

1.3.4 Commercialisation and Utilisation programme

1.3.4.1 Specified programme personnel and private sector participants

Commercialisation and utilisation programme	
Specified personnel - programme leader Dr P Smethurst (utilisation and training)	Time commitment 0.2 for start-up, with assistance of CEO; build to 0.5 by 2007.
Commercialisation manager tba	0.5 with support from DED from 2006/07.
Private sector participants All core and supporting industry participants including SME representative organisations: Southern Tree Breeding Association Forest Practices Board of Tasmania Australian Forest Growers Private Forests Tasmania	

1.3.4.2 Outcomes, outputs and milestones

CU milestones applicable to all outputs:

- Commercialisation and Utilisation plan detailed for each project in March 2006.
- Review CU plans annually in March 2007, 2008, 2009, 2010, 2011 and 2012.

CRC Outcome 1.		
Improved ability to select planting sites and manage for increased profitability of plantation investments, through higher yields and lower costs of production.		
1.1 Output Significant presence established in the national market with a visualisation system for soil and stand condition.	Delivery date June 2012	Related research programme(s) Research Programme Output 1.1
1.1.1 Milestone Commercial product and licensed service providers available for airborne LIDAR and large format aerial photography for assess stand attributes. Workshop to inform of potential applications.		December 2007
1.1.2 Milestone Rapid assessment technology available as licensed commercial service for assessing soil attributes. Workshop to inform of potential applications.		December 2010
1.1.3 Milestone Commercial product and licensed service providers available for forest condition indicators from remotely sensed imagery. Workshop to inform of potential applications.		March 2012
1.1.4 Milestone Commercial product and licensed service providers available for 3D visualisation systems. Workshop to inform of potential		March 2012

applications.		
1.2 Output Adoption by industry of management systems for predicting impacts, consequences and best-bet intervention strategies to minimize the risks of growing plantations, maximizing production through the management cycle and predicting the spatial distribution of hazards.	Delivery date June 2012	Related research programme(s) Research Programme Output 1.2
1.2.1 Milestone Training provided to industry on climate and site-specific strategies for intra-and inter-rotational management to maximise sustainable production from blue gum plantations.		December 2009
1.2.2 Milestone Workshop on tools for predicting impacts and risks of climate and forest management: recent advances, remaining needs and potential		December 2009
1.2.3 Milestone Models for predicting rotation length impacts of damage from disease and insects available as software, and members and other stakeholders trained in their use.		December 2010
1.2.4 Milestone Further training in use of tools for predicting impacts and risks of climate and forest management		March 2012
1.3 Output Adoption by market of modules of licensed software for integrating effects of genetic stock and site variability, plantation history and plantation management to predict the size class distribution (stem sizes, clear log length) and survival of trees.	Delivery date June 2012	Related research programme(s) Research Programme Output 1.3
1.3.1 Milestone Pilot project completed of software for predicting size class distributions and survival.		December 2009
1.3.2 Milestone Licensed modular software available to industry that predicts size classes and survival.		December 2010
1.3.3 Milestone Workshops provided in regions on potential applications for licensed modular software to predict size class distributions and survival.		December 2010
1.3.4 Milestone Members trained in use of productivity prediction software that incorporates below-ground competition between one tree crop species and weeds or a companion crop species.		March 2012
CRC Outcome 2. Increased use of planting stock with improved genetic potential, managed to optimise production of high value wood for fibre and solid wood markets.		
2.1 Output	Delivery date	Related research

Use of improved germplasm from members' breeding programmes to produce higher-value plantations for specified end-uses.	June 2012	programme(s) Research Programme Output 2.1
2.1.1 Milestone Phenotypic information on pulpwood quality traits for at least 800 trees per species of <i>E. globulus</i> and <i>E. nitens</i> provided to members owning the sampled trials.		June 2007
2.1.2 Milestone Training provided in solid-wood breeding objectives and assessment techniques for <i>E. nitens</i> incorporated into STBA TREEPLAN® genetic assessment software, and into alternative delivery platforms for non-STBA industry.		June 2008
2.1.3 Milestone Training provided in solid-wood breeding objectives and assessment techniques for <i>E. globulus</i> incorporated into STBA TREEPLAN® genetic assessment software, and into alternative delivery platforms for non-STBA industry.		June 2010
2.1.4 Milestone Molecular genetic information for solid-wood and pulpwood traits of <i>E. globulus</i> , <i>E. nitens</i> and <i>E. pilularis</i> available for application by CRC members through commercially available routine DNA analysis.		June 2011
2.1.5 Milestone Molecular genetic information for pulpwood traits of <i>E. globulus</i> and <i>E. nitens</i> incorporated into STBA TREEPLAN® genetic assessment software, and into alternative delivery platforms for non-STBA industry partners, enabling integration of molecular and quantitative genetic information		March 2012
2.2 Output Adoption of soundly based silvicultural prescriptions by eucalypt growers targeting solid and engineered wood products.	Delivery date June 2012	Related research programme(s) Research Programme Output 2.2
2.2.1 Milestone Workshop on the currently-known effects of silviculture and environment on variables that define solid-wood development.		June 2007
2.2.2 Milestone Pilot programme initiated in collaboration with at least one industry practitioner in thinning strategies for <i>E. globulus</i> and <i>E. nitens</i> that incorporate the effects of site quality on the capacity of trees to respond to thinning.		June 2009
2.2.3 Milestone Workshop on wood quality impacts of form factor, aspect ratio, crown-symmetry and architecture, and individual tree responses to high-lift pruning in <i>E. globulus</i> and <i>E. nitens</i> .		June 2009

2.2.4 Milestone Training provided on the use of biometric relationships for <i>E. globulus</i> and <i>E. nitens</i> that allow log yield parameters to be predicted in response to silvicultural management.		June 2010
2.2.5 Milestone Training provided in the use of software compatible with existing process-based models for predicting the response of wood-quality variables to silvicultural intervention for <i>E. globulus</i> and <i>E. nitens</i> .		March 2012
2.3 Output Growers trained and in silvicultural treatments for solid and engineered wood products through a better understanding of impacts on wood quality and product value.	Delivery date June 2012	Related research programme(s) Research Programme Output 2.3
2.3.1 Milestone Members trained in silvicultural prescriptions that will minimise tension wood formation in <i>E. globulus</i> plantations in southern mainland Australia.		June 2008
2.3.2 Milestone In-field training for members on silvicultural prescriptions to minimise levels of decay and other defects in response to pruning and thinning treatments for <i>E. nitens</i> in Tasmania.		June 2009
2.3.3 Milestone Workshop held on the impact of tension wood on processing of solid/engineered products from <i>E. globulus</i> and <i>E. nitens</i> in Tasmania and eastern Victoria, and one subtropical eucalypt species.		June 2010
2.3.4 Milestone Training provided on silvicultural prescriptions that will optimise the net value of products from plantations of <i>E. globulus</i> (2010) for defined processing systems.		June 2010
2.3.5 Milestone Training provided on silvicultural prescriptions that will optimise the net value of products from plantations of <i>E. nitens</i> (2011) for defined processing systems.		June 2011
2.3.6 Milestone Training provided on silvicultural prescriptions that will optimise the net value of products from plantations of one subtropical eucalypt species for defined processing systems.		March 2012
2.4 Output Adoption of sampling strategies and software to achieve improved valuation of pulpwood and solid/engineered wood plantations.	Delivery date June 2012	Related research programme(s) Research Programme Output 2.4
2.4.1 Milestone Workshop on implementation of improved pulpwood sampling protocols.		June 2009

2.4.2 Milestone Pilot projects completed on new sampling protocols for pulpwood and solid-wood regimes.	June 2010
2.4.3 Milestone Workshop on potential uses of solid-wood sampling protocols.	June 2010
2.4.4 Milestone Training provided on use of licensed software modules for wood quality prediction incorporating site, germplasm and silvicultural information.	March 2012

CRC Outcome 3.		
Adoption of harvesting and logistical practices which reduce delivered wood costs, contributing to industry profitability, while maintaining conformity with certification standards.		
3.1 Output Adoption of systems to automatically capture performance data from forest harvest machines and to support networked data transfer from forest to office.	Delivery date June 2010	Related research programme(s) Research Programme Output 3.1
3.1.1 Milestone Workshop on current options and future directions nationally and internationally on automated data collection systems, including field-to-office data transfer.		December 2006
3.1.2 Milestone Pilot projects completed on automated data capture and networking of machine performance.		December 2009
3.1.8 Milestone Workshop held on potential uses of commercialised hardware and software.		December 2010
3.2 Output Systems designed to optimise harvesting systems and operator performance adopted by industry members.	Delivery date December 2009	Related research programme(s) Research Programme Output 3.2
3.2.1 Milestone Workshop on current options and future directions nationally and internationally on roading optimisation.		June 2007
3.2.2 Milestone Pilot projects completed on equipment optimisation and a chain of custody system.		December 2008
3.2.3 Milestone Workshop held on potential uses of a Forest Road Planning package and equipment optimisation.		June 2009

CRC Outcome 4.		
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.		
4.1 Output Adoption of tools to predict the effect of forestry activities on water yield and quality and strategies for sustainable water outcomes.	Delivery date June 2012	Related research programme(s) Research Programme Output 4.1
4.1.1 Milestone Provisional strategies for locating and managing tree crops to optimise productivity and water outcomes workshopped with industry members.		December 2008
4.1.2 Milestone Pilot projects completed testing best-bet strategies on a catchment scale.		December 2009
4.1.3 Milestone Demonstrate integrated catchment models to one or more Catchment Management Authorities (CMAs) in pilot projects		December 2011
4.1.4 Milestone Present results of studies of forest management impacts on water yield, quality and stream health to forest managers in two or more regional workshops		December 2011
4.1.5 Milestone Workshop guidelines for riparian zone management with CMAs, forest managers and other stakeholders		March 2012
4.2 Output Stakeholder adoption of tools and prescriptions for monitoring and managing biodiversity Adoption of tools to predict the effect of forestry activities on water yield and quality and strategies for sustainable water outcomes.	Delivery date June 2012	Related research programme(s) Research Programme Output 4.2)
4.2.1 Milestone Revised prescriptions for native forest silviculture and management of coarse woody debris workshopped with industry members.		December 2008
4.2.2 Milestone Pilot projects completed to test cost-effective options for non-lethal control of browsing marsupials.		June 2009
4.2.3 Milestone Prescriptions for non-lethal strategies for controlling marsupial browsing integrated into pest management strategies of Tasmanian forest managers.		June 2009
4.2.4 Milestone Workshop on biodiversity management options.		June 2009
4.2.5 Milestone Planners trained in a decision support system for assessing the risk of gene flow from plantations into native forest gene		June 2010

pools and strategies to manage this risk.		
4.2.6 Milestone 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.		June 2011
4.2.7 Milestone 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.		December 2011
4.2.8 Milestone Training provided on strategies for assessing and managing the biodiversity values of remnant forests in production landscapes workshopped with and adopted by industry.		March 2012
4.3 Output Strategies adopted by forest industry to improve their engagement with immediate neighbours, other local landholders, planning authorities and the wider community	Delivery date June 2012	Related research programme(s) Research Programme Output 4.3
4.3.1 Milestone Engagement strategies implemented as pilot projects with industry members in 2 regions.		June 2008

<p>4.3.2 Milestone Engagement strategies workshopped with members and available as public domain information and consultancies to a broader range of stakeholders.</p>	<p>December 2010</p>
<p>4.3.3 Milestone Revised strategies adopted by forest managers and recognised by certification authorities.</p>	<p>March 2012</p>
<p>4.4 Output Software adopted for negotiation support systems to guide landscape planning and evaluation of trade-offs between production, water, biodiversity, visual amenity and other community requirements.</p>	<p>Delivery date June 2012</p> <p>Related research programme(s) Research Programme Output 4.4</p>
<p>4.4.1 Milestone Training of a wide range of stakeholders during the completion of an estate design plan for a controversial situation negotiated through participatory modelling.</p>	<p>June 2010</p>
<p>4.4.2 Milestone Adaptable modules and user-guides to support participatory modelling evaluated and adopted by industry partners and other stakeholders.</p>	<p>June 2011</p>
<p>4.4.3 Milestone Stakeholders trained in the use of generic optimisation modules for evaluation of stand and landscape level trade-offs available through licensed service providers.</p>	<p>March 2012</p>

1.4 Overall programme structure

CRCF research will be organised into four programmes, each under the leadership of a programme manager:

Research programme one - Managing and monitoring for growth and health

Research in this programme will lead to reduced costs of wood production, decreased investment risk, and reduced off-site effects of tree plantation management, through adaptation of currently available and emerging technologies for assessment and inventory of forest condition. The programme is organised into three projects.

Research programme two - High-value wood resources

Research in this programme will result in wood production of increased value through application of new molecular genetic techniques to improvement of solid wood and fibre properties; through optimised silvicultural treatments; and through increased capacity to predict wood quality yield and incorporate into stand and estate planning tools. The programme is organised into four projects.

Research programme three - Harvesting and operations

Research in this programme will provide greater market competitiveness for Australian wood products through improved harvesting and transport efficiency and reduction in operational and wood delivery costs. Researchers will develop systems for data capture and transfer from forest to office; new planning tools through modelling of harvest and transport systems; new algorithms and systems for operational planning and control.

Research programme four - Trees in the landscape

Research in this programme is aimed at ensuring the forest industry's long-term "License to operate" in the Australian landscape through the development and verification of more sustainable forest practices and ultimately better community engagement and acceptance.

Researchers will study interactions between production forests and their biotic, biophysical and social environments. They will develop models for assessing impact of forestry activities (eg., harvesting, tree planting, roading) on water catchments and on biodiversity values; techniques and strategies for monitoring and managing biodiversity; and improve understanding of community values in relation to the forest environment for better community engagement. The programme is organised into four projects.

While there are substantial overlaps in the disciplinary content of the programmes, each is focussed at creating value at different points in the forestry business activity chain.

Within each programme there are two or more sub-programmes ("projects"). Projects that cover a wide geography and include multiple research providers may contain one or more sub-projects. Lead researchers/managers will be designated at each of these organisational levels. An individual may assume multiple responsibilities within a programme. Core participants in the CRC have a right, but not an obligation, to invest actively in every project and also to take an active part in the research of every project. Supporting partners and third party associates have rights to invest and actively participate in a restricted number of projects. All participants in a project have a right of involvement in the project steering committee, which may or may not extend to participation in the respective programme co-ordination committee. The project is the lowest administrative unit at which we will account contributions for equity purposes, thus

participation in any one sub-project carries an entitlement to a share in proceeds of any related sub-projects, unless otherwise determined by the board.

Opportunity for value creation through cross-project and cross-programme collaboration has been identified as a particular strength of the CRC programme. The programme co-ordinating committees and strategic policy committee will be charged with ongoing review of such opportunities. It is anticipated that a degree of restructuring of projects will occur over the life of the CRC.

1.4.2 Programme description and specified personnel

Research Programme 1. Managing and monitoring for growth and health	
Specified personnel - Programme Leader	Time commitment
Dr M. Battaglia	0.5
Specified Personnel – Key Researchers	
NIL	
Private sector participants	
Forest Products Commission WA Forestry Tasmania Gunns Ltd Timbercorp Ltd WA Plantation Resources Ltd Great Southern Plantations Ltd Hansol PI Ltd Oji Paper Co. Ltd Forest Enterprises Australia Ltd Hancock Victorian Plantations Pty. Ltd Integrated Tree Cropping Ltd Midway Pty Ltd Norske-Skog Paper Mills (Australia) Ltd South Australian Forestry Corporation	
Description	
Research in this programme will lead to reduced costs of wood production, decreased investment risk, and reduced off-site effects of tree plantation management, through adaptation of currently available and emerging technologies for assessment and inventory of forest condition. The programme is organised into three projects.	
Outputs	
1.1 Visualisation system to visualise below- and above-ground forest conditions. 1.2 Management systems for predicting impacts, consequences and best-bet intervention strategies to minimize the risks of growing plantations, maximising production through the management cycle and predicting the spatial distribution of hazards.	

1.3 Modules of licensed software for integrating effects of genetic stock and site variability, plantation history and plantation management to predict the size class distribution (stem sizes, clear log length) and survival of trees.

Research Programme 2. High-value wood resources	
Specified personnel - Programme Leader	Time commitment
Dr C. Harwood.	0.3
Specified Personnel – Key Researchers	
NIL	
Private sector participants	
Forest Products Commission WA Forestry Tasmania Gunns Ltd Timbercorp Ltd WA Plantation Resources Ltd Great Southern Plantations Ltd Hansol PI Ltd Oji Paper Co. Ltd Southern Tree Breeding Association Incorporated Forest Enterprises Australia Ltd Hancock Victorian Plantations Pty. Ltd Integrated Tree Cropping Ltd Midway Pty Ltd	
Description	
<p>Research in this programme will result in wood production of increased value through application of new molecular genetic techniques to improvement of solid wood and fibre properties; through optimised silvicultural treatments; and through increased capacity to predict wood quality yield and incorporate into stand and estate planning tools. The programme is organised into four projects.</p>	
Outputs	
<p>2.1 Technologies for developing germplasm for high-value wood products</p> <p>2.2 Prescriptions available for silvicultural treatments that will maximise recovery of fit-for-purpose grades and maximise value of product mix from eucalypt plantations.</p> <p>2.3 Improved understanding of the impact of site conditions and silvicultural treatments on wood quality and product value.</p> <p>2.4 Sampling strategies and software to achieve improved valuation of pulpwood and solid/engineered wood plantations.</p>	

Research Programme 3. Harvesting and operations	
Specified personnel - Programme Leader	Time commitment
Associate Professor L. Bren	0.5
Specified Personnel – Key Researchers	
NIL	
Private sector participants	
Forest Products Commission WA Forestry Tasmania Gunns Ltd Timbercorp Ltd WA Plantation Resources Ltd Great Southern Plantations Ltd Hansol PI Ltd Oji Paper Co. Ltd Forest Enterprises Australia Ltd Midway Pty Ltd Norske-Skog Paper Mills (Australia) Ltd South Australian Forestry Corporation South East Fibre Exports Pty. Ltd	
Description	
<p>Research in this programme will provide greater market competitiveness for Australian wood products through improved harvesting and transport efficiency and reduction in operational and wood delivery costs. Researchers will develop systems for data capture and transfer from forest to office; new planning tools through modelling of harvest and transport systems; new algorithms and systems for operational planning and control. The programme is organised into two projects</p>	
Outputs	
<p>3.1 Systems developed to implement automatic capture of performance data from forest harvest machines and to support networked data transfer from forest to office. Options for expanding the range of machine performance information will also be explored.</p> <p>3.2 Systems designed to optimise harvesting systems and operator performance.</p>	

Research Programme 4. Trees in the landscape	
Specified personnel - Programme Leader	Time commitment
Professor B. Potts	0.3
Specified Personnel – Key Researchers	
NIL	
Private sector participants	
<p>Forest Products Commission WA Forestry Tasmania Gunns Ltd Timbercorp Ltd WA Plantation Resources Ltd Great Southern Plantations Ltd Hansol PI Ltd Oji Paper Co. Ltd Hancock Victorian Plantations Pty. Ltd Integrated Tree Cropping Ltd Midway Pty Ltd Norske-Skog Paper Mills (Australia) Ltd South Australian Forestry Corporation</p>	
Description	
<p>Research in this programme is aimed at ensuring the forest industry's long-term "License to operate" in the Australian landscape through the development and verification of more sustainable forest practices and ultimately better community engagement and acceptance. Researchers will study interactions between production forests and their biotic, biophysical and social environments. They will develop models for assessing impact of forestry activities (eg., harvesting, tree planting, roading) on water catchments and on biodiversity values; techniques and strategies for monitoring and managing biodiversity; and improve understanding of community values in relation to the forest environment for better community engagement. The programme is organised into four projects.</p>	
Outputs	
<p>4.1 Knowledge of the net benefits/costs of planting and managing trees on the quantity and quality of water in production forestry landscapes.</p> <p>4.2 Strategies and indicators for monitoring and managing biodiversity in production landscapes including: genetic and biological indicators for monitoring sustainability criteria; strategies to maintain the long-term biodiversity values of production landscapes and manage the biotic interchange between plantations and adjacent native communities; and sustainable strategies for managing populations of pests and pathogens of tree crops which reduce reliance on chemicals.</p> <p>4.3 Understanding of the costs and benefits for regional communities from the plantation forest industry and elucidation of community attitudes related to plantation forestry and the regional context in which it operates. Negotiation support systems to guide landscape</p>	

planning and evaluation of trade-offs between production, water, biodiversity, visual amenity and other community requirements.

1.4.3 Outcomes, Outputs and Milestones

CRC Outcome 1		
Improved ability to select planting sites and manage for increased profitability of plantation investments, through higher yields and lower costs of production.		
1.1 Output Visualisation system to visualise below- and above-ground forest conditions.	Delivery date June 2012	Related research programme(s) RP1
1.1.1 Milestone Data capture and processing technology finalised for assessing stand condition from LIDAR and large format aerial photography.		June 2007
1.1.2 Milestone Rapid technology available for assessing soil condition.		June 2010
1.1.3 Milestone Methodologies defined for assessing and monitoring indicators of forest condition from remotely sensed imagery.		June 2011
1.1.4 Milestone Development of 3D visualization systems to portray soil and stand conditions.		March 2012
1.2 Output Management systems for predicting impacts, consequences and best-bet intervention strategies to minimize the risks of growing plantations, maximising production through the management cycle and predicting the spatial distribution of hazards.	Delivery date June 2012	Related research programme(s) RP1
1.2.1 Milestone Climate and site-specific strategies for intra-and inter-rotational management to maximise sustainable production from blue gum plantations.		June 2009
1.2.2 Milestone Models for predicting rotation length impacts of damage from disease and insects available as software.		June 2010
1.2.3 Milestone Commercial product and licensed service providers available for site hazard ratings for major plantation risks.		March 2012

1.3 Output Modules of licensed software for integrating effects of genetic stock and site variability, plantation history and plantation management to predict the size class distribution (stem sizes, clear log length) and survival of trees.	Delivery date June 2012	Related research programme(s) RP1
1.3.1 Milestone Extension of cellular-automata model to predict development of social hierarchies in forest stands to include the effects of weeds.		June 2009
1.3.2 Milestone Assessment of the roles of genetic variation, site variability due to edaphic conditions and the role of plantation history and management in generating size class distributions and patterns of mortality in forest stands.		December 2009
1.3.3 Milestone Incorporation of improved sub-models of understorey and weed water use into catchment hydrological models and application to predict impacts of management practices.		December 2011

CRC Outcome 2. Increased use of planting stock with improved genetic potential, managed to optimise production of high value wood for fibre and solid wood markets.		
2.1 Output Technologies for developing germplasm for high-value wood products	Delivery date June 2012	Related research programme(s) RP2
2.1.1 Milestone Breeding objectives for solid-wood and veneer production developed for <i>E. nitens</i>		June 2008
2.1.2 Milestone Breeding objectives for solid-wood and veneer production developed for <i>E. globulus</i>		June 2011
2.1.3 Milestone Quantification of the effects of allelic variants of at least five candidate major genes on key wood quality traits in <i>E. globulus</i> , <i>E. nitens</i> and <i>E. pilularis</i> for breeding populations of these species		June 2009
2.1.4 Milestone Validation of impact of the allelic variants identified in milestone 3, in independent validation populations		June 2010
2.1.5 Milestone Integration of molecular genetic information on key wood traits into breeding value prediction for <i>E. globulus</i> , <i>E. nitens</i> and <i>E. pilularis</i>		March 2012

2.2 Output Prescriptions available for silvicultural treatments that will maximise recovery of fit-for-purpose grades and maximise value of product mix from eucalypt plantations.	Delivery date June 2012	Related research programme(s) RP2
2.2.1 Milestone Database of silvicultural trials for wood quality studies established	June 2006	
2.2.2 Milestone Literature review of effect of crown symmetry/architecture on wood development	June 2006	
2.2.3 Milestone Establishment of new genetic trials under solid-wood silvicultural regimes to enable investigation of genetic differences and genotype-by-environment effects on solid/engineered wood quality	June 2006	
2.2.4 Milestone Collation of growth and yield data from silvicultural trials.	June 2007	
2.2.5 Milestone Empirical growth and yield functions developed and parameterised for <i>E. globulus</i> and <i>E. nitens</i> .	June 2008	
2.2.6 Milestone Determination of quantitative relationships to describe impacts of silviculture on wood quality traits and how these relationships are changed by environment.	June 2010	
2.3 Output Improved understanding of the impact of site conditions and silvicultural treatments on wood quality and product value.	Delivery date June 2011	Related research programme(s) RP2
2.3.1 Milestone Levels of decay and other important wood properties in response to pruning and thinning treatments determined in silvicultural trials of <i>E. nitens</i> in Tasmania.	June 2008	
2.3.2 Milestone Degree of silvicultural control of tension wood determined for <i>E. globulus</i> in southern mainland Australia (Vic and WA).	June 2008	
2.3.3 Milestone Significance of tension wood in causing processing problems evaluated in silvicultural trials of <i>E. globulus</i> and <i>E. nitens</i> in Tasmania and eastern Victoria, and one subtropical eucalypt species.	June 2010	
2.3.4 Milestone Degree of silvicultural control of economically important wood properties affecting solid/engineered wood product value, in absence of tension wood, determined for <i>E. globulus</i> .	June 2010	

2.3.5 Milestone Degree of silvicultural control of economically important wood properties affecting solid/engineered wood product value determined for <i>E. nitens</i> and for one sub-tropical eucalypt species.		June 2011
2.4 Output Sampling strategies and software to achieve improved valuation of pulpwood and solid/engineered wood plantations.	Delivery date June 2012	Related research programme(s) RP2
2.4.1 Milestone Improved sampling protocols developed for pulpwood value prediction for <i>E. globulus</i> , <i>E. nitens</i> and <i>E. dunnii</i> based on radial scanning of pith-to-bark wood samples.		June 2008
2.4.2 Milestone Sampling protocols for prediction of solid-wood and engineered wood log value from non-destructive sampling methods on standing trees developed for <i>E. globulus</i> , <i>E. nitens</i> and one subtropical eucalypt species.		June 2009
2.4.3 Milestone Cost-effective sampling protocols developed for estimating stand value based on returns from pulpwood for <i>E. globulus</i> and <i>E. nitens</i> .		June 2009
2.4.4 Milestone Algorithms for wood quality prediction incorporating site, germplasm and silvicultural information developed and tested for <i>E. globulus</i> , <i>E. nitens</i> and one subtropical eucalypt species.		March 2012

CRC Outcome 3. Adoption of harvesting and logistical practices which reduce delivered wood costs, contributing to industry profitability, while maintaining conformity with certification standards.		
3.1 Output Systems developed to implement automatic capture of performance data from forest harvest machines and to support networked data transfer from forest to office. Options for expanding the range of machine performance information will also be explored.	Delivery date December 2010	Related research programme(s) RP3
3.1.1 Milestone 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		June 2006

3.1.2 Milestone Prototype software to allow collection, communication with office based computers, validation, verification and storage of data.		December 2006
3.1.3 Milestone On-board data capture for key equipment types and in-forest data network communications systems developed and tested.		December 2006
3.1.4 Milestone Design and establishment of field trial (1)		December 2006
3.1.5 Milestone Report/assessment of field trial (1) Design of field trial (2)		December 2007
3.1.6 Milestone Report/assessment of field trial (2) Design of field trial (3)		December 2008
3.1.7 Milestone Report/assessment of field trial (3)		December 2008
3.1.8 Milestone Commercial hardware and software available.		December 2010
3.2 Output Systems designed to optimise harvesting systems and operator performance.	Delivery date September 2009	Related research programme(s) RP3
3.2.1 Milestone Development of roading engineering proposal.		September 2005
3.2.2 Milestone Report detailing factors that affect performance levels (benchmarking), optimisation and availability of suitable harvesting equipment, and chain of supply.		June 2006
3.2.3 Milestone Stage one, roading tool development.		June 2006
3.2.4 Milestone Integration of planning and operation/harvesting systems.		December 2007
3.2.5 Milestone Stage two, roading tool development (optimisation of roading).		December 2007
3.2.6 Milestone Prototype integrated planning and optimisation system		December 2008
3.2.7 Milestone Development of a forest road planning package.		June 2009

CRC Outcome 4		
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.		
4.1 Output Knowledge of the net benefits/costs of planting and managing trees on the quantity and quality of water in production forestry landscapes.	Delivery date December 2011	Related research programme(s) RP4
4.1.1 Milestone Review long-term hydrological data for selected experimental forest catchments.		December 2007
4.1.2 Milestone Integration of catchment hydrological models with tree- and stand-level productivity and water use models.		December 2009
4.1.3 Milestone 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.		December 2011
4.2 Output Strategies and indicators for monitoring and managing biodiversity in production landscapes including: genetic and biological indicators for monitoring sustainability criteria; strategies to maintain the long-term biodiversity values of production landscapes and manage the biotic interchange between plantations and adjacent native communities; and sustainable strategies for managing populations of pests and pathogens of tree crops which reduce reliance on chemicals.	Delivery date December 2011	Related research programme(s) RP4
4.2.1 Milestone Review of biodiversity values of silvicultural regimes in native forest and forest components such as coarse woody debris.		December 2007
4.2.2 Milestone Identification of cost-effective options for non-lethal control of marsupial damage in plantations and native forests.		December 2008
4.2.3 Milestone Strategies for assessing and managing the risk of gene flow between plantations and native eucalypt populations.		December 2009
4.2.4 Milestone Sustainable strategies for managing key pests and pathogens, including revised, more socially acceptable means of controlling vertebrate browsing.		December 2010
4.2.5 Milestone Synthesise knowledge of impacts of operations in native forests and plantations on biodiversity values		December 2010

4.2.6 Milestone Strategies for the management of keystone and listed threatened taxa in production landscapes, including improved seed zone classifications of key commercial eucalypt species.		June 2011
4.2.7 Milestone Development of strategies for assessing and managing the biodiversity values of remnant forest in production landscapes.		December 2011
4.3 Output Understanding of the costs and benefits for regional communities from the plantation forest industry and elucidation of community attitudes related to plantation forestry and the regional context in which it operates.	Delivery date December 2011	Related research programme(s) RP4
4.3.1 Milestone Preliminary socio-economic profile of the costs and benefits of plantation forestry in 2 regions.		December 2007
4.3.2 Milestone Analysis and explanation of community attitudes and values in 2 regions.		June 2008
4.3.3 Milestone Full socio-economic profile of the costs and benefits of plantation forestry in 2 regions.		December 2009
4.3.4 Milestone Engagement Strategies evaluated and refined with industry members.		June 2010
4.3.5 Milestone Analysis of change in community attitudes and values in 2 regions.		December 2011
4.4 Output Negotiation support systems to guide landscape planning and evaluation of trade-offs between production, water, biodiversity, visual amenity and other community requirements.	Delivery date June 2012	Related research programme(s) RP4
4.4.1 Milestone Framework to enable GIS-data and participatory spatio-temporal models for evaluation of estate design scenarios and assist participatory planning.		December 2010
4.4.2 Milestone Proven algorithms for spatio-temporal optimisation of land use.		December 2010
4.4.3 Milestone Evaluation of participatory model and user guidelines		December 2011
4.4.4 Milestone Production of a library of resource materials for participatory modelling		March 2012

1.5 Education and training programme

1.5.1 Description and specified personnel

Education and training programme	
Specified personnel - programme leader Prof. P. Kanowski, Co-ordinator of the education committee Dr N. Davidson, education and training manager	Time commitment 0.3 1.0 in total
Private sector participants All CRC industry partners will actively engage in the E&T programme	
<p>Description</p> <p>The education and training programme will focus on post-graduate training in forestry relevant to industry needs, will develop the skills of students and staff in research management, and will support industry training activities. The programme will be integrated with the utilisation and commercialisation programme through a range of joint activities, and with the research programmes through the supervision of students.</p> <p>1. Post-graduate training relevant to industry needs and sustainable forested landscapes Each research programme will identify Honours, Masters and PhD-level projects which students will undertake under joint university-industry supervision. Students will participate in activities facilitated by both the research and the utilisation and commercialisation programmes, to enhance their familiarity with both research and industry issues.</p> <p>2. Developing the skills of students in research leadership and management All PhD and Masters students will complete courses in research leadership and management.</p>	

1.5.2 Outcomes, outputs and milestones

Education and Training outcome 1	
Greater national research capacity relevant to industry needs in creating, maintaining and enhancing sustainable forested landscapes	
1.1 Output 63 PhD students enrolled and completed over life of CRC.	Delivery date June 2012
1.1.1 Milestone First 21 CRC PhD students enrolled.	Achievement date April 2007
1.1.2 Milestone Second 21 CRC PhD students enrolled.	Achievement date April 2009
1.1.3 Milestone First 21 CRC PhD students completed.	Achievement date April 2010
1.1.4 Milestone Third 21 CRC PhD students enrolled.	Achievement date April 2010
1.1.5 Milestone Second 21 CRC PhD students completed.	Achievement date April 2012

1.1.6 Milestone Third 21 CRC PhD students completed.	Achievement date April 2013
1.2 Output Ten Honours students enrolled and completed over life of CRC.	Delivery date June 2012
1.2.1 Milestone First three Honours students enrolled and completed.	Achievement date December 2007
1.2.2 Milestone Second three Honours students enrolled and completed.	Achievement date December 2009
1.2.3 Milestone Last four Honours students enrolled and completed.	Achievement date December 2011

Education and Training Outcome 2	
Enhanced student skills in research leadership and management	
2.1 Output Formal training in research leadership and management.	Delivery date June 2012
2.1.1 Milestone First 21 PhD students have completed at least two courses (or equivalent) in research leadership and management.	Achievement date December 2008
2.1.2 Milestone Second 21 PhD students have completed at least two courses (or equivalent) in research leadership and management.	Achievement date December 2010
2.1.3 Milestone Third 21 PhD students have completed at least two courses (or equivalent) in research leadership and management.	Achievement date March 2012