



DIVISION OF FOREST RESEARCH AND DEVELOPMENT

annual report 2009



stewards of the forest



Mission

To provide research, development and information services to support Forestry Tasmania and clients

Vision

To be recognised for excellence in forest research and development

Pictured above

Staff from the Division of Forest Research and Development at Barn Back 103G in the southern Tasmanian forests October 2008

Forestry Tasmania is a REGISTERED RESEARCH AGENCY (RRA) under the Commonwealth Industry Research and Development Act 1986, for the purpose of performing contracted research and development (R&D) for eligible companies claiming the 125% R&D tax concession under Section 73B of the Income Tax Assessment Act 1936. Research is carried out in the forestry, botanical, zoological, horticultural, soil and water sciences. For more information, please refer to the Commonwealth Government Ausindustry Agency website at www.ausindustry.gov.au

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Cover Photo: Eva Hilbig & Peter Sheldon at the Warra Long Term Ecological Research Site in the southern forests of Tasmania.

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overview: FORESTRY TASMANIA

Tasmania

Tasmania is an island of 68 331 square kilometres and outstanding natural beauty located 240 kilometres below the south-east corner of the Australian mainland. It is Australia's southernmost state. Tasmania has a population of around 500 000, and benefits from a temperate climate.

Tasmania is rich in natural assets, including forests and a diversity of minerals, and is the most forested state in Australia. Its relatively unspoilt beauty attracts visitors from all over the world.

Forestry Tasmania

Forestry Tasmania is a Tasmanian State Government Business Enterprise. The business manages 1.5 million hectares (ha) of State forest for multiple uses, an area that contains 39 per cent of Tasmania's forests. Just less than half of the area of state forest is available for wood production, with the remainder being set aside for other values such as conservation and recreation. Forests on other public lands, mostly national parks and other conservation reserves, are managed by separate agencies.

Forestry Tasmania manages its operations with five administrative Districts across the State, and headquarters in Hobart. As of 30 June 2009, Forestry Tasmania employs 547 personnel and 1 228 contractors..

There are some 107,000 ha of plantations on State forest, comprising:

- 52 490 ha of softwood - *Pinus radiata*

- 54 540 ha of hardwood - predominantly *Eucalyptus globulus* and *E. nitens*

A portion of this plantation estate is in joint venture with private investors or customers, including buyers of finished forest products.

Forest Tourism

Forestry Tasmania also manages world-class tourist destinations in the forest, such as the Tahune AirWalk, Tarkine Forest Adventures at Dismal Swamp, the Forest EcoCentre in Scottsdale, and the Eagles Eyrie, part of the Maydena Adventure Hub



overview: FOREST RESEARCH & DEVELOPMENT

Forestry Tasmania manages State forest for the production of timber, water and other products, and for conservation of biodiversity. The Division of Forest Research and Development undertakes research to improve the sustainability, productivity and profitability of this management. These three goals – productivity, sustainability and profitability – and Forestry Tasmania’s Sustainable Forest Management Objectives, Targets and Indicators therefore guide the Division’s research planning. The Division is also committed to communicating research results and the scientific basis for forest management within Forestry Tasmania and to the wider community.

The Division has been in existence for over 30 years and is headed by the Chief Scientist. A significant investment of approximately \$3.0 million per annum from Forestry Tasmania’s funds is directed to in-house research, out-sourced research and collaborative programs, and is augmented by competitively gained research funds and other State and Commonwealth funding.

Forestry Tasmania is a core member of the Co-operative Research Centre for Forestry, and is also a participant in the Bushfire CRC and the Landscape Logic Commonwealth Environmental Research Facility. Forestry Tasmania also leads the long-term research at Warra in Tasmania’s Southern forests.

Key challenges

The Division’s key challenges are to make available to Forestry Tasmania the most up-to-date knowledge in forest science, and to conduct focused research for its strategic and operational implementation, thereby maintaining the scientific basis for forest management; and to conduct research efficiently, making maximum benefit of in-house scientific knowledge and external collaboration.

Our strategies

Forestry Tasmania is internationally recognised as a leader in research on the management of native forests and eucalypt plantations. Our activities towards organisational and community objectives are managed across three Branches within the Division: Biology and Conservation, Native Forests, and Plantations. The Division’s key strategies are to:

- undertake research into new silvicultural techniques for native forests and for improved operational performance;
- develop sustainable management techniques and improved genetic material for plantations, focusing on profitability and high-value products, and linking research outcomes and advances in knowledge with marketing objectives and field operations;
- ensure conservation of biological diversity and habitat within production forests, and sustainable management of carbon, water and other values;
- develop integrated browsing management strategies;

- undertake health surveillance of native and plantation forests, and develop related protection and remediation strategies.

Many of these strategies make use of the Warra Long-Term Ecological Research site in southern Tasmania:

<http://www.warra.com>



Alison Phillips servicing insect traps at Warra

chief scientist's

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A key feature of research undertaken or brokered by Forestry Tasmania is that the work is not complete until it has been used to inform policy or improve operations. The Silvicultural Systems Trial at Warra achieved both these goals in 2008/09. Presentation of the "New Silviculture" report to the State Government was the culmination of research initiated over 10 years ago, and funded recently by the Commonwealth and State governments through the Tasmanian Community Forestry Agreement. This report summarised Warra research results, and concluded that aggregated retention was the silviculture most able to achieve ecological goals not achieved by clearfelling, while being capable of being carried out in a safe and relatively profitable and productive manner.

Operational implementation of alternatives to clearfelling in 80% of the annual harvest of coupes containing oldgrowth forest – the policy goal - can thereby be achieved. Simultaneously, the Division performed its first evaluation of ecological outcomes from operational aggregated retention coupes across Tasmania, which showed how the continued development of coupe design to permit a successful post-harvest burn was compatible with achieving the desired retention, influence and connectivity goals. The density and vigour of the resultant eucalypt regeneration still gives some cause for concern, but options for earlier and more effective browsing control are being investigated to improve this situation.

Yet the Warra Trial is far from being abandoned. The first 10-year monitoring for some coupes was undertaken, and plans developed for continued silvicultural and ecological monitoring at key times over the coming decades. The goal of any silviculture is to regenerate a forest stand that can capture the diversity, variability and productivity of the pre-harvest state, and this of course requires monitoring over a full rotation. However, blind monitoring can be worse than useless, as it can give the illusion of providing management information while just providing data, so there will be a continual need for adaptive monitoring, reassessing periodically the goals and hypotheses that the monitoring is designed to test. Already assessment of the ecological outcomes from operational aggregated retention coupes has seen monitoring focus on informative taxa and criteria. The basis for these decisions can be found in the peer-reviewed publications in the Special Issue of Forest Ecology and Management that resulted from presentations at the Old Forests, New Management conference held in Hobart in 2008.

A further piece of research brought to an end-point in 2009 was the population viability analysis of Tasmanian wedge-tailed eagles in Bass District. In a complex and innovative approach, the University of Melbourne, in collaboration with Forestry Tasmania, combined spatially explicit forest growth and disturbance models with a demographic population model for the eagle.

The work incorporated the variety of threats faced by this endangered species, and while not predicting its local extinction did indicate that the provision of new nest trees was an important determinant of future population trends; existing provisions to mitigate disturbance effects on nesting birds were also shown to be important in maintaining populations. These results can now be incorporated into forest management planning on public and private land statewide.

Several projects and initiatives were commenced in 2008/09, indicative of the range of new information required by Forestry Tasmania for forest management. Many of these projects were externally funded. ARC Linkage grants were received for work on the dispersal of dead-wood-dependent beetles at various scales across a managed forest landscape, and for work on the role of organic forms of nitrogen in plantation productivity. A number of projects were able to secure funding from Forest and Wood Products Australia, attesting to the credibility gained by Divisional research staff, as well as the wider applicability attached to our approaches. These projects cover development of landscape metrics for assessing ecological outcomes of forest management, use of inventory data to predict stand and estate water use, and genetic analysis of traits valuable for production of veneer from plantation logs. More such projects are planned, including on forest carbon storage and dynamics, for which

REPORT

a Forestry Tasmania research agenda was developed and approved this year. Our developing relationship with the FWPA complements well our most extensive research collaboration, that with the CRC for Forestry.

This degree of external funding of the research that provides information for managing Tasmanian State forests is commendable, but the impending completion of the Tasmanian Community Forest Agreement and the significant worldwide downturn in forest products markets has required an increased effort to win external research work to maintain the current staff profile. Our skills and expertise in forest health surveillance and in plantation management and productivity improvement have led to external contracts being agreed, including a major, multi-year contract with Yong'An Forestry Company, China. Delivery of the requirements of these contracts can need different approaches to the delivery of internal research, but our skills are very transferable to new clients and we look forward to this type of work supplying increasing income in years to come.

But the whole of this year was not spent just looking forward. It is also appropriate at times to reflect on the journey taken to reach the present-day, and to gain confidence that with planning and insight even difficult problems in forest management can be solved.

This year saw the publication of "A History of Innovation: Eighty-five Years of Research and Development at Forestry Tasmania" by Humphrey Elliott, Ken Felton, Jean Jarman and Martin Stone, with a successful launch at the Eagles Eyrie above Maydena, also the location for this year's Research Reviews. This book provides a detailed account for historians and foresters alike of subjects ranging from plantation development in Tasmania, sustainable yield and resource assessment, forest health, and our history of managing and using fire, culminating in modern approaches to conservation biology on the production forest estate.

It is important at times to remind ourselves that all we know and discover now is built upon the knowledge and discoveries of others, and the "History of Innovation" confirms for us the central and continuing role of research in modern forest management.

*Steve Read at Eagles Eyrie
for the DFRD Reviews*



Achieving good ecological outcomes in aggregated retention coupes

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Aggregated retention (ARN) is designed to retain mature-forest elements within harvested coupes, leading to production forest landscapes with greater ecological integrity and function than were clearfelling alone used. Aggregated retention coupes need to be carefully designed to maximise the benefits of retained mature forest for biodiversity. A series of criteria has been developed to guide the design of aggregated retention coupes, with metrics to assess whether individual aggregated retention coupes meet the ecological goals of aggregated retention.

The proposed system of coupe-level metrics for assessing biodiversity outcomes for ARN coupes is based on Forestry Tasmania's Goals and Guidelines for Variable Retention (VR), which can be simplified as:

Objective 1: facilitating rapid re-establishment of mature forest biodiversity into the harvested area, by ensuring forest influence on the majority of the harvested area.

The recent aggregated retention coupe (KD023E) contains only edge aggregates, which remained largely unburnt in the regeneration burn. A total of 72% of the harvested area is within one tree-height of forest that will be retained for the full rotation.



Lifeboating biological legacies in an aggregate in coupe SX020A. Visible are rainforest understorey species, undisturbed coarse woody debris, and an oldgrowth Eucalyptus obliqua tree, providing habitat for hollow-dependent fauna and a substrate for bryophytes and lichens.



Objective 2: ensuring retention of biological legacies after harvesting

Objective 3: ensuring suitable conditions for plant regeneration and animal habitat in the harvested area, with connectivity between retained forest edges and the regenerating stand

Many aspects of coupe design contribute towards ecological outcomes through providing current and future habitat suitable for the various components of forest biodiversity. Further, variability both within coupes and among different coupes is central to the variable retention approach. The performance measures are thus designed to allow room for flexibility, and to allow trade-offs between competing ecological objectives, whilst setting limits within which a

coupe design must lie to successfully meet the stated goals. These metrics have been tested on coupes harvested to date using aggregated retention, and demonstrate that most coupes are achieving good ecological outcomes.

The results also illustrate how adaptive management with changing coupe designs has resulted in improved outcomes for biodiversity. For example, compared to early aggregated retention coupes, current coupes contain larger aggregates and these are more often located on coupe edges, thereby reducing edge-effects and improving connectivity for animal movement. A lower proportion of retained forest has been impacted by regeneration burns, and less harvested area has been negatively impacted by creation of firebreaks.

HIGHLIGHTS

Surveillance of plantations on State forest to detect pest and disease problems

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Surveillance of plantations on State forest to detect pest and disease problems has been done annually since 1997 - 98. Research done over the past few years has provided an understanding of the type and level of damage that can be reliably detected by surveillance. This has allowed us to refine surveillance to use the most cost-effective methods for detecting damage likely to require management. We are now turning our attention to the linkage between detection and the management of pests and diseases. In particular, we want to better understand and document the value of averting potential future losses from pests and diseases, as a result of management actions triggered by health surveillance.

Information from surveillance can avert future losses from pests and diseases in several ways. The simplest is when detection leads to a direct response to prevent damage. For example, the detection of an emerging outbreak of autumn gum moth in an *E. nitens* plantation in western Tasmania this year resulted in the decision to spray the plantation with insecticide to prevent severe defoliation. That detection and management response was calculated to have averted \$103 000 in future losses, and protected 47 800 m³ of future sawlogs and veneer logs that would otherwise have been used for pulpwood.

Severe late-season defoliation of a high altitude plantation of E. nitens by chrysomelid leaf beetles.

Another way in which losses can be averted is when surveillance identifies sub-optimal management in operational pest management programs. For several years, the issue of late-season defoliation by leaf beetles has been identified through health surveillance. Studies done this year identified that insecticide spraying of over-threshold larval populations is largely effective in preventing late-season damage by adult beetles. However, many

plantations that are beyond the current age-range targeted by the operational program, particularly those at high altitude, are suffering severe defoliation. Calculations based on levels of moderate and severe defoliation assessed last year indicate that, by extending the operational leaf beetle program to include plantations in high risk areas up to the age when they are thinned, we could increase annualised financial returns by about \$150 000 and the annual yield of sawlogs and veneer logs by about 8 000 m³.



New seed orchard advances - *E. nitens* genetic improvement program

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A new generation of *E. nitens* genetic material has been captured and assembled into a new seed orchard established at Castra in north-west Tasmania. This new orchard signifies the continuing advancement of the *E. nitens* genetic improvement, and highlights the value of this research program to increasing the value and productivity of Forestry Tasmania plantations.

Eucalyptus nitens plantations make up 75% of the Forestry Tasmania eucalypt plantation estate because this species is well suited to rich soils and high rainfall, and is also cold-tolerant. It is therefore planted above 300 m altitude, where it has an advantage over the other major species, Tasmanian blue gum (*E. globulus*). The *E. nitens* breeding program has been in operation for almost 30 years and is building on a very large foundation of trials and experience held by Forestry Tasmania. Since 2003, more than 20 trials have been established, including progeny tests, species comparisons, genetic gains trials and the ongoing development and maintenance of existing seed orchards. These existing orchards are now producing seeds, with the Oigles Road *E. nitens* seed orchard producing around 12 000 000 genetically improved seeds for use in Forestry Tasmania plantations and also for commercial release. This annual harvest of seed is valued at more than \$600 000 and is of a quality well-regarded by other growers of *E. nitens*.

The new orchard at Castra signifies a further major advance in deploying the superior genes developed in the breeding program, which aims to continually improve tree quality in terms of form, wood quality and growth rate, linked to Forestry Tasmania's management objective of high-quality solid-wood production (sawlogs and veneer logs) from its eucalypt plantations, with genetics also tailored to other end-uses such as pulp production.

This genetic improvement research will deliver crucial further knowledge and understanding about *E. nitens*, its development, and ways to optimise its genetic makeup.

Dean Williams inspects a seed orchard tree for flower buds



The value of overseas experience in advancing research for operational improvements

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Dr Paul Adams and Dr Sandra Roberts both undertook Gottstein Fellowships during 2008 – 09, with study tours to the United States of America.



Dr Paul Adams' study tour included attending the North American Forest Soils Conference, a visit to the Forest Nutrition Cooperative (FNC), and visiting a number of forest companies in south-east USA. The experience provided a valuable insight to the region, and the history of land use, forest distribution, development and management on a wide range of soils and environments. It was clearly demonstrated that the local forest managers have a good knowledge and understanding of the link between soil and forest productivity, and other factors that influence tree growth.

This knowledge has been the key to improving productivity, due in large part to the collaborative research that has been undertaken by the FNC. The Cooperative has industry-wide recognition for providing valuable and practical research outcomes on nutrition and productivity in south-east USA. Discussions with three forest companies demonstrated a high degree of operational management and a strong relationship to the staff and students at the FNC.

This study tour provided Dr Adams with a much greater appreciation and understanding of nutrition research practices and management in the region, and has enabled him to update the strategy for advancing management of nutrition and productivity in Forestry Tasmania eucalypt plantations, and to use this to drive new research activities.

Dr Sandra Roberts' role as the forest hydrologist with Forestry Tasmania includes managing hydrology experiments in the Warra LTER, and studies on the impacts of plantations on water quality and evapotranspiration. During Sandra's Gottstein study tour she visited five U.S. Department of Agriculture Forest Service Experimental Forests, to learn how research into the impacts of forest management on hydrology is undertaken.

Dr Roberts was able to view hydrology experiments, participate in the collection of data, and talk to researchers, field technicians, data managers and students about

their projects and experiences. Sandra attended annual meetings at three of the experimental forests to learn about the range of research activities being undertaken, and also spent four weeks at Oregon State University working on streamflow data from the Warra LTER.

This work was under the instruction of Associate Professor Julia Jones at the Department of Geosciences, Oregon State University. Ten years of streamflow data from Warra were corrected, and basic analyses undertaken. The data will be published, and plans are in place to write a joint paper with Julia Jones and others that will compare the results of long-term forest hydrology studies in North America, South America and Australia.

These two Gottstein Fellowships highlight the value of working with overseas colleagues, and the value of overseas experience. Forestry Tasmania is proud that its scientists were awarded such prestigious opportunities, and recognises the benefits to its research in hydrology, nutrition, productivity and research management more generally.

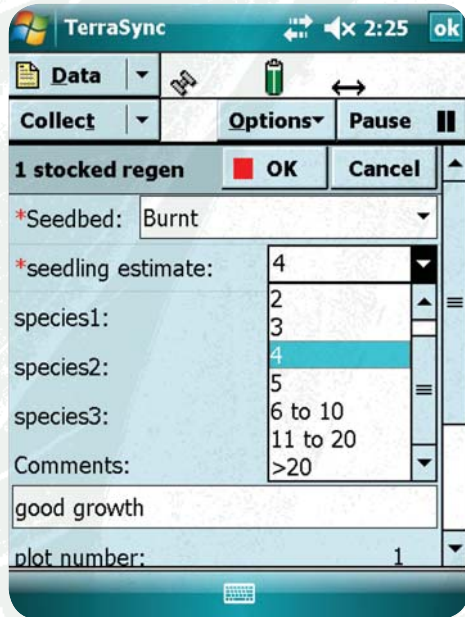
Both Gottstein reports are available on the internet:
[http:// www.gottsteintrust.org](http://www.gottsteintrust.org)

Using GPS to conduct regeneration surveys

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Forestry Tasmania conducts regeneration surveys on all areas of regenerating forest. These surveys are the measure of how successful our regeneration works have been, and also provide the information from which a forester determines whether any additional regeneration treatments are required.



The screenshot shows the TerraSync PDA interface. At the top, it displays the Windows logo, the application name 'TerraSync', and system icons for signal strength, volume, and a timer set to 2:25. Below this is a menu bar with 'Data', 'Collect', 'Options', and 'Pause'. The main screen shows a data entry form for a plot. The plot is identified as '1 stocked regen'. The 'Seedbed' is 'Burnt'. The 'seedling estimate' is '4'. There are three 'species' fields, with 'species2' set to '4'. The 'Comments' field contains 'good growth'. The 'plot number' is '1'. There are 'OK' and 'Cancel' buttons next to the 'seedling estimate' field.

Screen display for the Browsing Management PDA

For each hectare of regenerating forest, 5 survey plots of 2.26 m radius are established. On each plot, the number of seedlings present is estimated, the existing basal area is measured and an assessment of the seedbed condition is made. Approximately 40 000 of these plots are assessed annually.

In the past, individual plot data has been captured on field sheets and then transcribed onto an electronic spreadsheet once back in the office. The spreadsheet was then used to generate summary data. The forest officer then manually plotted the individual survey points onto a map to generate a spatial representation of the regeneration survey results. From this map, any understocked sections that needed follow-up work could be identified.

With the introduction of GPS technology, spatially referenced information can now be captured immediately against each regeneration survey point. This information can then be simply uploaded onto Forestry Tasmania's Geographic Information System, in which summary calculations can be

made and a map instantly generated. This process saves considerable time and reduces data-entry errors.

The technology was used for the first time this financial year and proved to be a resounding success: 16 761 plots were assessed on 80 coupes, approximately one-third of the year's regeneration survey program. In coming years, it is expected that a larger proportion of the regeneration survey program will be conducted using GPS technology.



Training field crews in the use of the in-field computer

A new silviculture for Tasmania's public forests

Dr Steve Read

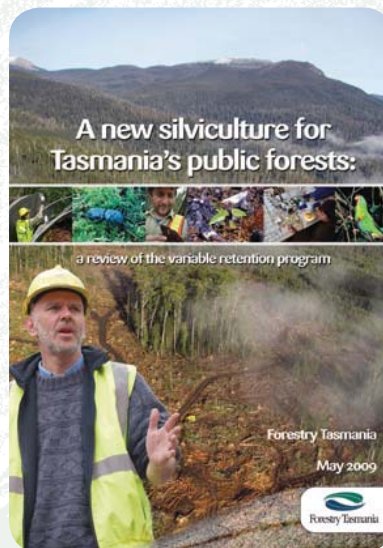
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The former Prime Minister, the Hon. John Howard, and the former Premier of Tasmania, the Hon. Paul Lennon, jointly announced the Tasmanian Community Forest Agreement (TCFA) on 13 May 2005. The TCFA is a joint commitment of the Australian and Tasmanian Governments to enhance conservation of Tasmania's oldgrowth forests and development of the Tasmanian forest industry.

One component of the TCFA is to facilitate research into alternatives to the use of clearfelling in oldgrowth forests. This commits the Australian and Tasmanian Governments to cooperate in a program to facilitate reduction in the use of clearfell harvesting in oldgrowth forests to less than 20 per cent of the annual oldgrowth harvest by 2010.

The Australian Government's contribution of \$2 million for this research program supplements the \$11.1 million being invested by Tasmania in further research and implementation, including training and support for harvesting contractors. The joint investment facilitated acceleration of the research associated with the Silvicultural Systems Trial at the Warra LTER site in southern Tasmania, and enabled its expansion into other forests in other parts of the State.

As a result, variable retention silviculture is being implemented as the main alternative to clearfelling, and in 2009 the program was fully summarised and reviewed in a major document 'A New Silviculture for Tasmania's Public Forests'.



The review was informed by a Science Panel of internationally recognised experts in forest and conservation science, and by the major themes of the Old Forests, New Management conference held in Hobart in February 2008.

This report confirms that it is possible to achieve by 2010 the non-clearfelling target of less than 20 per cent of the annual oldgrowth harvest. By doing this, the report's findings provide the pathway to achieving the next step forward for environmental forestry. Variable retention is now the global standard for best practice when harvesting oldgrowth forests. Forestry Tasmania has articulated the option of extending the use of variable retention into regrowth forests where oldgrowth elements are sparse, to improve biodiversity outcomes and provide continuing habitat for a range of species.

Scientific thinking is thus moving away from a narrow focus on protection of oldgrowth forest, towards a greater focus on maintaining mature forest elements across the whole forest.

The extent of variable retention will be limited by the increased costs involved, operational difficulties and continuing the Forestry Tasmania obligation to make available 300 000 cubic metres of sawlogs and veneer logs annually.

Currently it is possible to harvest 1 000 hectares of forest by variable retention each year, although that area could be increased if on-coupe burning risks change following establishment of a biomass plant. Variable retention costs \$5.20 a tonne more than clearfelling, which equates to more than \$1 million in extra costs over the 1 000 hectares.

The successful development of variable retention builds on a succession of measures to improve environmental management of Tasmanian State forests since the Forest and Forest Industry Strategy in 1990. These include the protection of one million hectares of oldgrowth forest, cessation of use of 1080 poison and atrazine, and the end to conversion of native forest to plantation. The Sustainability Charter released in 2008 affirms Forestry Tasmania's commitment to reserve at least 250 000 hectares of oldgrowth forest on State forest, a quarter of all oldgrowth forest protected in Tasmania.

research branch reports:

Biology and Conservation Branch

Principal Research Scientist: Dr Tim Wardlaw
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The Biology and Conservation Branch conducts research into the management of pests and diseases and the conservation of natural values. Arising from this research are management prescriptions and monitoring systems to increase forest productivity and ensure ecologically sustainable management practices. The Branch also provides Forest Health Surveillance services to Forestry Tasmania and external clients. At June 2009, the Branch had 6 full-time and 9 part-time staff. Two University of Tasmania post-doctoral research fellows are also based in the Branch.



Main outputs for 2008 - 09

- Successful funding from FWPA to evaluate the effectiveness of CAR Reserves and complementary off-reserve management for conservation of the biodiversity dependent on mature forest in production forest landscapes. The study will be undertaken in the Southern Forests Experimental Forest Landscape (SFEFL) anchored at Warra.
- Developed prescriptions for the retention of CWD in fuelwood harvesting operations that were endorsed and publicly released.
- Involved as industry partner in a successful ARC Linkage proposal to use molecular methods to map the dispersal of saproxylic beetles within the SFEFL, as an indicator of the need for maintaining continuity of the coarse woody debris habitat. The grant will fund a post-doctoral researcher and a PhD student for three years
- Completed the second 3-year sampling of emerging saproxylic beetles from Warra Log Decay Study. Beetles have been sorted, identified and databased in preparation for analysis
- Publication of a revised population viability analysis for wedge-tailed eagles in Bass District in Biological Conservation. Management of production forest for the ongoing supply of future nest sites, as existing nesting trees are lost through fire or senescence, was identified as a key requirement for conservation outcomes for this species.
- Completed a study on the early recolonisation of vascular plants into harvested areas adjacent to burnt and unburnt aggregates
- Developed ecological metrics to rate how well forest operations have achieved the ecological goals for variable retention silviculture (retention of habitat, influence on the harvested area, and connectivity and eucalypt regeneration)
- Continued development of methods for introducing systemic insecticide into trap trees. Monitoring found that leaf beetles were active much later in this season than normal, but that treated trees also remained lethal until the end of the season.
- Timely monitoring and effective communication between the Branch and Districts, resulting in a very high proportion of over-threshold leaf beetle populations being managed. There was a tripling in the area sprayed using the biological insecticide spinosad, compared with last year.
- Retrospective analysis of health surveillance records, to identify the main damage agents influencing the choice of planting *E. globulus* or *E. nitens* in those parts of the estate suitable for both.
- Health surveillance completed of all Forestry Tasmania eucalypt plantations, and all pine plantations on State forest. Severe defoliation by autumn gum moth was averted in 150 ha of young *E. nitens* plantations following timely detection and rapid response.

Dr Tim Wardlaw

BIOLOGY AND CONSERVATION

Biology and Conservation - Key research and development projects

Sustainable Forest Management Objective	FT Staff and Collaborators	Project name and aims	2008 - 09 Progress
1. Sustaining biodiversity and habitat			
<p>1.1 Reserve system Maintain a reserve system in State forests in accordance with the Regional Forest Agreement and Tasmanian Community Forest Agreement.</p> <p>Also contributes to:</p> <p>1.2. (Biodiversity): Maintain a diversity of natural habitats and mixed age forests to support biodiversity across the forest estate.</p> <p>1.3. (Threatened species): Maintain viable populations of all existing animal and plant species and communities found in State forests.</p>	<p>S Grove T Wardlaw C Airey D Bashford A Phillips S Read J Hickey M Yee R Gao</p> <p>Collaborators University of Tasmania, DSE - Vic, DPI - NSW, DEC - WA, Forest Practices Authority</p>	<p>Effectiveness of CAR Reserves To quantify the contribution of CAR reserves and complementary off-reserve management to the conservation of biodiversity dependent on mature forest habitats in production forest landscapes across the continuum of forest management intensity.</p>	<p>Successfully attracted grant funding from FWPA to conduct a study to evaluate the effectiveness of the CAR Reserves and complementary off-reserve management to conserve mature forest-dependent biodiversity in production forest landscapes.</p> <p>Conducted a spatial analysis of the Southern Forests Experimental Forest Landscape (SFEFL) to classify the entire area into five classes of intensity of management history. Identified sections of the SFEFL potentially suitable as plots for the FWPA project.</p>
<p>1.3 Threatened species, communities and habitats Maintain viable populations of all existing animal and plant species and communities found in State forests.</p>	<p>S Grove</p> <p>Collaborators CRC Forestry, University of Tasmania</p>	<p>Coarse woody debris To apply prescriptions to integrated harvesting operations in wet eucalypt forests, which can be demonstrated to sustain coarse woody debris (CWD) habitat and its dependent biota.</p>	<p>Provisional prescriptions for the retention of CWD in fuelwood harvesting operations were written and subsequently endorsed.</p> <p>FT-funded PhD on the autecology of selected saproxylic beetles has completed field study phase and has progressed to analysis and write-up.</p> <p>A significant finding was the presence of Mt Mangana Stag Beetles in Acacia logs as well as in Eucalyptus logs.</p>
	<p>S Grove</p> <p>Collaborators University of Tasmania</p>	<p>Log Decay To develop ecologically sustainable management practices in relation to biota dependent upon the decaying log and mature timber habitat.</p> <p>Continued the second 3-year cycle of beetle trapping in the Warra log decay project.</p>	<p>Completed second three-year sampling of emerging saproxylic beetles from Warra Log Decay Study. Beetles have been sorted, identified and databased in preparation for analysis.</p>

Sustainable Forest Management Objective	FT Staff and Collaborators	Project name and aims	2008 - 09 Progress
1. Sustaining biodiversity and habitat			
1.3 Threatened species, communities and habitats (cont.)	<p>S Read R Gao</p> <p>Collaborators Melbourne University, Forest Practices Authority</p>	<p>Wedge tail eagle population viability modelling</p> <p>To use population viability analysis for predicting future eagle populations and identifying the key factors influencing future population levels.</p>	<p>The results of a revised population viability analysis of wedge tailed eagles in Bass District was published in <i>Biological Conservation</i>. Significant amendments to the model were made to correct previous errors and incorrect assumptions. Although the model predicted a decline in carrying capacity under realistic forest management scenarios, it never predicted extinction.</p>
	<p>S Grove T Wardlaw</p> <p>Collaborators University of Tasmania</p>	<p>Persistence of saproxylic beetles</p> <p>To develop understanding scales and structural attributes of production forest landscapes that facilitate dispersal of saproxylic beetles thus enabling their persistence.</p>	<p>Successfully applied for an ARC-Linkage Grant for study using molecular methods to map dispersal capacity of saproxylic beetles in the southern forests experimental forest landscape (SFEFL). The grant will fund a post-doctoral researcher and a PhD student for three years.</p>
<p>1.4. Oldgrowth forests Retain oldgrowth elements including large trees, stags, understoreys and logs across the forest estate.</p>	<p>S Baker T Wardlaw M Neyland S Grove D McElwee S Read</p> <p>Collaborators CRC Forestry, University of Tasmania</p>	<p>VR biodiversity</p> <p>To verify function of retained aggregates in operational ARN coupes providing viable habitat for late successional species.</p>	<p>Biodiversity assessments completed for aggregates and unlogged controls in 2008 ARN coupes. Data entered into the database and checked for accuracy.</p> <p>Burn impact on retained forest assessed for 2008 and 2009 ARN coupes and matched clearfells. Mapping and analysis of the impact of regeneration burns into retained forest demonstrates that recent coupe designs have minimised burn escapes to levels comparable with clearfells. A draft report on burn outcomes has been prepared.</p> <p>A study was completed on the early recolonisation of vascular plants into harvested areas adjacent to burnt and unburnt aggregates.</p> <p>Developed ecological metrics to rate how well operations have achieved the ecological goals for VR (retention, influence and minimising machinery disturbance).</p>

Biology and Conservation - Key research and development projects (continued)

Sustainable Forest Management Objective	FT Staff and Collaborators	Project name and aims	2008 - 09 Progress
1. Sustain biodiversity and habitat			
1.4 Oldgrowth forests (cont.)	S Grove A Phillips A Hingston (contract)	Silvicultural Systems Trial (SST) biodiversity To document the biodiversity impacts from the range of silvicultural treatments available for harvesting wet eucalypt forests.	Completed annual surveys of ground beetles and birds in control plots and completed first of the 10-year post-harvest treatments in the SST.
	Collaborators CRC Forestry		
2. Sustaining jobs for current and future generations			
2.3.1 Native forests: Eucalypt forests Ensure an ongoing long-term supply of the highest quality eucalypt timbers from native forests.	T Wardlaw L Edwards M Neyland P Sheldon	Wood decay in regrowth To identify, test and introduce silvicultural tools and other management strategies operationally to minimise the effect of stem decay.	Unusually high decay levels within the stand greatly restricted opportunities for tree selection to reduce the proportion of severely decayed trees in the final crop.
	Collaborators CRC Forestry		

Sustainable Forest Management Objective	FT Staff and Collaborators	Project name and aims	2008 - 09 Progress
3. Maintain Ecosystem Health and Vitality in State forest			
3.1 Carbon and climate change Manage State forests for long term carbon storage and provide a sustainable source of products which contribute to locking up carbon and reducing emissions.	T Wardlaw S Read Collaborators University of Tasmania, CRC Forestry, CSIRO Marine & Atmospheric Research, Monash University	Warra carbon flux tower To document fluxes in carbon, energy and water from mature / regrowth <i>E. obliqua</i> forest.	A bid for inclusion of the Warra LTER in an expanded Ozflux network, funded as part of the Terrestrial Ecosystem Research Network (TERN) was successful.
Monitor emerging climate change scenarios and trends and adapt forest management practices.	T Wardlaw S Grove Collaborators CSIRO Sustainable Ecosystems, University of Tasmania	Baseline altitudinal monitoring plots (BAMPS) Early detection of large-scale influences such as climate change on forest processes. To enable the effect of any large-scale influences such as climate change to be taken into consideration when interpreting small-scale treatment effects on biodiversity.	Analysis of the baseline sample of ground beetles collected from the Baseline Altitudinal Monitoring Transects found that changes in the altitudinal distribution are likely to be the main response to climate change in that group, rather than shifts in seasonal patterns of emergence.
3.2 Ensure availability of clean water from State forests	S Read T Wardlaw Collaborators University of Tasmania (R Magierowski, P Davies)	Landscape logic To link land use change, and resulting chemical and physical changes in water quality and riverine habitats, to river health.	Submitted paper to <i>Environmental Management</i> reporting results from retrospective study. Key finding was that proportion of grazing land in the catchment was the main driver of river health. Sensitive invertebrate taxa declined as a proportion of total aquatic biodiversity with increasing percentage of catchments under grazing. Invertebrate biodiversity responses to the proportion of production forestry in catchments were similar to response provided by protected areas.

Biology and Conservation - Key research and development projects (continued)

Sustainable Forest Management Objective	FT Staff and Collaborators	Project name and aims	2008 - 09 Progress
3. Sustaining carbon stores, clean air, water and healthy forests			
3.4 Weeds, pests and diseases Control weeds, pests and diseases to protect State forests.	L Clark T Wardlaw IBMG Members	Browsing monitoring and extension Develop systems to support the adoption of a reactive approach to browsing management.	Statewide introduction of The Browsing Management Tool - a PDA application to streamline the collection and processing of browsing management surveys . The timely acquisition and reporting of monitoring results is being used to help Districts allocate resources for browsing management.
	L Clark T Wardlaw IBMG Members	Browsing IPM Develop a risk-based framework to support adoption of non-lethal methods.	Collaborated with CRC F to review results of FT research together with CRC F research in the initial step towards developing a CRC integrated Browsing Management strategy.
	Collaborators University of Tasmania, CRC Forestry		
	D Bashford Collaborators National Sirex Coordination Committee	Sirex wood wasp To prevent significant losses from outbreaks of Sirex wood wasp in <i>P. radiata</i> plantations.	Chair National Sirex Coordination Committee. Monitored five compartments for Sirex using static traps. Provided supervision to NSCC-sponsored research projects (Ips competition with Sirex in trap-trees, temperature effects on <i>Amylosterum</i>).

Sustainable Forest Management Objective	FT Staff and Collaborators	Project name and aims	2008 - 09 Progress
3. Maintain Ecosystem Health and Vitality in State forest			
3.4 Weeds, pests and diseases (cont.)	<p>J Elek</p> <p>Collaborators</p> <p>University of Tasmania, CRC Forestry, Bayer Crop Science</p>	<p>Lethal trap trees</p> <p>To develop a novel delivery method for systemic insecticides as an alternative to aerial spraying, which offers the potential for better targeting defoliators and in particular adult beetles that are difficult to manage with current methods.</p>	<p>Prepared an establishment report (as a Technical Report) of the Lethal Trap Tree Trial.</p> <p>Evaluated several methods for introducing systemic insecticide into trap trees. The high-volume infusion method proved superior. In-field monitoring of beetle mortality after feeding on treated trap trees found lethality persisted for at least 22 weeks following treatment.</p> <p>FT supported a pilot study to screen volatile compounds released from juvenile foliage and leaf beetles for sensory responses in leaf beetles.</p>
	<p>L Jordan T Wardlaw J Elek</p>	<p>Coordination of leaf beetle management</p> <p>To develop an integrated pest management (IPM) system that is efficient at preventing economic damage by leaf beetles in plantations.</p>	<p>A summary table for leaf beetle monitoring was developed for FOD and populated with all 2007 - 08 and 2008 - 09 monitoring results.</p> <p>Provided training to District staff and contractors in leaf beetle monitoring.</p> <p>Transferred responsibility for coordinating leaf beetle monitoring to Forest Health and provided support to District staff in control decisions. Timely monitoring and effective communication between the Branch and Districts resulted in a very high proportion of over-threshold leaf beetle populations being managed. There was a tripling in the area sprayed using the biological insecticide, spinosad, compared with last year.</p> <p>Reviewed the conduct of leaf beetle management for the 2008 - 09 season.</p> <p>Conducted defoliation assessments (as part of health surveillance program) to evaluate the effectiveness of the leaf beetle management program in protecting plantations from severe defoliation.</p>
	<p>T Wardlaw S Jennings N Ramsden</p> <p>Collaborators</p> <p>Forest Practices Authority, DPIPWE</p>	<p><i>Phytophthora cinnamomi</i></p> <p>To ensure that susceptible plant species and communities of high conservation value are protected as far as possible from the adverse effects of <i>P. cinnamomi</i>.</p>	<p>Conducted quarry certification inspections in Huon, Bass and Murchison Districts as well as for several private clients.</p> <p>Provided advice on Forest Practices Plan hygiene prescriptions for operations in areas with susceptible plant species.</p> <p>Collaborated with DPIPWE in a pilot study to examine the feasibility of stream baiting for environmental monitoring for <i>Phytophthora</i> species.</p>

Biology and Conservation - Key research and development projects (continued)

Sustainable Forest Management Objective	FT Staff and Collaborators	Project name and aims	2008 - 09 Progress
3. Sustaining carbon stores, clean air, water and healthy forests			
3.4 Weeds, pests and diseases (cont.)	K Wotherspoon S Jennings N Ramsden L Jordan T Wardlaw	Health surveillance of plantations (FT & external) To maximise the health and productivity of plantations by ensuring health problems are detected and managed before significant impacts occur.	Health surveillance was completed of all Forestry Tasmania eucalypt plantations and all pine plantations on State forest. A total of 131 notification reports were sent to clients. Severe defoliation by autumn gum moth was averted in 150 ha of young <i>E. nitens</i> plantations following timely detection and rapid response by District staff.
	S Jennings K Wotherspoon N Ramsden L Jordan K Swanepoel	FHS: District liaison and quality standards To provide pro-active responses to the management of detected health problems through effective liaison between FHS staff (and specialists) and District staff. To increase awareness among field staff of the common health problems in pine and eucalypt plantations.	Conducted annual debrief of the 2007 - 08 surveillance year with Districts and developed agreed action plans for remedial treatments.
	K Wotherspoon S Jennings N Ramsden L Jordan T Wardlaw	FHS - policy To ensure the flow of information from FHS to inform policy and corporate reporting.	Prepared annual summary report of the main pest and disease problems detected in plantations on State forest in 2008 - 09. Compiled tabular and narrative summaries from FHS for inclusion in the Sustainable Forest Management Report. Compiled annual pest and disease status report for the Research Priorities Coordination Committee. Attended meetings of Tasmanian Biosecurity Technical Committee.

Sustainable Forest Management Objective	FT Staff and Collaborators	Project name and aims	2008 - 09 Progress
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3. Sustaining carbon stores, clean air, water and healthy forests

3.4 Weeds, pests and diseases (cont.)	<p>D Bashford N Ramsden</p> <p>Collaborators DPIPWE, OCPPO</p>	<p>Exotic insect surveillance Timely detection of new incursions of exotic insect pests and monitoring the spread of established insect pests.</p>	<p>Conducted surveys to map the Tasmanian distribution of several established exotic insect pest species as part of a national project.</p> <p>Added insects trapped during quarantine surveys to the Tasmanian Forest Insect Collection.</p>
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<p>D Bashford T Wardlaw K Wotherspoon N Ramsden</p> <p>Collaborators DPI - Qld, ACIAR</p>	<p>FHS - Research To refine methods for the detection of forest pests.</p>	<p>Completed study to examine the fine-scale spatial pattern of static trap captures within a stressed plantation and its relationship with damage.</p> <p>Continued malaise trap survey to comprehensively document the suite of wood boring insects in a stressed eucalypt plantation.</p> <p>Analysed the relationships between static trap surveys and damage surveys in eucalypt plantations along a rainfall gradient.</p> <p>Conducted two visits to Fiji to train forestry and quarantine staff as part of a capacity-building project on surveillance methods to detect insect pests.</p>
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5. Sustaining science-based stewardship

<p>5.3 Maintain a viable research program Use science to inform continuous improvement in forest policy and management.</p>	<p>S Grove D Bashford</p> <p>Collaborators Australian National Insect Collection, University of Tasmania, University of Guelph, CRC Forestry, Numerous taxonomists</p>	<p>Tasmanian Forest Insect Collection (TFIC) To develop and implement a cost-effective method for reducing the impact of European wasp.</p>	<p>Added beetles from (i) the second 3-year sampling of the Warra Log Decay study; (ii) the remaining Baseline Altitudinal Monitoring Plots baseline surveys (2001); (iii) quarantine surveys.</p> <p>Prepared mock-up of a web-based portal to the TFIC that includes specimen photographs and distributional maps (generated automatically).</p>
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Biology and Conservation - Key research and development projects (continued)

Sustainable Forest Management Objective	FT Staff and Collaborators	Project name and aims	2008 - 09 Progress
5. Sustaining science-based stewardship			
5.3 Maintain a viable research program Use science to inform continuous improvement in forest policy and management.	S Grove S Read P Hopson Collaborators University of Tasmania, CRC Forestry, Australian National University, Bureau of Rural Studies, Australian LTER network, Taiwan Ecological Research Network, US LTER network	Warra development Maintain a high public and scientific profile of the Warra Long Term Ecological Research (LTER). Develop a long-term research strategy based on the Warra Ecological Model. Promote collaborative research at the Warra LTER site.	Provided funding support through the Warra Small Projects Grants to Eva Hilbig (CWD surveys in Wildfire Chronosequence), Dr Brad Law (bats in Aggregated Retention treatments); Lisa Cawthorn (call recognition for Tasmanian bat species). Hosted visit by Dr Chau-Chin Lin from Taiwan Ecological Research Network.
	D Bashford A Phillips J Leseck	Laboratory management Maintain a functional laboratory facility to support research.	Conducted routine maintenance and calibration of equipment. Maintained Occupational Health and Safety (OH&S) through ensuring MSDS documentation remained current and ensured all new laboratory users were properly inducted.
	All research staff	Communications Maintain strong linkage between research and science-based forest management. Maintain a high profile for credible research within the scientific community.	Continued to communicate with key stakeholders to inform on the results of research and implications for management. Continued to showcase FT capability of science-driven forest management.

research branch reports:

Native Forests Branch

Principal Research Scientist: Mark Neyland
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Native Forests Branch conducts research on the silviculture of native forests to increase productivity and support continuous improvement for sustainable forest management. At 30 June 2009, the branch had 6 full-time and 2 part-time staff.

Main outputs for 2008 - 09

- Acceptance of variable retention as a viable alternative to clearfelling in oldgrowth wet eucalypt forests, and silvicultural support for and monitoring of operational aggregated retention coupes established throughout the State
- Maintenance, monitoring and reporting of the Warra silvicultural systems trial
- Continued development of stand management regimes for native forest regrowth
- Development of stand management regimes for blackwood in native forests
- Development of a research agenda for native forest carbon stocks and dynamics
- Continued improvement of the quality standards system for native forests, and completion and reporting of the annual Quality Standards review
- Provision of silvicultural support and training to field staff

*Mark Neyland discusses
'A new silviculture for
Tasmania's public forests'*



NATIVE FORESTS

Native Forests - Key research and development projects

Sustainable Forest Management Objective	FT Staff and Collaborators	Project name and aims	2008 - 09 Progress
1. Sustaining biodiversity and habitat			
<p>1.4 Oldgrowth forests Forestry Tasmania will maintain a minimum of 250 000 hectares of oldgrowth in reserves in State forests (25% of Tasmania's reserved oldgrowth forests), for conservation values.</p> <p>Forestry Tasmania will retain oldgrowth elements including large trees, stags, understoreys and logs across the forest estate.</p>	<p>M Neyland L Edwards D McElwee R Scott</p>	<p>Alternatives to clearfelling lowland wet eucalypt forest To establish a replicated silvicultural systems trial (SST) in wet eucalypt forests at Warra and compare the standard clearfell, burn and sow system with potential alternatives.</p>	<p>Monitoring and maintenance of the trial.</p>
	<p>J Jarman M Neyland</p> <p>Collaborators Tasmanian Herbarium (G Kantvilas), University of Southern Illinois (P Minchin)</p>	<p>Impacts of harvesting and regeneration operations on lichens and bryophytes in wet eucalypt forests To assess the impact of various logging and regeneration treatments on the lichen and bryophyte floras of wet eucalypt forest.</p>	<p>Sampled plots in the aggregates within two coupes and completed the species identifications.</p> <p>Prepared the dataset for the final analyses which will be undertaken by Dr Peter Minchin (University of Southern Illinois, USA).</p> <p>Made substantial progress with the draft manuscript on assessing the impacts of the treatments.</p> <p>Commenced a paper on succession after harvesting and burning.</p>
	<p>M Neyland R Scott L Edwards</p>	<p>Reporting To report on aspects of the Warra SST.</p>	<p>Paper on safety and productivity of the trial accepted for publication in <i>Tasforests</i>.</p> <p>Paper on stocking and early growth of the eucalypt regeneration at Warra accepted for publication in <i>Forest Ecology and Management</i>.</p>

Sustainable Forest Management Objective	FT Staff and Collaborators	Project name and aims	2008 - 09 Progress
1. Protect and maintain environmental values in State forest			
1.4 Oldgrowth forests (cont.)	L Edwards D McElwee M Neyland	Warra LTER support To support and promote research at the Warra LTER site. To inform visitors to the Warra LTER site of the costs and benefits of various silvicultural treatments applied to wet eucalypt forests designated for wood production.	Provided assistance to external researchers. Undertook safety coordination with Huon District. Provided guides for 12 Site tours (210 participants). Research tracks established and maintained for long-term studies.
	R Scott D McElwee L Edwards M Neyland	Operational development and evaluation of aggregated retention (ARN) in tall oldgrowth forests To develop ARN as a reliable and cost effective silvicultural system. To monitor outcomes in all aggregated retention coupes.	Database maintained on all ARN coupes and comparable Clearfell Burn and Sow (CBS) coupes. Goals and guidelines document prepared and released. Variable Retention (VR) manual updated (version 9) . Two VRIG meetings coordinated. Completed 6 of 10 planned regeneration burns in ARN coupes. Provided input to New Silviculture report on progress to June 2008.
	T Blanks R Scott M Neyland	Regeneration burning of aggregated retention coupes To assist the Districts to undertake successful regeneration burns in aggregated retention coupes. To identify approaches to regeneration burning in ARN coupes that can assist future burning.	Monitored burning conditions and outcomes in all VR coupes and a set of CBS coupes for comparison.

Native Forests - Key research and development projects (continued)

Sustainable Forest Management Objective	FT Staff and Collaborators	Project name and aims	2008 - 09 Progress
2. Sustaining jobs for current and future generations			
2.3.1 Eucalypt forests	L Edwards M Neyland D McElwee	Measurement and maintenance of established trials To maintain established trials in an efficient manner.	The trial in Southport 22 was successfully isolated, and was unharmed while thinning operations were conducted in the surrounding forest.
	M Neyland L Clark D Mannes R Musk M Stone	Rationalisation, measurement and maintenance of established thinning trials To rationalise the existing thinning trials, to commence data analysis using existing data sets, and to determine the most efficient program of monitoring for the next few years.	First meeting of group held, existing data sets identified. Work required to bring existing native forests data sets into corporate data bases identified. Gaps in existing knowledge and some inventory needs identified.
	L Edwards T Wardlaw M Neyland Collaborators Melbourne University (L Kellogg), CRC Forestry (M Acuna)	Southport productivity trial To establish an operational research trial in Southport 14F to evaluate tree marking versus operator selection in a regrowth thinning operation. The trial will allow the efficiency of this operation to be compared to thinning in <i>E. sieberi</i> forests in NSW.	Trial monitoring completed. Piece size is the key factor influencing productivity in commercial thinning. Tim Wardlaw commenced a report on the outcomes of the operator selection versus tree marking trial.
	M Neyland	Dry eucalypt forests To develop and improve silvicultural treatments being applied to dry eucalypt forests, particularly in Bass, Derwent and Mersey Districts.	Advice provided as required. Undertook a two-day field trip to Mersey District to review seed tree and shelterwood coupes and likely future operations in these coupes.

Sustainable Forest Management Objective	FT Staff and Collaborators	Project name and aims	2008 - 09 Progress
2. Sustaining jobs for current and future generations			
2.3.1 Eucalypt forests (cont.)	M Neyland L Clark	High altitude eucalypt forests To provide silvicultural advice and to promote good silvicultural practice in high altitude forests.	<p>The Uneven Aged Treatment (UAT) procedure has become widely accepted as a useful tool for planning and monitoring the harvesting of high / dry <i>E. delegatensis</i> forest. Pre-logging assessments have declined recently due to a lack of staff. Progressive harvesting assessments continue to be useful.</p> <p>In 2001 - 02, 1674 ha were treated and 76% met the standard. In 2002 - 03, 2700 ha68% met the standard. In 2003 - 04, 4000 ha.....90% met the standard. In 2004 - 05, 4410 ha..... .96% met the standard. In 2005 - 06, 3445 ha..... .98% met the standard. In 2006 - 07, 1969 ha..... .94% met the standard. In 2007 - 08, 3078 ha..... .93% met the standard. In 2008 - 09, 3531 ha..... .92% met the standard.</p>
	L Clark L Edwards M Neyland	Quality standards monitoring To ensure 'best practice' standards are developed and met in native forest silviculture.	<p>Provided support to Districts with inputting data into FOD.</p> <p>Formal Quality Standards visit held in each District. Statewide review held in September. Reported to General Management Team in October. Key issues were browsing management and seed supply.</p> <p>2009 Quality Standards Manual published.</p>
	L Clark	Review of strategic seed reserves To estimate the amount of seed required to fulfil 3 year plan requirements and compare that with present seed centre stocks. This will provide seed coordinators with priority species by zones for seed collection.	<p>Provided on-going analysis of seed stock shortfalls and surpluses on an as-needs basis.</p>

Native Forests - Key research and development projects (continued)

Sustainable Forest Management Objective	FT Staff and Collaborators	Project name and aims	2008 - 09 Progress
2. Sustaining jobs for current and future generations			
2.3.1 Eucalypt forests (cont.)	L Clark	Support for seed allocation program To ensure that optimum seed mixes are used in all FT sowing.	Supported seed allocation process for 2009 sowing. Provided technical advice and support to seed centre staff on germination testing procedures.
	L Clark L Edwards	Native forest coordinators group To provide Districts with forum to exchange ideas on native forest management and to identify and update SEMS documents.	Meeting held of native forest coordinators group. Co-ordinated field trip to Victoria to observe seed collection and management systems. Created regeneration survey database for in-field capture of regeneration survey data. Browsing monitoring tool successfully rolled out to all Districts. Maintained mammal browsing database.
	M Neyland L Clark L Edwards Collaborators University of Melbourne (Peter Ades Paul Nevill), University of Tasmania (Brad Potts, Dot Steane, Justin Bloomfield)	Genetics of <i>E. regnans</i> and <i>E. obliqua</i> To use DNA studies to: (i) examine variability and similarity in and between populations; (ii) identify what environmental factors map with genetic variation; (iii) better understand mating systems.	Justin Bloomfield completed an Honours project and Paul Nevill neared completion of his PhD. The projects demonstrated that the current FT seed zoning system is adequate with respect to maintaining eucalypt genetics, with some minor alterations; notably, there are genetic superzones – for example the northeast (Bass) appears to be a distinct genetic region. The current approach to identifying suitable in-zone seed will be checked and modified where necessary to prevent seed from being transported across the superzone boundaries.

Sustainable Forest Management Objective	FT Staff and Collaborators	Project name and aims	2008 - 09 Progress
2. Sustaining jobs for current and future generations			
2.3.2 Special timbers	S Jennings D McElwee M Neyland	Remedial treatments in swamp-blackwood forests To regenerate a failed swamp blackwood coupe.	CH042B is a failed swamp blackwood coupe. A field day was held that reviewed this coupe amongst others. The coupe was subsequently rough heaped, burnt in autumn 2009 and re-fenced. The coupe will be closely watched over the next couple of years.
	S Jennings D McElwee M Neyland	Regeneration strategies for swamp blackwood myrtle forests To investigate the effectiveness of partial harvesting and fencing in achieving successful regeneration in swamp blackwood myrtle forests.	CH41D and CH41E is a swamp blackwood myrtle forest. The FPA in recent years have recommended that partial harvesting options should be explored in these later successional stage forests. This coupe was selectively harvested for blackwood and other commercial special timbers, then patchily burnt and fenced. It remains to be seen whether the captive (inside the fence) browsing mammal population can be controlled and successful regeneration established.
	L Edwards M Neyland	Silvicultural systems for harvesting special timbers from tall oldgrowth forest To assist Huon District to develop and implement a safe, practical and economic silvicultural system for the sustainable production of low volumes of special timbers from tall oldgrowth forests.	A second series of patches at WR017B was harvested in 2007, and fuels prepared for burning in 2008. The patches weren't burnt in 2008, nor in 2009. Feedback from the design group and the District is that the patches harvested in the second round are too small. The lesson from WR8G and elsewhere is that openings of at least two tree heights wide are required to provide sufficient light for regeneration to prosper and to enable good fuel preparation without excessive soil disturbance (as a proportion of the harvested area) which facilitates burning. Small patches are also too shady; once wet in autumn they do not dry out.
	S Jennings L Clark M Neyland	Harvesting damage assessment in rainforest coupes To train harvesting supervisors to monitor and report on harvesting damage in rainforest coupes.	A rapid succession of (3) supervisors were trained in the one rainforest coupe that was harvested this year on the west coast. Development of target levels for damage and wilt need to be established.
	S Jennings M Neyland	Regeneration of celery-top pine To prepare a paper of the results of a series of rainforest trials, looking at the regeneration strategies of celery-top pine.	Draft paper prepared.

Native Forests - Key research and development projects (continued)

Sustainable Forest Management Objective	FT Staff and Collaborators	Project name and aims	2008 - 09 Progress
3. Sustain carbon stores, ocean air, water and healthy forests			
3.1 Carbon and climate change	M Moroni L Edwards M Neyland	Calibration of accounting systems To commence calibration of carbon accounting systems for Tasmanian forests.	Selected the most suitable forest carbon model. Commenced calibration for State forest. Scope required field measurement of key forest carbon stocks.
	M Moroni M Neyland S Read	Review of carbon carrying capacities. To commence definition of landscape-level carbon storage and sequestration parameters.	Undertook Forest Wood Products Australia (FWPA) - funded review of implications of "green carbon", "carbon-carrying capacity" and related concepts for native forest management in temperate Australia.
5. Sustaining science-based stewardship			
5.4 Organisational capacity	M Neyland L Clark S Jennings R Scott L Edwards	Technical bulletins (TB) To maintain a comprehensive set of technical bulletins for native forest silviculture.	Prepared drafts of TB 1, TB 7 and TB 12.
	M Neyland L Clark R Scott L Edwards S Jennings	Silvicultural training To communicate recommended management practices and research results to staff and Technical Forester trainees through training programs, field days and seminars.	Provided training to Forest Practices Officers and Supervisors Courses. Provided on-ground training for field staff based on needs identified at annual Quality Standards Reviews. Provided input to review of the FPO training package.

research branch reports:

Plantations Branch

Principal Research Scientist: Dr Paul Adams
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The Plantations Branch undertakes research and development on Forestry Tasmania's plantation estate, provides operational advice on management of Forestry Tasmanian plantations, reports on quality standards and provides consulting services to external clients. Collaborative research is undertaken with a number of public and private sector organisations in Australia and elsewhere. At 30 June 2009, the Branch had 11 full-time and 1 part-time staff.

Main outputs for 2008 - 09

- Established a new grafted clonal *Eucalyptus nitens* seed orchard at Castra in Mersey district
- Roll-out of versions of the Pesticide Impact Rating Index for District and Nursery staff
- Development of generic equations for *E. nitens* water use for Woodstock modelling
- Successful delivery of a Plantation Management and Silviculture Project for Yong'an Forestry Group (Fujian, China)
- Successful funding of Rotary Peeling and Tree Water-Use projects by the FWPA
- Established a Plantation Productivity and Management Group (PPMG) to guide management of the plantation estate for improved productivity
- Staff awarded two Gottstein Fellowships for study tours to the USA



Dr Paul Adams

PLANTATIONS

Plantations - Key research and development projects

Sustainable Forest Management Objective	FT Staff and Collaborators	Project name and aims	2008 - 09 Progress
2. Sustaining jobs for current and future generations			
<p>2.4.1 Establish and manage plantations to maintain timber supply levels to industry</p> <p>Maximising the production of high quality sawlogs, and associated products, from plantations through genetic improvement, pruning, thinning and fertilising to improve growth and wood quality.</p>	<p>D Williams P Moore P Volker D Robertson D McKenzie C Cox</p> <p>Collaborators University of Tasmania, SeedEnergy, STBA, Plantplan Genetics, CRC Forestry, CSIRO</p>	<p>Tree improvement and seedling supply</p> <p>To provide genetic material for plantations to maximise profitability and product quality.</p>	<p>Established a new grafted clonal <i>E. nitens</i> seed orchard at Castra (Mersey district).</p> <p>Successful funding applications from FWPA for Rotary Peeling project and Tree water use project.</p> <p>The current breeding strategy is compatible with improving the recovery of structural and appearance grade products.</p> <p>Commenced a program to quantify the contribution of genetic improvement to productivity.</p> <p>Commenced a joint <i>E. nitens</i> genetic analysis project with Gunns Ltd.</p> <p>Established 11 new genetics trials (Mycosphaerella, species comparison, seedling systems).</p> <p>Produced grafts of elite STBA <i>E. globulus</i> material to infuse into Perth seed orchard and commenced new pollination program.</p> <p>Investigated the commercial suitability of eucalypt species for lowland cold and dry environments in Tasmania (collaboration with Private Forests Tasmania).</p> <p>Completed two joint research projects with UTAS on the risk of genetic pollution from eucalyptus plantations and the relationship between growth and wood properties.</p> <p>Completed wood quality assessments in the project on the effects of genetics on <i>E. nitens</i> sawn board quality.</p> <p>Investigated the effects of genetics on Rotary Peeled Veneer quality (funded by FWPA).</p>

Plantations - Key research and development projects (continued)

Sustainable Forest Management Objective	FT Staff and Collaborators	Project name and aims	2008 - 09 Progress
2. Sustaining jobs for current and future generations			
2.4.1 Establish and manage plantations to maintain timber supply levels to industry	M Wood D McKenzie D Robertson	<p>Eucalypt plantation silviculture</p> <p>To conduct research to investigate the effects of silvicultural management on growth.</p> <p>To communicate research outcomes to district and / or operational staff.</p> <p>To optimise silvicultural management, limit associated risks and ensure maximum financial returns.</p>	<p>Analysis of silviculture and economic outcomes after harvesting Goulds Country trial (CRC F).</p> <p>Commenced harvesting/sawing study of second long-term silvicultural trial (CRC F).</p> <p>Further developed WindRISK – development of high-resolution exposure maps, automated calculation of other key landscape variables.</p> <p>Continued development of Farm Forestry Toolbox.</p> <p>Development of StandWORKS (FT specific silvicultural decision support tool).</p> <p>Commenced the Derwent Project to add value to current plantation information, identify gaps and formulate coupe management plans for the District.</p> <p>Goulds Country silviculture trial - analyses exploring the effects of alternative drying and reconditioning techniques on the occurrence of key value-limiting defects (CRC F).</p>

Sustainable Forest Management Objective	FT Staff and Collaborators	Project name and aims	2008 - 09 Progress
2. Sustaining jobs for current and future generations			
2.4.1 Establish and manage plantations to maintain timber supply levels to industry	P Adams D Robertson D McKenzie Collaborators CRC Forestry, University of Sydney	Nutrition and productivity To develop and implement plantation nutrient management systems. To evaluate nutrient limitations to plantation growth and the long-term implications of nitrogen and phosphorus status in eucalypt plantations. To evaluate and predict productivity for plantation sites.	Established Plantation Productivity and Management Group (PPMG) to guide management of plantation estate & research to improve productivity. Investigated slow release products in primary fertiliser trials. Initiated aerial copper spraying operations across districts to treat deficiencies. Establishment of long-term weed control plots (CRC F).
	M Syme D McKenzie P Volker	Quality standards monitoring and extension To ensure growth targets and silvicultural objectives are met through the implementation of quality standards monitoring.	Completed the 2008 Annual Quality Standards report for plantations and reported against revised Plantation Performance Indicators for 2008. Formed the Chemical Users Group (CUG) in collaboration with Field Services. Rolled out Pesticide Impact Rating Index (FT-PIRI and Nursery-PIRI) for district staff.

Plantations - Key research and development projects (continued)

Sustainable Forest Management Objective	FT Staff and Collaborators	Project name and aims	2008 - 09 Progress
3. Sustaining carbon stores, clean air, water and healthy forests			
3.3.1 Ensure availability of clean water from State Forests	<p>S Roberts E Trainer R Barton-Johnson C Marunda P Volker</p> <p>Collaborators: TCFA, CRC Forestry, DPIW, CSIRO, University of Tasmania</p>	<p>Hydrology research To provide advice on hydrological issues and chemical policy.</p> <p>To incorporate water use change into the plantation estate planning process.</p> <p>To quantify the streamflow generated in tall wet eucalypt forests.</p> <p>To develop a better understanding of the impacts of forest management on hydrological processes in tall wet eucalypt forests.</p>	<p>Developed generic equations of tree water use for Woodstock modelling.</p> <p>Soil evaporation, transpiration, canopy interception and climate measurement plots were established and maintained in <i>E. nitens</i> plantations aged 0-10.</p> <p>Successful monitoring of stream water quality at potentially contentious forest harvest sites.</p> <p>Initiated research to improve methods for monitoring for chemicals in surface waters.</p> <p>Commenced TCFA funded chemical water quality monitoring project in conjunction with routine chemical application.</p> <p>Used LIDAR imagery to describe landscape and vegetation at a range of catchments.</p> <p>Collected spatial and historical information for catchments in Warra LTER to determine biophysical factors that have the greatest influence on water quality and yield.</p> <p>Collated water quality data for 15 water sampling sites (Warra), prepared technical report.</p> <p>Instruments upgraded at Warra weirs to include remote telemetry.</p>
3.3.2 Select soil values and geodiversity	<p>P Adams M Wood D Robertson</p>	Soil site selection and productivity estimation	Commenced TCFA funded project on the impact of firebreak construction on native forest regeneration (in collaboration with NFB).
4. Sustaining community access and heritage			
4.6.1 Actively promote open and constructive relationships with stakeholders and the broader community	<p>P Adams S Roberts M Syme</p>		<p>Successful delivery of Plantation Management and Silviculture Project for Yong'an Forestry Group (Fujian, China).</p> <p>Two Gottstein Fellowships - study tours to USA (Plantation management and nutrition, Hydrology).</p>

warra

Warra Long-Term Ecological Research (LTER) Site

Dr Simon Grove
Forestry Tasmania Warra Research Co-ordinator
Simon.Grove@forestrytas.com.au

The Warra LTER Site of 15 900 ha was designated in 1995 to encourage long-term ecological research and monitoring in wet forests in Tasmania. The site is supported by eight LTER site partners from Tasmanian and national research agencies. Continuing projects are listed at www.warra.com
DFRD provided Warra small-project grants to 3 researchers during 2008 - 09.

Major activities for 2008 - 09

- Collected spatial and historical information for catchments in Warra LTER to determine biophysical factors that have the greatest influence on water quality and yield
- Collated and reported water quality data for 15 water sampling sites
- Upgraded instruments at the Warra weirs to include remote telemetry
- Completed second 3-year sampling of emerging saproxylic beetles from Warra Log Decay Study. Beetles have been sorted, identified and databased in preparation for analysis.
- Completed annual surveys of ground beetles and birds in control plots at the SST, and completed first of the 10-year post-harvest treatments.
- Successful ARC Linkage Grant to use molecular methods to map dispersal of saproxylic beetles in the Southern Forests Experimental Forest Landscape (SFEFL) anchored at Warra. The grant will fund a post-doctoral researcher and a PhD student for three years

FT's Sandra Roberts with visiting Uni of Syracuse biogeochemist Assoc Prof Chris Johnson and doctoral student Ankit Balaria at a weir in Warra

- Successful inclusion of the Warra LTER in an expanded Ozflux network, allowing future establishment of a carbon flux tower in a mature / regrowth *E. obliqua* forest
- Analysis of initial sample of ground beetles collected from the Baseline Altitudinal Monitoring Transects
- Provided Warra Honours scholarship to Ian Riley (in collaboration with CRC for Forestry) to study carbon content of water in Warra streams
- Sampled lichen and bryophyte plots in retained aggregates of two Warra SST coupes, completed species identifications and prepared the dataset for final analyses

Projects commenced 2008 - 09 at the Warra LTER site

- Variation of volume, mass and carbon-content of coarse woody debris in tall wet *E. obliqua* forests in a chronosequence after fire disturbance or harvest. Project Leader - Ms Eva Hilbig and Prof J Bauhus
Affiliation - Freiburg University, Germany
- Baseline sampling of bats in aggregated retention coupes and other silvicultural treatments at Warra. Project Leader - Mr Bradley Law, Forests NSW
- Compilation of digital images of the saproxylic beetles of Warra
Project Leader - Ms Lynnette Forster



LEGEND

Quarry

Forest Type

Roads

Waterways

AirWalk Attractions

Giant Tree

Operational Coupes

Silvicultural Systems Trial

Long Term Ecological Projects

World Heritage Area





trading unit summaries

Forest Nursery

Forest Nursery and Seed Centre Manager: Peter Moore
Peter.Moore@forestrytas.com.au

Forest Nursery

Established in 1936, the Forest Nursery at Perth is a forestry business unit located on 80 hectares of land next to the South Esk River. The property also has:

- seed orchards
- facilities to produce specialist seed crops
- a regional administrative facility
- the Tasmanian Seed Centre

Production systems at the nursery are highly flexible with a wide range of propagation methods utilised. The nursery specialises in large-scale production of containerised eucalypt seedlings and bare-root pines. In addition, the nursery undertakes the growing of other species for customers with specific requirements.

The Forest Nursery offers clients a number of services, including:

- large-volume contract seedling production
- cold-hardened stock
- multiple species propagation
- wide range of propagation methods
- consultancy advice on nursery practice and infrastructure development
- technical support of Forestry Tasmania's Division of Forest Research & Development

Tasmanian Seed Centre

Forest Nursery and Seed Centre Manager: Peter Moore
Peter.Moore@forestrytas.com.au

The Tasmanian Seed Centre operates as a commercial trading unit and is responsible for extracting, cleaning, germination testing, and storage of seed supplied to Forestry Tasmania, in an efficient and economic manner, according to best silvicultural practice. Seed produced is also sold locally, as well as in interstate and international markets, via on-line seed purchase facilities.

The Tasmanian Seed Centre offers clients a number of services, including the capacity to process efficiently large volumes of seed-bearing material. Processed seed can be cool-stored in the most up-to-date facilities.

The Tasmanian Seed Centre is also a commercial seed-trading unit providing seed production services to external clients.

Seed orchards are established and managed by the Tasmanian Seed Centre to produce seed of improved genetic quality for use in Forestry Tasmania's plantation program and for external sale.

In January 2009, as part of a business restructure, both the Forest Nursery and the Tasmanian Seed Centre were transferred to the Operations group of Forestry Tasmania. The Division of Forest Research and Development will continue to provide support to the trading units in the development of seed orchards and general silvicultural advice.



*Inspecting seedlings at the Forest Nursery Glasshouse
L to R - Peter Rowlands (District Forest Manager, Mersey),
Carlton Cox (Assistant Forest Nursery Manager),
Michael Wood (Assistant General Manager, Strategic Business).*

Library and information services

Library

Librarian:

library@forestrytas.com.au



Forestry Tasmania's Library is located in the head office at 79 Melville Street, Hobart. It contains an extensive collection of core technical information and resources that supports the diverse needs of Forestry Tasmania: 16 000 books, 6 000 print images and slides, and 225 current serial titles. It also serves as a repository and archive for published technical reports and organisational materials from Forestry Tasmania and other forestry organisations nationally and internationally.

The library also makes information available to students, other libraries and members of the public who have specific requirements not able to be satisfied from other sources, and thus makes a valuable contribution to community involvement by Forestry Tasmania.

The existing collection of books, journals, videos and photographic images is augmented by on-line access to most current journals.

Library opening hours are 9 am – 5 pm Monday - Wednesday, by appointment only.

Phone 03 6235 8160 or email library@forestrytas.com.au

<http://www.forestrytas.com.au/science/forestry-library>

Plantations Research Officer Richard Lindley looking at the 'Report on Forestry for the year ended 1921' against a backdrop of a J M Beattie (Hobart) historical photo - Falling a 'Forest Giant' Bruny Island

divisional services to external clients

Research Services

Business & Communications Manager: Peter Hopson
Peter.Hopson@forestrytas.com.au

Staff from the Division of Forest Research and Development work with external clients, such as other forestry companies and land managers, in a number of ways, including research contracts and technical service consultancies.

The Division has significant experience in delivering contract research and consultancies to industry and other organisations both in Tasmania and abroad. A substantial body of know-how and other intellectual property has been gained by the Division through long experience of native forest management, and specialist skills have been developed in growing plantation pines and eucalypts for solid timber products.

Divisional staff provide training and operational advice to internal and external clients in harvesting, regeneration, thinning and pruning procedures. Specialist manuals, standard operating procedures, and quality assessment protocols for these operations have also been developed. Much of this material is now incorporated as part of Forestry Tasmania's Forest Management System, which complies with the International Standard ISO 14001.

The Division works with clients in a number of ways such as collaborative research, research services contracts, and technical services consultancies on specific projects undertaken on a fee-for-service basis.

Key advantages for clients who use Research Branch Services are:

- Working with a service provider that has a long history of forestry research and development, and provision of technical solutions for a large native forest and plantation estate

- Working with a team that specialises not only in high-quality science but also in converting project outcomes into operational realities in the forest
- Buying knowledge and expertise at the leading edge in development of specialist hardwood silvicultural regimes for maximising solid wood production

Specialist technical services are offered in:

- Native forest harvesting and regeneration
- Native forest seedbed preparation, sowing and remedial treatments
- Native forest silviculture, including pre-commercial thinning and commercial thinning operations
- Plantation silviculture and auditing
- Thinning and pruning regimes to produce clearwood in sawlogs from eucalypt plantations
- Soil surveys to assess sites for plantation establishment
- Health surveillance and audits of eucalypt plantations
- Diagnosis of forest health problems (pests, diseases and abiotic issues), advice on the significance of their impacts, and advice on management options
- Integrated management of major insect pests in eucalypt plantations
- Use of environmentally friendly insecticides to control major insect pests of eucalypt plantations
- Forest monitoring and assessment protocols for biodiversity, and analysis and interpretation of biodiversity data
- Development of appropriate management prescriptions for biodiversity

Forestry Tasmania has signed a commercial agreement with China's Yong'an Forestry Group (YFG). Under the agreement, Forestry Tasmania's new business arm, Forest Technical Services, will work with YFG to improve the way trees are grown in eucalypt plantations in Fujian Province in south-eastern China. Forestry Tasmania will provide services to develop tree breeding and silviculture, and will also help develop sustainable management of plantations, which is becoming an increasingly high priority in China.

To obtain a DFRD Capability Statement contact

Peter Hopson - phone (03) 6235 8169

email Peter.Hopson@forestrytas.com.au

<http://www.forestrytas.com.au/science/research>

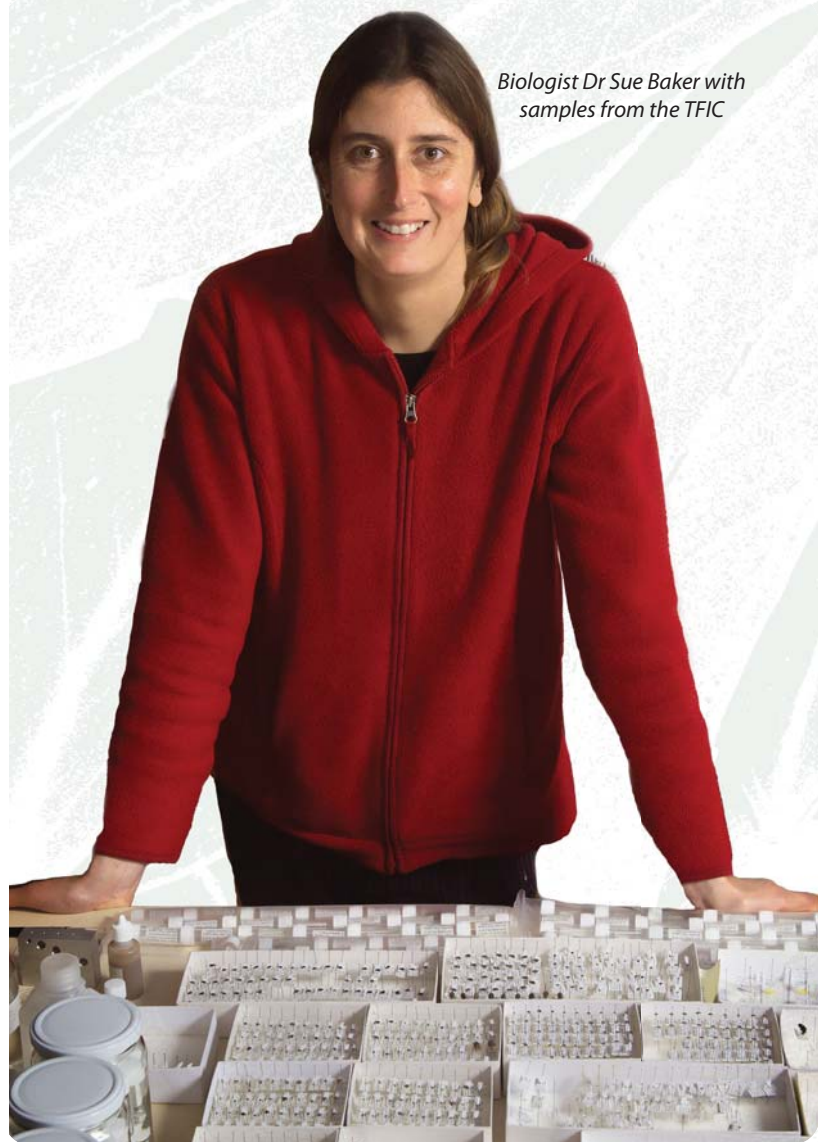


tasmanian forest insect collection

Tasmanian Forest Insect Collection (TFIC)

Dick Bashford

Dick.Bashford@forestrytas.com.au



Biologist Dr Sue Baker with samples from the TFIC

Insects are one of the most diverse groups living in our forests; some are pests that cause damage to trees, and some are natural enemies of the pest insects, but mostly insects contribute to the biodiversity of forests and are essential for the function of healthy forest ecosystems. We need to understand our insects to enable us to look after our trees, our forests and our biodiversity.

The Tasmanian Forest Insect Collection (TFIC) commenced in 1974 under the headship of Dr Humphrey Elliott, the Chief Scientist of DFRD at that time and now a member of the Forestry Tasmania Board. The collection began with an initial focus on forest pests and their predators and parasitoids. Dick Bashford continued the focus on forest pests and particularly wood borers.

More recently, Dr Simon Grove has overseen a major focus on beetle biodiversity, particularly saproxylic (log-dwelling) and ground beetles. The insects collected during many studies done by university students, particularly those done at Warra, are also added to the TFIC. The TFIC is one of only three state forestry-specific collections (Qld and NSW hold the others), is registered as a satellite collection of the Tasmanian Museum & Art Gallery, and is also a member collection of the Council of Heads of Australian Entomological Collections.

The main value of the TFIC is in providing a reference that either links insect specimens with their accepted name, or, if un-named, with a consistent "morphospecies" (grouping insects with the same physical characteristics). This is particularly important for long-term studies (seven long-term studies currently contribute to the TFIC), where it is

critical to maintain the correct identity of insects collected at different times.

As the TFIC was becoming established, most specimens were sent to the Australian National Insect Collection (Canberra) for identification. Now, however, many insect identifications are done in-house or in collaboration with overseas entomologists who specialise in particular groups. In the future we may rely more on DNA techniques to identify insect specimens.

During the last few years there has been major reorganisation of the TFIC to group specimens according to their taxonomic relatedness, greatly increasing the scientific value of the collection. Further adding to the value of the TFIC has been the development of the TFIC Database. All new specimens added to the TFIC are captured in the database and, progressively, many specimens already in the collection have been added to the database as well. The TFIC currently contains approximately 320 000 specimens in 24 ten-drawer cabinets, 40% of which are databased (123 326 specimens, 98% of which are beetles), including 1 944 species of beetles.

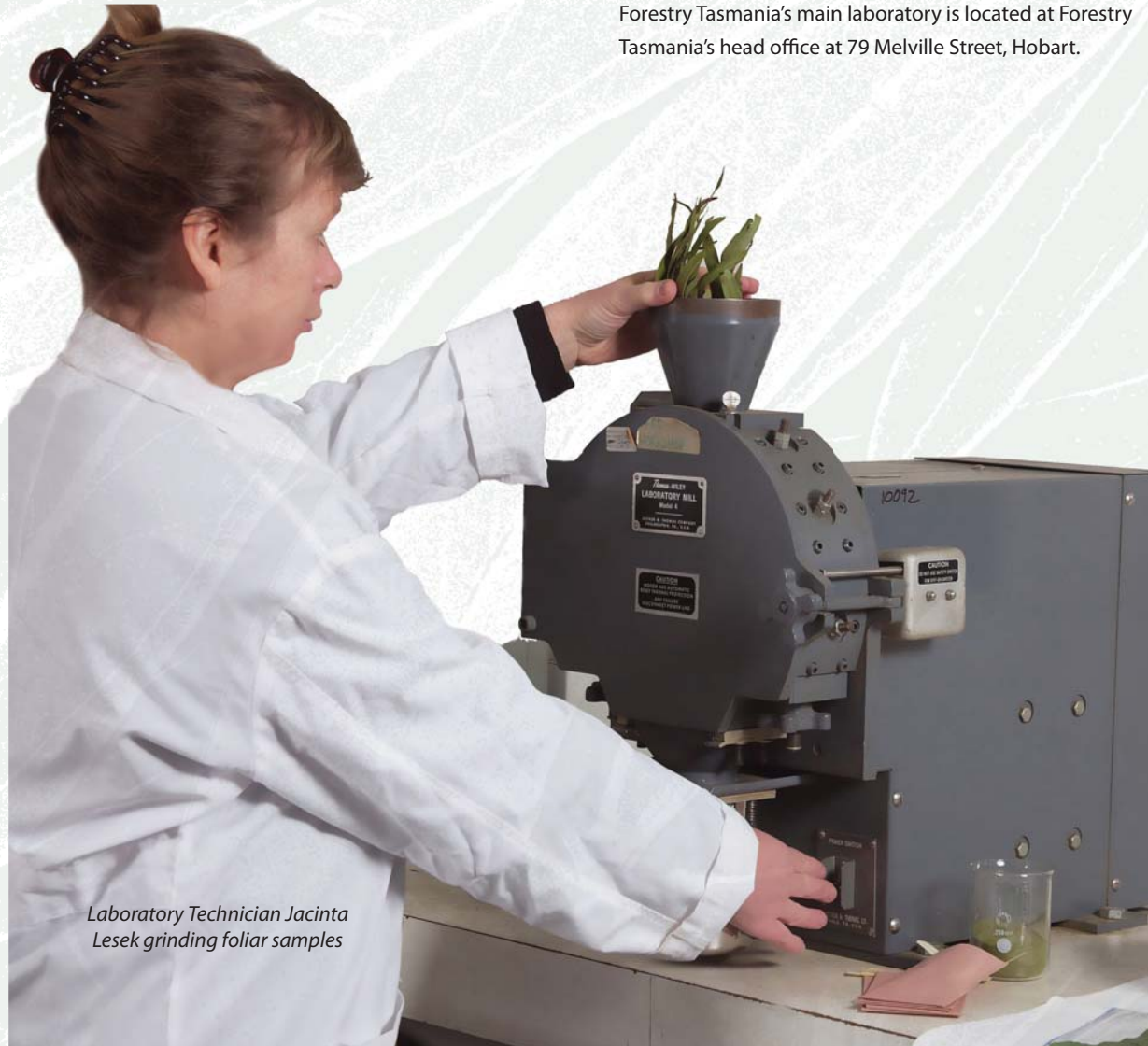
The TFIC has thus become a valuable resource for research on the link between forest management and biodiversity, and in supporting operational programs such as health surveillance and quarantine. As the TFIC continues to grow, it provides new opportunities for scientists to discover patterns across space and time - a critical aspect of forest management. Making the TFIC more accessible to scientists, and others, through a web-based portal is currently being examined.

Laboratory services

Laboratory

Laboratory Manager: Dick Bashford
Dick.Bashford@forestrytas.com.au

Forestry Tasmania's main laboratory is located at Forestry Tasmania's head office at 79 Melville Street, Hobart.



Laboratory Technician Jacinta
Lesek grinding foliar samples

Activities undertaken for Forestry Tasmania, and services that can be supplied to external clients, include:

1. Pathology

- Soil testing for *Phytophthora cinnamomi* (using standard lupin bait test)
- Diagnosis of diseased trees - isolation and identification of pathogenic fungi

2. Entomology

- Identification of forest insect pests
- Insecticide bioassays

3. Soil and foliage testing

- Preparation of soil and foliage samples for chemical analysis by external labs
- Assessment of soils for physical characteristics using wet sieve analysis

4. Wood density for wood quality assessment

- Process wood samples including discs and cores to assess basic density
- Cellulose content assessment

5. Water Quality Sampling

- Initial sample preparation
- Turbidity, pH testing and electrical conductivity

The laboratory works in conjunction with other laboratories to obtain specialist analyses.

collaboration & linkages

The Division leverages more research than it can fund directly, through gaining grant funds and through working closely with other research providers such as Universities and CSIRO.

Australian Centre of Excellence for Risk Assessment

- Dr Tim Wardlaw collaborated with Dr Jeff Dambacher and Dr Keith Hayes (both CSIRO Division of Marine and Atmospheric Research) on a project to model the consequence of eucalypt rust becoming established in Australia.

Australian National Insect Collection

- Dr Simon Grove and Dick Bashford collaborated with the ANIC in the identification of insect specimens from the Tasmanian Forest Insect Collection.

Australian National University, School of Resources, Environment and Society

- Dr Simon Grove is a co-supervisor of ANU doctoral student Ian Scanlan, who is developing methodologies for interpreting forest disturbance history from structural measurements for Tasmania's southern forests
- Dr Cris Brack provided input on sampling procedures for quality standards monitoring.

Bayer Crop Science

- Dr Jane Elek is involved in a collaboration evaluating the efficacy of stem-injected imidacloprid for protecting the foliage of plantation eucalypts from chrysomelid leaf beetles.

Bushfire CRC

- Dr Simon Grove is a key investigator for subproject B-3.1 (Ecological Processes and Biodiversity) on a project aiming to establish a Wildfire Chronosequence benchmark set in the Southern Forests. Dr Perpetua Turner is the post-doctoral researcher working on this project.

Charles Sturt University

- Dick Bashford is co-supervisor with Professor Geoff Gurr and Dr Angus Carnegie (NSW-DPI) of a PhD student funded by the National Sirex Co-ordination Committee.

CRC for Forestry

- Dr Steve Read is Chair of Program 4 (Trees in the Landscape) Co-ordinating Committee.
- Dr Tim Wardlaw is Chair of Project Steering Committee for Project 4.2 (Biodiversity) and Project 1.2.2 (Measuring and managing forest health).
- DFRD researchers are involved in most of the research projects of this CRC:
Program 1 Managing and monitoring for growth and health (Dr Paul Adams, Dr Tim Wardlaw and Karl Wotherspoon);
Program 2 High value wood resources (Dr Matt Wood, Dr Dean Williams);
Program 3 Harvesting and operations (Mark Neyland and Dr Tim Wardlaw),
Project 4.1 Water quantity and quality (Dr Sandra Roberts, Dr Crispen Marunda);
Project 4.2 Biodiversity (Dr Tim Wardlaw, Dr Simon

Grove, Dr Jane Elek, Dr Dean Williams, Mark Neyland, Robyn Scott, Dr Sue Baker, Andrew Walsh) .

- Dr Peter Volker sits on the Program Coordinating Committee for Program 3 Harvesting and Operations.
- Several postgraduate students from the CRC for Forestry use the Warra Silvicultural Systems Trial for their research.

CSIRO Division of Forestry and Forest Products

- Dr Chris Beadle co-supervises postgraduate research by Mark Neyland and Gordon Bradbury who is undertaking a PhD on blackwood timber quality. Dr Beadle also collaborates with Native Forests Branch on research needs for blackwood.
- Work with Dr Chris Beadle on pruning and thinning, blackwood plantation silviculture, nutrient management and genetics in relation to wood quality.
- Collaboration with Dr Simon Southerton to identify genes that significantly affect wood quality in *E. nitens* and *E. globulus*.
- Dick Bashford, Dr Simon Grove and Lynne Forster are collaborating with Dr Libby Pinkard on a study of invertebrates along an altitudinal transect at Warra.
- Collaboration with Dr Mike Battaglia and Dr Jody Bruce on an FWPRDC-funded project "Climate change and Australia's plantation estate: risks and management to mitigate impacts".
- Collaboration with Dr John Raison and Dr Jacqui England on a FWPRDC-funded project "Life-cycle inventory for forestry and forest products".

CSIRO Division of Land and Water

- Provided input to Dr Rai Kookana on modification of the Pesticide Impact Rating Index (PIRI), to utilise Soil Dryness Index. This is part of the Tasmanian River Catchment Water Quality Initiative Project.

Department of Environment, Water, Heritage and Arts

- Christine Scheveijer and Dr Alan Thomas (DEWHA) sit on the Management Committee of Tasmanian River Catchment Water Quality Initiative Project.
- DEWHA funds the CERF Research Hub Landscape Logic at University of Tasmania, of which Forestry Tasmania is a member.

Department of Primary Industries, Parks, Water and Environment

- Dick Bashford is collaborating with Danny Reardon in conducting a hazard-site surveillance program for Tasmania.
- Dick Bashford is a member of the Biosecurity Technical Committee and Dr Tim Wardlaw is on the Stakeholder Reference Group of the Tasmanian Biosecurity Committee.
- Dick Bashford is collaborating with Dr Megan Szczerbanik in conducting quarantine surveillance programs in Tasmania to detect exotic forestry insects as part of a national program funded by the Office of the Chief Plant Protection Officer (OCPPO).
- Water Management Branch staff communicate regularly with Dr Sandra Roberts and provide input to research

and operational programs.

- Dr Peter Volker is a member of the Inter-Departmental Group on Genetically Modified Organisms.
- Dr Sandra Roberts provided advice during the development of the Water Availability and Forest Landuse Planning Tool.
- Dr Peter Volker (Project Manager) and Erin Trainer (Project Officer) worked with Sven Meyer (DPIPWE) on the Tasmanian River Catchment Water Quality Initiative Project.

Forests and Forest Industry Council

- Sue Jennings and Mark Neyland contribute to a Blackwood Roundtable subcommittee that considers research needs for blackwood timber supply.

Forest Practices Authority, Tasmania

- Dr Sue Baker is collaborating with Dr Sarah Munks and Dr Amy Koch on habitat trees retained in aggregates of aggregated retention coupes.

Forest and Wood Products Australia

- Many Forestry Tasmania staff are involved in a number of collaborative projects funded by the FWPA, including on the effect of thinning on wood quality in regrowth forests, incorporating plantation water use parameters into routine forest inventory, and the interaction between the CAR reserve system and forest

management by prescription.

Forestry Plantations, Queensland.

- Dick Bashford is co-researcher with Mr Michael Ramsden looking at the internal temperature variation within softwood trees and its impact on *Amylostereum* growth rates.

Monash University

- Dr Simon Grove collaborated with Dr Paul Sunnucks and Dr Christina Smucki on developing an ARC Linkage project using molecular genetics approaches to examine landscape factors affecting the movement of log-dwelling beetles in the Southern Forests Experimental Forest Landscape.

National *Sirex* Co-ordination Committee

- Dick Bashford is Chair and Treasurer of the NSCC for the next three years. The NSCC is a national body responsible for the development of the biological control program for *Sirex*.

Plant Health Australia

- Dick Bashford is providing technical input into the development of a Plantation Timber Industry Biosecurity Plan.

Queen Victoria Museum, Launceston

- Dick Bashford and Dr Simon Grove are collaborating with Queen Victoria Museum staff on studies of invertebrates at Warra.

Queensland Department of Primary Industries

- Dr Tim Wardlaw, Dick Bashford and Karl Wotherspoon collaborated with Queensland Department of Primary Industries on an ACIAR-funded project on establishing pest detection systems in South Pacific countries and Australia.

Research Priorities Coordinating Committee

- RPCC Membership - Dr Steve Read.
- Research Working Group 1 (Genetic Resources): Membership - Dr Peter Volker, Dr Dean Williams
- Research Working Group 3 (Water): Membership - Dr Sandra Roberts.
- Research Working Group 4 (Native Forest Management): Membership - Mark Neyland, Dr Simon Grove.
- Research Working Group 5 (Plantation Management): Membership - Dr Paul Adams, Dr Matt Wood.
- Research Working Group 7 (Forest Health): Membership - Dr Tim Wardlaw, Dick Bashford.

Scion (New Zealand)

- Dr Tim Wardlaw collaborated with Mark Miller and Lindsay Bulman on a project comparing needle cast assessment methods for screening *P. radiata* genetics trials.

seedEnergy Pty Ltd

- Provision of contract services for control-pollination of eucalypts under the FT40 project.

Southern Tree Breeding Association Inc.

- *E. globulus* operational tree breeding and genetic improvement research is done through the STBA, and STBA is undertaking a TreePlan® analysis of FT *E. nitens* breeding populations under contract with PlantPlan Genetics.
- Dr Peter Volker and Dr Dean Williams are elected members of the STBA Board and Technical Advisory Committee respectively.
- David Pilbeam (STBA) provides assistance and information for the Forestry Tasmania eucalypt breeding program.

State University of New York at Syracuse

- Dr Simon Grove is collaborating with Dr Chris Johnson on a study examining decomposition in eucalypt logs using NMR Spectroscopy.

TCFA Alternatives to 1080

- Andrew Walsh is a member of the Technical Reference Group.

Tasmanian Herbarium

- Dr Jean Jarman is collaborating with Dr Gintaras Kantvilas on surveys of bryophytes and lichens in the Warra Silvicultural Systems Trial.

Tasmanian Museum and Art Gallery

- Dick Bashford and Dr Simon Grove are collaborating with staff at the Invertebrate Department examining archival storage for the Warra residual invertebrate samples.

Tourism Tasmania

- Mr Rowan Sproule was part of the steering committee for the project entitled "Social acceptability of forest management options; Landscape level analysis". This project is being conducted by the University of Melbourne with funding from the Australian Research Council, Forestry Tasmania and the Forest Practices Authority.

University of Freiburg, Germany

- Dr Perpetua Turner and Dr Simon Grove, in collaboration with the ANU and the University of Freiburg (Julia Sohn and Dr Jürgen Bauhus), progressed establishing the set of wildfire chronosequence plots (long-term 'natural disturbance benchmark' sites) in and around Warra.
- Felix Gerhardt undertook the German equivalent of an honours project, investigating the stand dynamics of young regrowth forests.

University of Melbourne

- Dr Leon Bren provides advice on the Warra Hydrology project.
- John Hickey is collaborating with Dr Kath Williams, Professor Ian Bishop, Rebecca Ford and Eric Smith to determine the social acceptability of alternatives to clearfelling.
- Drs Tom Baker, Yue Wang and David Forrester collaborate in CRC Forestry Program 2 (High Value Wood Resources), particularly in the area of growth and yield modelling in eucalypt plantations.

- Dr Steve Read is involved in a range of collaborations with the School of Botany, School of Zoology and School of Forest and Ecosystem Sciences.
- Professor Ian Rae undertook an audit of historical water monitoring data supplied for the Tasmanian River Catchment Water Quality Initiative Project.

University of Sydney

- Dr Charles Warren has been collaborating on work aimed at understanding the importance of organic nitrogen and improving soil nitrogen indicators funded by an ARC Linkage Grant..

University of Tasmania

- Mark Neyland is collaborating with Dr Peter Ades (University of Melbourne), Dr Dot Steane (University of Tasmania) and Professor Brad Potts (University of Tasmania) on a project "Management of Genetic Resources" which is investigating the genetics of *E. regnans* and *E. obliqua*, and may lead to a more genetically based system for seed sourcing.
- ARC Linkage project led by Dr Julianne O'Reilly-Wapstra to examine genetic interactions of browsing animals and eucalypts.
- ARC Linkage project led by Dr Geoff Allen and Dr Paul Walker as post-doctoral researcher to examine pheromones and other chemical attractants of autumn gum moth and scarab beetles.
- ARC Linkage project led by Dr Caroline Mohammed and Dr Anna Smith as post-doctoral researcher to examine factors affecting bark stripping of pines by wallabies.

- ARC Linkage project led by Dr Caroline Mohammed and Dr Karen Barry as post-doctoral researcher to examine generic indicators of stress in eucalypt seedlings.
- Gordon Bradbury is undertaking a PhD project on genetic variation of wood quality in blackwood.
- Collaboration with Professor Brad Potts and Associate Professor Rene Vaillancourt to examine genetic and phenotypic segregation in F2 families of *E. globulus*.
- Landscape Logic is a research partnership with regional natural resource managers and catchment managers to develop decision-making approaches that improve the effectiveness and efficiency of environmental management across Australia. Professor Ted Lefroy leads the project, with Forestry Tasmania as a member.
- Dr Tim Wardlaw is co-supervisor of PhD studies by Genevieve Gates on macro-fungal communities on coarse woody debris and Bryony Horton on mycorrhizal indicators of declining forest health in high-altitude eucalypt forests, and a MSc study by Belinda Browning on early bryophyte succession on coarse woody debris.
- Mark Neyland is enrolled at the School of Plant Science at the University of Tasmania as a part-time PhD student. His topic is "Regeneration and growth of *E. obliqua* after a range of silvicultural treatments". Mark is supervised by Dr Jürgen Bausch (University of Freiburg), Dr Chris Beadle (CSIRO FFP), Dr Neil Davidson (University of Tasmania) and John Hickey (Forestry Tasmania).
- Robyn Scott is enrolled at the School of Plant Science at the University of Tasmania as a part-time PhD student.

Her topic is "Effects of variable retention harvesting on productivity and growth in wet eucalypt forests". Robyn is supervised by Dr Mark Hovenden (University of Tasmania), Dr Steve Mitchell (University of British Columbia) and Mark Neyland (Forestry Tasmania).

- Dr Simon Grove is co-supervisor of MSc study by Belinda Browning on early bryophyte succession on coarse woody debris, and a PhD study by Belinda Yaxley on the autecology of saproxytic insects in the southern forests.
- Professor Brad Potts and Dr Robert Barbour contributed information to Forestry Tasmania to develop a Policy on Genetic Pollution as part of policy development for the Australian Forestry Standard.

Warra Policy and Research Committees

- Membership – Dr Steve Read and Dr Simon Grove.

division of research and development staff

Dick Bashford inspects a log decay site at Warra



Tim Wardlaw with school children during FT's open day



Ken Jeffreys and Erin Trainer inspecting a weather station



Crispen Marunda explaining the E. nitens water use trial at the DFRD Reviews



DFRD Staff at the Hollybank Treetops Adventure



Simon Grove and Sue Baker at the launch of Going Bush 2



Leigh Edwards 'happy' as the last tree is cut to assess internal defect on a naturally regenerated eucalypt regrowth stand



Mona Garandel and Robyn Scott 'field day' at Barn Back 103G



Matthew Wood discusses aspects of windthrow at the DFRD reviews



Dion McKenzie measuring rainfall in the Florentine



Lynnette Forster, insect trapping at Warra



published papers, reports & presentations

Authors employed by Forestry Tasmania during 2008 - 09 are shown in boldface.

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- Blackburn, D., Harwood, C., Hamilton, M., Innes, T., Potts, B. & **Williams, D.** (2009). Genetic variation in wood stiffness and sawn board checking traits in *Eucalyptus nitens*. Paper presented at the 2nd Australasian Forest Genetics Conference, Fremantle, Western Australia 20 - 22 April 2009.
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- Elek, J.,** Allen, G. and **Wardlaw, T.** (2009). Establishment Report: Evaluation of lethal trap trees in eucalypt plantations for managing larval and adult chrysomelid leaf beetles. DFRD Technical Report 01/2009
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- Adams, P.R.** Forestry in south-eastern USA. Presentation on study tour (June - July 2008) funded by Gottstein Fellowship Trust. September 2008.
- Adams, P.R.** Nutrition management in industrial plantations. Lecture to National Forestry Masters course students. September 2008.
- Adams, P. R.** Inter-rotation management. Lecture to National Forestry Masters course students. September 2008.
- Adams, P.R.** (2008). Management of fast-growing eucalypt plantations in Tasmania, Australia. Presented to staff at NC State University. Raleigh, North Carolina, USA. 30 June 2008.
- Adams, P. R.** (2008). Silvicultural regimes for eucalypt plantations in Tasmania. Presentation to Yong'an Forestry Group. Yong'an, Fujian, China. November 2008.
- Adams, P.R.** (2008). Management of field research. Presentation to Yong'an Forestry Group. Yong'an, Fujian, China. November 2008.
- Adams, P.R. and Williams, D.** (2009). Plantation eucalypts in Tasmania. Presentation made to Guangxi Forest Research Institute. Guangxi, China. March 2009.
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- Bashford, D.** (2008). Provided training workshops for quarantine inspectors in the recognition of damage symptoms in urban trees.
- Elek, J.** (2008). Provided two training workshops for field staff and contractors in monitoring leaf beetle populations.
- Elek, J. and Trainer, E.** (2008). A review of methods and a proposal for managing and reporting environmental impacts of pesticides in forestry management. Oral presentation for IUFRO Recent Advances in Forest Entomology, South Africa. July 2008.
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- Elliott, H.J. and **Adams, P.R.** (2008). Sustainable Management of Eucalypt Plantations for Solid Wood Products in Tasmania, Australia. Presentation at the China Eucalypt conference. Zhangzhou. 4 November 2008.
- Grove, S., Forster, L., Doran, N. and Driessen, M.** (2008). Turnover in beetle assemblages with altitude: baseline data from a long-term study on Mount Weld, southern Tasmania. Poster presentation, Ecological Society of Australia Annual Conference, Sydney. 1 - 5 December 2008.
- Neilsen, W.A. and **Adams, P.R.** Management of phosphorus nutrition in radiata pine: 45 years of research and experience in Tasmania, Australia. Paper presented at 50th Anniversary North American Forest Soils Conference, VirginiaTech. 23 - 26 June 2008.
- Neyland, M.** Final PhD seminar, School of Plant Science, University of Tasmania.
- Roberts, S.** Hydrological impacts of plantations. Lecture to National Forestry Masters course students. September 2008.
- Roberts, S.** Draft report on Judds Creek Hydrology, delivered to Huon District.
- Roberts, S.** Draft report on MA107D hydrological issues, delivered to Bass District.

FIELD DAYS AND PRESENTATIONS

- Scott, R.** Poster to CRC annual science meeting: 'Effects of variable retention harvesting on productivity and growth in wet eucalypt forests'.
- Scott, R.** Introductory PhD seminar, School of Plant Science, University of Tasmania.
- Southerton, S., **Williams, D.**, Joyce, K., Ravenwood, I., Meder, R., Blackburn, D., MacMillan C., Zhang D., Bell, J., Bhuiyan, N., Potter, S. and Thumma, B. (2009). Association of allelic variation in xylem genes with wood properties in *Eucalyptus nitens* (Deane & Maiden). Paper presented at the 2nd Australasian Forest Genetics Conference, Fremantle, Western Australia. 20 – 22 April 2009.
- Trainer, E.** and **Roberts, S.** How does Forestry Tasmania manage the use of silvicultural chemicals? Forest Practices Authority / CRC Forestry Stream Seminar. 24 July 2008.
- Trainer, E.** and **Volker, P.** PIRI Validation and Development. PIRI Inner Government Launch. 21 August 2008.
- Trainer, E.** PIRI: Pesticide Impact Rating Index. Presented to Forestry Tasmania executive committee. 22 August 2008.
- Trainer, E., Volker, P.,** Kookana, R., Corell, R., Doyle, R., Bendor, M., and Parr, I. Pesticide Impact Rating Index. Poster presented at Tasmanian Weed Society conference 2008. Launceston. 16 October 2008.
- Trainer, E.** and **Correll R.** Presented interactive PIRI-Tas workshop at: PIRI-Tas forestry industry information day. Launceston. 3 September 2008.
- Trainer, E.** and **Volker, P.** PIRI Validation and Development. PIRI Public Launch. 10 September 2008.
- Wardlaw, T.** (2009). Forest Health Surveillance. Presentation to AusAid/University of Tasmania Workshop on Disease Management Strategies in Plantations. Jogjakarta, Indonesia. 4 - 8 May 2009.
- Wardlaw, T.** (2009). Constraints to use of chemicals in forestry plantations. Presentation to AusAid/University of Tasmania Workshop on Disease Management Strategies in Plantations. Jogjakarta, Indonesia. 4 - 8 May 2009.
- Wardlaw, T.** and O'Reilly-Wapstra, J. (2008). Plantation Health. Presentation to Forestry Masters Students, CRC Forestry, Hobart. September 2008.
- Wardlaw, T.** (2008). Overview of Program 4.2 Biodiversity. Oral presentation to Forest Health Workshop (CRC Forestry Project 1.2.2), Melbourne. 24 July 2008.
- Wardlaw, T.** (2009). Tasmanian Flux Site: Warra LTER. Oral presentation to Ozflux 2009, Darwin. 24 - 26 June 2009.
- Wardlaw, T.J., Wotherspoon K.P.** and **Ramsden, N.** (2009). Adding value to forest health surveillance through retrospective analysis. Proceedings of IUFRO International Forest Biosecurity Conference. Rotorua, New Zealand. 16 - 20 March 2009.
- Williams, D.** Genetics and Propagation. A lecture for the National Forestry Masters Program – Plantations and the Environment. 9 September 2008.
- Williams, D.** Plantation Genetic Improvement – Innovation and Utilisation. Presented to the Tasmanian Science and Technology Council. 12 February 2009.
- Williams, D.** 2009. Provenance Trials of Blackwood (*Acacia melanoxylon*). Presentation made to Chuxiong Forest Research Institute. Chuxiong, Yunnan, China. March 2009.
- Williams, D.** 2009. Provenance Trials of Blackwood (*Acacia melanoxylon*). Presentation made to Guangxi Forest Research Institute. Guangxi, China. March 2009.
- Wood, M.** Solid wood production - strategic and operational challenges. Lecture to National Forestry Masters course students. September 2008.
- Wood, M.** Decision support systems. Lecture to National Forestry Masters course students. September 2008.
- Wood, M.** and **Volker, P.** Strategic and operational planning using Farm Forestry Toolbox. Workshop for National Forestry Masters course students. September 2008.
- Wood, M.** Strategic and operational planning - practical implications. Field day for National Forestry Masters course students. September 2008.
- Wood M.J., Volker, P.W.,** Beadle, C., Harwood, C. and Medhurst, J. (2008). Plantation-grown eucalypts for high-value solid-wood products: a decision support framework. Annual Science Meeting, Cooperative Research Centre for Forestry, Launceston, Tasmania, Australia. 5 - 7 November, 2008.

forest tours and lunchtime talk series



Dr Simon Grove showing students 'Treeflip' during National Science Week

Forest Tours

During National Science Week, school groups visited the Tahune AirWalk to see a variety of science displays and to quiz scientists on-site. The newly opened Warra theatre was popular with students, with a video presentation providing an insight into the research being undertaken across the Tahune bridge at the Warra Long-Term Ecological Research (LTER) site. Over the weekend of National Science Week, DFRD's scientists hosted four free bus tours into the Warra LTER site, where participants saw first-hand the extensive research being undertaken.

Lunchtime Talk Series

The Division presents regular lunchtime talks in a series known as Forestry Talks. The broad theme is "Applying Science to Modern Forest Management". The presentations incorporate talks by Forestry Tasmania's scientists, and also by visiting scientists and from institutions such as the University of Tasmania. For a complete listing of Forestry Talks visit:
<http://www.forestrytas.com.au/science/forestry-talks>

Forestry Talks 2008 - 09

- 20 August 2008 M Battaglia
Forestry: adaption to unavoidable climate change
- 17 September 2008 Peter Volker & Erin Trainer
Managing the impacts of pesticides in our forests
- 15 October 2008 Sue Baker & Robyn Scott
Variable Retention - an alternative to clearfelling

- 12 November 2008 David Bowman
Living in a flammable landscape: why Tasmania is the origin of a global theory on fire
- 10 December 2008 Simon Grove & Marie Yee
How flora and fauna survive fire
- 11 March 2009 Tim Wardlaw & Dugald Close
Why things go wrong without fire
- 15 April 2009 Dean Williams
Seed for the future

A DVD of Forestry Talks presented by DFRD during 2008 - 09 is included inside the back cover of this publication.



divisional publications

The publications below are available from the Division
(Tel: 03 6235 8219 or email research@forestrytas.com.au)

A History of Innovation - 85 years of Research and
Development at Forestry Tasmania

A New Silviculture for Tasmania's public forests

Botany

Swamp Forests in Tasmania

Division Research Notes

No.1: Lissotes and logs

No.2: Logs in a state of decay

No.3: Bat echoes

No.4: North-east forest snail

No.5: Testing the Archaeological Potential Zoning
system

No.6: Mount Arthur burrowing crayfish

No.7: A history of timber-getting in the Southern Forests

No.8: Use of habitat trees by birds after logging

No.9: Beetles in retained snips and stream reserves

No.10: Impact of leaf beetles on growth of eucalypt
plantations

No.11: Commercial Thinning: How much is enough?

Native Forest Silviculture & Technical Bulletins:

Pesticide Manual

No.1: Eucalypt Seed and Sowing

No.2: *Eucalyptus delegatensis* Forests

No.3: Lowland Dry Eucalypt Forests

No.4: High Altitude *Eucalyptus dalrympleana* and
Eucalyptus pauciflora Forests

No.5: Silvicultural Systems

No.6: Regeneration Surveys and Stocking Standards

No.7: Remedial Treatments

No.8: Lowland Wet Eucalypt Forests

No.9: Rainforests

No.10: Blackwood

No.11: Silvicultural Effects and Use of Fire

No.12: Monitoring and Regeneration Protection

No.13: Thinning Regrowth Eucalypts

National Rainforest Conservation Program Reports:

No.1: Tasmanian Rainforest Research

No.2: Myrtle Wilt

No.3: Floristic and Ecological Studies in Tasmanian
Rainforest

No.5: Management of Rainforest in Reserves

No.7: The Effect of Fire on West Coast Lowland
Rainforest

No.10: Autecology of *Phyllocladus* and *Anodopetalum* in
Tasmania

No.13: Species Collection - Litter Invertebrates

No.14: A Floristic Study of Rainforest Bryophytes and
Lichens in Tasmania's Myrtle-Beech Alliance

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No.2: Soils of Tasmanian State forests. 2. Forester sheet,
North-east Tasmania

No.3: Soils of Tasmanian State forests. 3. Forth sheet,
Northern Tasmania

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Tasmanian Forest Insects and their Host Plants

Warra

Design of a Hydrologic Research Project for the Warra Long
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Vegetation of the Warra LTER Site. A report and 1:25,000
map

divisional management structure & key staff

The Division is headed by the Chief Scientist, who oversees the following management team:

Principal Research Scientist (Native Forests)

Manages research on techniques aimed at increasing productivity of the harvestable areas in native forests. Coordinates continuous improvement of ecologically sustainable forest management.

Principal Research Scientist (Plantations)

Manages research and extension on plantation silviculture and forest hydrology. Manages operational implementation of plantation research and quality standards monitoring.

Principal Research Scientist (Biology & Conservation)

Manages research into the conservation of natural values and management of pests and diseases. Manages the forest health surveillance program.

Forest Nursery and Tasmanian Seed Centre Manager

(until Jan 2009, when reporting responsibility moved from DFRD to Forest Operations)

Responsible for the annual production of over 8 million pine, eucalypt and other tree seedlings from the Forest Nursery in Perth. Responsible for the collection, storage and distribution of native seed for regenerating native forest and the production of high-quality selected seed for plantations.

Business and Communications Manager

Manages the Division's commercial activities, communications and marketing.

Executive Officer

Manages administrative and financial matters.

STEVE READ (Chief Scientist)



Dr Steve Read commenced as Chief Scientist in 2004. Steve was previously on the staff of the School of Forestry, University of Melbourne, Creswick and the School of Botany, University of Melbourne, Parkville and has a PhD in plant development

and biochemistry from the University of Cambridge, UK. His research interests range widely across forest science.

Steve was involved in the previous CRC for Hardwood Fibre and Paper Science and is part of the current CRC for Forestry. He has also:

- authored some 30 research papers and 50 conference publications and supervised 20 Masters and PhD students
- served as Associate Dean (Coursework) in the University of Melbourne Institute of Land and Food Resources 2001 - 2004
- worked on the Land & Biodiversity Implementation Committee of the Glenelg-Hopkins Catchment Management Authority in western Victoria

Steve also maintains a position as an Honorary Associate Professor, Department of Forest and Ecosystem Sciences, University of Melbourne.

MARK NEYLAND (Principal Research Scientist – Native Forests Branch)



Mark graduated from the Australian National University in 1980 with a Bachelor of Science in Forestry, and is currently a PhD student at the University of Tasmania. Mark has spent most of his career as a botanist and ecologist. His research has included the ecology and

conservation of rare butterflies, and the conservation and management of relict rainforest in eastern Tasmania, tree ferns and dry forests and woodlands. Mark joined Forestry Tasmania in 1998 as a research officer and became the Principal Scientist in Native Forests Branch in 2005. The Warra Silvicultural Systems Trial has been a major focus of his work throughout that time. He has authored over 60 publications, from peer-reviewed scientific papers through to technical documents designed to transfer the results of research into forest management systems and guidelines.

PAUL ADAMS (Principal Research Scientist – Plantations Branch)



Dr Paul Adams has been a forest researcher for nearly 20 years, for the last 10 focusing on soil, nutrition and productivity-related research in pine and eucalypt plantations. This work includes the development of secondary fertiliser programs, monitoring and decision-support

systems to improve the productivity and quality of *E. nitens*, *E. globulus* and *P. radiata* plantations. Other interests include off-site impacts of fertilising, sustaining long-term productivity, and weed management.

TIM WARDLAW (Principal Research Scientist – Biology & Conservation Branch)

Dr Tim Wardlaw has a Bachelor of Science (Hons) and a PhD from the University of Tasmania. He has 25 years experience in applied forest pathology research, with particular emphasis on disease survey, impact assessment, diagnosis and development of management strategies. Tim introduced forest

health surveillance to Tasmania in 1997. He has a strong record of successfully securing funds for research projects, and has undertaken many consultancies in the Asia-Pacific region. Tim has authored more than 25 peer-reviewed publications and book chapters as well as numerous technical reports and conference publications.

PETER MOORE (Forest Nursery Manager, Tasmanian Seed Centre Manager)

Peter has an Advanced Diploma in Horticulture from TAFE Tasmania, and has worked at the Forest Nursery since 1983. He has wide-ranging experience in nursery production systems, including the use of the latest propagation techniques for plantation pine



and eucalypts, as well as the cultivation and large-scale production of a diverse range of ornamental and amenity species. His role encompasses the administration and management of a large-scale nursery utilising automatic seed sowing, open-ground production and containerised technology. His work has also included advising consultancy clients in China on nursery improvement programs.

PETER HOPSON (Business & Communications Manager,)

Peter commenced with the Forestry Commission after leaving Elizabeth College in 1974 and has been with the organisation for over 35 years. Peter commenced with the Finance Branch and worked

in a variety of jobs within the section before moving to Forestry Tasmania's Plant Branch as the Senior Clerk. In 1993 Peter became the Division's Executive Officer and remained in this position until 2004 when he transferred to Corporate Relations & Tourism, changing from 'financial/admin' duties to web and graphic design with communication responsibilities. Peter was appointed to the position of Divisional Business & Communications Manager in July 2007.



ROBYN LEACH (Executive Officer)



Robyn commenced her career with the Australian Taxation Office in 1985 prior to commencing work with Forestry Tasmania as a part-time Digitizer in 1989. Robyn completed a Diploma of Business (Accounting) with

the Hobart Institute of TAFE in 1995. Since that time Robyn has undertaken administration for various offices within Forestry Tasmania, including the Regional Forest Agreement, Native Forest Program, Planning and Resources and now Forest Research and Development. Robyn brings to the team a wealth of administrative and financial experience.

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