. globulus* will be important.

During the coming year, collaboration with Research Programme One will be undertaken to forge strong links between empirical and process-based growth modelling for silviculturally managed stands so that synergies can be established between the two lines of research.

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

Links with the University of Tasmania ARC Linkage Grant "Unravelling the links between growth and wood density", and with CSIR Environmentek and Chilean companies having clonal plantations of *E. globulus* are discussed above.

5.3 Research Programme Three: Harvesting and operations

Please refer to Schedule 1 of the Commonwealth Agreement: page 19 (Outputs 4.1 and 4.2), page 23 (1.4.2 research programme description and specified personnel) and pages 30-31 (CRC Outcome 4).

Research Programme Manager: Associate Professor Leon Bren

Key research achievements

- A number of short term projects have been initiated that will provide valuable information for industry early in the second year.
- Recruitment of staff in key positions will ensure the project meets deliverables in future years.
- Considerable effort has been put into recruitment of research staff and review of project activities and outputs in light of industry requirements and expectations.

Reasons for milestones not being reached

- We have experienced difficulties hiring qualified forest harvesting research staff to date despite our best efforts and considerable expense.
- It has been difficult to recruit qualified staff for key positions. This is caused by the fact that harvesting and operations is a non-traditional research area, so there is not a body of trained professionals waiting to take up the positions on offer. Similarly, there is a shortage of post-graduate students. We have advertised a number of scholarships widely, including attempts to recruit students from engineering and industry backgrounds, but have had little up-take by qualified students. This reflects near-full employment in this sector and perhaps unwillingness by young graduates to work in this field. We are developing new strategies for graduate student recruitment including part-time enrolment of talented individuals working in industry, using school alumni as marketing agents for post-graduate students and projects that would involve international students.

Please also see the summary provided in Table 5.

Nature of major consultancies and their contribution to the CRC

None during the first year of operations.

Nature of any grants and how they contribute to the CRC

None during the first year of operations.

How the research overall has contributed to national research priorities:

This research programme will contribute to the "Frontier Technologies for Building and Transforming Australian Industries" priorities:

- Priority Goal 4: smart information use, "improved data management for existing and new business applications and creative applications for digital technologies."
- Priority Goal 5: promoting an innovation culture and economy, "maximising Australia's creative and technological capability by understanding the factors conducive to innovation and its acceptance."

Any changes proposed to future directions

New activities and modifications to original project proposals are being developed with industry partners given the difficulties experienced in recruiting qualified researchers. These include development of attractive secondments for overseas workers, re-evaluation of the fundamental directions of the project in the light of skill shortages, and re-affirmation that our "directions" are the correct ones. DEST will be informed promptly if any agreed changes affect the Commonwealth Agreement.

Forestry SA and Midway Pty Ltd both join the CRC in early 2006-07. The additional cash and in-kind resources brought by these new parties will allow work to expand in areas of interest to them.

Table 5: Research milestones and/or outputs - Research Programme Three

Type of milestone and/or output	Description of all 2005-06 milestones and/or outputs incl. past milestones which have not been met (and date)	Achieved (yes/no)	If achieved, progress during 05-06 and planned activities in 06-07	Reasons why milestones and/or outputs have not been achieved	Strategies to achieve milestones which have not been met
Milestone 4.1.1 (due June 2006; see page 30, Schedule 1)	Report presenting and detailing user requirements for information from automated data collection systems, the existing and expected development for data collection capabilities and recommendations for direction of other sub–programmes*	Yes.	Development and implementation of techniques in conjunction with industry partners		
Milestone 4.2.1 (due September 2005; see page 31, Schedule 1)	Development of roading engineering proposal.	No.	Limited progress.	Staff recruitment issues.	Milestones under review to better reflect current industry partner requirements. New approaches to staff recruitment being adopted. Linkages with international institutions being developed including secondment and sabbatical arrangements from overseas institutions to meet project objectives.
Milestone 4.2.2 (due June 2006; see page 31, Schedule 1)	Report detailing factors that affect performance levels (benchmarking), optimisation and availability of suitable harvesting equipment, and chain of supply.	No.	Limited progress.	Delays in staff recruitment and review of the programme's outputs to better reflect industry requirements.	New approaches to staff recruitment being adopted. Linkages with international institutions being developed including secondment and sabbatical arrangements from overseas institutions to meet project objectives.
Milestone 4.2.3 (due June 2006; see page 31, Schedule 1)	Stage one, roading tool development.	No.	Limited progress.	Delays in staff recruitment and review of the programme's outputs to better reflect industry requirements.	Milestones under review to better reflect current industry partner requirements. New approaches to staff recruitment being adopted. Linkages with international institutions being developed including secondment and sabbatical arrangements from overseas institutions to meet project objectives.

*Sub-programmes are now commonly referred to "projects".

Number of collaborations entered into

One: Research Programme Three of the CRC for Forestry is collaborating with the CRC for Spatial Information in a project looking at routine use of spatial information in forest harvesting machines. The two CRCs are sharing the cost of this work.

Number of international collaborations

Two:

1. The Department of Forest Engineering of the College of Forestry, Oregon State University. This is a large research institution in forest engineering and harvesting. Professor Loren Kellogg is the key contact.
2. Virginia Technical University (Associate Professor Rien Visser).

Nature of collaborations and how they add value to the CRC:

- Professor Kellogg is the Visitor for the research programme and provides guidance on future directions.
- Associate Professor Visser is planning a sabbatical visit in 2006-07 to investigate harvesting efficiency in plantation timber production and potential for bioenergy harvesting.

Progress developing collaborative linkages within the CRC across all activities

The debarking project in Research Programme Three that is currently being developed will have links to Project 4.1 (Water) via the catchment water use link.

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

A project to evaluate the value of collecting spatial information to use in work studies of forest harvesting is being run in conjunction with the CRC for Spatial Information.

5.4 Research Programme Four: Trees in the landscape

Please refer to Schedule 1 of the Commonwealth Agreement: page 13-15 (Outputs 1.1, 1.2, 1.3, 1.4), page 24 (1.4.2 research programme description and specified personnel) and pages 25-27 (CRC Outcome 1).

Research Programme Manager: Professor Brad Potts

Project Leaders:

Project 4.1 (Water) – Dr Patrick Lane

Project 4.2 (Biodiversity) – Professor Brad Potts / Associate Professor Giles Hardy

Project 4.3 (Communities) – Dr Jacki Schirmer

There are no milestones due for this programme this financial year.

Key research achievements

4.1 Water

Site instrumentation, experimental treatments and conceptual models developed for water quality components. Water yield models evaluated, and knowledge gaps identified.

4.2 Biodiversity

Integration of biodiversity data (vascular plants, lichens and bryophytes, ground beetles and birds) from pre-, one- and three-year post logging surveys in the Forestry Tasmania silvicultural systems trial (SST) at the Warra Long Term Ecological Research Site, in Southern Tasmania, has commenced. Biodiversity response is a key factor informing

decisions about silvicultural systems as alternatives to clear felling in tall wet eucalypt forest in Tasmania. Permanent plots have also been established in cable and ground-based logging coupes in wet forest to assess their impacts on man-fern survival and regeneration.

As a first approach to predicting the spatial and temporal distribution of coarse woody debris habitat in the production forest landscape, a model has been developed that predicts change in density (weight loss) by log decay class and log size class (attributes which are routinely assessed).

Data is currently being collected that will enable modelling of the residence time of logs as they progress through the different decay classes. This information will be used later to develop management prescriptions.

University of Tasmania PhD projects continuing from the CRC for Sustainable Production Forestry, an external grant, and CRC for Forestry funding have all contributed to a high level of research activity in the area of integrating management of browsing mammals following the banning of 1080 poison in Tasmanian State Forest from the end of 2005. Both the characteristics of the eucalypt planting stock and characteristics of the surrounding vegetation have been shown to be important factors influencing the amount of browsing damage.

Biological data relating to factors affecting the risk of exotic gene flow between plantations and native forest species has been collected by scientists working with funding from external grants and collated. This is being used to identify which Tasmanian native eucalypt species are most at risk of gene flow from *Eucalyptus nitens* plantations. A pilot project has commenced to develop operational guidelines for buffering of communities of the threatened *E. ovata* from genetic contamination from *E. nitens* plantations.

Trees have been treated with systemic insecticides using several application methods, with the aim of developing lethal trap tree technology as a means of reducing chemical use for control of eucalypt leaf eating beetles. Results indicated that the insecticidal activity was not sufficiently persistent to affect late season feeding by adult beetles.

The IPMG has started long-term trials to determine whether spraying against *Eucalyptus* weevil (*Gonipterus scutellatus*) enhances productivity. IPMG has determined the relationships between the number of egg cases of *Eucalyptus* weevil at the beginning of the season and the level of defoliation caused by larvae of *Eucalyptus* weevil at the end of the season in 14 plantations and developed a protocol for an efficient assessment of early instar larvae of the spitfire sawfly (*Perga dorsalis*) in the Green Triangle.

Two large family trials have been established to test strategies to exploit genetic-based resistance to *Mycosphaerella* leaf disease. This research is to allow the planting of *E. globulus* in areas with high risk of the disease. Potential mechanisms and genome regions affecting resistance have been identified, which may offer a strategy for disease screening.

Three fauna and three flora based research projects are underway aimed at the development of management objectives, prescriptions and actions for listed threatened flora and fauna in production forestry landscapes in Tasmania.

Over 800 old-growth *Eucalyptus regnans* trees from throughout the geographic range of the species have now been sampled for DNA studies. Fifteen years' worth of data has now been collected from trials of *Eucalyptus obliqua* in Tasmania aimed at studying fine-scale adaptive differentiation. These are the main native species harvested in wet forests in Tasmania and Victoria and these studies will lead to the development of genetic based seed zones and gene pool management strategies for these species.

Five PhD projects have commenced across Australia studying the biodiversity impacts of plantation establishment on communities in remnant or retained native vegetation and strategies to manage this native vegetation.

4.3 Communities

A series of public seminars, attended by more than 500 people in total, helped to inform public debate about the socio-economic impacts of plantations, as did national and international conference presentations.

Appointment of two PhD students (see also Education section).

In collaboration with industry partners, a new Forest Industry Survey was designed. This survey will enable more accurate data to be gathered at a local scale regarding employment and spending by the forest industry.

Planning has been completed for focus groups whose information will assist in prioritising the key questions communities ask about socio-economic dimensions of forest industries, and focus groups are being held in late 2006 and early 2007. The information gathered will be used to (a) decide which questions are to be researched using independent statistical data, e.g. impacts of plantation expansion on rural population or land prices, and (b) design a quantitative survey of values and attitudes held about forestry by members of different communities. Sources of statistical data were identified during 2005-06 and options for their utilisation explored.

Collaborative planning between researchers within this project will assist in linking the results of the four subprojects as they progress in coming years.

Planning and initial activities undertaken in 2005-06 have ensured the research activities planned for 2006-07 are proceeding on schedule.

Reasons for milestones not being reached

No milestones were due for this research programme in 2005-06, but activities are on track for delivery of future milestones (see Table 6)

Nature of major consultancies and their contribution to the CRC

There have been no consultancies during the first year.

Nature of the grants and how they contribute to the CRC

4.1 Water

There have been no extra grants.

4.2 Biodiversity

Research in this project is facilitated by close interaction with several Bushfire CRC projects and ARC grants held by in-kind scientists.

ARC grants studying fundamental aspects of exotic gene flow are contributing basic information to CRC for Forestry pilot 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.

4.3 Communities

There have been no new grants in 2005-06.

How the research overall has contributed to national research priorities

An environmentally sustainable Australia

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.

2: Transforming existing industries

Research of Project 4.3 (Communities) enables an understanding of the socio-economic implications of transformation of industries, including the impact of changing technology on rural population levels, employment availability and spending patterns by the forest industry.

3: Overcoming soil loss, salinity and acidity

Research of 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.

5: Sustainable use of Australia's biodiversity

All aspects of Project 4.2 (Biodiversity) address this priority goal, as the research aims to change management practices, policies and prescriptions to enhance the biodiversity outcomes of forestry in the Australian environment, and assess the effects of management and protection measures.

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, a factor which can affect social well-being.

4: Strengthening Australia's social and economic fabric

Research of Project 4.3 (Communities) 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

A new project related to Project 4.3 (Communities) has been developed with a number of funding organisations, which is closely related to the work of the CRC for Forestry. Project 4.3a involves cash funding of $196,500 and $293,000 in-kind funding through the life of the project, beginning in 2006-07 and continuing until 2008. The new project will examine 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 will 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, three Victorian shires, and the Glenelg Hopkins Catchment Management Authority). It is an important project as it enables the comparison of the impact 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 enables 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 project towards meeting milestones.

Forestry SA and Midway Pty Ltd both join the CRC in early 2006-07. The additional cash and in-kind resources brought by these new parties will allow work to expand in areas of interest to them.

Table 6: Research milestones and/or outputs - Research Programme Four

Type of Milestone and/or Output	Description of all 2005-06 milestones and/or outputs incl. past milestones which have not been met (and date)	Achieved (yes/no)	If achieved, progress during 05-06 and planned activities in 06-07
Research milestone 1.1.1 (due December 2007; see page 25, Schedule 1)	Review long-term hydrological data for selected experimental forest catchments.	Progressing on time	Data collated and analysis progressing.
Research milestone 1.1.2 (due December 2009; see page 25, Schedule 1)	Integration of catchment hydrological models with tree- and stand-level productivity and water use models.	Progressing on time	Field sites in Victoria and Tasmania have been selected. Instrumentation, and current and historical data collation proceeding.
Research milestone 1.1.3 (due December 2011; see page 25, Schedule 1)	Report on the impacts of forestry practices (harvesting, replanting/regeneration) in high and medium to low rainfall areas on water quantity and quality and stream health.	Progressing on time	The Control Burning project (4.1.3) has seen considerable progress with field sites instrumented, historical data collated, experimental burn completed and experimental plots established. A post-graduate student will begin in August. The headwater stream component (4.1.4) has progressed with planning and establishing collaborative linkages.

C&U milestone 1.2.1 (due December 2008; see page 14, Schedule 1)	Revised prescriptions for native forest silviculture and management of coarse woody debris workshopped with industry members	Progressing on time. An international conference planned for late 2007 may be delayed until February 2008.	Surveys to document biodiversity associated with treatments in the silvicultural systems trial at the Warra long-term ecological research site and integration commenced. Permanent plots established in cable and ground-based logging coupes in wet forest. Model developed that predicts change in density (weight loss) by log decay class and log size class. Data being collected that will enable modelling of the residence time of logs as they progress through the different decay classes. Planning for international conference commenced.
C&U milestone 1.2.2 (due June 2009; see page 14, Schedule 1)	Pilot projects completed to test cost-effective options for non-lethal control of browsing marsupials	Progressing on time	Browsing mammal management research is being integrated for the design of non-lethal strategies. Eucalypt planting stock and surrounding vegetation has been shown to be important factors.
C&U milestone 1.2.3 (due June 2009; see page 14, Schedule 1)	Prescriptions for non-lethal strategies for controlling marsupial browsing integrated into pest management strategies of Tasmanian forest managers.	Progressing on time	As 1.2.2
C&U milestone 1.2.4 (due June 2009; see page 14, Schedule 1)	Workshop on biodiversity management options.	Progressing on time	Five PhD projects have commenced studying the biodiversity impacts of plantation establishment and management of remnant native vegetation.
C&U milestone 1.2.5 (due June 2010; see page 14, Schedule 1)	Planners trained in a decision support system for assessing the risk of gene flow from plantations into native forest gene pools and strategies to manage this risk	Progressing on time	Exotic gene flow risk data is being collected and collated. A pilot project has commenced to develop operational guidelines for buffering communities of *E. ovata* from genetic contamination from *E. nitens* plantations.

C&U milestone 1.2.6 (due June 2011; see page 14, Schedule 1)	Workshop held on prescriptions for managing key pests and pathogens, including more socially acceptable revised strategies for controlling marsupial browsing, with adoption by forest managers and recognition by certification agencies	Progressing on time	IPMG commenced spraying trials for *Gonipterus scutellatus* and determined the relationship between the number of egg cases at the beginning of the season and the level of defoliation caused by larvae. A protocol for efficient assessment of early instar larvae of the *Perga dorsalis* in the Green Triangle was developed and adopted. Eucalypts treated with systemic insecticides using several application methods for use with trap trees. Two large family trials established to test strategies to exploit genetic-based resistance to *Mycosphaerella* leaf disease. Potential mechanisms and genome regions affecting resistance have been identified. See also 1.2.2
C&U milestone 1.2.7 (due December 2011; see page 14, Schedule 1)	Pilot projects and training provided to members and other stakeholders on revised prescriptions for native forest silviculture that integrates management of threatened and dominant/keystone taxa in production landscapes, including genetically based adaptive model for eucalypt seed sourcing	Progressing on time	Three fauna and three flora based research projects on threatened species are underway. More than 800 old-growth *Eucalyptus regnans* trees from throughout the species' geographic range have been sampled. Studies of the *E. globulus* gene pool are well underway and a project on genetic differentiation in *E. obliqua* has commenced. See also 1.2.1.
C&U milestone 1.2.8 (due March 2012; see page 14, Schedule 1)	Training provided on strategies for assessing and managing the biodiversity values of remnant forests in production landscapes workshopped with and adopted by industry	Progressing on time	See 1.2.4

Research milestone 1.3.1 (due December 2007; see page 14, Schedule 1).	Preliminary socio-economic profile of the costs and benefits of plantation forestry in two target regions	Progressing on time	Progress has included the design of a Forest Industry Survey (FIS; to be implemented in August 2006) and the initial review of available statistical data sources. Planned activities in 2006-07 include community focus groups to identify topics to examine further, access and analysis of FIS, and access and analysis of statistical data.
Research milestone 1.3.2 (due June 2008; see page 14, Schedule 1).	Analysis and explanation of community attitudes and values in two regions.	Progressing on time	2005-06: PhD student appointed; research planning begun. 2006-07: Advisory group and focus group meetings to be held, research design to be finalised, survey in one region to be carried out.
C&U milestone 1.3.1 (due December 2008; see page 14, Schedule 1).	Engagement strategies implemented as pilot projects with industry members in two regions.	Progressing on time; potentially some modification to methods of identifying optimal engagement strategies.	2005-06: PhD student appointed and research planning begun. 2006-07: Review of literature and selection of case studies. At present, planning is to engage in a review and evaluation of the multiple engagement strategies already in use in each region, rather than focus only on a single pilot project in each region.
C&U milestone 1.4.1 (due December 2010; see page 15, Schedule 1).	Strategies evaluated and refined with industry members.	Progressing on time	2005-06: Discussion of potential case studies with industry members and others. 2006-07: Continue to identify potential sites and selection criteria.

The following columns have been removed from the table above, as they do not apply in this instance:

- Reasons why milestones and/or outputs have not been achieved
- Strategies to achieve milestones which have not been met

Number of research collaborations entered into

Project 4.1 (Water)

There are no formal collaborations at this stage directly through the CRC for Forestry. There are a number of collaborations of partner organisations or research providers that will directly advantage the CRC for Forestry.

There are several linkages with research projects in the eWater CRC (Project D1 and D2), a University of Melbourne held Land and Water Australia grant on fire impacts on hydrology (Project DSE1), University of Melbourne research projects for the Victorian Department of Sustainability and Environment and for the Forest and Wood Products Research and Development Corporation (FWPRDC) project PN04.4009. These projects generate methodologies and new knowledge that contribute to the research area. There are also a number of collaborative linkages described in later sections.

Project 4.2 (Biodiversity)

The first year of the CRC for Forestry has focused upon setting up the basic research programme for this project. Individual scientists involved maintain active collaboration with national and international research groups that contribute to the research objectives of the projects. Key research links at the national level have been established with National Heritage Trust ("decline in forest remnants") and the Bushfire CRC ("fire chronosequence") projects.

The 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.

In-kind scientists are also members of the ARC Environmental Futures Network. Additional formal research linkages are in the process of being established as Forestry SA, Midway Pty Ltd and the Queensland Department of Primary Industries and Fisheries prepare to join the CRC for Forestry.

Several scientists involved in the CRC for Forestry Biodiversity project are also members of the ARC Research Network for Understanding and Managing Australia's Biodiversity.

Staff interact with the Threatened Species Unit of the Tasmanian Government Department of Primary Industries and Water in enhancing database information on Tasmania's threatened species and risk assessment.

Project 4.3 (Communities)

Existing collaborative arrangements have resulted in a new project in the Green Triangle in 2006-07 (see the future directions section).

Number of international collaborations

Project 4.1 (Water)

The Forest Products Commission has an international carbon sequestration collaboration with RITE Japan and Seikei University (Japan). The Forest Practices Authority and Ensis have collaborative links with the United States Department of Agriculture (USDA) through Dan Neary (Watershed and Riparian Ecosystems project leader) of the USDA Forest Service.

Project 4.2 (Biodiversity)

The Warra LTER site where silvicultural treatment studies are being undertaken is part of the International LTER network. Several scientists in the project are also members of the International *Eucalyptus* Genome Network (IEGN).

Project 4.3 (Communities)

Nil

Nature of collaborations and how they add value to the CRC

Project 4.1 (Water)

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 the CRC for Forestry research. These include projects on carbon sequestration and tree growth with Curtin University; collaboration with the University of Western Australia on RIRDC-JVAP projects CAL 6A and CAL 8A; and development of sustainable bioenergy systems with CSIRO and the New South Wales Department of Primary Industries.

The University of Melbourne has collaborations with CSIRO Land and Water and Victorian Department of Primary Industries on an FWPRDC 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 has also been involved in collaborative projects with the Department of Sustainability and Environment regarding the impacts of bushfires on hydrology, which link back to C&U milestone 1.1.4 ("Present results of studies of forest management impacts on water yield, quality and stream health to forest managers in two or more regional workshops"; see page 13, Schedule 1).

A linkage exists with Forestry Tasmania through the Tasmanian Community Forestry Agreement plantation hydrology project.

Project 4.2 (Biodiversity)

These collaborations maintain strong linkages with international science networks. In the case of the IEGN, in-kind scientists have been involved in the preparation of an international submission for the USA Department of Energy to under take a public domain sequence of the *Eucalyptus grandis* genome. The involvement of Biodiversity scientists in this network allows information relevant to managing eucalypt genetic resources to flow back to Australia.

Project 4.3 (Communities)

This collaborative project will add value to the CRC for Forestry by expanding the number of regions in which the socio-economic impacts of forestry are examined, and broadening the understanding of the impacts of forestry by comparing it to a range of other land uses to be examined in the collaborative project.

Progress on developing collaborative linkages within the CRC across all activities

Project 4.1 (Water)

Discussions have been held with researchers in Research Programme One to integrate tree water use measurements and modelling for growth into the hydrologic programme. This will result in data sourced from an expanded set of environments and integrate growth with hydrologic outcomes.

Project 4.2 (Biodiversity)

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. Contribution of in-kind staff to both 4.1 and 4.2 maintains linkages between Water and Biodiversity research related to water quality.

Project 4.3 (Communities)

Communities researchers will engage further with other parts of the CRC for Forestry once key research questions are refined based on focus group data. These research questions will have relevance to a range of other CRC for Forestry projects.

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

Project 4.1 (Water)

This project has strong linkages with the eWater CRC as mentioned above. The project also has strong linkages with research users in the Victorian Department of Sustainability and Environment and Forestry Tasmania.

The activity in Western Australia has links through in-kind staff to the CRC for Plant-Based Management of Dryland Salinity.

Project 4.2 (Biodiversity)

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.

Project 4.3 (Communities)

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
- The planning of community advisory groups in each study region, who will have input by helping researchers to identify the key questions that communities ask about the impacts of forest industries in different regions. These advisory groups are made up of representatives from communities and groups with an interest in forestry, but who largely are not CRC for Forestry partners (with one or two members also being CRC for Forestry partners to ensure linkages to the Project Steering Committee). The advisory groups will include farmers, rural residents, representatives of local government and state government, indigenous groups, and other groups as appropriate. The advisory groups will be used both to inform research and to assist in dissemination of research outcomes and adoption of recommendations by end-users.

6. Education and training

Please refer to Schedule 1 of the Commonwealth Agreement: page 32-33 (education outputs 1.1, 1.2 and 2.1), page 32 (1.5.1 Education and Training programme description and specified personnel) and pages 32-33 (CRC Outcomes 1 and 2).

The CRC for Forestry is on track to meet milestones for student recruitment (see Table 7). Ten CRC for Forestry-funded PhD students and one Masters by research student began their studies in 2005-06. The majority of these, consistent with the overall distribution of scholarships, enrolled at Melbourne University and the University of Tasmania. A further 31 PhD students, whose scholarship funding comes from other sources, were affiliated with the CRC's research programmes. Unfilled scholarships remain in a number of the CRC for Forestry's research programme areas, and strategies to address these have been developed. These strategies include direct promotion to prospective students and recruiting partnerships with industry partners.

Some 50 per cent of CRC for Forestry research students that have commenced this financial year (fully-funded or affiliated) are directly co-supervised by industry partners; in total, six industry partner organisations are represented on supervisory panels.

First graduates from the CRC for Forestry will not complete their degrees until early 2008, so no graduate destination information is yet available for these new students. Our affiliated students, many of whom began research projects with the CRC for Sustainable Production Forestry, are continuing to complete their degrees. Two such PhD students graduated this year and four received industry placements. Twenty-five per cent of current CRC for Forestry research students were previously, or are still, employed by forestry businesses.

All CRC for Forestry research students (other than one student currently on a fellowship in Europe) are participating in the CRC for Forestry's 2006 Annual Research Meeting (to be held during the first week of July 2006), and in a satellite student programme which focuses upon research leadership and management, and media skills. The CRC for Forestry envisages conducting short courses for industry in 2006-07, but none were conducted during the CRC's first year.

No milestones were specified for 2005-06 (the startup year). Progress towards 2006-07 Education milestones are listed in Table 7.

Nature of end-user involvement in developing undergraduate courses

Four of the CRC for Forestry's university partners offer forestry degrees at the undergraduate level (University of Tasmania, University of Melbourne, Australian National University and Southern Cross University) and most of these universities provide guest lecturers from forest industry, who are usually the industry partners of the CRC for Forestry.

An Honours degree is an undergraduate degree and the CRC for Forestry provides supervision to Honours students by academic researchers and our industry partners, offering the students a wide range of topics for research. Honours students choose their research projects based upon their undergraduate experiences and the CRC for Forestry therefore recognises that it is important to contribute to the undergraduate experience and encourage students to continue on to Honours. Honours degrees prepare students for study at the Masters or PhD level, providing the skills needed to engage in a PhD project successfully.

Nature of seminars/workshops/courses run for industry

Consultation with industry has shown that undergraduate courses are not usually the ideal form of training for industry staff, as they can afford only a restricted amount of time away from work, so industry seeks training that will fit in with staff workloads. The CRC for Forestry meets this need via its workshop programme. Each workshop is structured to present

information simply and can be used as a training course for the staff that attend. There are a number of courses that the CRC for Forestry runs as part of its workshop programme.

Two examples of workshops that involved our industry partners, and were developed from discussion with industry about the direction and nature of our research, are:

1. A workshop held at Penola in South Australia in March, involving 30 attendees, which resulted from a request from industry to identify the research questions that relate to plantation establishment in and around native stands of eucalypts in the agricultural landscape.
2. A workshop held at the Melbourne Airport in June, involving 40 attendees, to discuss and identify a system that can be used nationally to determine stand quality. In order to gain accreditation for plantations, forestry companies must demonstrate that the condition of the remnant stand is maintained or improved during the rotation. Those companies therefore need to collect accurate condition statements at the start of the rotation, and a uniform system to do this across Australia is desirable.

Seminars are regularly presented at various venues around the country by CRC for Forestry researchers and industry staff, and by visiting national and international scientists. These seminars provide professional development for industry practitioners, which assist in improving operational aspects of business in the forestry sector or in making more informed decisions about investing in research and development. Some seminars are video recorded and distributed to interested partners in other states and territories. Workshops and courses of several hours to several days in duration are also provided, allowing more in-depth knowledge assimilation and training (two examples are given above). As CRC for Forestry research outputs develop, workshops and courses will be increasingly used to transfer knowledge and to train industry personnel. During 2005-06, 18 seminars and 12 workshops and courses were presented.

Contribution to skill development in the industry

The programme of seminars, workshops and courses directly develop skills in the industry. In addition, four industry staff were enrolled in specific postgraduate training courses with the CRC for Forestry. These and other industry staff were also involved in detailed planning and execution of two pilot projects.

Table 7: Education and training milestones and/or outputs

Type of milestone and/or output	Description of future milestones and/or outputs	If achieved, progress during 05-06 and planned activities 06-07	Strategies to achieve future milestones
Education milestone 1.1.1 (due April 2007; see page 32, Schedule 1)	First 21 PhD students enrolled.	Ten CRC-funded PhD and one Masters student started in 2005-06; recruitment will continue in 2006-07.	The CRC has an active recruitment programme, in partnership with both industry and university members.
Education milestone 2.1.1 (due December 2008; see page 33, Schedule 1)	First 21 PhD students will have completed at least two courses (or equivalent) in research leadership and management.	14 students completed an introductory course in research leadership and management, July 2006.	The CRC is working with training providers and member universities to identify appropriate training opportunities.

The following columns have been modified in the table above:

- "Description of 2005-06 milestones and/or outputs" has been modified to cover "Description of future milestones and/or outputs"
- "Achieved (Yes/No)" has been deleted (there were no milestones due in 2005-06).
- "Reasons why milestones and/or outputs have not been achieved" has been deleted (there were no milestones due in 2005-06)
- "Strategies to achieve milestones which have not been met" has been modified to cover "Strategies to achieve future milestones"

7. Communications strategy

The CRC's communication strategies including the strategies for developing linkages with businesses, including SMEs together with any achievements in developing such linkages

Under direction from the Board, a Communications Committee has been formed. Please refer to section two "Governance, structure and management" for more information about the Communications Committee.

A draft communications strategy has been written with the intent to position the CRC for Forestry as a trusted knowledge broker. The CRC will do this by making scientific findings readily available and providing media training to members so they may engage in public debate with confidence. The draft communications strategy will be revised with input from the new CEO in early 2006-07 and submitted to the Communications Committee for approval. Five press releases have been issued and the CRC for Forestry has received media coverage of its activities in the rural and regional media, the urban media, radio, newspapers and TV news stations, as well as specialist media, across the country. Raising the profile of the work of the CRC for Forestry not only helps to position it as a trusted knowledge broker, but also better places it to attract further linkages with businesses, including SMEs.

The Communications Coordinator joined the IUFRO Forest Science Communicators Group in August and wrote the "IUFRO communications discussion paper and draft plan" in consultation with other group members from Metla (Norway) and the Canadian Forest Service. The paper has been presented to the IUFRO secretariat and endorsed to be progressed further. This international collaboration presents an opportunity for the CRC for Forestry to draw benefit from international forest science communication efforts and to take a lead role in assisting the direction that such international efforts take.

The CRC for Forestry members' website has been modified from that developed to serve the internal communications needs of the CRC for Sustainable Production Forestry; an interim public website has been put online and is continually updated.

The Management Committee and Communications Coordinator visited CRC for Forestry nodes in Victoria and Western Australia in 2006 and made personal contact with partners in those states.

Some of our existing partners are SMEs:

- Forest and Wood Products Research and Development Corporation
- Forests and Forest Industry Council
- Hancock Victorian Plantations Pty Ltd
- South East Fibre Exports Pty Ltd
- Southern Tree Breeding Association

The CRC for Forestry has also formed linkages with the following SMEs:

- Australian Forest Growers
- Bureau of Rural Sciences
- Bushfire CRC
- CRC Wood Innovations
- Greening Australia
- National Association of Forest Industries
- Plantplan Genetics Pty Ltd

- Private Forests Tasmania
- SonarData
- Timber Communities Australia
- Victorian Association of Forest Industries

Each of the research programmes' individual linkages and associations with SMEs are described below.

Research Programme One

Round-table discussions have occurred with SonarData with the intent that this SME will assist in the design and implementation of the visualisation system and a route to market for Research Programme One's research outcome two "visualisation system to visualise below- and above-ground forest conditions" (see Schedule 1, page 27) and C&U milestone 2.1.4 "commercial product and licensed service providers available for 3D visualisation systems" (see Schedule 1, page 16).

Research Programme One sources LiDAR data and remotely sensed data from SMEs. CRC work in developing forestry tools that incorporate these data will increase the potential market for these data providers.

Research Programme One is working with the Southern Tree Breeding Association (a CRC for Forestry partner) to improve the germplasm realised in their operational field trials and evaluating the benefits that the germplasm offers.

Preliminary work has begun developing ways to cut soil cores to get a smooth enough surface for scanning with mid-infra-red (MIR). This research team is working to improve calibration of ground and non-ground samples for MIR. These calibrations will be CRC propriety IP but their availability will increase the applicability of MIR sensors for forest soil analysis and increase the market potential for instrument developers.

Research Programme One works with Bushlogic, a small business that has been engaged to assist with the programming and evaluation of the modelling program CABALA and to assist with delivery platforms. Bushlogic is also taking Natural Heritage Trust remnant tree decision support information and, using C&U funds, packaging that information in a useful decision support system (DSS) to assist those in rural areas to gain maximum value from strategies to combat rural tree decline. Those DSS users (often farmers) therefore represent another group of SMEs who will be involved with the DSS once it is ready to be used.

Research Programme Two

Research Programme Two worked with small business McKay's Timber in St Helens on the Gould Country plantation wood quality trials: McKay's timber cut the logs at the mill without charge and will be given the timber for commercial sale, once CRC researchers have gathered their data.

Buffalo Valley Logging is a small business that was hired to harvest the Goulds Country trial; it is likely that they will be re-engaged for the three to four future harvests planned for coming years.

Technical Forest Services is an SME that has been engaged to measure trees for CRC Forestry related trials and an ongoing relationship is expected.

Soil Professionals Pty Ltd is an owner operated enterprise that provides advice on soils and has been engaged to provide assistance from time to time.

Various other small contractors have also been engaged to assist Research Programme Two with tasks such as weed control and general forestry work.

Research Programme Three

Most of the industry partners in this research programme are SMEs, so communication with these stakeholders is critical. Research Programme Three staff have been and will continue to visit a number of SMEs to recruit them into relations with the CRC for Forestry and, in one case, an SME has been given a consultancy ("Woollybutt Consultants" are working on the effect of growth on harvesting in the Green Triangle region of South Australia).

Communication strategies include:

1: Personal visit to SMEs' workplaces.

2: Defining mutual areas of cooperation.

3: Forming an agreement.

Most of the forest harvesting firms in Australia are SMEs and hence there is congruence between the interests of Research Programme Three and the SMEs involved in forest harvesting.

Research Programme Four

Many SMEs are working with researchers in Project 4.2 (Biodiversity): Arianda Pty Ltd and *seedEnergy* Pty Ltd are assisting with research on gene pool management. The STBA and *seedEnergy* Pty Ltd are collaborating on research screening *E. globulus* for resistance to *Mycosphaerella* leaf disease.

Project 4.3 (Communities) has developed links with all forest industry businesses (from owner-operator enterprises, through SMEs to large corporations involved in the industry) through the Forest Industry Survey, which was sent to every business in the forest industry in the study regions of Western Australia and Tasmania. These businesses will be sent copies of results of the survey, ensuring strong communication continues enabling forest industry businesses to access and utilise the outputs of the Communities project.

How the CRC's involvement with SMEs aligns with its strategic direction

Throughout Schedule 1 of the Commonwealth Agreement the CRC for Forestry asserts its commitment to engage with SMEs. The case studies mentioned in the above section demonstrate our achievements towards this in 2005-06 and it will continue to be a strategic direction for this CRC in the future.

8. Specified personnel

Table 8: Specified personnel

Specified personnel	Their contributing organisation	Their position in the CRC	The percentage of their time contributed to CRC activities	Any changes during the year (where blank, available for full year)
Rod Griffin	CRC Forestry Limited	Chief Executive Officer	80%	
Jo Neilson	CRC Forestry Limited	Company Secretary	100%	
Philip Smethurst	CSIRO	Utilisation Manager	20%	
Peter Kanowski	Australian National University	Education Programme Chair	30%	
Michael Battaglia	CSIRO	Manager, Research Programme One; Leader, Project 1.3	54%	
Chris Harwood	CSIRO	Manager, Research Programme Two; Co-leader, Project 2.1	37%	
Leon Bren	University of Melbourne	Manager, Research Programme Three; Leader, Project 3.1	50%	
Brad Potts	University of Tasmania	Manager, Research Programme Four; Co-leader, Project 4.2	30%	
Neil Sims	CSIRO	Leader, Project 1.1	24%	
Caroline Mohammed	University of Tasmania / CSIRO	Leader, Project 1.2	71%	
Gerd Bossinger	University of Melbourne	Co-leader, Project 2.1	50%	
Peter Volker	Forestry Tasmania	Co-leader, Project 2.2	20%	
Tom Baker	University of Melbourne	Co-leader, Project 2.2	50%	
Russell Washusen	CSIRO	Leader, Project 2.3	23%	
Geoff Downes	CSIRO	Leader, Project 2.4	22%	
Jim Morris	University of Melbourne	Leader, Project 4.1	20%	July - January
Pat Lane	University of Melbourne	Leader, Project 4.1	50%	February - June
Giles Hardy	Murdoch University	Co-leader, Project 4.2	20%	
Digby Race	Australian National University	Leader Project 4.3	30%	July - September
Jacki Schirmer	Australian National University	Leader, Project 4.3	100%	October - June

Appendix one: glossary

3D	Three-dimensional.
3-PG	A generalised computer model of forest productivity using simplified concepts of radiation-use efficiency, carbon balance and partitioning.
ABC	Australian Broadcasting Corporation.
AFLP	Amplified fragment length polymorphism.
AGGRO	A decision support tool for farm foresters – currently being built into the Farm Forestry Toolbox.
AGM	Annual general meeting.
AIC	Australian Institute for Commercialisation.
ALS	Airborne laser scanner.
AO	Officer of the Order of Australia.
ARC	Australian Research Council.
ASRIS	Australian Soil Resource Information System (website).
BA(Hon)	Bachelor of Arts (Honours).
B.Bus	Bachelor of Business.
B.Ec	Bachelor of Economics.
B.Ed	Bachelor of Education.
B.Pharm	Bachelor of Pharmacy.
B.Sc.For.	Bachelor of Forest Science.
C&U	Commercialisation and utilisation.
CABALA	A linked carbon, water and nitrogen computer model of forest growth for silvicultural decision support.
CALM	Western Australian Government Department of Conservation and Land Management.
CIPMC	Commercialisation and IP Management Committee.
CPA	Certified practising accountant.
CEO	Chief Executive Officer.
Co.	Company.
CO_2	Carbon dioxide.
COAG	Council of Australian Governments.
COFORD	National Council for Forest Research and Development (Ireland).
CRC	Cooperative Research Centre.
CSIR	Council for Scientific and Industrial Research (South Africa).
CSIRO	Commonwealth Scientific and Industrial Research Organisation.
CLW	CSIRO Land and Water.
DEST	The Commonwealth Government Department of Education Science and Training.
DF	Doctor of Forestry.
Dip.C.M	Diploma in Computing and Manufacturing.
DNA	Deoxyribonucleic Acid.
D.Sc	Doctor of Science.
DSE	Victorian Government Department of Sustainability and Environment.
DSS	Decision support system.
DVD	Digital versatile disc.

E. dunnii	*Eucalyptus dunnii* (also commonly known as Dunn's white gum).
E. globulus	*Eucalyptus globulus* (also commonly known as blue gum).
E. nitens	*Eucalyptus nitens* (also commonly known as shining gum; and as silver top occasionally in New South Wales).
FABI	Forestry and Agricultural Biotechnology Institute, University of Pretoria, Pretoria, South Africa.
FAIM	Fellow of the Australian Institute of Management.
FAIPM	Fellow of the Australian Institute of Project Management.
FCA	Fellow of the Institute of Chartered Accountants.
FFIC	Forests and Forest Industry Council of Tasmania.
FIS	Forest industry survey.
FT	Forestry Tasmania.
FTSE	Fellow of the Australian Academy of Technological Sciences and Engineering
FWPRDC	Forest and Wood Products Research and Development Corporation.
GradDip.Sci	Graduate Diploma in Science.
HPV	Hancock Victorian Plantations.
(Hons)	Honours.
IEGN	International Eucalyptus Genome Network.
IP	Intellectual property.
IPMG	Industry Pest Management Group.
IUFRO	International Union of Forest Research Organisations.
IUSS	International Union of Soil Sciences.
JVAP	Joint Venture Agroforestry Programme.
LiDAR	Light detection and ranging.
Ltd	Limited.
LTER	Long-term ecological research (at Warra, in Tasmania’s southern forests).
MAESTRA	A process-based model.
MAICD	Member of the Australian Institute of Company Directors.
MBA	Master of Business Administration.
MF	Master of Forestry.
M.For.Sci	Master of Forestry Science.
MIR	Mid-infra-red.
MrVBF	Multi-resolution valley bottom flatness.
MSc(Hons)	Master of Science with Honours.
NAFI	National Association of Forest Industries.
NHT	Natural Heritage Trust.
NIR	Near infra-red.
NIRS	Near infra-red spectroscopy.
NRP	Australian Government National Research Priorities.
NZ	New Zealand.
PCC	(Research) programme coordinating committees.
PCR	Polymerise chain reaction.
pH	Potential hydrogen (a measurement of acidity and alkalinity).
PhD	Doctor of Philosophy.
Project 1.1	Monitoring and measuring
Project 1.2	Managing and sustaining
Project 1.3	Modelling and information integration

Project 2.1	Breeding for high value wood products (also known by its short name: “Breeding”).
Project 2.2	Silviculture for high value solid and engineered wood products (also known by its short name: “Silviculture”).
Project 2.3	Impact of silviculture interventions on wood quality into plantation estate management (also known by its short name: “Wood quality and processing”).
Project 2.4	Incorporating wood quality into plantation estate management (also known by its short name: “Wood quality and management”).
Project 2.5	High value wood resources from subtropical plantations (not yet active in 2005-06).
Project 3.1	Harvesting and operations
Project 4.1	Water quality and quantity (also known by its short name: “Water”).
Project 4.2	Biodiversity
Project 4.3	Communities
Project 4.4	Landscape design (this project was absorbed into projects 4.3 and 3.1)
PSC	Project steering committees.
Pty	Proprietary.
QDPIF	Queensland Department of Primary Industries and Fisheries.
QTL	Quantitative trait loci.
R&D	Research and development.
RIRDC	Rural Industries Research and Development Corporation.
RITE	Research Institute of Innovative Technology for the Earth.
RP1	Research Programme One.
RP2	Research Programme Two.
RP3	Research Programme Three.
RP4	Research Programme Four.
SA	South Australia.
SABI	South African Biosystematics Initiative.
Sch1	Schedule 1 of the Commonwealth Agreement signed in October 2005.
Scion	A New Zealand Crown Research Institute providing science expertise for biomaterials development and the forestry sector, which is engaged in a joint venture with CSIRO called Ensis.
SME	Small to medium enterprise.
SOLVE	A magazine published by CSIRO.
SSAND	Soil supply and nutrient demand.
SST	Silvicultural systems trial.
STBA	Southern Tree Breeding Association.
UK	United Kingdom.
UNSW	University of New South Wales.
USDA	United States Department of Agriculture.

Appendix two: refereed publications and other communications

from research programmes one, two and four

Research Programme One: Managing and monitoring for growth and health

* = major funding source is not the CRC for Forestry but address is on the article, or the CRC for Forestry is acknowledged

= directly relevant to the project but the CRC for Forestry is not mentioned on the publication; usually involves CRC for Forestry in-kind staff.

Project 1.1 (Monitoring and measuring)

Public presentations

Musk RA (2006) LiDAR in Tasmanian Forests. Annual Remote Sensing Seminar. Spatial Sciences Institute. Tasmania, 21 May.

Project 1.2 (Managing and sustaining)

Refereed journal articles

Milgate AW, Potts BM, Joyce K, Mohammed CL, Vaillancourt RE (2005) Genetic variation in *Eucalyptus globulus* for susceptibility to *Mycosphaerella nubilosa* and its association with tree growth. *Australasian Plant Pathology* **34,** 11-18. #

Milgate AW, Vaillancourt RE, Mohammed CL, Powell M, Potts BM (2005) Genetic structure of a *Mycosphaerella cryptica* population. *Australasian Plant Pathology* **34,** 345-354. #

Pinkard EA, Baillie CC, Patel V, Mohammed CL (2006) Effects of fertilising with nitrogen and phosphorus on growth and crown condition of *Eucalyptus globulus* Labill. experiencing insect defoliation. *Forest Ecology and Management* **231**,131-137. #

Pinkard EA, Gill WM, Mohammed CL (2006) Physiology and anatomy of lenticel-like structures on leaves of *Eucalytpus nitens* and *E. globulus* seedlings. *Tree Physiology* **26**, 989-999. #

Pinkard EA, Mohammed CL (2006) Photosynthesis of *Eucalyptus globulus* Labill. with *Mycosphaerella* leaf disease. *New Phytologist* **170,** 119-127. #

Pinkard EA, Patel V, Mohammed CL (2006) Chlorophyll and nitrogen determination for plantation-grown *Eucalyptus nitens* and *E. globulus* using a non-destructive meter. *Forest Ecology and Management* **223,** 211-217. #

Pinkard EA, Baillie CC, Patel V, Paterson S, Battaglia M, Smethurst PJ, Mohammed CL, Wardlaw T, Stone C (2006) Growth responses of *Eucalyptus globulus* Labill. to nitrogen application and severity, pattern and frequency of artificial defoliation. *Forest Ecology and Management* **229**, 378-387. *

Pietrzykowski EA, Stone C, Pinkard EA, Mohammed CL (2006) Effects of *Mycosphaerella* leaf disease on spectral reflectance properties of juvenile *Eucalyptus globulus* foliage. *Forest Pathology* **36,** 1-15. #

Smith AH, Pinkard EA, Stone C, Battaglia M, Mohammed CL (2006) Precision and accuracy of pest and pathogen damage assessment in young eucalypt plantations. *Environmental Monitoring and Assessment* **111**, 243-256. #

Wiseman D, Smethurst P, Pinkard EA, Wardlaw T, Beadle C, Hall M, Baillie C, Mohammed CL (2006) Pruning and fertiliser effects on branch size and decay in two *Eucalyptus nitens* plantations. *Forest Ecology and Management* **225** (1-3), 123-133. #

In press

Glen M, Smith A, Langrell, SRH, Mohammed CL (2006) Nested PCR detection of *Mycosphaerella* species in leaf disease of *Eucalyptus* plantations. *Phytopathology* (*in press*) #

Medhurst JL, Pinkard EA, Beadle CL, Worledge D (2006) Increases in photosynthetic capacity of plantation-grown *Acacia melanoxylon* after form pruning. *Forest Ecology and Management* (*in press*) #

Pietrzykowski E, Stone C, Pinkard EA, Mohammed CL (2006) Effects of *Mycosphaerella* Leaf Disease on the spectral reflectance of juvenile *Eucalyptus globulus* foliage. *Forest Pathology* (*in press*) #

Smith AH, Hunter G, Pinkard EA, Wingfield M, Mohammed CL (2006) Barrier-zone formation and its association with resistance of juvenile *Eucalyptus nitens* leaves to *Mycosphaerella* Leaf Disease. *Australasian Plant Pathology* (*in press*) #

Wiseman D, Hall MF, Baillie CC, Smethurst PJ, Pinkard EA, Wardlaw T, Beadle CL, Mohammed C (2006) The effects of tree nutrition on tree attributes and decay from pruning in *Eucalyptus nitens* plantations. *Forest Ecology and Management* (*in press*) #

Unrefereed conference proceedings

Pietrzykowski E, Stone C, Pinkard EA, Simms N, Mohammed CL (2005) From leaf to landscape: identifying *Mycosphaerella* leaf blight in *Eucalyptus globulus* plantations using digital multispectral imagery. In '15th Biennia Australasian Plant Pathology Society Conference'. 26 – 29 September, p.138.

Pinkard EA, Mohammed CL (2005) Physiological responses of *Eucalyptus globulus* to *Mycosphaerella* infection. In '15th Biennia Australasian Plant Pathology Society Conference'. 26–29 September, p.155.

Pinkard EA, Battaglia M, Quentin A, Mohammed CL (2005) Predicting growth responses of eucalypts to *Mycosphaerella*: physiological considerations. In '15th Australasian Plant Pathology Society Conference: *Mycosphaerella* leaf diseases of eucalypts workshop' (Ed A Carnegie) (Geelong, Australia).

Smith AH, Gill WM, Pinkard EA, Hunter G, Wingfield BD, Mohammed CL (2005) Defence responses in eucalypts to infection by *Mycosphaerella* species. In 'The 15th Australasian Plant Pathology Society conference: *Mycosphaerella* leaf diseases of eucalypts workshop' (Australasian Plant Pathology Society: Geelong, Australia).

Smith AH., Gill WM, Pinkard EA, Wingfield MJ, Mohammed CL (2005) Defence responses in eucalypts to infection by *Mycosphaerella* species. In '15th Biennia Australasian Plant Pathology Society Conference'. 26–29 September. p.153.

Wardlaw T, Pinkard EA, Mohammed CL (2005) Can fertilisation with nitrogen and phosphorus lessen impacts of *Mycospharella* leaf blight in *Eucalyptus globulus*? In '15th Australasian Plant Pathology Society Conference: *Mycosphaerella* leaf diseases of eucalypts workshop'. (Australasian Plant Pathology Society: Geelong, Australia).

Public reports

Mohammed CL, Pinkard EA, Smith AH, Pietrzykowski, EA, Wardlaw, T (2006) Risk, Impact on Productivity and Control of *Mycosphaerella* Infection in Plantations of *Eucalytpus nitens* and *E. globulus*. In 'ARC project LP0214138 report to industry partners' p.163 #

Pinkard EA, Mohammed CL, Battaglia M, Wardlaw T, Stone C, Smethurst P, Baillie C, Patel V (2006) Fertilisation and forest health: preventing or offsetting biotic leaf loss in eucalypt plantations. In 'Final Report to the Forest and Wood Products Research and Development Corporation, Project PN04-4003' p.170 #

Theses

Walker, SN (2005). The influence of depth to groundwater on the transpiration of plantation maritime pine (*Pinus pinaster*, Ait.) on the Gnangara mound, Western Australia. BSc (Honours) Thesis, University of Western Australia.

Public presentations

White DA, McGrath JF, Macfarlane C, Kinal J, Battaglia M, Benyon RG (2006) Blue gums and water – a case study and overview of current knowledge. Invited keynote presentation at Public Workshop on Plantations and Water Resources. Department of Water and Whicher group, Busselton, September.

White DA, McGrath JF, Macfarlane C, Kinal J, Battaglia M, Benyon RG (2006) Blue gums and water – a case study and overview of current knowledge. Invited keynote presentation at Public Workshop on Plantations and Water Resources. Department of Water, Bunbury, July.

1.3 Modelling and information integration

Refereed journal articles

O'Grady AP, Worledge D, Battaglia M (2005) Above and below ground relationships, with particular reference to fine roots, in a young *Eucalyptus globulus* stand in southern Tasmania. *Trees* (*in press*) **#**

O'Grady AP, Worledge D, Battaglia M (2005) Temporal and spatial changes in fine root distributions in a young *Eucalyptus globulus* stand in southern Tasmania. *Forest Ecology and Management* **214**, 373-383. #

Unwin GL, Jennings SM, Hunt MA (2006) Light environment and tree development of young *Acacia melanoxylon* in mixed-species re-growth forest, Tasmania, Australia. *Forest Ecology and Management* (*in press*) *****

Hunt MA, Battaglia M, Davidson N, Unwin GL (2006) Competition between plantation *Eucalyptus nitens* and *Acacia dealbata* weeds in north-eastern Tasmania. *Forest Ecology and Management* (*in press*) *****

Comerford NB, Cropper Jr WP, Li H, Smethurst PJ, Van Rees KCJ, Jokela EJ, Adégbidi H, Barros NF (2006) Soil supply and nutrient demand (SSAND): a general nutrient uptake model and an example of its application to forest management. *Canadian Journal of Soil Research* **86**, 665-673. *

Hunt MA, Murray KE, Battaglia M, Mathers NJ (2006) Determination of specific leaf area of some commercially useful sub-tropical hardwood species. *Australian Forestry* (*in press*) *****

Public reports

Henskens F, Battaglia M, Ottenschlaeger M (2005) Silvicultural decision support for farm foresters: predicting tree growth in farm forestry and following thinning. (RIRDC/L&W Australia/FWPRDC Joint Venture Agroforestry Programme, Canberra)

Theses

Mummery D (2006) Spatial modelling of eucalypt productivity. PhD, University of Tasmania.

Ringrose C (2006) Long-term annual nitrogen fertilisation of *Eucalyptus regnans* F. Mueller and *Pinus radiata* D.Don: effects on tree growth, soil chemistry and net nitrogen mineralisation. PhD, University of Tasmania. *

Industry newsflashes (ie *The Monitor* or equivalent)

The Monitor 1: Research Programme One newsletter, December 2005.

Computer programs

AGGRO, decision support tool for farm foresters – currently being built into Farm Forestry Toolbox.

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

Thyer R (2006) 'How well will those blue gums grow? An interview with Michael Battaglia'. February. SOLVE. p. 18.

Research Programme Two: High value wood resources

* = major funding source is not the CRC for Forestry but address is on the article, or the CRC for Forestry is acknowledged

** = research funded under the CRC for Sustainable Production Forestry and an ARC grant; has the CRC for Sustainable Production Forestry in the address but the CRC for forestry is not a major funding source.

= directly relevant to the project but the CRC for Forestry is not mentioned on the publication; usually involves CRC for Forestry in-kind staff.

Project 2.1 (Breeding for high value wood products)

Refereed journal articles

Freeman J, Potts BM, Shepherd M, Vaillancourt RE (2006) Parental and consensus linkage maps of *Eucalyptus globulus* using AFLP and microsatellite markers. *Silvae Genetica* (*in press*) **

Poke FS, Potts BM, Vaillancourt RE, Raymond CA (2006) Genetic parameters for lignin, extractives and decay in *Eucalyptus globulus*. *Annals of Forest Science* (*in press*) *

Poke FS, Raymond CA (2006) Predicting extractives, lignin, and cellulose contents using near infrared spectroscopy on solid wood in *Eucalyptus globulus*. *Journal of Wood Chemistry and Technology* **26** (2), 187-199 *

Li, Y Gregory W, Dutkowski GW, Apiolaza LA, Pilbeam DJ, Costa e Silva J, Potts BM (2005) The genetic architecture of a *Eucalyptus globulus* full-sib breeding population in Australia. *Forest Genetics* (*in press*) *

Myburg Z, Potts BM, Marques CMP, Kirst M, Gion J-M, Grattapaglia D, Grima-Pettenati J (2006) Genome mapping and molecular breeding in *Eucalyptus*: molecular domestication of a major fibre crop. In 'Genome Mapping & Molecular Breeding. Vol. 6: Forest Trees'. (Ed C Kole) (Springer: Heidelberg, Berlin, New York, Tokyo) (*in press*) *

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

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

Forestry Tasmania Weed Control Field Day, 25 October 2005 held at Perth Nursery and forests in north eastern Tasmania. Led by Drs Peter Volker and Paul Adams of Forestry Tasmania.

Project 2.3 (Effect of silvicultural interventions on wood quality)

Unrefereed conference proceedings

Volker PW, Greaves B, Wood MJ (2005) Silvicultural management of eucalypt plantations for solid wood and engineered wood products – experience from Tasmania, Australia. In 'Proceedings of International Conference on Plantation Eucalyptus: Challenge in Product Development'. 28 November – 1 December, pp. 3-12. (Research Institute of Wood Industry, China Eucalypt Research Centre: Zhanjiang, Guandong, China).

Wood MJ, Ellis L, Volker PW (2005) Towards the prediction and management of windthrow in *Eucalyptus* plantations across Tasmania, Australia. In 'Proceedings of International Conference on Plantation Eucalyptus: Challenge in Product Development'. 28 November – 1 December, pp. 13-27. (Research Institute of Wood Industry, China Eucalypt Research Centre: Zhanjiang, Guandong, China).

Public presentations

Volker (2005) How we know what to grow. Forestry Tasmania lunchtime talk for National Science Week. 17 August.

Volker (2005) What makes good wood? Forestry Tasmania lunchtime talk for National Science Week. Wood Design Centre, Launceston, 19 August.

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

CRC Programme Two field visit to Goulds Country Trial, 27 July 2005. Tour led by Drs Peter Volker (Forestry Tasmania), Matt Wood (Forestry Tasmania), Chris Harwood (Ensis) and Russell Washusen (Ensis).

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

Volker P (2006) Harvesting and processing of Goulds Country E. nitens silvicultural trial. Interview with ABC Radio. 17 May.

Washusen R (2006) Processing of Goulds Country E. nitens silvicultural trial. Interview with ABC Radio. May.

Research Programme Four: Trees in the landscape

* = major funding source is not the CRC for Forestry but address is on the article, or the CRC for Forestry is acknowledged

= directly relevant to the project but the CRC for Forestry is not mentioned on the publication; usually involves CRC for Forestry in-kind staff and research was funded by the CRC for Sustainable Production Forestry or other grants (e.g. ARC).

Project 4.1 (Water)

Refereed journal articles

Archibald RD, Harper RJ, Fox JED, Silberstein RP (2006) Tree performance and root-zone salt accumulation in three dryland Australian plantations. *Agroforestry Systems* **66**, 191-204 #

Davies PE, Cook LSJ, McIntosh PD, Munks SA (2005) Changes in stream biota along a gradient of logging disturbance, 15 years after logging at Ben Nevis, Tasmania. *Forest Ecology and Management* **219**, 132-148 *

Davies PE, McIntosh PD, Wapstra M, Bunce SEH, Cook LSJ, French B, Munks SA (2005) Changes to headwater stream morphology, habitats and riparian vegetation recorded 15 years after pre-code forest clearfelling in upland granite terrain, Tasmania, Australia. *Forest Ecology and Management* **217**, 331- 350 *

Harper RJ, Smettem KRJ, Tomlinson RJ (2005) Using soil and climatic data to estimate the performance of trees, carbon sequestration and recharge potential at the catchment scale. *Australian Journal of Experimental Agriculture* **45**, 1389-1401 #

Pracilio G, Adams ML, Smettem KRJ, Harper RJ (2006) Determination of spatial distribution patterns of clay and plant available potassium contents in surface soils at the farm scale using high resolution gamma ray spectrometry. *Plant and Soil* **282**, 67-82 #

In press

Robinson N, Harper RJ, Smettem KRJ (2006) Soil water depletion by *Eucalyptus* spp. tree belts integrated into dryland agricultural systems. *Plant and Soil* (*in press*) #

Bren L, Lane P, McGuire D (2006) An empirical, comparative model of annual water yield changes associated with pine plantations in southern Australia. *Australian Forestry* (*in press*) *

Lane PNJ, Sheridan PJ, Noske PJ (2006) Changes in sediment loads and discharge from small mountain catchments following wildfire in south eastern Australia. *Journal of Hydrology* (*in press*) #

Smettem KRJ, Harper RJ, Watanabe F (2006) Can concepts of ecological optimality provide guidance for predicting the performance of replanted perennial vegetation in dryland areas? *Journal of Arid Land Studies* (*in press*) #

Unrefereed conference proceedings

Harper RJ, Robinson N, Smettem KRJ, Sochacki S (2005) Phased forestry systems for biomass production and salinity control. In 'International Energy Agency Tasks 30 and 31 Workshop: Multiple Benefits from Sustainable Bioenergy Systems'. 31 July - 5 August. (Perth, Western Australia) #

Harper RJ, Robinson N, Smettem KRJ, Sochacki S (2005) Phase farming with trees: the acceleration of farm forestry to combat dryland salinity. In 'XXII International Union of Forest Research Organisations World Congress: Forests in the Balance, Linking Tradition and Technology". 8-13 August. (Brisbane, Queensland) #

Harper RJ, Robinson N, Smettem KRJ, Sochacki S (2005) Phase farming with trees: the acceleration of farm forestry to combat dryland salinity (Abstract). Abstract of invited sub-plenary talk at 'Forests in the Balance: Linking Tradition and Technology', XX11 IUFRO World Congress, 8-13 August. (Brisbane, Queensland). *International Forestry Review* **7** (3), 276-277. doi: 10.1505/ifor.2005.7.3.276 #

Harper RJ, Smettem KRJ (2005) Using soil and climatic data to estimate carbon sequestration and recharge reduction at farm, watershed and regional scales. In 'Desert Technology 8'. 27 November – 2 December. (Nasu, Japan) #

Confidential reports

Harper RJ, McGrath JF (2005) Forestry and climate change in Western Australia. Climate change and adaptation in the south-west of Western Australia 1960-2005. (Ed J. Molin). Commercial in Confidence inter-government progress report to the Australian Greenhouse Office, pp. 57-60 #

Sochacki S, Harper RJ (2006) Characterisation of the sites for the RITE-Forest Products Commission joint study at Wickepin, Western Australia. In confidence Research Report for the Research Institute of Innovative Technology for the Earth (RITE), p.15. (Japan) #

Public reports

Davies PE, Smith B, Cook L, Richards K, Munks SA (2006) Changes in benthic macroinvertebrate communities in upper catchment streams in Tasmania across a gradient of intensity of forest operations. Unpublished report to Forestry Tasmania and the Forest Practices Authority. #

Book chapters

Smettem KRJ, Pracilio G, Oliver YM and Harper RJ (2005) Data availability and scale in hydrologic applications. In 'Development of Pedotransfer Functions in Soil Hydrology, Developments in Soil Science Vol. 30' (Eds Y Pachepsky and WJ Rawls). pp. 253-271. #

Theses

Sim R. (2005) Phase farming with trees on saline discharge areas of the WA wheatbelt. BSc(Honours) Thesis, Curtin University of Technology, Perth, Western Australia. #

Public presentations

Roberts S (2005) Water Quality in Tasmanian Forests FT lunchtime talk series, Hobart, Tasmania November. *

Roberts S (2005) Water Quality Management in Forests. Australian Water Association, Launceston, August *

Roberts S (2005) Why are forests part of the water debate? Timber Communities Australia, Launceston, May *

Roberts S (2005) Water in Tasmanian Forests. Triabunna Probus, Orford, August *

Roberts S (2006) Water and Forests. A dry topic for dinner-table discussion? FFIC, St Mary's, 14-15 June *

Smethurst P (2006) Riparian forestry project initiated. Poster presented to VegFuture06 Conference, Albury-Wodonga, 19-23 March.

Harper R (2005). Hydrological challenges in inserting trees into the medium rainfall (500-700 mm/yr) farming landscapes of southern Australia. Cooperative Research Centre for Forestry, Hobart, Tasmania. 27 July #

Harper R (2005) (a) Site evaluation and land selection, (b) New technologies for plantation establishment, (c) Plantation design for production and salinity control. Lectures to Forest Products Commission Training Course on Soils and Hydrology. Collie, Western Australia, 23-25 August, #

Harper R (2005) New technologies for the Forest Product Commission's plantation expansion. Forest Products Commission Annual Conference, Busselton, Western Australia. 3 November #

Harper R (2005) Extreme silviculture: the acceleration of farm forestry to combat salinity. Presentation to Primary Industries Ministerial Council, Forestry and Forest Products Committee, Research Working Group 5 (Silviculture), Busselton, Western Australia, 15 November #

Industry newsflashes

Harper RJ, Smettem KRJ, Sochacki S (2006) Phase farming with trees: the acceleration of farm-forestry to combat dryland salinity. *Australasian Forestry and Timber and Review* #

CD-ROMs/DVDs

Roberts S (2005) Water Quality in Tasmanian Forests FT lunchtime talk series, Hobart, Tasmania, November (available as DVD) *

Project 4.2 (Biodiversity)

Refereed journal articles

Baker, SC (2006) A comparison of litter beetle assemblages (Coleoptera) in mature and recently clearfelled *Eucalyptus obliqua* forest. *Australian Journal of Entomology* **45**, 130-136.*

Baker, SC, Barmuta, LA (2006) Evaluating spatial autocorrelation and depletion in pitfall-trap studies of environmental gradients. *Journal of Insect Conservation* **10**, 269-276.*

Burgess TI, Sakalidis ML, Hardy GE (2006) Gene flow of the canker pathogen *Botryosphaeria australis* between *Eucalyptus globulus* plantations and native eucalypt forests in Western Australia. *Austral Ecology* **31**, 559-566#

Costa e Silva J, Potts BM, Dukowski G (2006) Genotype by environment interaction for growth of *Eucalyptus globulus* in Australia. *Tree Genetics and Genomes* **2**, 61-75 *

Davies PE, Cook LSJ, Munks SA, Meggs J (2005) *Astacopsis gouldi* Clark: habitat characteristics and relative abundance of juveniles. *Tasforests* **16**, 1-18 #

Gates GM, Ratkowsky DA, Grove SJ (2005) A comparison of macrofungi in young silvicultural regeneration and mature forest at the Warra Long Term Ecological Research Site in the Southern Forests of Tasmania. *Tasforests* **16**, 127-152 #

Hopkins AJM, Harrison KS, Grove SJ, Wardlaw TJ, Mohammed CL (2005) Wood decay fungi and beetle assemblages associated with living *Eucalyptus obliqua* trees: early results from studies at the Warra Long Term Ecological Research Site, Tasmania. *Tasforests* **16**, 111-126 #

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Yee M, Grove SJ, Richardson A, Mohammed CL (2006) Brown rot in inner heartwood: why large logs support characteristic saproxylic beetle assemblages of conservation concern. In 'Insect biodiversity and dead wood. Proceedings of a symposium at the International Congress of Entomology' (Eds SJ Grove, JL Hanula) August 2004. USDA Forest Service Southern Research Station General Technical Report, Athens. (Brisbane, Queensland) (*in press*) #

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Richards K, Munks S, Spencer C, Wapstra M (2006) Monitoring the effectiveness of conservation measures for the broad-toothed stag beetle, *Lissotes latidens* in SE Tasmania. Unpublished report to Forestry Tasmania and the Forest Practices Authority. #

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Humphrey J (2005) Genetic variation and rapid analysis of defensive chemistry in *Eucalyptus globulus*. BSc (Honours) Thesis, University of Tasmania.

Mann A (2005) Variation in *Eucalyptus morrisbyi*: associations between leaf attributes and resistance to a marsupial herbivore. Unpublished BSc (Honours) Thesis, University of Tasmania #

Rice AD (2005) The larval parasitoid guild of *Chrysophtharta agricola* (Coleoptera: Chrysomelidae): host-parasitoid ecological and developmental interactions. PhD, School of Agricultural Science, University of Tasmania, Hobart, Tasmania #

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Davies S, Duncan F, Chuter A (2005) Sustainable harvesting of tree ferns (*Dicksonia antarctica*) in Tasmania. Abstract of talk at 'Forests in the Balance: Linking Tradition and Technology', XX11 IUFRO World Congress, 8-13 August, Brisbane, Queensland. *International Forestry Review***.**

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Grove SJ (2005) Deadwoodology Down Under. Oral presentation for Forestry Commission, Alice Holt Research Station occasional seminars, Wrecclesham, UK, 3 November.

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Grove SJ (2005) Messy forests are healthy forests. Oral presentation at the University of Melbourne School of Forest and Ecosystem Sciences occasional seminars, Creswick, Victoria, 2 June.

Grove SJ (2005) The Warra Long Term Ecological Research Site. Oral presentation at the Tasmanian Field Naturalists Club monthly meeting, Hobart, Tasmania, 6 October.

Grove SJ (2006) The Warra LTER site in southern Tasmania. Poster presentation at Sixth conference of the East Asia - Pacific regional network of the International Long Term Ecological Research network, Kyoto, Japan, 20-23 March.

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Harrison K, Hopkins AJM, Grove S, Mohammed CL (2005) Saproxylic beetles associated with mature living *Eucalyptus obliqua* trees in southern Tasmania. Poster presentation at the 7th Invertebrate Biodiversity and Conservation conference, Canberra, Australia Capitol Territory, 5-9 December #

Hopkins AJM (2006) Wood-inhabiting fungi in *Eucalyptus obliqua* logs: examining the effect of log size and forest type on fungal community composition. Oral presentation. In 'The Joint Conference of the NZ Ecological Society and the Ecological Society of Australia'. 28 August - September, Wellington, New Zealand. (*in press*) #

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Munks SA, Wapstra M, Corkrey R, Walker B (2005) Conservation of the hollow resource in the dry eucalypt forests of south-eastern Tasmania: to what extent do current measures capture hollow-bearing trees? Abstract, XX11 IUFRO World Congress, Brisbane, Queensland, August.

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O'Reilly-Wapstra JM (2006) NIRS: a rapid tool for addressing ecological questions. The Macaulay Land Use Research Institute, Aberdeen, Scotland, June *

Potts BM, McKinnon G, Steane DA, Jones T, McGowen M, Foster S, Dutkowski G, Vaillancourt RE (2005) *Eucalyptus globulus*: A model species for eucalypt genetic research. Abstract of invited sub-plenary talk at 'Forests in the Balance: Linking Tradition and Technology', XX11 IUFRO World Congress, 8-13 August, Brisbane, Queensland. *International Forestry Review* **7**, 49 *

Potts BM, McKinnon GE, Steane DA, Jones TH, Foster S, Vaillancourt RE, Freeman JS (2005) Molecular insights into the gene pool of *Eucalyptus globulus*. Abstract for poster presented at IUFRO Tree Biotechnology Meeting. Forestry and Agricultural Biotechnology Institute [FABI]: University of Pretoria, Pretoria, South Africa, 6-11 November *

Stamm L, Yee M, Grove S, Mohammed CL (2005) Talking rot! Poster presentation at the 7th Invertebrate Biodiversity and Conservation conference, Canberra, ACT, 5-9 December.

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Steane DA, McKinnon GE, Freeman JS, Dutkowski G, Vaillancourt RE, Potts BM (2005) Genotypes and phenotypes: evolutionary processes in the Tasmanian blue gum, *Eucalyptus globulus*. Invited talk (by DS) at the Allen Herbarium, Lincoln, New Zealand. *

Walsh A (2005) A strategy for integrated management of browsers on State forest in Tasmania. Paper presented at the Vertebrate Pest Conference, Christchurch, New Zealand, August.

Wapstra M, Roberts R, Duncan F, Woolley A (2005) Illuminating the dark of the forest floor: managing the 'fairy lanterns' *Thismia rodwayi* in wood production forests in Tasmania. Flora Conservation Symposium, Advances in Plant Conservation Biology: Implications for Flora Management and Restoration, Perth, Western Australia, October.

Wapstra M, Duncan F (2005) Managing threatened flora in wood production forests in Tasmania: a pragmatic approach. Flora Conservation Symposium, Advances in Plant Conservation Biology: Implications for Flora Management and Restoration, Perth, Western Australia, October.

Watson T (2005) Using a tree decline toolkit of existing methods to address decline. Oral presentation at Using a decision support system to control tree decline. Field workshop hosted by NHT, CRC Forestry and Greening Australia at Oatlands, Tasmania, 13 December.

Watson T, Davidson NJ, Jordan G (2006) Assessing the biodiversity value of establishing plantations amongst remnant forest stands. Poster presented at Veg Futures 2006. The Conference in the field. Albury-Wodonga, Victoria, 19-23 March.

Newsletters

Munks SA (2005) The FPA becomes a supporting partner organisation in the new CRC for Forestry. *Forest Practice News*. **6** (4), 13

CD-ROMs/DVDs

Potts BM (2006) *Eucalyptus globulus*: a tree for the world. Forestry Talks DVD, Topic 18.

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

Collett N (2006) University of Melbourne research. Oral presentation to the 'Biodiversity workshop' Penola, South Australia, 30-31 March.

Davidson NJ (2006) Introduction. Oral presentation to the 'remnant assessment workshop' Tullamarine Hilton, Victoria, 23 June.

Davidson NJ (2006) Introduction to the Biodiversity Project. Oral presentation to the 'Biodiversity workshop' Penola, South Australia, 30-31 March.

Davidson NJ (2006) Outcomes of workshop. Oral presentation to the 'remnant assessment workshop' Tullamarine Hilton Victoria, 23 June.

Davidson NJ (2006) Persistence of forest remnants. Oral presentation to the 'remnant assessment workshop' Tullamarine Hilton Victoria, 23 June.

Davidson NJ (2006) Tasmanian research. Oral presentation to the 'Biodiversity workshop' Penola, South Australia, 30-31 March.

Loyn R (2006) Remnants as wildlife habitat: their value and opportunities for enhancement. Oral presentation to the 'Remnant Assessment workshop' Tullamarine Hilton, Victoria, 23 June.

Matsuki M (2006) Biodiversity project rankings in Western Australia. Oral presentation to the 'Biodiversity workshop' Penola, South Australia, 30-31 March.

Unwin GL (2006) Weather makers or weather breakers. Book review for *Australian Forest Grower*, **29** (1), April.

Wardlaw T (2006) Forestry Tasmania research. Oral presentation to the 'Biodiversity workshop' Penola, South Australia, 30-31 March.

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

Potts B (2006) Sweet tree dreaming. Is it last drinks for Tasmania's cider gums? Australian Geographic interview on Mienna cider gum and photo published Gabi Mocatta, January-March 2006. Pp. 39-40.

Potts B (2006) The Mienna cider gum. Live interview with Luis Saunders on the ABC radio morning show, 16 January 2006.

O'Reilly-Wapstra JM, Loney P, Wiggins N (2006) Research into alternatives to 1080 as a browsing management strategy. Interview with Neisha Harris for ABC television news, April 2006.

Project 4.3 (Communities)

Unrefereed journal articles

Schirmer J (2006) Socio-economic study explodes popular myths. *Australian Forest Grower* **10** *

Refereed conference proceedings

Schirmer J (2006) Plantations and social conflict: exploring the differences between small-scale and large-scale plantation forestry. In 'Small-scale forestry and rural development: the intersection of ecosystems, economics and society. Proceedings of IUFRO 3.08 Conference'. (Galway-Mayo Institute of Technology: COFORD, Dublin) 18-23 June 2006.

Public presentations

Schirmer J (2005) Socio-economic impacts of plantation forestry in Western Australia and New South Wales. Talk hosted by Commercial Plantations Western Australia, Albany, Western Australia, 18 November 2005 *

Schirmer J (2005) Socio-economic impacts of plantation forestry in Western Australia and New South Wales. Talk presented to the 2006 NAFI Workshop, 30 November 2005, Canberra *

Schirmer J (2005) Socio-economic impacts of plantation forestry. Seminar for Private Forests Tasmania, 13 December 2005 12:30-1:30pm, Launceston *

Schirmer J (2005) Socio-economic impacts of plantation forestry. CRC for Forestry seminar, held at University of Tasmania (Newnham Campus), 13 December 2005 5:30-7pm, Launceston *

Schirmer J (2005) Socio-economic impacts of plantation forestry. CRC for Forestry seminar, CRC for Forestry seminar room, Sandy Bay, 14 December 2005, Hobart, Tasmania *

Schirmer J (2006) Socio-economic impacts of plantation forestry. DPI Victoria public seminar, 1 February 2006, Hamilton, Victoria *

Schirmer J (2006) Socio-economic impacts of plantation forestry. Timber Communities Australia breakfast, February 3rd 2006, Mt Gambier, South Australia *

Schirmer J (2006) Socio-economic impacts of plantation forestry. Timber Communities Australia public seminar, 13 February 2006, Tumut Shire Council Office, Tumut, New South Wales *

Schirmer J (2006) Socio-economic impacts of plantation forestry. Timber Communities Australia public seminar, 14 February 2006, Tumbarumba, New South Wales *

Schirmer J (2006) Socio-economic impacts of plantation forestry. Timber Communities Australia public seminar, 20 February 2006, Bombala New South Wales *

Schirmer J (2006) Integrating commercial forestry into rural landscapes – social and economic implications. Veg Futures '06, Greening Australia & Land and Water Australia, March 20 - 22 2006, Albury - Wodonga, New South Wales.

Schirmer J (2006) Socio-economic impacts of plantation forestry. DPI Victoria public seminar, 18 April 2006, Colac, Victoria.

Schirmer J (2006) Socio-economic impacts of plantation forestry. DPI Victoria public seminar, 19 April 2006, Leongatha, Victoria.

Schirmer J (2006) Socio-economic impacts of plantation forestry. DPI Victoria public seminar, 19 April 2006, Sale, Victoria.

Schirmer J (2006) Socio-economic impacts of plantation forestry. DPI Victoria public seminar, 19 April 2006, Wangaratta, Victoria.

Schirmer J (2006) Socio-economic impacts of plantation forestry. Timber Communities Australia 2006 workshop. 27 May 2006, Canberra.

Schirmer J (2006) Plantations and social conflict: exploring the differences between small-scale and large-scale plantation forestry. Paper presented to Small-scale forestry and rural development: the intersection of ecosystems, economics and society. IUFRO 3.08 Conference, 19 June 2006, Galway-Mayo Institute of Technology, Galway, Ireland.

Media releases

CRC for Forestry media release. 13 December 2005. Socioeconomic impacts of plantations.

Department of Primary Industries Victoria media release. 5 April 2006. What are the impacts of plantation forestry on our rural communities?

Media articles & interviews – directly mentioning the CRC for Forestry

Shirmer J (2006) Western Victoria Warrnambool Rural Report, interview on ABC 6.44am Thursday 9 February 2006.

Shirmer J (2006) Interview on WIN Television Tasmania, 14 December 2005.

Shirmer J (2006) Interview with Campbell Cooney, ABC Rural Victoria, 7 May 2006.

Mansell S (2006) Forestry to boost population. *The Border Times* 3 February 2006. p.3.

Portland Observer (2006) Study explores impact of plantation forestry. 6 February 2006. p.5.

Appendix three: communications achievements

Web

- A public website is being developed and has received tens of thousands of hits in year one.

Media releases and other press

- May*: In The Living Forest* hardcover book about the forest industry, with a feature about the CRC for Forestry.
- Media release, 8 May: "Experimental trees grown for high value products: now for the results" (a press release about the Goulds Country experiment wood quality trial that is first of its kind in Australia.
- Media release, 13 December: "Socio-economic impacts of plantations".
- October: annual forestry feature in *The Examiner*, featuring the CEO of the CRC for Forestry.
- August: feature in the Higher Education section of *The Australian* about further education in the forest sector – heavily featuring the CRC for Forestry, including a picture of one of our scientists.
- Media release, 25 July: launch of the CRC for Forestry.
- See also "media articles and interviews" sections listed by research programme/project in appendix two.

Industry newsletters

- A two-page editorial was published in the research section of the *Australasian Forestry and Timber Review*, plus one page in the education section, and the company listing.
- The CRC for Forestry has a regular column or feature in *True Blue* (Tasmanian Forests and Fprest Industry Council newsletter), which comes out quarterly and is distributed to 15,000 people in the industry.
- *Australian Forest Growers* has featured stories about the CRC for Forestry, including an article about Goulds Country.

Internal communications

- The members-only website is being updated and used to share confidential information. An online forum space is being set up for students to keep in touch Australia-wide.
- Newsletters are coming out regularly for each of the research programmes.

Politicians

- 29 March: Project 4.3 (Communities) leader Jacki Schirmer met with Malcolm Turnbull MP and Senator Bill Heffernan, and members of their staff, where she was able to inform them about our current research. The CRC for Forestry established direct links to the offices of both the parliamentarians.
- 2 May: the new Australian Forestry Minister Senator Eric Abetz, and the Tasmanian Minister for Economic Development and Resources Hon Bryan Green held a joint press conference at the head quarters of the CRC for Forestry. The CRC for Forestry was represented at the press conference by CEO Rod Griffin and Acting Research Programme Four Manager Tim Wardlaw and the research of the CRC for Forestry in the areas of alternatives to clearfelling and alternatives to 1080 poisoning were highlighted.
- 2 June: Senator Abetz and his advisor visited CRC for Forestry headquarters, they were briefed by programme managers, toured the site and met some of the scientists.

CRC Forestry Limited

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Annual financial report for the year ended 30 June 2006

Annual financial report for the year ended 30 June 2006

Directors' report

The directors of CRC Forestry Limited submit herewith the annual financial report of the company for the year ended 30 June 2006. 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 Divisions of General Practice. 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.
Patricia Caswell	(BA(Hon), B.Ed). Chief Executive Officer, Victorian Association of Forest Industries. Joined the Board at incorporation of the company on 30 June 2005 in a non-executive capacity and resigned at the first Annual General Meeting of the company on 6 December 2005.
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 30th 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.
Richard Michael Ede	(MSc(Hons), PhD, MAICD). Director, Ensis Investment. Joined the Board on 6 January 2006 in a non-executive capacity. Dr Ede is Chairman of the Commercialisation and IP Management Committee.
Ian Stewart Ferguson	(B.Sc.For, MF, DF). Fellow of Australian Academy of Technological Sciences and Engineering; Professor Emeritus, University of Melbourne; Director of Hancock Victorian Plantations Pty Ltd, Tiaki Plantation Co., and Timber Training Centre, Creswick. Joined the Board at incorporation of the company on 30 June 2005 in a non-executive capacity and resigned at the first Annual General Meeting of the company on 6 December 2005.
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 and Nomination Committee.
Ian Charles Ravenwood	(GradDip.Sci, MBA). North West Plantation Manager, Gunns Limited. Joined the Board at incorporation of the company on 30 June 2005 in a non-executive capacity and resigned at the first Annual General Meeting of the company on 6 December 2005.
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 and Nomination Committee.
Robert Geoffrey Woolley	(B.Ec, FCA). Chairman of the Forests and Forest Industry Council of Tasmania, and previously a partner in Deloitte Touché 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.

The above named directors held office during and since the end of the year except for:

- Patricia Caswell, Ian Ferguson and Ian Ravenwood – all resigned 6th December 2005
- Richard Ede – appointed 6th January 2006
- Gary Inions – appointed 13th December 2005
- Robert Woolley – appointed 12th December 2005

Company Secretary

Joanne Margaret Neilson (BBus, CPA), joined the company at incorporation on 30th June 2005 and previously held the Business Manager position in the Cooperative Research Centre for Sustainable Production Forestry (on secondment from her substantive position as Manager Financial Reporting, University of Tasmania). Mrs Neilson holds a Bachelor of Business Degree from the University of Tasmania, is a Certified Practising Accountant and affiliated member of Chartered Secretaries Australia.

Principal activities

CRC Forestry Limited is the 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

The Company was incorporated on 30th June 2005 but did not commence operations until the legal documentation between the participants in the CRC for Forestry and the Commonwealth Government was signed on 26th October 2005 (hence no comparative figures have been provided for the previous year). The major sources of funding are the Commonwealth Government's CRC Programme and the Participants in the CRC for Forestry ($2,700,000 and $1,519,945 respectively in the year).

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 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, 7 board, 1 remuneration and nomination committee and 1 compliance committee meetings were held. The commercialisation and IP management committee and communications committee did not meet during the year.

	Board of directors		Remuneration and Nomination committee		Compliance committee	
Directors	Held	Attended	Held	Attended	Held	Attended
Anne Carnell	7	7	1	1	1	1
Timothy Browning	7	6			1	1
Patricia Caswell	5	4				
Johannes Drielsma	7	6	1	1		
Richard Ede	2	2				
Ian Ferguson	5	3				
Gary Inions	2	2	1	1		
Ian Ravenwood	5	5				
James Reid	7	7	1	1		
Robert Woolley	2	2			1	1

Auditor's independence declaration

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

Signed in accordance with a resolution of the directors made pursuant to s.298(2) of the Corporations Act 2001.

On behalf of the Directors

Robert Woolley
Director
Hobart, 29 September 2006

Deloitte.

Deloitte Touche Tohmatsu
ABN 74 490 121 060

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

29 September 2006

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 2006, 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

L. T. Cox
Partner
Chartered Accountants

Deloitte.

Deloitte Touche Tohmatsu
ABN 74 490 121 060

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Independent audit report to the members of CRC Forestry Limited

Scope

The financial report and directors' responsibility

The financial report comprises the balance sheet, income statement, cash flow statement, statement of recognised income and expense, a summary of significant accounting policies and other explanatory notes and the directors' declaration for CRC Forestry Limited, for the financial year ended 30 June 2006 as set out on pages 9 to 21.

The directors of the company are responsible for the preparation and true and fair presentation of the financial report in accordance with Accounting Standards in Australia and the Corporations Act 2001. This includes responsibility for the maintenance of adequate financial records and internal controls that are designed to prevent and detect fraud and error, and for the accounting policies and accounting estimates inherent in the financial report.

Audit approach

We have conducted an independent audit of the financial report in order to express an opinion on it to the members of the company. Our audit has been conducted in accordance with Australian Auditing Standards to provide reasonable assurance whether the financial report is free of material misstatement. The nature of an audit is influenced by factors such as the use of professional judgement, selective testing, the inherent limitations of internal controls, and the availability of persuasive rather than conclusive evidence. Therefore, an audit cannot guarantee that all material misstatements have been detected.

We performed procedures to form an opinion whether, in all material respects, the financial report is presented fairly in accordance with Accounting Standards in Australia and the Corporations Act 2001 so as to present a view which is consistent with our understanding of the company's financial position, and performance as represented by the results of its operations, its changes in equity and its cash flows.

Our procedures included examination, on a test basis, of evidence supporting the amounts and other disclosures in the financial report, and the evaluation of accounting policies and significant accounting estimates made by the directors.

While we considered the effectiveness of management's internal controls over financial reporting when determining the nature and extent of our procedures, our audit was not designed to provide assurance on internal controls.

The audit opinion expressed in this report has been formed on the above basis.

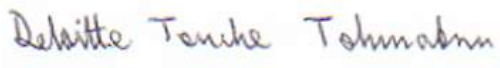
Deloitte.

Audit 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 2006 and of its performance for the year ended on that date; and

(b) complying with Accounting Standards in Australia and the Corporations Regulations 2001.



DELOITTE TOUCHE TOHMATSU

L.T. Cox
Partner
Chartered Accountants
Hobart, 29th September 2006

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

Robert Woolley
Director
Hobart, 29 September 2006

Income statement for the year ended 30 June 2006

	Note	2006
		$
Revenue		
Revenue	2	2,535,868
Other income	2	245,741
Total Revenue		**2,781,609**
Expenses		
Research provider expenses		1,844,880
Employee related expenses		518,287
Depreciation		13,414
Rental and maintenance		108,995
Corporate and other expenses		296,033
Total Expenses		**2,781,609**
Profit before income tax		**0**
Income tax expense		0
Profit for the year		**0**

Notes to the financial statements are included on pages 14 to 21.

Balance sheet as at 30 June 2006

	Note	2006
		$
Current assets		
Cash and cash equivalents	12(a)	1,016,074
Trade and other receivables	4	102,455
Other	5	654,980
Total current assets		**1,773,509**
Non-current assets		
Plant and equipment	6	53,713
Total non-current assets		**53,713**
Total assets		**1,827,222**
Current liabilities		
Trade and other payables	7	137,846
Other	2	1,684,077
Total current liabilities		**1,821,923**
Non-current liabilities		
Provisions	8	5,299
Total non-current liabilities		**5,299**
Total liabilities		**1,827,222**
Net assets		**0**
Equity	15	
Reserves		0
Retained earnings		0
Total equity		**0**

Notes to the financial statements are included on pages 14 to 21.

Statement of recognised income and expense for the year ended 30 June 2006

	Note	2006
		$
Net income recognised directly in equity		0
Profit for the year		0
Total recognised income and expense for the year		**0**

Notes to the financial statements are included on pages 14 to 21.

Cash flow statement for the year ended 30 June 2006

	Note	2006
		$
Cash flows from operating activities		
Receipts from customers		4,717,751
Payments to suppliers and employees		(3,745,182)
Net cash provided by operating activities	12(c)	**972,569**
Cash flows from investing activities		
Interest received		50,662
Payment for property, plant and equipment		(60,747)
Proceeds from sale of property, plant and equipment		53,590
Net cash provided by investing activities		**43,505**
Cash flows from financing activities		
Net cash provided by financing activities		**0**
Net increase in cash and cash equivalents		**1,016,074**
Cash and cash equivalents at the beginning of the year		0
Cash and cash equivalents at the end of the year	12(a)	**1,016,074**

Notes to the financial statements are included on pages 14 to 21.

Notes to the financial statements for the year ended 30 June 2006

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 Urgent Issues Group Interpretations, and complies with other requirements of the law. Accounting Standards include Australian equivalents to International Financial Reporting Standards ('A-IFRS'). Compliance with the A-IFRS ensures that the financial statements and notes of the company comply with International Financial Reporting Standards ('IFRS').

The financial statements were authorised for issue by the directors on 28 September 2006.

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.

In the application of A-IFRS management is required to make judgments, estimates and assumptions about carrying values of assets and liabilities that are not readily apparent from other sources. The estimates and associated assumptions are based on historical experience and various other factors that are believed to be reasonable under the circumstances, the results of which form the basis of making the judgments. Actual results may differ from these estimates.

The company was incorporated on 30 June 2005, but did not commence operations until 26 October 2005, accordingly no comparative information is presented in this financial report.

The estimates and underlying assumptions are reviewed on an ongoing basis. Revisions to accounting estimates are recognised in the period in which the estimate is revised if the revision affects only that period, or in the period of the revision and future periods if the revision affects both current and future periods.

Judgments made by management in the application of A-IFRS that have significant effects on the financial statements and estimates with a significant risk of material adjustments in the next period are disclosed, where applicable, in the relevant notes to the financial statements.

Accounting policies are selected and applied in a manner which ensures that the resulting financial information satisfies the concepts of relevance and reliability, thereby ensuring that the substance of the underlying transactions or other events is reported.

The accounting policies set out below have been applied in preparing the financial statements for the year ended 30 June 2006.

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

(a) Cash and cash equivalents

Cash and cash equivalents comprise cash on hand, cash in banks and investments in money market instruments, net of outstanding bank overdrafts. 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 and accordingly only current year figures covering the period from incorporation are shown.

(c) Employee benefits

Provision is made 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.

Provisions made 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.

Provisions made 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 incurred.

(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.

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 are recorded at amortised cost less impairment.

(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

At each reporting date, the company reviews the carrying amounts of its tangible and intangible 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.

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 in profit or loss immediately, unless the relevant asset is carried at fair value, in which case the impairment loss is treated as a revaluation decrease (refer note 1(j)) .

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 periods. A reversal of an impairment loss is recognised in profit or loss immediately, unless the relevant asset is carried at fair value, in which case the reversal of the impairment loss is treated as a revaluation increase (refer note 1(j)).

(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.

	2006 $
2. Profit from operations	
Revenue	
CRC Programme Funds:	
Received during the year (and included on Cash Flow Statement)	2,700,000
Less deferred government grant (recorded as current liability on Balance Sheet)	1,684,077
	1,015,923
Core Participant funds	1,268,945
Supporting Participant funds	251,000
Total Revenue	**2,535,868**
Other Income	
Miscellaneous income	117,523
Consultancy income	17,586
Contribution of asset	59,059
Interest income	50,662
Gain on disposal of asset	911
Total Other Income	**245,741**
3. Remuneration of auditors	
Auditor of the parent entity	
Audit of the financial report	11,500
Other accounting consultancy	4,900
	16,400

The auditor of CRC Forestry Limited is Deloitte Touche Tohmatsu.

4. Current trade and other receivables	
Trade receivables (i)	22,103
Goods and services tax (GST) recoverable	80,352
	102,455

(i) The average credit period on sales of goods is 30 days, no interest is charged on trade receivables.

5. Other current assets	
Advance payments to research providers:	
CSIRO	316,727
Murdoch University	48,657
Southern Cross University	15,966
University of Melbourne	150,574
University of Tasmania	118,056
	649,980
Prepayments	5,000
	654,980

6. Plant and equipment (at cost)

	2006 $
Gross carrying amount	
Balance at beginning of reporting the year	0
Additions	60,747
Disposals	(52,679)
Asset contributions from other parties	59,059
Gross Balance at end of the year (at cost)	67,127
Less depreciation expense	13,414
Net book value at end of the year	**53,713**

7. Current trade and other payables

Trade payables (i) & (ii)	17,662
Accrued expenses	120,184
	137,846

(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 $11,648 owing to The Australian National University (ANU), this being the difference between the total advance payments to ANU during the year $95,925 and the amount expended by ANU during the year of $107,573.

8. Non-current provisions

Employee benefits	5,299
	5,299

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	98,800
Longer than 1 year and not longer than 5 years	436,333
Longer than 5 years	120,205
	655,338

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

	2006 $
(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	80,694
At call deposit account	935,380
	1,016,074
(b) Financing facilities	
Mastercard facility	**20,000**
(c) Reconciliation of profit for the year to net cash flows from operating activities	
Profit for the year	0
Gain on sale of non-current assets	(911)
Depreciation and amortisation of non-current assets	13,414
Equipment transferred from old CRC for Sustainable Production Forestry	(59,059)
Interest income received and receivable	(50,662)
(Increase)/decrease in assets:	
Current receivables	(102,455)
Other current assets	(654,980)
Increase/(decrease) in liabilities:	
Current payables	137,846
Other current liabilities	1,684,077
Non-current provisions	5,299
Net cash from operating activities	**972,569**

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.

(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.

13. Financial instruments (continued)

(c) Interest rate risk management

Maturity profile of financial instruments

The following table details the company's exposure to interest rate risk as at 30 June 2006:

2006	Weighted average effective interest rate %	Variable interest rate $'000	Fixed maturity dates: Less than 1 year $'000	1-2 years $'000	2-3 years $'000	3-4 years $'000	4-5 years $'000	5+ years $'000	Non interest bearing $'000	Total $'000
Financial assets:										
Cash at bank and on hand	5.00	80,694								80,694
At call term deposit	5.65	935,380								935,380
Trade receivables	n/a								22,103	22,103
Other receivables	n/a								80,352	80,352
		1,016,074	0	0	0	0	0	0	102,455	1,118,529
Financial liabilities:										
Trade payables	n/a								17,662	17,662
Other payables	n/a								120,184	120,184
Employee benefits	n/a								5,299	5,299
		0	0	0	0	0	0	0	143,145	143,145

(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 group of counterparties having similar characteristics.

14. Key management personnel remuneration

The compensation of the specified directors and specified executives, being the key management personnel of the company, is set out below:

	2006 $
Short-term employee benefits	241,905
Post-employment benefits	24,277
Other long-tem employee benefits	2,328
Termination benefits	14,721
	283,231

15. 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