



CSIRO Annual Report 2006–07

CSIRO – the Commonwealth Scientific and Industrial Research Organisation – is one of the largest and most diverse scientific organisations in the world. It has over 6 300 staff located across 55 sites throughout Australia and overseas.

CSIRO is an independent statutory authority constituted and operating under the provisions of the Science and Industry Research Act 1949 and the Commonwealth Authorities and Companies Act 1997.

Our purpose states:

By igniting the creative spirit of our people, we deliver great science and innovative solutions for industry, society and the environment.

CSIRO Head Office

Limestone Avenue Campbell ACT 2612

PO Box 225 Dickson ACT 2602

Tel: 1300 363 400

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Cover images – Top: The honeybee genome is the first sequence of a social organism other than humans (see page 30). Photo: David McClenaghan. Bottom left: CSIRO scientist, Dr Anna Tarasova, is working with an Atomic Force Microscope used for imaging surface topography at the molecular scale. Photo: Mark Fergus. Bottom centre: Testing salinity levels in Barrenbox Swamp Reservoir, Murrumbidgee River, Griffith, NSW (see page 14). Photo: Gregory Heath. Bottom right: CSIRO scientists have developed an industrial-scale pilot plant, which is now producing low-cost thin magnesium alloy sheet. Photo: Mark Fergus

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About CSIRO

Our history

The Council for Scientific and Industrial Research (CSIR) was established in 1926 with its primary research devoted towards agriculture. In the late 1930s this was extended to include industrial research.

In 1949, the CSIR was reconstituted as CSIRO, and gradually expanded its activities so that its research was related to almost every field of primary, secondary and tertiary industry.

Today, CSIRO is a trusted source for creative ideas and practical technologies to deliver impact for the nation. It seeks to be a valuable partner with strong international relationships.

Our purpose

By igniting the creative spirit of our people, we deliver great science and innovative solutions for industry, society and the environment.

CSIRO is a research enterprise dedicated to delivering benefit to industry and the community through world-class science.

What we do

CSIRO carries out scientific research in areas including energy, the environment, information technology, health, mining, manufacturing, agriculture, and natural resources. We seek to make a difference and generate impact by focusing on the nation's big challenges and opportunities. Our research delivers:

- integrated solutions to help meet major national challenges
- technologies to transform or create new markets for Australian industry
- innovative technologies to improve the competitiveness of existing industries
- advice, information and research to meet specific community needs
- knowledge-based services to governments and businesses.

How we deliver

We strive to deliver value to our clients at all stages of research, development and commercialisation. We conduct our research through Divisions, National Research Flagships, Joint Ventures and other entities. Some facts:

- CSIRO currently leads six National Research Flagships that bring focus and scale to research addressing some of Australia's most important and complex challenges and opportunities, and will launch a further three Flagships in 2007–08
- CSIRO transfers know-how through secondments, industry workshops, seminars and specialist publications and produced nearly 5000 scientific publications, over 13 000 client reports and around 260 media releases in 2006
- CSIRO is the largest single participant in the Cooperative Research Centre (CRC) Program (participating in 37 of the 56 centres, during 2006–07)
- CSIRO typically has over 3000 active research contracts each year serving small, medium and large businesses in Australia and overseas, as well as public sector agencies, national and state governments, and other research organisations
- CSIRO hosts three major National Research Facilities (the Australian Animal Health Laboratory, the Australia Telescope, the Marine National Facility – Research Vessel Southern Surveyor) and over 30 other research facilities such as the Riverside Life Sciences Centre in Sydney and the Australian Resources Research Centre in Perth
- CSIRO manages II national reference collections including: the Australian National Fish Collection, the Australian National Insect Collection, the Australian National Herbarium, the Australian National Wildlife Collection, the National Tree Seed Collection and the Scientific Marine Data Collection
- CSIRO offers more than 50 specialised technical and analytical services. These include analyses

for air pollutants and satellite imaging of natural resources through to fire testing of materials and diagnosis of exotic animal diseases

- 88 per cent of CSIRO's total expenditure is directed towards the priority goals associated with Australia's National Research Priorities
- CSIRO Publishing produces multimedia products for CSIRO and partners such as The Learning Federation, and publishes about 50 new books each year and over 20 peer reviewed journals, in partnership with the Australian Academy of Science and other scientific societies, for international markets
- worldwide, CSIRO is involved in over 700 current or recently completed research activities, working with leading scientific organisations and firms in the United States, Japan and Europe, and with developing countries, especially in Asia
- CSIRO is Australia's leading patent filing enterprise, holding over 3900 granted or pending patents
- more than 150 spin-off companies are based on CSIRO generated intellectual property and expertise.

Education and outreach

- in collaboration with university colleagues, our staff supervise, co-supervise and/or sponsor over 700 postgraduate research students, including more than 130 supervised in collaboration with CRCs
- through this sponsorship and supervision of MSc and PhD students, our extensive postdoctoral programs, our Distinguished Visiting Scientists Scheme, the CEO's Science Leader Scheme and other initiatives we are continuing to build and foster a world-class team of scientists and helping to develop the science leadership Australia needs to meet future challenges
- stories involving CSIRO science are reported in around 12 000 news or feature items every

year in print, radio and television and there are approximately 30 000 articles relating to CSIRO on Australian and International web pages each year

- CSIRO media releases posted on Eurekalert (an online, global news service operated by the American Association for the Advancement of Science) are viewed by about 60 000 subscribers each year
- the number of CSIROpod podcast listeners continues to grow rapidly, with now over 400 000 downloads of CSIROpod a year
- CSIRO's nine Science Education Centres engage over 360 000 students, parents and teachers each year, including school visits in metropolitan and regional areas with the 'Lab on Legs' program
- CSIRO's Double Helix Science Club has over 25 000 members, with its two magazines *The Helix* and *Scientriffic* and hundreds of club events. Our weekly e-newsletter, 'Science by Email' has 27 000 subscribers, one third being teachers
- CSIRO jointly produces SCOPE, a science TV program, with a viewing audience of over 400 000 each week
- the Discovery Centre in Canberra is CSIRO's showcase, featuring an interactive exhibition, modern events facilities and an education program that gives children a chance to explore real research issues in a scientific setting complete with working laboratories. The centre had over 60 000 visitors during the past year. CSIRO's radio telescope in Parkes had over 96 000 visitors in 2006–07 who learnt about the telescope, radio astronomy and CSIRO
- CSIRO Enquiries serves a diverse range of general public, industry, education and internal clients with a one-stop service for information about CSIRO research and activities. The contact centre handles over 35 000 enquiries a year (1300 363 400, enquiries@csiro.au)

Letter of transmittal

The Hon Julie Bishop MP Minister for Education, Science and Training Parliament House CANBERRA ACT 2600

We have pleasure in submitting to you, for presentation to Parliament, the fifty-ninth Annual Report of the Commonwealth Scientific and Industrial Research Organisation. This report has been prepared in accordance with the requirements of the *Science and Industry Research Act 1949* and in accordance with section 9 of the *Commonwealth Authorities and Companies Act 1997* (CAC Act).

Under section 9 of the CAC Act, CSIRO Board members are responsible for producing an annual report in accordance with the rules laid down in Schedule 1 of this Act, including a 'Report of Operations' prepared in accordance with the Finance Minister's Orders.

This report presents fairly the information required by the Minister for Finance and Administration as set out in the *Commonwealth Authorities and Companies* (Report of Operations) Orders 2005.

The report has been approved for presentation to you, signed this 22nd day of August 2007 in accordance with a resolution of the Board members.

The report includes an appendix comprising a report from the Chief Executive of CSIRO, as trustee of the Science and Industry Endowment Fund established under the *Science and Industry Endowment Act 1926*, on the operations of the Fund together with a report by the Auditor-General on the accounts of the Fund.

Since 30 June 2007, no developments have arisen that have significantly affected or may significantly affect CSIRO's operations or state of affairs.

We commend the Organisation's achievements to you.

John W Stocker, AO Chairman of the Board

October 2007

Geoff G Garrett *Chief Executive*

Foreword by the Chairman



In June 2007, it was my pleasure to accept the invitation to chair the CSIRO Board, some 12 years after completing my five-year term as Chief Executive of the Organisation. I join a CSIRO which has evolved to meet the

challenges of today, an Organisation conscious of the importance of its role and dedicated to delivering world-class scientific research and to encouraging and facilitating its application in the national interest. CSIRO is an Organisation of which the nation is justifiably proud.

Australians are increasingly looking to their CSIRO as an authoritative source of scientific knowledge to inform major decisions in areas such as climate adaptation, water management and energy. Our ability to provide that advice is often the outcome of years of patient research which emphasises the importance of continuing to build our scientific capability and knowledge and to foster creativity through investing in science and education.

The outcome of the 2007 Federal Budget was a major affirmation of the direction of the Organisation. CSIRO funding for the next four years to 2011 was confirmed and additional funds were provided for three new National Research Flagships and other important initiatives totalling some \$2.8 billion over four years. We acknowledge with gratitude the continued support of the Australian Government and all of our stakeholders.

This Annual Report demonstrates that CSIRO provides a strong return on that investment. It has maintained its international reputation for scientific excellence, effectively formed collaborative relationships with other researchers and with the industries and policy makers who adopt and apply our research, established sound governance practices, and delivered significant and enduring benefits to Australia.

Over the past year, the Board and management of CSIRO have formulated a Strategic Plan for 2007–11 to ensure that CSIRO's rich record of achievement continues. The strategy aims to deliver great science and innovative solutions for industry, society and the environment through three major elements:

- addressing national challenges and opportunities, faster and better
- focusing and strengthening our core science capability and delivery
- strengthening our enterprise and enhancing operational excellence.

I would like to take this opportunity to express the heartfelt thanks of the whole Organisation to Ms Catherine Livingstone for her hard work, commitment, wisdom and splendid leadership as Chairman of the Board from 2001 to 2006. I would also like to warmly acknowledge the service of Mr Peter Willcox to the CSIRO Board and to thank Dr Terry Cutler for ably fulfilling the duties of the Chairman for much of the second half of the year.

Finally, I would like to congratulate the management and staff of CSIRO on a successful year. Thanks to their efforts the Organisation is well positioned to continue to deliver great science and innovative solutions for the benefit of all Australians.

John W Stocker, AO Chairman of the Board

The year in summary, and looking ahead

In 2003, with the development of our 2003–07 Strategic Plan, CSIRO continued on an ambitious journey of strategic repositioning to increase our impact and relevance in order to provide greater economic, environmental and societal benefits for Australia. Reflecting on this period it is clear that CSIRO has undergone significant and positive transformation, with progress in 2006–07 building on the gains made over the preceding three years.

The paragraphs to follow overview some important activities and indicators, with more detail provided throughout this report.

- CSIRO continued to deliver high impact science outcomes in its key roles in the National Innovation System, and this Annual Report provides some illustrative examples across important domains as diverse as helping advance our understanding of climate change and its potential impacts, to mapping the ocean bed mineral deposits off our shores; or from developing the world's fastest wireless network to unravelling the genetics of debilitating plant diseases.
- Assessing both the quality of our science and its delivery continues to be important and, with a further five Divisional Reviews undertaken during the year, we have now completed the first full three-year cycle of a comprehensive program of independent reviews. As with previous reviews, those undertaken this year have shown that our science is conducted to a very high standard, with effective linkages to relevant industry and community groups, typified by the feedback from one (US-based) reviewer: 'I was tremendously impressed both by the science that was world-class and with the facilities we visited, also world-class. In addition, I found the science management and leadership, an imperfect science at best, quite forward thinking, at the very least comparable with strategic planning anywhere in the world'.

- Our publication rates continue to rise.
 In 2006, our published journal articles increased 13 per cent, to 2198. Since 2001 the number of research publications per research scientist has increased by over 50 per cent, from 1.98 to an average of 3.0. Reports to clients also increased over the past year by almost 25 per cent to over 13 400.
- CSIRO scientists have maintained their record of publication in the world's most prestigious scientific journals (*Nature, Science,* and *Proceedings of the National Academy of Sciences, USA*) and other high impact journals. Our average citation rate (an important measure of science quality) also continues to increase, from 10.46 last year to a current rate of 11.09. Only the Australian National University in Australia has a greater citation rate (11.42).
- On the basis of publication citations we maintained our ranking in the top one per cent of the world's science institutions in 13 research fields, ranging from geology to materials science to microbiology, with top ten ranking in plant and animal sciences, agricultural sciences, and environment and ecology.¹
- An independent 'Impact' Review was undertaken by economic analysts ACIL Tasman as part of the formal review of CSIRO's performance under the triennium funding arrangements with the government. The purpose of the review was to identify and, where possible, to quantify economic, social and environmental impacts resulting from a broadly representative set of CSIRO activities undertaken over the last three years. The 'bottom line' from this review was that CSIRO is continuing to deliver significant benefit to Australia, with the results indicating that the outcomes created through CSIRO's research and development represent a very substantial return on investment.

¹ Institute for Scientific Information (ISI) Web of Knowledge, July 2007

- In January 2007, the Australian Government agreed to a baseline funding for a four-year period (as opposed to previous three-year funding agreements), thus providing CSIRO with greater funding security. Subsequently, CSIRO received an additional \$244.5 million over four years as part of the Federal Budget – the single largest increase in CSIRO's history, representing a 19.5 per cent increase over the preceding four-year period, to a total of \$2.8 billion for the next quadrennium.
- The National Research Flagships are now part of the fabric of CSIRO, with almost 30 per cent of our appropriation resources devoted to these programs. The number of partners across industry and research sectors continues to grow and now numbers over 350. The Flagship Collaboration Fund has been a considerable success with nine clusters, involving 21 universities, established in 2006–07 in areas such as detecting and preventing Alzheimer's disease, advanced membrane technologies for water treatment, and the concentration and separation of bioactives in food science. A further 19 Collaboration Fund projects and 16 visiting Fellowships are also underway or already completed.
- Building on this successful model, and supported by a strong independent review, the Australian Government announced, as part of the 2006–07 budget, funding of \$174 million over four years for three new Flagships in the areas of Climate Adaptation, Niche Manufacturing and Minerals Down Under, and for an expansion of the current Energy Transformed Flagship in the area of alternative transport fuels.
- A further four new spin-off companies were formed based on CSIRO technology during the year, in the areas of innovative methods for coating of magnesium, new methods of energy

extraction from combustion of coal, developing wheat with health benefits when consumed and revolutionary fuel cell technology. We also grew our equity portfolio value to record levels. However, revenues from our Intellectual Property decreased slightly (by \$1.8 million) from the record level set in 2005–06, primarily due to effect of the drought on royalty income.

- The consolidation of our 'One-CSIRO' enterprise-wide Research Support Services (RSS) is now substantially complete; all support functions (finance, human resources, information services, legal, contract administration, commercialisation, and property) are now operating under the RSS model, with positive staff feedback. To support these changes, implementation of the SAP standard information platform across our enterprise remains an important objective for 2007–08.
- Despite the impacts of one of the worst droughts on record for the agricultural sector, our total external revenue still grew by a modest 3.6 per cent to \$360.9 million with the Organisation returning a small surplus (\$1.0 million) for the year on a total sales turnover of \$974 million.
- Continuing improvement in the area of Health and Safety (H&S) has resulted in a further reduction in our Comcare premium for next year – to 0.68 per cent of payroll compared with an average of 1.55 per cent for all Australian Government agencies. This reflects the progress we have made in a number of areas, for example, reductions over the last year in both the number of incidents and our Lost Time Injury Frequency Rate.
- Over the past year, we completed the second round of our new Science Investment Process (SIP), with Theme-based allocations made in line with strategic 'Broad Direction Setting',

summarised later in this report. The SIP is designed to evaluate and focus our whole science portfolio against a robust set of criteria which help maximise the relevance and impact of our science.

Overall, therefore, 2006–07 was a very good year for CSIRO. We have progressed our strategy satisfactorily, delivered operational performance largely in accordance with plan, and have – as indicated by the Federal Budget result – continued to build strong stakeholder support and confidence, while all the time enhancing our reputation for science quality and its delivery. We remain committed to continuing to build on what we have achieved over the past four years as we strive for further improvements in the years ahead.

2006–07 also saw a comprehensive process for the development of our next four-year strategy, building on the 2003–07 Strategic Plan, and which will focus on three strategic elements: addressing national challenges and opportunities, faster and better; (continuing to) focus and strengthen our core science capability and delivery; and strengthening our enterprise and enhancing our operational excellence. This Plan was formally signed-off by the CSIRO Board in June 2007.

As we begin the implementation of this new Plan, consistent with the strategic objectives articulated therein, particular attention at the enterprise level over the next 12 months will be paid to, among other things, getting our three new Flagships 'up and running', with approved business plans and operating structures in place and delivery commenced; effective functioning of our matrix operations; successfully implementing phase one of our Business and Enabling Technologies Replacement (BETR) project for providing an enterprise-wide, common platform providing standardised information across the Organisation; revisiting our processes for ensuring rapid and effective take up/adoption of our science outputs; and building on the progress we have made in health and safety.

I would again like to thank all CSIRO staff, most sincerely, for their commitment, talented input and hard work over this past year and look forward to working with them, our Board, our customers, and other key stakeholders as we continue to '...deliver great science and innovative solutions for industry, society and the environment'.

Seon James

Geoff Garrett Chief Executive





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Section I – Performance Delivering impact from our science

CSIRO's roles in the National Innovation System

With the increasing pace and competitiveness of innovation across the globe, CSIRO's place in Australia's national innovation system (NIS) has become more important than ever. A healthy, unified and differentiated CSIRO is delivering significant benefits for Australia.

In line with our enterprise strategy, CSIRO has developed a new articulation of the roles it performs, and will continue to perform, for the Australian community. This refreshed perspective will hopefully help improve stakeholder and collaborator understanding of the full spread of research activities being conducted by CSIRO.

CSIRO has multiple roles to play within the context of Australia's NIS. These can be classified into three types: Core, Satellite and Enabling. CSIRO's core roles revolve around fulfilling the science needs of industry and the community. Related satellite roles are important in the NIS and complement or support CSIRO's execution of our core roles. Our enabling functions provide the strong foundation necessary for effective and efficient delivery towards CSIRO's goals.

Core roles

CSIRO's core roles are as follows:

- addressing major national challenges and opportunities, through harnessing the breadth and depth of our expertise
- similarly, creating new, or significantly transforming, industries to increase the competitiveness and sustainability of Australian industry
- delivering incremental innovation to improve the efficiency and competitiveness of existing industries
- providing fact-based solutions which meet community needs and knowledge that informs Government policy

• advancing the frontiers of science, an essential component of maintaining long-term capability.

Satellite roles

CSIRO also performs a number of key satellite roles that deliver value to Australia; these roles currently include:

- supporting the development of postgraduate students and postdoctoral fellows
- Outreach and Education programs (eg through our Science Education Centres, and magazines such as *The Helix*)
- managing national facilities and collections (such as the Australia Telescope National Facility, the Australian Animal Health Laboratory, the Australian National Insect Collection, the National Herbarium and the National Fish Collection)
- scientific publishing services (eg scientific journals, technical books and CDs)
- providing consulting and technical services (eg fire testing, air pollution analyses, and quarantine testing).

Enabling functions

Specific enabling functions are necessary to support the Organisation to deliver on its core and satellite roles; in CSIRO the two most important enabling functions are:

- Enterprise Strategy and Governance (through Executive Management and the CSIRO Board)
- providing Research Support Services (eg human resources, communications, legal, commercialisation, finance, information technology/services and property management).

To this end, CSIRO's roles are captured in our 'Role House' diagram:



The 'Role House' illustrates CSIRO's core roles at the centre of the diagram, surrounded by satellite roles. The enabling functions are represented as the 'roof' and 'floor' of the house, highlighting the support and guidance they provide to the other roles. The house also illustrates the continuum between industry driven activities (left side of the house) and community driven activities (right side of the house) across CSIRO's various roles. The industry driven/community driven continuum illustrates that, while all of CSIRO's activities ultimately deliver public good benefits for Australia, some activities are more driven by industry needs and others are more driven by community needs.

The dashed lines within the house signify the integration and interdependence between the roles. None of the roles can exist in isolation – there are linkages between each of them. No sharp boundaries exist between roles, and no core role is separable. Within the core roles,

time horizons broadly correlate with vertical positions within the house. In other words, 'Advancing Frontiers of Science' typically has a long-term time horizon while 'Delivering Incremental Innovation for Existing Industries' often has a much nearer time horizon.

This Annual Report has been organised in line with the role house framework; it begins by reporting on outputs and outcomes in the core and satellite roles, then follows an assessment of performance against our strategic objectives, information on our enterprise governance and research support services, and the financial statements for the year 2006–07.

Following are some examples highlighting our recent achievements across each of CSIRO's core and satellite roles. Additional examples can be found on our website at: www.csiro.au/ org/2007Achievements, as well as in the section to follow (outputs and outcomes).

Science-based solutions for the community



Role description:

- the provision of timely advice and information, research, and specific community solutions which inform and protect society and the environment
- knowledge intensive research and development (R&D) strongly leveraging existing CSIRO technology, research and expertise
- technology transfer and knowledge diffusion typically occurs through publication and service provision and informing policy

Combining knowledge to benefit the Murray-Darling Basin

Balancing economic, social and environmental water use in the Murray-Darling Basin is a key goal of the National Water Initiative and a focus of the Water for a Healthy Country Flagship.

New research by the Flagship is unravelling how the Murray-Darling Basin's hydrological system works, and is assessing future risks to water supplies. The findings, underpinned by the latest CSIRO climate change scenarios, are helping decision-makers plan for an expected water shortfall of between 2500 and 5000 gigalitres within 20 years, representing a 10 to 20 per cent drop in water availability in the Basin.¹ Such a shortfall would have a major impact on irrigation, the environment and the broader community. The Flagship is also delivering tools and knowledge that will allow these vital uses to be better planned for and managed.

The River Murray Floodplain Inundation Model assists catchment management agencies and water managers by predicting the extent of flooding on the River floodplain, allowing accurate planning of environmental flow strategies, such as targeted periodic inundation of the floodplain.

Research has also improved understanding of water use efficiency in the irrigation sector. This includes a full audit of water flows throughout the irrigation catchments, development of innovative technology to rapidly detect channel 'hotspots', and development of models that link water flows with geographic and economic information.

Non-market recreational values have also been quantified for two iconic sites on the River Murray (Barmah Forest and the Coorong) providing, for the first time, an economic assessment of the value that people place on their recreational experience, including a range of benefits that visitors enjoy, but do not purchase, such as Indigenous values or existence value.

This research is supporting policy development and decision-making in a region where the competition for water across all uses, economic, social and environmental, is intensifying.



Testing salinity levels in Barrenbox Swamp Reservoir, Murrumbidgee River, Griffith, NSW. Photo: Gregory Heath

¹ These estimates are currently being greatly refined by the Murray-Darling Basin Sustainable Yields project, using 2007 Intergovernmental Panel on Climate Change global climate models and detailed hydrologic modelling of the linked surface and groundwater resources of the Basin.

Improving animal welfare

CSIRO researchers are assisting the Australian wool industry to identify alternatives to the practice of mulesing in sheep to help them meet their animal welfare goals.

Presently mulesing is an essential part of animal husbandry, where the skin from the hindquarters of Merino lambs is surgically removed to reduce the risk of fly-strike. Fly-strike is a major problem for the industry in the production of Merino wool and causes lost production and costs millions of dollars for treatment.

CSIRO scientists in Armidale recently published the first peer-reviewed research on the effective use of analgesics on mulesed sheep and are working on the longer-term replacement of mulesing altogether.

In partnership with Australian Wool Innovation, scientists are evaluating the possibility of using genetic technologies to identify and breed sheep that will not need mulesing or any equivalent procedure. The program incorporates development of breeding guidelines based around fly-strike resistance indicator traits such as skin wrinkles and natural breech bare area.

In the area of livestock transport, CSIRO researchers are working with Australia's farming industries to ensure that animal welfare standards of road transport practices are underpinned by objective science.

Working with Meat and Livestock Australia, scientists have determined the appropriate durations of trucking for healthy sheep and cattle. The researchers recently completed a major study using measures of animal body temperature, blood, bodyweight, behaviour, and post-transport productivity. Many of these measurements were captured using sophisticated micro-loggers, which allow the animal to be assessed without interference.

The results from the research are being used by government, industry and animal welfare organisations in the development of new Australian standards for the land transport of production animals.



CSIRO research scientist, Dr Ken Geenty, inspects Merino sheep at FD McMaster Laboratory near Armidale, NSW. Photo: Rob Nethery



Thai officials and local community leaders discussing project field work. Photo: Khongsak Pinyopusarerk

CSIRO helps rebuild communities after tsunami devastation

Scientists from Ensis (a CSIRO science collaboration in forestry and forest industries with New Zealand's Crown Research Institute, Scion) are actively working and collaborating with agencies and organisations to provide social and environmental benefits to local Tsunami inflicted communities.

They are helping to rebuild the communities on the islands of Indonesia and Thailand, following the devastation caused by the 2004 Boxing Day Tsunami.

In December 2004, a destructive tsunami ravaged the shores of several Indian Ocean nations. Ensis scientists are providing relief to two of the islands which bore the brunt of the disaster.

In the tsunami-devastated Indonesian province of Banda Aceh, Ensis provided advice to ensure that homes rebuilt after the tsunami were not damaged by insect pests.

A typical home in Banda Aceh is primarily constructed of untreated timber, so any insect attack is severely damaging to the village. Ensis's expertise was brought in to inspect the constructions following the detection of significant insect attacks on the green-sawn hardwood timbers used in the rebuilding of the villagers' homes.

Scientists were able to identify the insects responsible for the damage to the timbers, provide information on their biology and present recommendations for managing on-going insect attack.

In Thailand, our scientists are helping produce a re-afforestation management plan for Pra Thong, a 75-square-kilometre island situated off Thailand's south west coast.

Pra Thong lost 200 of its population of 1500 people and three of its four villages in the disaster. As the monstrous wave swept inland, it also took with it acres of natural forest and cash crops such as cashew nut trees.

With funding from the Australian Government's aid agency, AusAID, Ensis researchers began a 12-month project, involving onsite technical advice to develop a model to restore the island's ecology and environment. The model has been delivered to the Thai Royal Forest Department and focuses on the rehabilitation of coastal areas through plantations or the restoration of natural forests.

Turning trash into energy treasure

Finding alternative fuel sources on a small remote island, such as King Island in the Bass Strait halfway between Tasmania and Victoria, loomed as a big problem for industrial seaweed processor Kelp Industries. The company dries seaweed and exports extracts to be used as thickening agents in food and industrial products worldwide.



Faced with a future shortage of wood, a rising cost of shipping in fuels and the importance of the island's environmental reputation, Kelp Industries found an ally in the famous King Island Dairy (owned by National Foods). The dairy had waste cardboard that was too expensive to ship back to the mainland, and Kelp Industries wondered whether this cardboard could be used as fuel for their generators which heats the seaweed in their kilns.

The idea to recycle the island's excess cardboard waste – about 300 tonnes per year – into dense briquettes to help fuel the Kelp Industries' furnaces and drying kilns was born and the companies consulted CSIRO to assess if the idea was scientifically practical.

CSIRO established the correct density of the cardboard briguettes for use in the furnace, estimated the optimal ratio of cardboard to wood burning to sustain the process and analysed the ash content to ensure impurities from the cardboard did not contaminate the drying seaweed.

CSIRO found that solid briquettes - the size of a housebrick – made from shredded cardboard waste worked well in the Kelp Industries' furnace as a 30 to 50 per cent component of the total fuel mix.

The project has been welcomed by the King Island Council, which sees reducing landfill and improving waste recycling as major issues for the island. The project also supports the island's commitment to sustainability.

Researcher Ms Melissa Toifl holds shredded waste cardboard which can be transformed into solid briquettes suitable for use as furnace fuel. Photo: Mark Fergus

A ready reckoner for Australia's transport fuel options

CSIRO is creating tools to explore the prospects for, and impacts of, alternative fuels for Australia's road transport.

With increased demand for energy, a changing climate and concerns over greenhouse gases, there is a growing search worldwide for reliable, sustainable energy sources for road transport.

Biofuels have been put forward as one of a range of alternatives with lower greenhouse gas emissions and a greater fuel security than petrol and diesel, which currently dominate Australia's fuel-use profile.

With the growing bank of information on the production and use of alternative fuels in Australia, there is a clear need for tools that capture and critically assess the prospects and impacts of different fuel types.

The Australian Fuel Alternatives Ready Reckoner is a web-based tool that can be used by policy makers, scientists, industry and consumers to explore options about fuel use. It summarises information about fuel feedstocks, pathways and products and provides a way for the user to compare the credentials – environmental, social and economic – of different fuels using a series of sustainability 'report cards'.

The Australian Fuel Alternatives Ready Reckoner reached prototype stage in late 2006, and was well received by a range of potential user groups including the Australian Government's Departments of Environment and Water Resources; Industry, Tourism and Resources; and Transport and Regional Services; Queensland State Development; and the Victorian Automobile Chamber of Commerce.

The tool is being expanded from its current set of twelve fuel pathways for cars, trucks and

buses. A general public version is expected to be released in early 2008, to enable consumers to compare alternative fuel types for their vehicles.

The alternative transport fuels research is part of the Energy Transformed Flagship's goal to help halve Australia's greenhouse gas emissions by 2050.



Dr Franzi Poldy and Dr Deborah O'Connell explore alternatives for fuelling Australia's cars. Photo: David McClenaghan

Delivering incremental innovation for existing industries



Role description:

- science-based solutions that help provide lower/more competitive production costs and improved quality of goods/services for industry
- knowledge intensive R&D which requires deep understanding of industry and domain expertise
- often leverages existing CSIRO technology, research and expertise to deliver improvements to industry
- traditionally focused on areas of high adoption and take up

Fencing livestock in – virtually

Using satellite technology, CSIRO scientists are developing a 'virtual' fence for livestock.

Scientists from the Food Futures Flagship have helped to develop a prototype animal-friendly virtual fencing system for cattle that enables the animals to be confined without using fixed fences. The prototype system has been demonstrated effectively in fencing a group of cattle.

Fencing is a major cost for cattle producers. Successful deployment of a virtual, easily movable fence - making physical posts and wire redundant - will reduce labour costs, allow better pasture use and provides the flexibility to exclude livestock from environmentally sensitive or degraded areas.

With virtual fencing, boundaries are drawn entirely by global positioning satellite (GPS) and exist only as a line on a computer. There are no wires or fixed transmitters used.

The animals wear collars containing software that identifies where they are and emit a

sound when they approach the boundary. The sound replaces the visual cue of a conventional electric fence that cows learn to avoid. The sophisticated software embedded in the system enables it to respond to varying animal temperaments.

The research, overseen by an independent animal welfare expert, also showed the animals are not unduly stressed by the virtual fence.

Once the boundary is set, the sensor-based system is fully automated and self-sufficient. It also enables farmers to continuously monitor where their cattle are located.

This project represents the latest progress amongst recently reported virtual fencing efforts, with a powerful combination of CSIRO's Fleck wireless sensor platform and the project's patented approach of behaviour-based stimulus application.



CSIRO research scientist Dr Caroline Lee and Project Officer Mr Jim Lea attaching a collar as part of the virtual fencing project at FD McMaster Laboratory near Armidale, NSW. Photo: David McClenaghan

Enhancing Australia's energy sources

Coal seam methane is becoming a widely used energy source, particularly in eastern Australia where a number of basins produce significant volumes of methane from coal seams. Coal seam methane is considerably less polluting than other fossil fuels and already accounts for over 40 per cent of Queensland's natural gas consumption.

Many of the high methane production zones occur in regions where micro-organisms produce gas (biogenic methane). Research shows that microbial activity can significantly enhance the methane saturation levels of the coal, with areas in the Sydney Basin showing that a biogenic component results in considerably higher gas production rates.

The Energy Transformed Flagship is investigating where methane production can be enhanced by augmenting and stimulating natural microbial activity. Researchers are conducting laboratory experiments to understand the processes involved and are culturing the micro-organisms to determine the viability of using them to optimise methane generation.

A long-term field trial will eventually be undertaken where micro-organisms and nutrients will be injected into the reservoir.

Industry will benefit from new technology to increase methane production from coal seams in Australia. In addition, production of coal seam methane by this method should potentially create additional capacity in those seams for the geological storage of carbon dioxide. Ultimately the technology may enable the conversion of carbon dioxide to methane (a process known to occur in nature), and this would deliver even further environmental and economical benefits.

A number of industry partners have already been engaged to support the project including AGL Energy, APEX Energy, Australian Coal Seam Methane, Macquarie Energy and Origin Energy and CSIRO is now in the process of forming a consortium of these and other companies to fund a larger project.



CSIRO scientist Dr Mohinudeen Faiz analyses a coal sample with methane-producing micro-organisms under the microscope. Photo: Chris Taylor



Gene discoveries promise brighter, more colourful fruit and wine

CSIRO researchers have recently pinpointed the genes responsible for making apples red and white grapes white.

The discoveries may help produce new apple and grape varieties with novel colours in the future. The discoveries also have great potential for reducing the cost associated with breeding

CSIRO research is targeting wine quality characteristics such as berry colour, flavour and aroma. Photo: CSIRO

new varieties because breeders can test seedling colour genes and select to trial only those that will produce the desired fruit colour.

Red apple skin colour is dependent on light. In collaboration with the Department of Agriculture and Food in Western Australia and Food Western Australia, facilitated by Horticulture Australia Ltd. the team was able to identify the gene that controls production of the red pigment (anthocyanin) in the presence of light.

The researchers showed that fruit colour can be predicted, even in seedling apple plants, by measuring the form of this gene.

This will give plant breeders the opportunity to use these molecular marker tests to speed up apple breeding and select for improved fruit colour.

In related research a CSIRO team working in the CRC for Viticulture, supported by the Grape and Wine Research and Development Corporation, has also been able to develop a marker that can be used in grapevine breeding to predict berry colour in seedlings, without waiting two to five years for them to produce fruit.

The team's work built on Japanese research, which showed that one particular gene, which controls production of anthocyanin, was mutated in a few white grape varieties.

The CSIRO team found that a second similar gene involved in the grape colour pathway is also different in white varieties.

By analysing a wide range of grapevine varieties, the researchers confirmed the mutations of both genes were present in nearly all white cultivars, suggesting that there is a single genetic origin of white grapes.

Solving major national challenges



Role description:

- strongly outcome focused, R&D intensive, mission-directed strategic research. Often large-scale, complex and multidisciplinary
- generally higher-risk, long-time horizon research, requires major investment
- national teamwork, collaboration and partnership are vital

Climate change knowledge

CSIRO research shows that carbon dioxide emissions from fossil fuels have accelerated globally in recent years at a far greater rate than expected. The findings are supported by CSIRO analyses of subsequent atmospheric concentrations of carbon dioxide, which also demonstrate an acceleration.

CSIRO made a considerable contribution to the Intergovernmental Panel on Climate Change's (IPCC) most recent assessments of climate change, which represents the consensus view

of about 2500 climate scientists from around the world.

The climate system is responding more guickly to rising carbon emissions than climate scientists had previously estimated. CSIRO contributed to research published in Science in February 2007 that demonstrated globalmean surface temperature observations from 1990 to 2006 are in the upper part of the range projected by climate models. In addition, observed sea level has been rising faster than models had projected and currently closely follows the IPCC's upper limit projection leading towards an 88 centimetre rise by 2100.

CSIRO climate impacts research has also contributed to the development of a National Action Plan for agriculture. The National Action Plan harnesses the expertise of Australian farmers, local communities, climate scientists and government. In the next stage, CSIRO researchers will be working to steer the Action Plan towards supporting risk management and sustainability in the agricultural sector.

A CSIRO report on how climate change impacts on marine life projects a southward shift in the distribution of species.



Dr John Church (left), co-author of the Science paper that shows observed sea level has been rising faster than models had projected, with CSIRO colleague Dr Neil White. Photo: Bruce Miller

Energy futures

CSIRO is actively addressing national and international challenges in energy supply, sustainability and climate change through collaboration with Australian and overseas partners.

Through the development of initiatives such as the Energy Futures Forum and involvement in the Asia Pacific Partnership on Clean Development and Climate (APP) the Energy Transformed Flagship is working to significantly reduce greenhouse gas emissions from energy generation and establish a lower-emissions path for our energy future.

The Energy Futures Forum brought together Australia's energy and transport stakeholders to identify plausible scenarios for energy out to 2050 and their implications for the nation's energy future. Participants included Origin Energy, Macquarie Generation, Rio Tinto Ltd, Australian Automotive Association, Xstrata Coal, Westpac Banking Corporation and WWF Australia. The forum culminated in the publication of a report, The Heat Is On, in December 2006 which featured several key findings:

- It is likely that the global benefits of avoiding climate change will outweigh the global costs of mitigation.
- Australian and world economies are projected to continue growing when carrying out greenhouse gas mitigation.
- Electricity can be expected to remain affordable for households.

Utilising the capabilities of CSIRO's Divisions, the Energy Transformed Flagship is working on a global scale with partners in Japan, China, India, the Republic of Korea and the United States through the APP program. APP announced funding for a series of projects in late 2006 with a focus on low-emission fossil fuel utilisation and renewable energy. Projects include:

- Building the world's first multi-tower solar array to highlight potential opportunities for the large-scale deployment of solar thermal technology. This project will employ CSIRO technology developed at the National Solar Energy Centre.
- Enhancing coal bed methane research to test and improve the use of CO₂ storage in coal seams, realising the economic, energy security and greenhouse gas benefits of the technology.
- Further developing and applying post combustion capture technology that can potentially reduce CO₂ emissions from coalfired power stations by 85 per cent.



CSIRO engineer, Mr Aaron Cottrell, is working on the post combustion capture research program which has the potential to substantially reduce carbon dioxide emissions from coal fired power stations. Photo: Murray McKean

Satellite images reveal Great Barrier Reef at risk from river plumes

Using remote sensing techniques, the Wealth from Oceans Flagship has shown, for the first time, that plumes from north-east Queensland rivers travel directly to the outer reef, and beyond.

A stunning series of satellite images, captured by CSIRO from 9 to 13 February 2007, challenge traditional hydrological models that predict these river plumes would mainly travel north along the coast, affecting only the inner Great Barrier Reef Lagoon and the inner reef corals.

The images show large plumes of terrestrial material following unconventional patterns and travelling quite fast as far as 65 to 130 kilometres to the outer reef, and in some instances, travelling along the outer reef and re-entering the reef.

The plumes contain suspended sediments and dissolved material and are the result of heavy

rainfalls in northern Queensland around late January to early February 2007, with the resulting flood waters carrying a larger materials load than during regular rainfall and river flow. As such floods had not occurred for a while, the accumulated material in the creeks and rivers, coupled with increased run-off from the land, caused a significant transport of terrestrial material to all areas of the affected reefs and reef waters.

The remotely sensed images were taken from NASA's MODIS satellite by GeoScience Australia for a new product being developed by the Flagship to track coastal and ocean events in real-time, building on the technology behind the successful SENTINEL bushfire tracking system.

Although extreme coastal events have been captured by remote sensing before, it is now possible to observe and analyse them straight after the event, and compare them to previous conditions. This has been achieved thanks to more satellites imaging the Earth and the Flagship's investment in fast information delivery systems.



Wealth from Oceans scientists, Dr Arnold Dekker, Mr David Blondeau-Patissier and Mr Magnus Wettle, working to unravel the science behind satellite images. Using remote sensing techniques they have been able to map river flood plumes as they move out to sea in near real-time. Photo: David McClenaghan

Creating new or significantly transforming industries



Role description:

- partnering to transform/create new industries through the use of technological innovation and risk sharing
- strongly outcome focused, R&D intensive, mission-directed strategic research with scalable trans-disciplinary teams
- generally higher-risk, longer-term projects
- partners include large corporates, consortia and industry associations

Casting a new image for car components

A new casting technology from the Light Metals Flagship offers potential for production of costcompetitive, high-performance magnesium alloy components — and benefits to the automotive industry in greater fuel efficiencies and reduced carbon dioxide emissions.

The T-Mag[™] technology is being taken to market by a joint venture partnership between CSIRO and three South Australian companies, Alloy Technologies International, SAGE Automation, and FLOTEK, and with the support of AusIndustry's Commercial Ready program.

T-Mag[™] is highly efficient, reducing the metal needed for high-pressure casting of a 3.5 kilogram component from six or seven kilograms to just 3.7 kilograms, providing large savings in recycling and energy costs. The T-Mag[™] machine integrates melting and casting operations in a single compact unit, which uses gravity rather than high-pressure or vacuum to fill the die smoothly from the bottom. The result is strong, lightweight castings which do not have flow lines or internal porosity. Their high strength and integrity make the castings suitable for high-performance automotive applications such as wheel rims and engine blocks. Magnesium alloy engine blocks are two-thirds the weight of aluminium alloy blocks, providing improved fuel efficiency and performance, which are attractive to premium car makers.

Low production costs make T-Mag[™] castings cost-competitive with aluminium and steel, and provide an entry to the structural automotive components market. The T-Mag[™] technology excited commercial interest when it was exhibited at GIFA, the World Foundry Congress, held last June in Dusseldorf, Germany.



Metal casting technician, Mr Danny Moran, overseeing casting of a magnesium alloy wheel using the T-Mag[™] machine. The wheel is being lifted out of the die at the completion of the casting process. Photo: Mark Fergus

Minerals map a world first

The Wealth from Oceans Flagship and its partners have created the first map of Australia's undersea mineral deposits.

The Australian Offshore Mineral Locations Map shows the location of all known mineral locations and deposits within Australia's marine jurisdiction. The map is the first of its kind in the world and is a vital step towards successfully and sustainably managing Australia's ocean territory.

In November 2004, Australia lodged an application for new maritime boundaries with the United Nations Commission on the Limits of the Continental Shelf. If these new boundaries are ratified by the Commission, just over half of Australia's land mass will be below the sea and Australia will have one of the largest marine jurisdictions in the world.

More than 380 mineral locations have been compiled within Australia's marine jurisdictions and possible extensions and adjoining international waters. This is much larger than the 12 or so occurrences known prior to the start of the project.

The map was created by combining data from all seven geological survey organisations in Australian states and the Northern Territory. The main source of data was information on mineral deposits that had been found by mineral exploration companies and registered with survey organisations.

Land exploration and mineral production is a massive industry and Australia is only just beginning to look at similar operations on the seafloor. There is now exciting potential for a possible future marine minerals industry.

The Australian Offshore Minerals Locations Map makes it possible to combine information



tralian Offshore Mineral Loca

CSIRO geologist Ms Shannon Johns examines the Australian Offshore Mineral Locations Map for areas of interest. Photo: Darryl Peroni

about mineral deposits with knowledge of the ecology of the area. This will allow future undersea exploration and mining to be developed responsibly, taking into account the long-term implications for the economy and the environment.

World's fastest wireless connection

On 6 December 2006, CSIRO publicly demonstrated, for the first time anywhere in the world, spectrum-efficient data transmission at a rate of more than six gigabits per second (Gbps) over a point to point wireless connection.

Before CSIRO developed this technology, the previous highest data rate achieved using a millimetre-wave system was 1.25Gbps.

The system is suitable for situations where a high-speed link is needed but it is too expensive or logistically difficult to lay fibre, such as in congested urban environments, and across valleys and rivers. The system is also ideal for creating networks to meet short-term needs such as emergencies and large events.

Gigabit links operate at speeds that leave current wireless network technologies far behind. For

example, the entire works of Shakespeare could be transmitted in four hundredths of a second or a full DVD movie in 34 seconds.

The system operates at 85 gigahertz (GHz) in the millimetre-wave part of the electromagnetic spectrum (above 55 GHz) which offers the potential for these enormous speeds and is not yet congested by other uses.

For the demonstration, the team transmitted 16 simultaneous streams of DVD guality video over a 250 metre link with no loss of guality or delays. This impressive demonstration nevertheless only utilised one tenth of the capacity of the link.

This achievement in wireless technologies is the result of work by a multidisciplinary team of over twenty researchers working together to solve major technical challenges.

The team is currently in the process of commercialising the technology.



Dr Y Jay Guo, Research Director, CSIRO Wireless Technologies Laboratory which developed the six gigabit wireless link. Photo: Chris Taylor

Advancing frontiers of scienc Role description:

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- insight based research leading to a paradigm shift that has potential implications across multiple domains
- potentially generates new science/technical platforms, capabilities and intellectual property
- often led by eminent scientists with global connections
- world leading frontier research, cutting-edge/ hot topic research or high potential (personal passion) research
- collaboration and connectivity to the global research community is key
- often performed without a particular client/partner in mind

New theory on how continents can break apart

A paper co-authored by CSIRO scientists and published in *Nature* in July 2006, *The effect of energy feedbacks on continental strength*, reveals new information on the strength of continents and how they can split apart.

Continents drift on the surface of the Earth in response to the recycling of oceanic plates, with new plates formed at rifts which are mostly located as sea-floor spreading centres in the middle of oceans. However, occasionally, the forces that cause the spreading of oceans can also break a continent apart to form a new ocean.

Rock strength increases with depth up to 15 kilometres and then decreases with further depth. However, this expectation fails to explain, and even squarely contradicts, fundamental observations in geology. The research team set out to investigate the effects that take place when continents are submitted to strong forces. They developed numerical models where the strength of the continents results from basic physics and natural feedback processes, which had so far been overlooked.

They discovered that the strongest part of the continents at a depth of 15 kilometres transforms into a narrow weak zone which takes up most of the deformation. Through dynamic interaction the strongest part becomes the weakest. The researchers concluded that the continents are significantly weaker than previously suspected. Such an understanding will provide critical input into modelling the distribution of large mineral systems at a terrain scale.



Dr Klaus Regenauer-Lieb, a joint CSIRO-University of Western Australia Premier's Fellow, whose research sheds new light on the ways continents break apart. Photo: Darryl Peroni

A landmark insulin discovery

A CSIRO research team has determined the molecular structure of the insulin receptor, the protein on the surface of cells that mediates the effects of insulin in humans. This landmark work was published in the prestigious international journal Nature in September 2006 and may lead to further important developments in the ongoing quest to enhance the understanding of how insulin functions in the body.



Dr Connie Darmanin monitors the preparation of a directed crystallisation screen in the Bio21 Collaborative Crystallisation Centre at CSIRO's Parkville laboratories. Photo: David McClenaghan The team has been at the forefront of research on the structural biology of the insulin receptor family since the early 1990s. The challenge of solving this structure has thwarted many laboratories worldwide over the last two decades.

This outcome required the combined expertise of molecular and cell biologists, fermentation experts, protein chemists, x-ray crystallographers, bioinformaticians and electron microscopists. The team also made use of synchrotrons from around the world and in recent times have been aided by the robotic crystallisation and imaging systems at the Bio21 Collaborative Crystallisation Centre established at the CSIRO Parkville laboratories.

The discovery of the insulin receptor structure will facilitate future research that ultimately might lead to new therapies for diabetes or cancer. By understanding how insulin binds to its receptor and triggers cellular events that regulate the body's uptake and utilisation of sugar, scientists will be able to exploit this information, using newly emerging science methodologies. These methodologies such as fragment-based drug discovery may assist in the design of novel therapeutic agents that can regulate the functioning of either insulin or a related receptor, (the insulin-like growth factor receptor) implicated in cancer development, for the treatment of diabetes or cancer, respectively, two of the major health problems facing the world today.

This research won the 2006 CSIRO Chairman's Medal which is awarded annually to scientists who have carried out research of national or international importance in the advancement of scientific knowledge, technology application or commercialisation (see page 57).

Honeybee genome and threats to global food supply

CSIRO scientists, working with their Australian and international colleagues, have made significant contributions to the knowledge of one of the world's most important insects, the European honeybee. The international consortium looked at various research aspects to map the sequence of the honeybee genome.

The findings from the Honey Bee Genome Sequencing Project were published in *Nature* in the paper *Insights into social insects from the genome of the honeybee Apis mellifera*. This was the first sequencing of a social organism other than a human and valuable information is now available to scientists to study characteristics associated with the genome.

Other science journals simultaneously published papers based on bee research and CSIRO scientists were authors on several subjects including sensitivity to insecticides, telomeres (DNA that protects the end of chromosomes) and crop pollination.

The sequencing of the genome provided insights into why honeybees are sensitive to insecticides. One group revealed in their paper, A *deficit of detoxification enzymes: pesticide sensitivity and* environmental response in the honeybee in Insect Molecular Biology (October, 2006), that the honeybee genome has fewer protein coding genes than other insects that have been studied. Some of the most marked differences occur in groups of detoxifying enzymes associated with insecticide resistance in other species.

Another international group showed that honeybees, unlike other insects studied so far, have a similar telomere system to humans. Their discovery of a simple telomere system and the identification of the gene for telomerase in the honeybee will allow the study of the role of telomerase in the very different ageing of the three bee castes and this may provide clues to understanding human ageing and cancers. Their paper *Canonical TTAGG-repeat telomeres and telomerase in the honeybee Apis mellifera* was published in *Genome Research*.

The importance of crop pollination by the European honeybee was revealed in a paper, Importance of pollinators in changing landscapes for world crops, published in the Proceedings of the Royal Society (October, 2006). The research, which confirmed that one in three mouthfuls of food comes from insect pollinated crops, revealed just how important bees are to global crop production.



The honeybee genome is the first sequence of a social organism other than humans. Photo: David McClenaghan

Satellite roles: managing national facilities



Role description:

- harnessing CSIRO's science and technology management skills to the management of selected National Facilities adds value to Australia's NIS and helps lift CSIRO's profile in the NIS and globally
- CSIRO currently manages three major National Research Facilities: the Australian Animal Health Laboratory; the Australia Telescope National Facility; and the Marine National Facility which operates the Research Vessel Southern Surveyor.

Australian biological collections

CSIRO is the custodian of a number of collections of animal and plant specimens that contribute to national and international biological knowledge. The Australian Biological Collections contribute to the discovery, inventory, understanding and conservation of Australia's plant and animal biodiversity, these include the:

- Australian National Insect Collection (ANIC), specialising in Australian insects
- Australian National Wildlife Collection (ANWC), specialising in land vertebrates
- Australian National Fish Collection (ANFC), specialising in marine fishes
- Australian National Herbarium (ANH), specialising in our native plants.

Together, they constitute a vast storehouse of information about Australia's biodiversity. They underpin a significant part of the country's taxonomic, genetic, agricultural and ecological research. They are, therefore, vital resources for conservation and the development of sustainable land and marine management systems. Good



Mr Alastair Graham with specimens collected for the field guide, *Economically Important Sharks and Rays of Indonesia*, which are lodged in the Australian National Fish Collection. Photo: David McClenaghan

Performance Delivering impact

science and sound decisions on biodiversity and natural resource management require correct identification of Australia's native species.

During 2006–07, there have been many highlights for the collections, including the launch of the *Atlas of Living Australia*, a webbased encyclopaedia of Australia's biodiversity knowledge. This national initiative will include data from more than 60 biological collections from across Australia.

The ANIC has contributed to knowledge of Australian insects through publication of a 376 page book on Australian ladybird beetles treating 260 species in 57 genera and a beautifully illustrated field guide to Australian moths.

The ANWC participated in a three-year Environmental Trust project 'Better Knowledge Better Bush' through researching gene flow in revegetated landscapes. This collaborative project, which links CSIRO with natural resource organisations, assists planners in New South Wales to understand the factors that influence biodiversity in revegetated landscapes and will lead to better conservation management.

Scientists from the ANFC worked with Indonesian colleagues to produce a 330-page field guide, *Economically Important Sharks and Rays of Indonesia*. The field guide, published by the Australian Centre for International Agricultural Research, is based on the findings of a five-year survey of catches at local fish markets in Indonesia. It provides the first detailed overview of Indonesia's shark and ray fauna, describing 130 species, including 20 that are new to science. The information is critical to the management of these species in Indonesia and Australia. Specimens of most of the species are lodged in the ANFC.

The ANH released the interactive identification keys EUCLID 3rd Edition covering all Australian eucalypts and Australian Orchid Genera. This

user-friendly format makes information about plants readily available to researchers, the general public and special interest groups. The Herbarium data has provided, for the first time, clear mapping of biotic regions in the Murray River Floodplain and has assisted in our understanding of the response of species to changing water regimes in parts of the Murray-Darling Basin.

Discovery of new bat-derived virus in humans

CSIRO scientists at the Australian Animal Health Laboratory (AAHL) have played a key role in discovering that bats are the likely host of a new virus that can cause a serious but apparently non-fatal respiratory tract illness in humans.

Working with collaborators from the National Public Health Laboratory in Malaysia, the new virus was named Melaka after the location where it was isolated in early 2006 from a human patient who showed signs of fever and acute respiratory illness. This is the only recorded case of the Melaka virus infecting humans. Melaka virus is a type of reovirus (Respiratory Enteric Orphan viruses) that was first isolated in humans in the early 1950s and so named because they were not associated with any known disease.

Although the symptoms were severe and persisted for four days, there is no evidence to suggest Melaka virus is fatal. The scientists at AAHL used scientific techniques including virology, serology, electron microscopy and molecular biology to establish whether the virus was a reovirus and if so, to what species group it belonged.

Retrospective research revealed that several other members of the patient's family developed similar symptoms approximately one week later and showed serological evidence of infection with the same virus. The delay in symptom onset suggests human-to-human transmission took place.

Bats were examined as a host, not only because previous unknown viruses have been found to have originated in bats, but because epidemiological tracing revealed the family were exposed to a bat in the house one week prior to the patient showing clinical symptoms of the virus.

AAHL plans to continue working closely with the group in the National Public Health Laboratory and other Malaysian scientists to identify how widely distributed the virus is and how many related viruses there are in the bat reovirus group.

The discovery of Melaka virus will make future diagnoses of unknown viruses more accurate as it can now be added to the list of new and emerging viruses.

The research was published in the Proceedings of the National Academy of Sciences, USA (July, 2007).



Research shows bat-borne reoviruses can be transmitted to humans. Photo: CSIRO

Big boost for Australia's Square Kilometre Array program

Radio astronomy is undergoing a revolution, as software replaces hardware and dishes morph into networked arrays of hundreds or thousands of elements. Terabytes of data will pour from these arrays each second, requiring massively parallel computing and new protocols for storing and retrieving data. CSIRO is positioning Australia to lead in this changing field.

Foremost among the 'next generation' telescopes is the Square Kilometre Array or SKA, a \$1.8 billion international project. Australia and South Africa have now been short listed as the possible SKA hosts. CSIRO research had previously established that the SKA candidate site in Western Australia (WA) would be one of the world's best for radio astronomy. As a result, several international experiments—the US/ Australian Widefield Array, CORE, PAPER, and SCOPE—are queuing to locate there.

But the major instrument bound for the site is the Australian SKA Pathfinder or ASKAP, a next-generation telescope of unprecedented capability that will demonstrate technology and techniques needed for the full SKA. ASKAP is being developed by CSIRO, with a number of international partners, and is due for completion in 2012.

ASKAP's scope has expanded in the last year, thanks to significant funding announcements: \$19.2 million under the National Collaborative Research Infrastructure Strategy and \$51.7 million in the 2007–08 Commonwealth Budget. The budget announcement included a further \$5 million for a coordinated 'Team Australia' approach to winning the SKA. Canada, an ASKAP partner, has also committed \$9 million in-kind support to the project.



CSIRO Digital Systems Engineer, Dr John O'Sullivan, with a revolutionary detector-receiver array being developed for the ASKAP telescope. Photo: Chris Walsh

The new funding will allow CSIRO to build up to 45 ASKAP dishes in WA and an extra six in New South Wales, the latter linked to WA by optical fibre.

High-speed networks are essential for 'distributed' telescopes such as ASKAP and the SKA. Their promise was demonstrated in April, when data from four Australian telescopes was streamed live to CSIRO's Parkes Observatory over dedicated high-speed links and then processed in real time.
Australia's Marine National Facility

The Marine National Facility Research Vessel, Southern Surveyor, supports deep-water marine research. It is owned and managed by CSIRO, with the Australian Government funding its operations as a National Facility to enable oceanographic, geological, fishery and ecosystem studies.

Australia's largest slice of sovereign territory and most valuable reserve of resources lie under our oceans. The Southern Surveyor represents an important path to a more prosperous future for our nation.

An annual call for research applications allows many Australian research organisations access to a blue-water research vessel. This year the Southern Surveyor supported studies of marine biodiversity, marine ecosystem dynamics and marine geoscience, yielding world-class scientific discoveries and advice relating to the impact of climate change and the sustainable management of marine resources.

A voyage off Western Australia led by CSIRO's Dr Peter Thompson in mid-2007 highlights the kind of intensive, at-sea research essential to

further Australia's scientific understanding of marine systems.

The voyage brought together scientists from a range of agencies including CSIRO, Geoscience Australia, University of Western Australia, Murdoch University and the Western Australian Museum to investigate one of the largest biological phenomena observed in Australia.

Their research paths across the Leeuwin Current characterised, for the first time, a massive annual plankton bloom that stretches 700 kilometres along the WA coastal zone, containing biomass levels five times greater than in summer.

The voyage listened, measured, photographed and sampled its way through the physics, chemistry and biology of the continental shelf in waters of 50-2000 metres in depth, from Cape Leeuwin to the North-West Cape.

It yielded a huge dataset that scientists will use to probe the causes of the plankton bloom and describe the structure and function of the Leeuwin Current, which will lead to greatly enhanced computer models of oceanography, productivity and food webs of the coastal zone. The results will influence everything from conceptual to mathematical models of WA shelf ecology.



Crew working on the deployment of a tsunami warning buoy, from the aft deck of the Southern Surveyor. Photo: Diana Reale

Satellite roles: supporting postgraduate/ postdoctoral development



Role description:

• developing and training graduates for the future benefit of CSIRO and more broadly the Australian NIS

For more information on number of students supervised and sponsored, and number of postdoctoral fellows employed by CSIRO see page 73.

PhD students making new discoveries

The recent discovery of small ribonucleic acid (RNA) molecules has revolutionised our understanding of how genetic information is expressed, highlighted by the 2006 Nobel Prize to the scientists who demonstrated their function. Small RNA have roles in many aspects of plant development, from stem cells to leaf shape.

PhD student Rob Allen, along with colleagues in the Australian National University and CSIRO, has identified the gene targets of members of a class of small RNAs called microRNAs. He has demonstrated that these microRNAs silence specific genes and this work may lead to biotechnology applications as well as a better understanding of gene regulation.

Rob says the collaboration between the ANU and the CSIRO has been invaluable in helping guide his research, 'It's been incredibly helpful to have input into my work from such a broad cross-section of scientific experts – and their technical knowledge'.

PhD student Matthew Miller, along with colleagues at the University of Tasmania and the CSIRO Food Futures Flagship, is researching novel renewable sources of oil with high-levels of omega-3 that can be used as a source of food for the salmon aquaculture industry. This will provide a high omega-3 salmon product and help to maintain the growth in the industry. Matthew's project is investigating possible sources of omega-3 oil from Patterson's curse, a noxious introduced weed, or oil from marine single cell micro-organisms and genetically modified seed oil crops.

Global sources of fish oil are under increasing pressure due to over-fishing and other environmental changes. The aquaculture industry relies on fish oil to supply the essential omega-3 long-chain polyunsaturated fatty acids, which are beneficial for human health including the reduction of cardiovascular disease. The decreasing supply of fish oil is therefore of international significance.



Food Futures Flagship PhD student – Mr Matthew Miller – is looking at new alternative diets for salmon farming. He is seen here readying a farmed Atlantic salmon for oil profiling. Photo: CSIRO

CSIRO's outcomes and outputs

All Australian Government agencies that receive appropriations from Parliament are required to develop an 'outcomes and outputs framework' that provides the context for their corporate governance, management and reporting systems.

Outcome statements define the purpose of the appropriations, and are specified in terms of the impact government is aiming to have on some aspect of society, the economy or the national interest. Agencies specify and manage their outputs to maximise their contribution to the achievement of the desired outcomes. CSIRO's outcome statement and output framework as agreed with the Australian Government at the commencement of the triennium in July 2004, are represented in Figure 1.¹

CSIRO delivers many different types of research products and services (outputs), and these

outputs contribute to economic, social and environmental benefits for Australia in a variety of different ways. The major pathways are shown in Figure 2.

Some examples of CSIRO's impact in contributing to innovative and competitive industries, healthy environments and lifestyles, and a technologically advanced society, have been highlighted in the preceding pages of this report. This section lists a further selection of recent achievements that illustrate the application or utilisation of research results in each output group. The classification of each achievement by outcome type is summarised in Table 1 (see page 46).

Information on each of the achievements listed below is available on our web site at: www.csiro.au/org/2007Outcomes

Outcome			
The application or utilisation of the results of scientific research delivers: • innovative and competitive industries • healthy environments and lifestyles • a technologically advanced society			
Output groups			
Research products and services for Information Technology, Manufacturing and Services	Research products and services for Sustainable Minerals and Energy	Research products and services for Environment and Natural Resources	Research products and services for Agribusiness and Health

Figure 1: CSIRO's outcome and outputs framework

¹ These output groups reflect the CSIRO organisational structure at the time the outcome-output framework was defined, not the current structure. A new outcome-output framework independent of CSIRO's organisational structure has been agreed and will take effect for the 2007-08 year.

Figure 2: How CSIRO's research benefits Australia

Output types (deliverables)

CSIRO delivers four major types of research products and services:

- new/improved technology and management systems
- 'catalyst' services and advice for policy and business
- new/improved intermediate and final products
- new knowledge and skills.

Outcomes and indicators (benefits)

Innovative and competitive industries

- lower/more competitive production costs
- improved quality of goods and services
- new products, services and businesses

Healthy environment and lifestyles

- improved human health, safety and wellbeing
- reduced pollution
- improved environmental health

A technologically advanced sociey

- reduced risk (economic, environmental or social)
- development of skills (enhanced human captial)
- informing policy (cost-effective public programs)

Information Technology, Manufacturing and Services (Output group 1)

Monitoring south-east Queensland ecosystem health

Researchers have calculated the health of different estuaries and Moreton Bay zones in south-east Queensland (SEQ) using a method known as spatio-temporal modelling. This new method has resulted in improved predictions and monitoring of water guidelines. This has been adopted by the SEQ Healthy Waterways Partnership Ecosystem Health Monitoring Program for its annual Ecosystem Health Report Card.

Intelligent vehicle health

CSIRO with the Defence Science and Technology Organisation have developed models which are automatically constructed to predict the lifetime of airframes and components. This is a first step towards machine intelligence being applied to airframes. The system has been installed on an RAAF aircraft by Boeing Australia Ltd.

BaNDIcoot[™] passes certification at Boeing

BaNDIcoot[™] is a self-contained, hand-held instrument for non-destructive inspection of defects in lightweight composite and sandwich structures. It detects manufacturing defects or in-service damage in modern composite materials commonly found in aircraft, boats, high-performance vehicles and aerospace platforms. BaNDIcoot[™] has recently passed a series of calibration and certification tests at Boeing which has purchased the instrument for quality assurance during production and certification of their 787 Dreamliner aircraft.



Mr Steve Bohlken and Dr Darren Fraser with the robot-mounted cold spray system. Photo: Mark Fergus

Cold spray technology to assist the mineral processing and casting industries

Monitoring the temperature of molten aluminium in the mineral processing and casting industries has been a long standing problem because aluminium reacts with most metals. CSIRO has solved this problem by developing unique titanium thermocouple sheaths produced by a new Cold Spray technology with the Australian company, ECEFast. The company is conducting industry trials and plans to establish the first Cold Spray plant in Australia.

Reditus[™] software helps to price complex financial options

Reditus[™] is a dynamic design, pricing and trading tool for the finance industry. It is based on CSIRO research in computational fluid dynamics, and is not a conventional options-pricing tool. It is used for exploring, manufacturing and trading

new instruments efficiently. The software has seen a rapidly growing customer base, with over 100 licences now issued globally.

New method for hiding secure information

CSIRO has developed a method of hiding secure information within the background printing on packaging material or personal identity documents by using a decoding lens. The technology known as Modulated Digital Image, enables brand owners or issuing authorities to verify the authenticity of products or documents that are liable to be counterfeited. The technology is now being utilised by a major pharmaceutical company for use on several of its drugs.

New textile covers for protecting potable water storages

In a collaborative project in East Gippsland, CSIRO demonstrated that covering water basins with suspended tensioned textile structures reduced algal blooms, stopped plant growth, prevented contamination from birds and wind borne debris, and reduced evaporation by 90 per cent. Town water supply security was also enhanced and maintenance costs reduced.

Compact Array capability expanded

The Australia Telescope Compact Array has been fitted with components that enable it to receive a new range of radio frequencies. This makes it a more powerful instrument for astronomy, and will also allow it to act as a backup to NASA's Australian tracking facility at Tidbinbilla.

New method for measuring the content of dark and hollow fibres in white wool

In collaboration with the Australian Wool Testing Authority (AWTA) and Australian Wool Innovation, a fully automated instrument has

been produced that measures dark and hollow fibre content in naturally white Australian wool. The AWTA is now commercially producing the instrument for use around the world.

International partner for multi-beam antennas

CSIRO's MultiBeam Antenna Technology, which has previously been deployed in Luxemburg and Copenhagen, has been licensed to Patriot Antenna Systems, USA. The technology provides the ability to access a large number of satellites and is considered highly innovative as it provides both receive and transmit capabilities, as well as reducing establishment costs and the required real estate. Patriot will market the technology on an international basis.

Lightweight building material ready for commercialisation

The commercialisation of the HySSIL lightweight building material technology is being actively supported by CSIRO through materials and process optimisation and testing to meet building code requirements. A pilot plant is been constructed in Victoria by a joint venture between HySSIL Pty Ltd and Westkon. The plant will supply HySSIL panels to a number of projects and complete large-scale process development.

Two new wool technologies launched internationally

New wool technologies from CSIRO were launched internationally at SpinExpo, a major textile industry exhibition in China. QuickDry Merino is a surface treatment that greatly reduces the saturated weight and drying time for wool products, and ColorClear™ WB achieves brighter whites on wool fabrics. The technologies have been developed and proven in commercial mills. CSIRO is now transferring the technologies to the processors of Australian wool in Europe and Asia that supply apparel to the global market.

Sustainable Minerals and Energy (Output group 2)

Reducing the risk of fires in underground mines

CSIRO, in conjunction with the Australian Coal Association Research Program, has developed an advanced group of strategies built around alterations to mining and operating practices to reduce fire risk in underground longwall mines. A number of mines have adopted the technology and this represents a contribution to improved coal mine safety.

Geochemical map of the Yilgarn Craton, Western Australia

In collaboration with the Geological Survey of Western Australia, the CRC for Landscape Environments and Mineral Exploration, and the Minerals and Energy Research Institute of Western Australia, CSIRO has developed and published a geochemical map of the Yilgarn Craton that shows the total range of element concentrations over the region. Within four weeks of its release, the total area pegged for exploration increased over three fold. This significantly increases the probability of exploration success in the region.

Efficient nickel and cobalt purification

CSIRO, through the Parker CRC for Integrated Hydrometallurgy Solutions, has developed a direct solvent extraction technology that simplifies nickel and cobalt purification from ore. Following a successful pilot plant program, Baja Mining Corporation is now developing a full-scale plant using the technology.

Genesis provides business intelligence to the oil and gas industry

Genesis is a CSIRO developed information management software package that allows easy analysis of existing oil well data — data that can then be used as a planning tool for improving new wells. The software technology

has been licensed to a spin-off company, Genesis Petroleum Technologies, and has been used by clients in various countries including USA, Canada, Italy, Brazil, Egypt, Mexico and Australia.

Petroleum exploration technique used to date the world's oldest caves

Clay-dating methods, originally developed by CSIRO to assist oil exploration companies to find oil deposits, have estimated the age of the Jenolan Caves in New South Wales at 340 million years, making them the world's oldest discovered open caves. This discovery has important implications for the understanding of the geological evolution of eastern Australia – until 20 years ago it was thought that the Jenolan Caves were no more than a few thousand years old.

New safe and cost-effective alternative to mine blasting

A new CSIRO developed process that improves caving of massive ore bodies has been adopted by the Northparkes Mines in New South Wales. This has resulted in significant improvements in mine safety and efficiency. Northparkes has extended the program and the method is being adopted by mines in Chile and Australia.

Maximising recovery from existing oil reservoirs while minimising costs

The first prototype of a near wellbore reservoir characterisation tool developed by CSIRO has been deployed by Woodside. With oil reserves declining it is crucial for companies to maximise recovery from existing reservoirs while minimising costs. The tool provides information for decision support and control in all phases of well life and allows engineers to optimise well design before and during drilling, and maximise recovery from the reservoir whilst minimising water production. Initial deployment in a real scenario indicated two per cent improvement in the recovery, which translated to \$25 million per well and a reduction of \$1 million in the completion costs for each well.

Dr Rob Jeffrey examines a hydraulically-driven fracture formed in the laboratory in order to better

understand the mechanisms underlying a new approach to improving ore caving without the use of traditional blasting methods. Photo: Christian Pearson

Environment and Natural Resources (Output group 3)

Developing new water sources for South Australia

CSIRO and its partners have been instrumental in developing new water sources for South Australia. Limestone aquifer storage and recovery has been adopted as a viable water source and this has been built into the Prime Minister's National Water Commission Project entitled Water Proofing Northern Adelaide.

Developing sustainable fishery harvest strategies

Scientists from CSIRO have contributed to the Harvest Strategy Policy and Guidelines for Commonwealth Fisheries. The strategy sets catch levels so that fish stocks are maintained above sustainable levels and is among new measures being introduced by the Australian Fisheries Management Authority.

Planning for climate change

Research by CSIRO into the impact of climate change and variability has contributed to the development of a National Agriculture and Climate Change Action Plan 2006–09. The plan provides a strategic framework for decisionmaking and business planning.

Controlling bird-dispersed invasive weeds

CSIRO, with the CRC for Weed Management, is applying native seed dispersal models to predict the spread of invasive weeds across rainforest landscapes. This information is used by Biosecurity Queensland weed eradication teams to prioritise search areas. As a result, the teams retrieve a far greater percentage of weed seeds and reduce the number of new weed outbreaks in rainforests devastated by Cyclone Larry.

Addressing coastal resource management in Western Australia

Research by CSIRO that links terrestrial land management practices with near-shore marine health has influenced management and regulatory practices in Cockburn Sound, south of Fremantle. The work on groundwater contamination pathways has been endorsed by the State Government and has strengthened the sustainability of the Sound's future development.



Beachfront sediment sampling, Cockburn Sound, 2006. Photo: Robert Garvey

Implications for water availability in Melbourne

CSIRO's research has assisted Melbourne Water and the community to focus on how best to respond to the likely decrease in water supply as a result of climate change. The findings were incorporated in two Victorian Government's key strategy documents.

Guiding management decisions in the Lower Murray

Working with regional partners our sophisticated systems models are being used in regional natural resource management. The results show different effectiveness of actions such as revegetation, irrigation efficiency, and salinity disposal basins for meeting salinity targets, aquatic and terrestrial ecosystem health, and agricultural productivity.

Projecting future regional climate change

Numerous regional climate change reports that focus on the impacts of climate change on different regions and sectors have been provided by CSIRO to key stakeholders including state governments, industry groups and the Australian Greenhouse Office. These have led to decisions such as the allocation of additional resources to Victorian fire fighting and readiness activities.

National biological control program for bridal creeper

Bridal creeper is a major environmental weed across temperate Australia. CSIRO introduced biological control agents in the early 2000s and they continue to be very effective in reducing populations of this invasive plant, allowing native plants to recolonise sites. The program continues to provide land managers with an effective tool to manage this weed of national significance.

Impacts of climate change on marine life

A report written by Wealth from Ocean Flagship scientists and titled the Impacts of Climate Change on Marine Life has been released by the Australian Greenhouse Office and projects a southward shift in the distribution of species, particularly along the east coast of Australia. The report is now providing key inputs into marine climate adaptation policy through the National

Resources Management Standing Committee of the Marine and Coastal Committee and the National Oceans Advisory Group. It has also provided input into the Fisheries Research Development Corporation national strategy.

New approach to assessing ecological risks from fishing

A new approach to assess the ecological risks to species, habitats and communities from fishing has been developed by CSIRO and the Australian Fisheries Management Authority (AFMA). The method has been applied to 14 AFMA managed fisheries, including 30 subfisheries. The information provided by the assessments will play a major role in the strategic fishery assessments under the Environment Protection and Biodiversity Conservation Act 1999 requirements for sustainable fisheries.



CSIRO scientists in the 'wet lab' onboard the Marine National Facility Research Vessel Southern Surveyor sort through biological samples collected during a study of the northern prawn fishery ecosystem in the Gulf of Carpentaria. Photo: CSIRO

Agribusiness and Health (Output group 4)

CSIRO helps to enhance quality and safety in cancer care

CSIRO's Preventative Health Flagship, partnering with Queensland Health, has developed new computer software that links lung cancer patient data from different sources in Queensland, while protecting individual privacy. Queensland Health has installed the software and as a means of coordinating large-scale databases to enhance safety and quality in cancer care.

Elusive plant rust resistance genes located

The discovery of a marker for two key rust resistance genes by CSIRO is enabling plant breeders around the world to breed more



CSIRO's Dr Evans Lagudah and his team have identified a DNA marker that is 99 per cent effective in flagging the presence of two key genes that provide resistance against different species and strains of rust. Photo: Carl Davies effective rust resistant wheat varieties. The marker has proven effective in a range of wheats from different countries including Australia, India, China, North America and the major wheat research centre, the International Maize and Wheat Improvement Center in Mexico.

Partnering with Laminex to produce quality products

Ensis provided expertise and capabilities in resin and board manufacture to Laminex that has enabled the company to maintain its consistent quality standards for its particleboard and medium-density fibreboard products.

Controlling the silver whitefly biologically

Silverleaf whitefly is considered to be one of the top ten worst invasive pests globally. A parasitic wasp, *Eretmocerus hayati*, is a natural enemy of the whitefly and has been released in affected areas by scientists. The wasp has spread rapidly through these areas and is effectively controlling the whitefly. In many areas farmers no longer need to spray their crops and are growing crops that they previously avoided due to the damage from the whitefly.

CSIRO Total Wellbeing Diet books make a major social impact

As of August 2007, books one and two combined have now reached sales of over one million in Australia. Book one has US, UK, Canadian and South African editions plus translations in 13 languages including Italian, Russian and German. The diet has been voted 'the best way to lose weight' by an online panel of Australian dieters. The follow-on book has also achieved number one bestseller status in Australia since its release in late 2006.

An external study conducted in October 2006 projected that the *CSIRO Total Wellbeing Diet* books have made a significant impact on



Grain that has health benefits can be used for a wide range of foods. Photo: CSIRO

the weight of more than 500 000 Australians between the ages of 15 and 64. Users of the books reported not just improvements in weight, but also some self-reported increases in their overall health, energy levels, fitness, mood and personal body image.

International launch of new poultry vaccine

CSIRO's VP2 antigen technology has been used in a newly released vaccine which is the first onedose poultry hatchery vaccine against Infectious Bursal Disease. This disease is a major cause of mortality and immunosuppression leading to secondary disease in poultry. The vaccine has been released in Brazil, with US release expected shortly.

More efficient production of gluten-free pasta

With funding from the National Food Industry Strategy, Food Science Australia assisted the company Roma to develop the world's first single stage gluten-free pasta. This has contributed to a doubling of Roma's production capacity and increased export trade.

Commercialising production of healthy wheat varieties

Arista Cereal Technologies is a Joint Venture between CSIRO through the Food Futures Flagship, the Grains Research and Development Corporation and Limagrain Céréales Ingrédients. The venture will deliver new high amylose wheat varieties developed by CSIRO and Limagrain, and build commercial relationships to take products through to the market. The new wheat varieties are expected to provide significant human health benefits. Wheat with high-levels of amylose, a particular form of resistant starch, can be used to produce foods with a low glycaemic index and potential benefits for bowel health.

New management tool for east Australian graziers

CSIRO has released a real-time information tool. Pasture Growth Rate (PGR[®]), to graziers in eastern Australia to assist them to better cope with the impact of climate variations on pasture production. The release in the eastern states follows on from its success in Western Australia where it was originally developed by CSIRO in collaboration with Western Australia Departments of Food and Agriculture and Land Information, with regional data provided by the Bureau of Meteorology. PGR[®] utilises information from climate records and satellite images to calculate pasture growth rates at the national, regional, farm and paddock scale. This assists farmers to make management decisions on practices such as grazing rotation and fertiliser application.

The following table (Table I) uses the framework presented in Figure 2 (on page 38) to classify each of these achievements according to the nature of the outcome or benefit achieved.

Table 1: Selected CSIRO achievements classified by type of outcome

Information Technology, Manufacturing and Services (output group 1)

Achievement title	Out	come type (benefit)
Monitoring south-east Queensland ecosystem health		Improved environmental health
Intelligent vehicle health	*	New products, services and businesses
BaNDIcoot™ passes certification at Boeing	*	Improved quality of goods and services Reduced risk
Cold spray technology to assist the mineral processing and casting industries	*	New products, services and businesses
Reditus [™] software helps to price complex financial options	*	Improved quality of goods and services
New method for hiding secure information	*	Improved quality of goods and services Reduced risk
New textile covers for protecting potable water storages	*	Lower/more competitive production costs Reduced risk
Compact Array capability expanded	*	Improved quality of goods and services Development of skills
New method for measuring the content of dark and hollow fibres in white wool	*	Improved quality of goods and services
International partner for multi-beam antennas	*	Lower/more competitive production costs Improved quality of goods and services
Lightweight building material ready for commercialisation	*	New products, services and businesses
Two new wool technologies launched internationally	*	Improved quality of goods and services
Casting a new image for car components [#]	*	New products, services and businesses Reduced pollution
World's fastest wireless connection#	*	Improved quality of goods and services*
Big boost for Australia's Square Kilometre Array program [#]	*	Improved quality of goods and services

A Healthy environment and lifestyles

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Table Key

Tinnovative and competitive industries

[#] Denotes feature story; see pages 14–36 * Anticipated output or outcome

A technologically advanced society

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Sustainable Minerals and Energy (output group 2)

Achievement title	Outcome type (benefit)
Reducing the risk of fires in underground mines	Improved human health, safety and wellbeingReduced risk
Geochemical map of the Yilgarn Craton, Western Australia	 New products, services and businesses Reduced risk
Efficient nickel and cobalt purification	★ Lower/more competitive production costs
Genesis provides business intelligence to the oil and gas industry	★ Lower/more competitve production costs
Petroleum exploration technique used to date the world's oldest caves	Development of skills
New safe and cost-effective alternative to mine blasting	 Lower/more competitive production costs Improved human health, safety and wellbeing Reduced risk
Maximising recovery from existing oil reservoirs while minimising costs	★ Lower/more competitive production costs
Turning trash into energy treasure#	 Lower/more competitive production costs Reduced pollution
Enhancing Australia's energy sources [#]	 Reduced pollution* Lower/more competitive production costs*
Energy futures [#]	 Informing policy Reduced pollution*
New theory on how continents can break apart#	Development of skills*Reduced risk*

Table Key		
\bigstar Innovative and competitive industries	igta Healthy environment and lifestyles	A technologically advanced society
[#] Denotes feature story; see pages 14–3	6 * Anticipated output or outcome	

CSIRO Annual Report 2006–07

Achievement title

Planning for climate change

		Informing policy
Controlling bird-dispersed invasive weeds		Improved environmental health
Addressing coastal resource management in Western Australia		Improved environmental health Reduced pollution
Implications for water availability in Melbourne		Informing policy
Guiding management decisions in the Lower Murray		Improved environmental health
Projecting future regional climate change		Improved human health, safety and wellbeing Improved environmental health
National biological control program for bridal creeper		Improved environmental health
Impacts of climate change on marine life		Informing policy
New approach to assessing ecological risks from fishing		Improved environmental health
Combining knowledge to benefit the Murray-Darling Basin [#]		Improved environmental health* Informing policy
A ready reckoner for Australia's transport fuel options [#]	•	Informing policy Reduced risk*
Climate change knowledge [#]	•	Informing policy Reduced risk
Satellite images reveal Great Barrier Reef at risk from river plumes [#]	•	Development of skills Informing policy*
Minerals map a world first [#]	• • *	Informing policy* Reduced risk* New products, services and businesses*
Australian biological collections [#]		Informing policy Improved environmental health
Australia's Marine National Facility [#]		Informing policy Improved environmental health

Outcome type (benefit)

Informing policy

New products, services and businesses Improved environmental health

Improved environmental health

 \bigstar

Table Key

 \star Innovative and competitive industries

A Healthy environment and lifestyles

A technologically advanced society

[#] Denotes feature story; see pages 14–36 * Anticipated output or outcome

Environment and Natural Resources (output group 3)

Developing new water sources for South Australia

Developing sustainable fishery harvest strategies

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Agribusiness and Health (output group 4)

Achievement title	Outcom	e type (benefit)
CSIRO helps to enhance quality and safety in cancer care	lmp	proved human health, safety and Ibeing
Elusive plant rust resistance genes located	🗙 Lov	ver/more competitive production costs
Partnering with Laminex to produce quality products	★ Imp	proved quality of goods and services
Controlling the silver whitefly biologically	ImpRec	proved environmental health Juced risk
CSIRO Total Wellbeing Diet books make a major social impact	lmp	proved human health, safety and Ibeing
International launch of new poultry vaccine	🗙 Ne	w products, services and businesses
More efficient production of gluten-free pasta	★ Ne ★ Lov	w products, services and businesses ver/more competitive production costs
Commercialising production of healthy wheat varieties	🖈 Ne	w product, services and businesses
New management tool for east Australian graziers	🗙 Lov	ver/more competitive production costs
Improving animal welfare [#]	● Infc ★ Imp	prming policy proved quality of goods and services*
CSIRO helps rebuild communities after tsunami devastation [#]	\star Imp 🔺 Imp	proved quality of goods and services proved environmental health*
Fencing livestock in – virtually#	🛨 Lov	ver/more competitive production costs*
Gene discoveries promise brighter, more colourful fruit and wine [#]	★ Imp	proved quality of goods and services*
A landmark insulin discovery [#]	🔺 Imp	proved human health, safety and wellbeing
Honeybee genome and threats to global food supply [#]	lmp	proved human health, safety and wellbeing velopment of skills*
Discovery of new bat-derived virus in humans#	🔺 Imp	proved human health, safety and wellbeing
PhD students making new discoveries [#]	 Dev 	velopment of skills

able Key		
rinnovative and competitive industries	A Healthy environment and lifestyles	A technologically advanced society

[#] Denotes feature story; see pages 14–36 * Anticipated output or outcome

Awards and honours

In 2006–07, CSIRO scientists won international and national acclaim for the excellence of their work. These awards are further demonstration of our effectiveness in research and its application in industry and the community. Over 100 awards were received by CSIRO staff, including the prestigious Sir Ian Clunies Ross Award and Eureka Prizes.

The Sir Ian Clunies Ross Award 2007

Mr Paul Gottlieb AM (formerly Minerals) was awarded the *Australian Academy of Technological Sciences and Engineering Clunies Ross Award* in recognition of his work – largely undertaken at CSIRO – to develop and commercialise QEMSCAN. Mr Gottlieb is now chief technology officer of Intellection Pty Ltd, a company spunout of CSIRO to commercialise the technology. QEMSCAN is an automated analysis system for measuring mineral composition in plant and ore samples. It allows 12 000 mineral



Mr Paul Gottlieb AM winner of the Sir Ian Clunies Ross Award with Mr Robert Gottliebsen, a member of the Board of Governors with the Clunies Ross Foundation. Photo: Ross Gibb Photography



From L to R: Dr Graeme Batley, Dr Jenny Stauber, Dr Stuart Simpson and Ms Roberta Brazil (Chair, Land & Water Australia) at the Eureka Prize ceremony. Photo: Steve Lunam

analyses per minute, with such accuracy that base and precious metal users have reported dramatic process improvement benefits. It has also been successfully applied to the oil and gas industry, coal, fly ash, building materials, soil, environmental, and forensic investigations. The Clunies Ross Awards are awarded to scientists and engineers who have persisted with their ideas to the point that their innovations are making a real difference to Australia: economically, environmentally and socially.

Australian Museum Eureka Prizes 2006

Dr Graeme Batley, Dr Stuart Simpson, Dr Jenny Stauber and the Centre for Environmental Contaminants Research team (Land and Water) won the 2006 Land & Water Australia Eureka Prize for Water Research for research into the assessment and regulation of contaminated sediments.

Malcolm McIntosh Prize 2006

Dr Naomi McClure-Griffiths (Australia Telescope National Facility) received the 2006 Malcolm McIntosh Prize for Physical Scientist of



Dr Naomi McClure-Griffiths speaking at the award ceremony after receiving the Malcolm McIntosh Prize. Photo: Sandy Spiers



Dr Geoffrey Smithers winner of the Sir Ian McLennan Achievement for Industry Award. Photo: Jessica Marcelino

the Year for her insight into the structure of our galaxy and her research leadership. The Malcolm McIntosh Prize is part of the Prime Minister's Prizes for Science, which are the nation's most highly regarded awards and the premier national awards for scientific achievement.

Sir Ian McLennan Achievement for Industry Award

This award was established by the former CSIRO Advisory Council in 1985 to recognise outstanding contributions by CSIRO scientists to Australian industry.

The 2006 Award was presented on 6 March 2007 by Mr Charles Allen, Chairman of the Sir Ian McLennan Trust.

The winner was **Dr Geoffrey Smithers** of Food Science Australia for developing technology and ingredients worth nearly \$60 million annually in foreign exchange to Australia.

Australian Honours

Order of Australia

Member (AM)

Dr Tony Fischer (Plant Industry) for service to agricultural science in Australia and developing countries, particularly wheat research in the areas of grain yield and crop cultivation and management.

Dr Ron Sandland (Deputy Chief Executive) for service to science and technology, particularly in the area of research management and through contributions to CSIRO.

Medal (OAM)

Dr Raymond Jones (Sustainable Ecosystems) for his service to science through pasture and animal research.

Public Service Medal (PSM)

Dr Margaret Friedel (Sustainable Ecosystems) for outstanding public service in the field of arid zone research.

International Awards

Dr Roger Arnold (Ensis) was awarded the 2006 Xiaoxiang Friendship Award, the highest prize from the Hunan Provincial People's Government honouring foreign experts who make devoted and great contributions to the economic construction and social development of the Hunan Province. Dr Arnold was recognised for his contributions to research and development of cold tolerant eucalypts in Hunan.

Dr Graeme Batley (Land and Water) received the *Herb Ward Exceptional Service Award* from the international Society of Environmental Toxicology and Chemistry (SETAC) for exceptional service to the Society, particularly in relation to the formation of SETAC Asia/Pacific. Dr Voichita Bucur (Ensis) was issued the Nondestructive Testing of Wood Outstanding Research and Development Award by the International Organising Committee for Non-destructive Testing of Wood Symposium in recognition of her outstanding research contributions in the non-destructive testing of wood area.

Dr Jim Cox (Land and Water) was awarded the *University of Helsinki Medal* for his contribution to research and teaching.

Mr Qiang Jiang (Land and Water) was celebrated by the Chinese Government through the inaugural '*Cunhui Cup*' Chinese Scholars Studying Abroad Innovation and Entrepreneurship Competition for his revolutionary decision support system for agricultural future exchange and his pioneer role in this field.

Dr Trevor McDougall (Marine and Atmospheric Research) received the 2006 Editor's Award from the American Meteorological Society for outstanding reviews for the Journal of Physical Oceanography.

Dr Brent McInnes (Exploration and Mining) received the *Fulbright Business/Industry (Coral Sea) Award* from the Fulbright Commission to undertake a secondment at the NASA Goddard Space Flight Center in Maryland, USA.

Dr Rana Munns (Plant Industry) received a *Corresponding Membership Award* from the American Society of Plant Biologists, which confers life membership to distinguished plant biologists from outside the United States.

Dr Nick Smale (Food Science Australia) received the *James Harrison Young Researcher's Award* by the International Institute of Refrigeration for his research in the area of refrigerated transport.

Dr Kelly Thambimuthu (Energy Technology) was presented with the 2006 Award for Sustainable Development in Coal by the Coal Industry Advisory Board of the International Energy Agency. The Award recognises Dr Thambimuthu's contributions to the development of clean coal technologies, most recently with a focus on the low-emission technologies needed to stem rising carbon dioxide emissions from the growing use of fossil fuels, including coal.

Dr David Trimm (Petroleum) won the 2007 Award for Excellence in Natural Gas Conversion awarded by the Natural Gas Conversion Symposium in Brazil for scientific and technological contributions in this research area.

Australian Awards

Dr Ravi Anand (Exploration and Mining) was awarded the Butt Smith Medal from the CRC for Landscape Environments and Mineral Exploration for his outstanding contribution to geoscientific research. Dr Anand discovered an association in plant biogeochemistry and mineralisation.

Dr Denis Anderson (Entomology) won a Quarantine and Exports Advisory Council Award, as part of the 2006 Public Sector Awards for outstanding quarantine or biosecurity achievements by government organisations for the development of guarantine protocols for the safe importation of leafcutter bees into Australia.

Mr Ken Atkinson (Textile and Fibre Technology) received an Innovation Award 2006 from the Geelong Smart Network for his work in leading the carbon nanotubes research team in the development of spun carbon nanotube yarns. Mr Atkinson was also awarded the overall Researcher of the Year 2006 for the Greater Geelong region.

The Australian National Wildlife Collection and CSIRO Publishing received a Whitley Award for the book CSIRO List of Australian Vertebrates: A reference with conservation status from the Royal Zoological Society of New South Wales.

The CAST Technology Team (Manufacturing and Materials Technology) together with the CAST CRC and o.d.t. Engineering won the CRC STAR Award for engagement with small and medium enterprises.

Ms Megan Chadwick (Livestock Industries) and Dr Sharon Downes (Entomology) won an Australian Government Science and Innovation Award for Young People. Ms Chadwick was recognised for her novel research to investigate salt resistant sheep which can comfortably graze saltland. The award will allow Dr Downes to further investigate the mating strategies of female cotton bollworm moths in genetically modified cottons that contain a protein that is toxic to bollworm caterpillars.

Dr Matt Colloff, Ms Jean Devonshire, Ms Anne Hastings and Ms Fiona Spier (Entomology) received the Royal Zoological Society of NSW Whitley Award for an identification key, Centipedes of Australia.

Dr George Cresswell (Marine and Atmospheric Research) received the Australasian Marine Sciences Association Silver Jubilee Award for research that has helped Australians understand the influences on two of their national icons – beach life and the coast.

Dr Vanessa Danthiir and Dr Carlene Wilson

(Food Science Australia) were awarded the Brailsford Robertson Award from the University of Adelaide and CSIRO for their research on the impact of nutrition, including omega-3 fatty acids on brain function and ageing in the elderly.

Dr Tracy Dawes-Gromadzki (Sustainable Ecosystems) won a *Northern Territory Research and Innovation Award* for her innovative research in soil ecology in northern Australia.

Dr Patricia Desmarchelier (Food Science Australia) received the Australian Institute of Food Science Technology President's Award for contributions to the Institute.

Dr Lan Ding (Sustainable Ecosystems) led two research teams to win national and state awards in 2006 and 2007. DesignCheck, a 3D CAD compatible software tool that reduces errors/rework and increases productivity by providing building designers and surveyors with an automated, quick and simple check against building codes, won the R&D category at the *Australian Institute of Building New South Wales Professional Excellence in Building Award*.

Dr Ding and her team also won a 2007 Facilities Management Association of Australia and Rider Hunt Terotech Industry Achievement Award for the Sydney Opera House FM Exemplar Project. This research shows how the data on a building's physical structure can be integrated with facilities management functions to improve the ways of managing a facility's operation, maintenance and strategic functions while gaining effective environmental and cost-benefits.

Dr Peter Dodds (Plant Industry) was awarded the *Fenner Medal* from the Australian Academy of Science for his achievements in the area of molecular biology of host-pathogen interactions, specifically the interaction between the flax plant and its flax rust pathogen. These discoveries have provided a route towards engineering new rust resistance genes for use in agriculture.

Dr Calum Drummond (Industrial Physics) won the 2007 Royal Australian Chemical Institute Physical Chemistry Medal in recognition of outstanding contributions to the field of Physical Chemistry in Australia.

Dr Matthew Dunbabin and the Starbug team (ICT Centre) won the *Innovation Award* at the Institute of Engineers Queensland Engineering Excellence Awards and an Australian Engineering Excellence Award at the Australian Engineering Excellence Awards 2006 for the development of *Starbug*, a fully autonomous submarine for reef research.

Dr Peter Eadington (Petroleum) has been named the 2007 *Gibb Maitland Medallist* by the Western Australia Division of the Geological Society of Australia for substantial contributions to geoscience in Western Australia, in particular, his contributions that relate to the occurrence or discovery of mineral resources.

Dr John Farrow and team (Minerals, and Manufacturing and Materials Technology) won the 2007 Cooperative Research Centres Association Award for Excellence in Innovation for the AMIRA Improving Thickener Technology project being conducted through the Parker CRC for Integrated Hydrometallurgy Solutions. The award recognises the team's development and application of sophisticated techniques to improve gravity thickener technology in the minerals industry.

Dr Tony Fischer (Plant Industry) was the winner of the 2007 Farrer Memorial Medal from the New South Wales Department of Primary Industries for his outstanding contribution to agricultural research in Australia and, in particular, his globally renowned work in cropping physiology.

Dr Margaret Friedel (Sustainable Ecosystems) won the 2007 Desert Knowledge Research award in the Northern Territory Research and Innovation Awards for her outstanding achievements relating to the ecology and management of the rangelands of arid Australia. Dr Mark Gibson and team (Manufacturing and Materials Technology) received a CAST Commercialisation Award from the CAST CRC for the development of the AM-HP2 and AM-HP3 magnesium alloy.

Mr Stefan Gulizia and Dr Mahnaz Jahedi

(Manufacturing and Materials Technology) received the Gordon Dunlop Award 2006 from the Cast Metals Manufacturing CRC for developing CASTcoat[™] technology.

Mr Mike Hauptmann (Plant Industry) won a Safety. Rehabilitation and Compensation Commission Award for two devices that he developed to prevent occupational overuse injuries in the cotton QA group awarded by the Commonwealth Safety, Rehabilitation and Compensation Commission.

Dr Sally Hutchinson (Textile and Fibre Technology) won the Australian Wool Innovation/ German Wool Research Institute Award for Excellence in Wool Science for her innovative work in wool science collaborative projects.

Dr Alex Hyatt (Livestock Industries) won the City of Greater Geelong's Sustainable Environment Award for his role in the development and implementation of international diagnostic and sampling assays for a deadly frog fungus. This award forms part of the annual Smart Geelong Network Researcher of the Year awards.

Dr Phillip Jackson (Plant Industry) was awarded the Sugar Research and Development Corporation R&D Award in recognition of his work in the sugar cane breeding program.

Dr Nigel Johnson (Textile and Fibre Technology) has been honoured by the Textile Institute with a Service to Industry Award for his long-term commitment to the textile industry.

Dr Shahbaz Khan (Land and Water) was recipient of the 2006 Charles Sturt University Vice Chancellor's Award for Research Excellence. The award illustrates the success of CSIRO's presence at the Wagga campus where Dr Khan is Professor of Hydrology while heading up CSIRO Land and Water's Irrigation Systems research stream.

Mr Daniel Layton (Livestock Industries) received the 2006 Deakin University Industry Partnerships Award, a component of the Smart Geelong Network Researcher of the Year Awards, for his research into organ transplant alternatives.

Dr John Lowke (Industrial Physics) won the Welding Technology Institute of Australia Dr Wilfred Chapman Award for 2006 in recognition of outstanding achievements in fundamental research into welding science and technology at Australian and international levels.

Dr Dave Masters and Dr Hayley Norman (Livestock Industries) were part of the team that won the CRC Association's Award for Excellence in Innovation – innovation arising from the application and use of research. The Award recognised the strength of the collaboration between research and the Sustainable Grazing for Saline Lands Producer Network which has been instrumental in 1200 livestock producers changing their farming practices.

Dr Colin Matheson (Ensis) was awarded the Commonwealth Forestry Association, Regional Award of Excellence: South Pacific Region in recognition of his outstanding and long-term contributions to forest genetics and tree improvement research and the impact of his work in Australia and internationally.

Mr Neil McPhail and Ms Alison Small

(Food Science Australia) received the Victorian Government Department of Primary Industries and Fisheries Food Safety Award in recognition of Food Science Australia's contributions in food safety research.

Dr Gary Meyers (Marine and Atmospheric Research) received an Australian Meteorological and Oceanographic Society Medal for his contributions to Australian science over more than 25 years.

Mr Ben Mooney (Marine and Atmospheric Research), a University of Tasmania/CSIRO PhD student, was named the inaugural Fulbright Tasmanian Scholar. The Fulbright Tasmanian Scholarship is granted to a Tasmanian whose research can bring direct benefit to Tasmania and Australia. Mr Mooney will use his scholarship to work at the University of Maryland Biotechnology Institute and the State University of New York, Syracuse, to study marine algae that cause multi-million dollar fish kills in aquaculture operations worldwide.

Dr Bruce Mungall (Livestock Industries) won the Smart Geelong Network Researcher of the Year Animal Health Award for his work in radiotelemetry modelling of animal body temperature.

The Northern Australia Irrigation Futures (NAIF) Project Team, were awarded the Cooperative Research Centre for Irrigation Futures 'Team Work and Collaboration' Award for creating outstanding team work and collaboration across northern Australia and beyond. Members of the NAIF Project Team include: Dr Keith Bristow, Mr Jeff Camkin, Dr Freeman Cook, Mr Bart Kellett, Dr Zahra Paydar, Dr Cuan Petheram, Ms Di Popham, Dr Emmanuel Xevi, (Land and Water) and Mr Patrick Hegarty (James Cook University).

Dr Art Raiche (Exploration and Mining) was awarded the Australian Society of Exploration Geophysics Gold Medal for significant contributions to the exploration geophysics industry whilst simultaneously establishing and maintaining Australia's reputation in the world of mathematical geophysics.

Dr David Rand (Energy Technology) was awarded the R H Stokes Medal from the Royal Australian Chemical Institute for his outstanding achievements in the field of electrochemistry.

Dr Dennis Saunders (Sustainable Ecosystems) was awarded the D L Serventy Medal by Birds Australia for his outstanding contribution to the publication of ornithological work in the Australasian region.

Dr Richard Stirzaker (Land and Water) won the CRC for Irrigation Futures 2006 Leadership and Excellence Award for development and implementation of the Solute Signatures Project.

Dr Ming-Bo Wang and Dr Peter Waterhouse (Plant Industry) won the Science category of The Bulletin Bayer Smart 100 awards for their groundbreaking work in plant-based RNA interference (RNAi) technology.

Dr Gang Wei (Industrial Physics) was awarded the Australian Federation of Chinese Organisations' Australian New Immigrant Remarkable Achievement Award for services to science.

Dr Harry Wu (Ensis) was honoured with a Special 2006 Award by the Southern Tree Breeding Association for his outstanding contributions to tree improvement in Australia.

CSIRO Medals and Awards

The CSIRO Medals 'Honouring Excellence'

The Chairman's Medal

The Insulin Receptor team (Molecular and Health Technologies) won the 2006 Chairman's Medal for the landmark achievement of determining the molecular structure of the insulin receptor, the protein on the surface of cells that mediates the effects of insulin. Their findings have been published in the prestigious international journal *Nature*. The team have been at the forefront of research on the structural biology of the insulin receptor family since the early 1990s and with their collaborators at the Ludwig Institute for Cancer Research and the Walter and Eliza Hall Institute of Medical Research, were the first to publish important structures of two members of the structurally

related epidermal growth factor receptor family of proteins in the prestigious international journals Cell in 2002 and Molecular Cell in 2003.

The winners of the *Chairman's Medal* were:

Team leader: Dr Colin Ward

Team members: Dr Timothy Adams, Mr Nic Bartone, Mr John Bentley, Ms Kellie Cartledge, Mr Lemuel Cheong, Ms Elizabeth Da Silva, Dr Olan Dolezal, Dr Thomas Elleman, Dr Vidana Chandana Epa, Dr Ross Fernley, Dr Maurice Frenkel, Mr Peter Hoyne, Dr Michael Lawrence, Mrs Jennifer Lewis, Ms Mei-Zhen Lou, Dr George Lovrecz, Dr Louis Lu, Dr Neil McKern, Mr Tam Pham, Ms Tram Phan, Ms Pat Pilling, Ms Kim Richards, Ms Christine Robinson, Ms Sonia Sankovich, Dr Lindsay Sparrow, Ms Violet Stoichevska, Dr Victor Streltsov, Mr Phillip Strike and Mr Albert van Donkelaar.



Winners of the Chairman's medal from L to R, back row: Dr Vidana Epa, Dr Neil McKern, Mr Peter Hoyne, Mr John Bentley, Ms Catherine Livingstone (Chairman), Dr Colin Ward, Dr Timothy Adams, Dr George Lovrecz, Dr Maurice Frenkel, Dr Geoff Garrett (Chief Executive). Front row, L to R: Mrs Jennifer Lewis, Mr Tam Pham, Ms Sonia Sankovich, Ms Violet Stoichevska. Photo: Jessica Marcelino

The CSIRO Medals for Research Achievement

The CSIRO Medals for Research Achievement for 2006 were awarded to:

• The Dry-formed Carbon Nanotube Structures for Advanced Textile Team

(Textile and Fibre Technology) for inventing a new method for producing multifunctional carbon nanotube yarns and transparent sheets that have a unique range of physical properties such as high strength and electrical conductivity with wide application in smart materials for high value products.

Team leader: Mr Ken Atkinson Team members: Professor Ray Baughman, Dr Jane Dai, Dr Stephen Hawkins, Ms Chi Huynh, Ms Jacinta Meyers, Mr Chris Skourtis and Dr Mei Zhang.



The Dry-formed Carbon Nanotube Structures for Advanced Textile Team. Back Row L to R: Mr Chris Skourtis, Ms Jacinta Meyers, Dr Stephen Hawkins. Front Row L to R: Dr Jane Dai, Mr Ken Atkinson, Ms Chi Huynh. Photo: Jessica Marcelino

• **Dr John Church** (Marine and Atmospheric Research) for his world-recognised research leading to significant improvement in



Dr Geoff Garrett (Chief Executive) with Dr John Church winner of a Medal for Research Achievement. Photo: Jessica Marcelino

understanding the rate of sea level rise, both its global average and the regional distribution, which has led him to become the Chair of the Joint Scientific Committee of the Geneva-based World Climate Research Programme.

• The Centre for Environmental Contaminants Research Team (Land and Water) for research advancing the assessment and regulation of contaminants in aquatic sediments, involving revised assessment protocols, new toxicity tests, and improved frameworks, underpinning revised sediment quality guidelines and defensible management actions that are appropriately protective of Australia's benthic and aquatic ecosystems.

Team leader: Dr Graeme Batley Team members: Ms Merrin Adams, Mr Brad Angel, Dr Anthony Chariton, Dr Catherine King, Ms Tina Micevska, Dr Stuart Simpson, Mr David Spadaro, Dr Jenny Stauber and Mr David Strom.

• The Air Cargo Scanner Team (Minerals) for its outstanding achievement in developing a world-first scanner for interrogating consolidated air cargo for contraband such as drugs and explosives.



Performance Delivering impact



Dr Geoff Garrett (Chief Executive) with Dr Jenny Stauber of the Centre for Environmental Contaminants Research team. Photo: Jessica Marcelino



Members of the Air Cargo Scanner team from L to R, back row: Mr Dragoslav Milinkovic, Mr Ivan Kekic, Dr Nick Cutmore, Mr Greg Roach, Mr Adam Williams, Dr Yi Liu, Mr Vic Sharp, Mr Stephen Rainey, Mr John Eberhardt, Mr Alistair McEwan. Front row, L to R: Mr Rod Stevens, Dr Brian Sowerby, Dr James Tickner, Ms Carmen Calle. Photo: Jessica Marcelino



Winners of the CSIRO Medal for Business Excellence from L to R, back row: Dr Geoff Garrett (Chief Executive), Mr Gary Burge, Mr Ian Reddoch, Mr Howard Allingham, Mr Laurence Street. Front row, L to R: Ms Jan Bingley, Dr Sureka Goringe, Mr John Shaw, Ms Julie Pulford. Photo: Jessica Marcelino

Team leader: Dr Brian Sowerby Team members: Ms Carmen Calle, Mr Alvaro Catanzano, Dr Nick Cutmore, Mr David Death, Mr John Eberhardt, Mr Ivan Kekic, Dr Yi Liu, Mr Alistair McEwan, Mr Dragoslav Milinkovic, Mr John Peacocke, Mr Stephen Rainey, Mr Greg Roach, Mr Vic Sharp, Mr Rod Stevens, Dr James Tickner, Mr Adam Williams and Mr Kern Wyman.

The CSIRO Medal for Business Excellence

The CSIRO Medal for Business Excellence was awarded to Intellection Pty Ltd for the Commercialisation of QEM*SCAN. CSIRO Minerals and the Corporate Commercialisation Transaction Team have successfully transformed an innovative technical concept – Quantitative Evaluation of Minerals using Scanning Electron Microscopy (QEM*SEM) – into a vibrant, well capitalised, and rapidly expanding 'born global' company: Intellection Pty Ltd. Team leader: Mr John Shaw Team members: Mr Howard Allingham, Ms Jan Bingley, Mr Gary Burge, Ms Debbie Carruthers, Dr Sureka Goringe, Mr Doug Knight, Ms Kathy Kociuba, Ms Julie Pulford, Mr Ian Reddoch, Mr Laurence Street, Mr Calvin Treacy (Intellection Pty Ltd) and Mr Kern Wyman.

The CSIRO Medal for Lifetime Achievement

Dr Ron Sandland (Deputy Chief Executive) was awarded a *CSIRO Medal for Lifetime Achievement* in recognition of 38 years of service to CSIRO and his exceptional science, divisional and organisational leadership, culminating in the successful implementation of the Flagships Program and the Science Investment Process initiatives – both of which will positively shape the Organisation into the future.



Dr Geoff Garrett (Chief Executive) with Dr Ron Sandland winner of the Lifetime Achievement Medal. Photo: Jessica Marcelino

Fellowships and Societies

Dr Norm Adams and Dr David Masters

(Livestock Industries) were inducted as Fellows of the Australian Society of Animal Production in recognition of their extensive contributions towards the advancement of animal production in Australia.

Mr Simon Allen (Marine and Atmospheric Research) was elected a Fellow of the Institute of Marine Engineering, Science and Technology, an international professional membership body for all marine professionals.

Dr Greg Ayers (Marine and Atmospheric Research), Dr Calum Drummond (Industrial Physics), Dr Andrew Holmes (Molecular and Health Technologies) and Dr John Oakeshott (Entomology) were elected to the Australian Academy of Technological Sciences and Engineering.

Dr Trevor Bird (ICT Centre), Dr Greg Constable (Plant Industry), Dr Ron Ekers (Australia Telescope National Facility),

Dr Richard Manchester (Australia Telescope National Facility), Dr Trevor McDougall (Marine and Atmospheric Research), Dr Stephen Rintoul (Marine and Atmospheric Research), and Dr David Trimm (Petroleum Resources) were appointed as CSIRO Fellows.

Dr Brian Boyle (Australia Telescope National Facility) was elected an Honorary Fellow of the Royal Astronomical Society for outstanding achievements in advancing astronomy.

Dr Martin Cole and Dr Chris Hudson (Food Science Australia) were elected to the International Academy of Food Science and Technology.

Ms Nicola Dooley (Ensis) has been awarded an International Science and Technology Fellowship to work at Helsinki University of Technology on the Super Masscolloider project. The focus of the project is to generate high-grade fines to improve the physical optical qualities of paper and to evaluate the quality of these fines using characterisation techniques developed in Finland.

Dr Hugh Dove (Plant Industry) was elected as an Honorary Member of the Nutrition Society of Australia.

Dr Geoff Downes (Ensis) was awarded the Hans Merensky Fellowship for 2007 by Hans Merensky Holdings, a major timber and subtropical fruit grower and processor in the Republic of South Africa.

Dr John Finnigan (Centre for Complex Systems Science) and **Dr Rana Munns** (Plant Industry) were elected as Fellows of the Australian Academy of Science.

Dr Bruce Kemp (Molecular and Health Technologies) was elected a Fellow of the American Association for the Advancement of Science.

Mr Andrew Morrow (Ensis) was awarded the Gottstein Fellowship for 2007 by the Joseph William Gottstein Memorial Trust Fund. Mr Morrow will use the fellowship to study the suitability of Australian timbers for the manufacture of musical instruments.

Dr Tom Okey (Marine and Atmospheric Research) has received a Pew Fellowship in Marine Conservation from the *Pew Institute for Ocean Science*, in partnership with the University of Miami Rosenstiel School of Marine and Atmospheric Science, one of the world's foremost marine research institutions.

Dr Richard Stirzaker (Land and Water) was awarded a Land & Water Australia Senior Research Fellowship, for his outstanding contributions in the area of irrigation, agroforestry and salinity research.

Dr David Topping (Food Futures and Preventative Health Flagships) was awarded a Fellowship of the *Nutrition Society of Australia* in recognition not only for his scientific contribution and his practical application of research findings, but also his ability to form alliances between groups to maximise impact.

Dr Ken van Langenberg (Ensis) was awarded the *Denis M Cullity Fellowship* for 2007 by the Forest and Wood Products Research and Development Corporation.

Dr Peter Waterhouse (Plant Industry) has been awarded a *Federation Fellowship* for his outstanding achievements in the field of plant science and ensuring he continues his leading research in Australia. Dr Waterhouse will conduct his Federation Fellowship jointly with the University of Sydney and the CSIRO.

Mr Michael Wedding (Ensis) was awarded the *Gottstein Fellowship* for 2007 by the Joseph William Gottstein Memorial Trust Fund. Mr Wedding will use the fellowship study advances in pilot paper forming and surface enhancement technologies with the view to improve processing efficiency and product quality in the paper industry.

Dr Gang Wei (Industrial Physics) was elected a Fellow of the *Royal Australian Chemical Institute*.

The CSIRO Awards – celebrating 2006 achievements

One-CSIRO Awards

The One-CSIRO Award was awarded to the CSIRO Roadshow Team, Business Development, who staged a national series of high-quality and high-impact 'Roadshows' that actively engaged 656 of our most senior industry customers. The team won the award for their vision and tireless commitment to One-CSIRO behaviour over the twelve months of planning and staging such a large and complex activity.

Team leader: Ms Dorothy Albrecht

Seminal contributors: **Ms Julianne Camerotto** and **Ms Tracey Nicholls**.

Other contributors: Ms Sylvia Bell, Ms Carrie Bengston, Ms Marilyn Chalkley, Mr Bob Chamberlain, Ms Patricia Chronis, Ms Kelly Claudius, Ms Mary-Lou Considine, Mrs Linley Davis, Ms Jacqui DeBattista, Ms Sam East, Dr Rick Ede, Ms Heather Forward, Mr Stephen Gilfedder, Mr Warrick Glynn, Dr Tom Hatton, Ms Kathy Hayes, Mr Ian Johnson, Ms Kylie Johnson, Mr Tom McGinness, Mr Huw Morgan, Mr Jamie Nicholson, Mrs Deanne Paisley, Ms Jenny Porter, Dr Raj Rajakumar, Ms Leane Regan, Ms Meg Rive, Ms Mandy Robinson, Dr Beverley Ronalds, Mr Craig Roy, Ms Nic Svenson, Mr Mark Squires, Mr Bill Stephens, Ms Lisa Walker, Mr John Williams, Dr John Wright and Dr Marcus Zipper.

The One-CSIRO Award was awarded to the Wealth from Oceans Oil and Gas Team for assessing and integrating CSIRO's diverse capabilities to deliver impact in the oil and gas industry through a coordinated, One-CSIRO approach.

Team leader: Dr Mayela Rivero Albarran

Significant contributors: **Dr Joanna Parr** and **Dr Beverley Ronalds.**

Other contributors: Dr Matthew Dunbabin. Dr Cathy Foley, Dr Cedric Griffiths, Dr Patrick Hartley, Dr Karen Kozielski, Dr Edson Nakagawa, Dr Nabil Noui-Mehidi, Dr Claus Otto, Dr Phil Schmidt and Dr Tara Sutherland.

The One-CSIRO Award (runner-up) was awarded to the ICT Centre for a coordinated series of One-CSIRO activities for promoting CSIRO to the ICT Industry at CeBIT Australia 2006.

Team leader: Mr Tom McGinness

Significant contributors: Mr Daniel Legovich and Ms Philippa V'landys.

Look Out!!! Award

The Look Out!!! Award was awarded to Dr Peter Manins, Marine and Atmospheric Research, for his work in helping to raise the standard of air quality impact assessments in New South Wales, in particular those relating to road and tunnel designs, by drawing attention to the much more advanced modelling tools of CSIRO.

Partnership Excellence

The Partnership Excellence Award was awarded to the SARS team, Livestock Industries, for outstanding achievement in the growth of a rapid-response global research partnership which has been instrumental in discovering the source of the SARS virus.

Team leader: Dr Linfa Wang

Seminal contributor: Dr Bryan Eaton

Significant contributors: Mr Gary Crameri, Ms Jennifer McEachern and Ms Meng Yu.

Occupational Health and Safety Achievement Awards

The Occupational Health and Safety Achievement Award was awarded to the Livestock Industries Team for the team's contribution to developing a safety culture amongst their peers by effectively demonstrating that exposure to two significant laboratory hazards could be minimised without the scientific rigor of their research being compromised.

Team leader: Dr Russell Lyons

Significant contributors: Mr Carl Davis, Dr Aaron Ingham and Mr Tony Vuocolo.

The Occupational Health and Safety Achievement Award was awarded to the Gas Safety Project team, Minerals, who designed and implemented a Gas Safety Project to support the CSIRO HS&E Network and Corporate Property in meeting compliance with compressed gas use and installations in CSIRO projects and facilities. The project has contributed towards better managing gas safety risks in a well-informed, timely and cost-effective manner. Team leaders: Mr Peter Steeden and Dr Angelica Vecchio-Sadus.

Significant contributor: Dr Bart Follink

The Occupational Health and Safety Achievement Award (runner up) was awarded to Mr Michael Hauptmann, Plant Industry, for the development of highly effective tools to control the risk of occupational overuse injuries in laboratory staff.

Environmental Achievement

The CSIRO Environmental Award was awarded to the Textile and Fibre Technology team for the implementation of a Water Recycling Project which has reduced water consumption at the Belmont site by approximately 20 per cent.

Team leader: Mr Rod Howard

Significant contributors: Mr Darren Pearson and Mr Philip Voigt.

Service from Science Awards

The Service from Science Award was awarded to the Virtual Critical Care Unit (ViCCU®) for the research, development and technology transfer of the ViCCU®, a transformational delivery outcome for healthcare.

Team leader: Dr Laurie Wilson

Seminal contributors: Mr Steve Broadhurst, Dr Patrick Cregan, Ms Rosemary Hollowell, Mr Alex Krumm-Heller, Dr Terry Percival, Mr Robert Shields and Dr Stuart Stapleton.

Significant contributors: Mr Tony Adriaansen, Mr Keith Bengston, Ms Susan Hansen, Mr Alija Kajan, Mrs Jane Li, Ms Monique Murphy, Ms Teresa Pun, Dr Craig Russell, Mr Robert Shaw, Mr Dave Smith, Mr Bob Tyler and Dr Rong-Yu Qiao.

The Service from Science Award was awarded to the MoISAR Technology Development Team, Molecular and Health Technologies, for the development of a robust modelling tool for the pharmaceutical and allied industries. It has been evaluated by a major multi-national corporation, Bio-RAD, who have licensed it.

Team leader: **Dr David Winkler** Seminal contributor: **Dr Frank Burden** Significant contributors: **Dr Mitchell Polley** and **Dr Paul Savage.**

Other contributors: Mr Richard Aarons, Mr Rajiv Cabraal, Dr Geoff Houston and Ms Emma van Haaster.

Go for Growth Award

The Go for Growth Award was awarded to Dr Allan Green (Plant Industry) and Dr Surinder Singh (Food Futures Flagship), for developing a leading international plant oils research group, generating nutritionally-improved food oils and novel industrial oils to underpin future growth and diversification of the Australian oilseeds industry.

John Philip Award

Dr Tim Muster (Manufacturing and Materials Technology) and **Dr Glenn Wilson** (Exploration and Mining) were both awarded a 2006 John Philip Award for the Promotion of Excellence in Young Scientists.





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Section 2 Performance against our strategic objectives

Performance against our strategic objectives

This section provides a comprehensive report on CSIRO's performance against the strategic goals and objectives articulated in CSIRO's Strategic Plan 2003–07 and the activities described in CSIRO's Operational Plan for 2006–07.

Goal I – Focusing our science investment

CSIRO contributes to the National Innovation System in a unique way in that we deliver integrated science solutions that help drive national innovation. We continue actively to focus our efforts so as to maintain our competitive standing for quality and scale and to maximise our impact in areas aligned with the National Research Priorities (NRPs). The National Research Flagships are our key delivery mechanism for Australia's most important and complex challenges and opportunities. Flagships ensure Australia can seize opportunities only attainable through large-scale partnerships and investment. Flagships focus CSIRO's and Australia's research efforts in areas of national significance and priority.

1.1 Play a significant role in delivering on Australia's National Research Priorities (NRPs)

Success measures:

- Share of science investment on NRPs
- Evidence of impact on NRPs

As Australia's largest publicly funded research agency, it is appropriate that CSIRO's research is closely aligned to the specific goals associated with the NRPs. CSIRO signalled strong commitment to the NRPs by establishing the National Research Flagships Program in 2003, and during 2006–07 new funding has been secured to further expand the Flagships Program in areas of major national significance (see page 69).

Each year since the introduction of NRPs, the share of CSIRO's total R&D investment directed to NRPs has consistently exceeded 80 per cent. In 2006–07, the estimated alignment to NRPs was 88 per cent, compared with 87 per cent the previous year.

The four national priority areas are: An Environmentally Sustainable Australia; Promoting and Maintaining Good Health; Frontier Technologies for Building and Transforming Australian Industries; and Safeguarding Australia. The achievements reported in Section One of this report include illustrative examples of impacts across each of these priority areas.

1.2 Build critical mass and ensure quality in our core research programs

Success measures:

- Implement the Program Performance Framework for core research
- · Share of programs with critical mass
- Science assessment process (including implementation of recommendations)

CSIRO's research is built on a common Theme-Stream-Project structure that promotes robust planning and strong accountability for performance.¹ Theme level investment is determined through the Science Investment Process (SIP – see page 72), while progress toward Theme Goals is monitored and reported through the Program Performance Framework (PPF), including progress toward specific Annual Performance Goals (APGs) specified at the Stream level. APGs emphasise both scientific milestones and other milestones (eg the development of relationships with delivery partners) that are required for successful achievement of stream objectives and theme goals.

The combined application of the PPF and SIP has seen a significant movement of resources within and between programs, the result being a smaller number of larger, more robust and better focused research programs that are contributing to CSIRO's goal of delivering excellent science with an effective 'path to impact'.

2

See glossary page 217 for definition of themes, streams and projects.

In accord with its Triennium Funding Agreement for 2004–07, CSIRO has also developed and implemented a rolling program of Divisional science assessment reviews. This robust, rigorous and independent process of assessment is integrated with the Australian Government's Quality Framework for Publicly Funded Research. It involves peer review of each Division's science capabilities by independent experts, from both Australia and overseas.

The keystone of the review process is the testing by the review panel of each Division's: self-assessment of its research capabilities; the scientific skills and infrastructure underpinning these capabilities; and, the feasibility of achieving the agreed and documented Theme outputs and outcomes. Findings are examined by the Executive Management and the CSIRO Board, together with a response plan, and there is follow-up examination of post-review implementation after 12 months. Results of reviews undertaken to date have affirmed that CSIRO's science is conducted to a very high standard with effective linkages to relevant industry and community groups.²

Five Divisions were reviewed during 2006–07 (Plant Industry, Textile and Fibre Technology, the Ensis joint venture, the Australia Telescope National Facility and the ICT Centre). Actions implemented in response to earlier Divisional reviews include:

- Five senior ecologists and associated support staff have been appointed in CSIRO Sustainable Ecosystems to build science leadership in ecology.
- In CSIRO Livestock Industries research in onfarm food safety has been reduced and the microbiological part of the work redirected into a strong gut microbiology group built around a newly appointed CSIRO Science Leader. Dr Mark Morrison.

- CSIRO Molecular and Health Technologies has established a Science Council as a mechanism to support and enhance science and research capability development. The Council includes the Division's four Federation Fellows and a CSIRO Fellow.
- Research on packaging materials in Food Science Australia has been reduced and collaboration with other parts of CSIRO increased.

The findings of the reviews have also influenced the development of a number of organisationwide initiatives, such as the Chief Executive Officer's (CEO) Science Leader Scheme and extension of the CSIRO postdoctoral scheme, aimed at maintaining and enhancing CSIRO's science excellence (see page 72, Section 2.1).

1.3 Champion National Research Flagships to improve the lives of Australians and advance Australia's key industries

Success measures:

- Flagship Programs operating successfully
- New and developing partnerships with external parties
- Proportion of Flagship Annual Performance Goals (APGs) achieved
- Total external revenue and share of appropriation funding in Flagships
- Adoption and impact of Flagship Program outbuts³

The Flagships consolidated their position during 2006–07 as a significant and successful model for addressing national challenges critical to Australia's future.

The Flagship initiative was reviewed by a largely external panel (led by Professor Robin Batterham, former Chief Scientist) in late June 2006. In their report, released in October 2006, the panel concluded that 'the

The assessment ratings use a five-point scale from 'benchmark' to 'weak' on two dimensions – research community impact and industry/community impact. The vast majority of capabilities have been assessed as favourable, strong or benchmark on both dimensions, with only a small minority assessed as tenable or weak on either dimension.

See 'Section 1: Performance – Delivering impact from our science' (pages 11-49) for selected achievements.

2

Flagships offer the most promising mechanisms yet to drive large-scale activity addressing Australia's National Research Priorities in a collaborative, cooperative and intensively managed manner.' The findings of the Flagship review are supported by independent analysis commissioned by CSIRO from economic assessment company ACIL Tasman, which indicated that a selection of activity in just a small sample of Flagship research areas has created options conservatively valued in excess of \$1 billion in a relatively short time as a result of work already done.

Building on this successful model, the government announced in its 2007 budget that additional funding of \$174 million over four years would be provided for three new Flagships (Climate Adaptation, Niche Manufacturing and Minerals Down Under) and for the significant expansion of Energy Transformed and for the Flagship Collaboration Fund.

Despite some initial delays with negotiations for Collaboration Fund activity (particularly clusters and projects), there is now a range of work underway and a number of strong relationships have been built between CSIRO and universities. As at June 2007, approximately \$50 million had been committed.

The Fund facilitates the involvement of the broader research community in addressing the major national challenges targeted by the Flagships. As the main component of the Fund, the clusters account for the majority of funding, supporting significant three-year partnerships which bring a range of researchers together to work on a collection of projects relevant to a Flagship's goals. Co-investment from partner organisations is expected, creating collaborative partnerships of significant scale.

Nine clusters were established in 2006–07, involving 21 universities, two CRCs and a number of other publicly-funded research agencies. The first round of clusters was launched in late 2006 with the support of approximately \$17 million from the Fund, plus significant contributions from partners. Four Australian Research Council Federation Fellows are involved in

leading these first clusters, which cover areas of research as diverse as preventing Alzheimer's disease, hydrogen generation and storage, the identification of bioactives in food science and the management of iconic Australian areas such as the Murray Mouth in South Australia and Ningaloo Reef in Western Australia. Launches for the second round clusters commenced in May 2007 with the launch of the Water for a Healthy Country Flagship's Advanced membrane technologies for water treatment research cluster at Victoria University. The remaining second round clusters (and the first of the third round clusters) will be established in the second half of 2007.

In addition to the clusters, 19 Collaboration Fund projects are now underway. Nine visiting fellowships have been completed, and another seven have commenced. Eighty Flagship postgraduate scholarships had been awarded to students co-supervised by university and CSIRO staff. The independent Flagship review found that the Fund had already 'helped forge stronger links with universities', 'engaged some of Australia's best and brightest scientists with the Flagships' and provided 'significant potential to enhance Flagship outcomes'.

The Flagships have also forged strong links with industry partners. Over 350 industry partners and research collaborators have been involved with Flagships to date. While external revenue for 2006–07 was \$5.6 million below budget at \$35.7 million (up 30 per cent from \$26.8 million in 2005–06), external in-kind support, such as use of a partner's facilities and research expertise, was strong (estimated at \$29.6 million for the year). This has meant that progress towards the Flagships' long-term objectives has not been adversely impacted by the revenue shortfall, with 72 per cent of Annual Performance Goals being achieved in 2006–07⁴. Flagship funding grew from 24.2 to 26.5 per cent of CSIRO appropriation (inclusive of corporate overheads), further progressing towards our long-term goal of 30–40 per cent of resources devoted to Flagship Programs.

This is consistent with previous years and with the level of 'stretch' involved in Flagship goals.
World leading researchers collaborate for Alzheimer's study

CSIRO's Flagships Collaboration Fund has enabled the establishment of the Australian Imaging Biomarker and Lifestyle (AIBL) Flagship Study.

The \$10 million study aims to improve understanding of the causes and diagnosis of Alzheimer's disease, examine lifestyle and diet



Dr Renae Walsh examines samples for loading into the Surface Plasmon Resonance instrument to measure protein-protein interaction. Photo: David McClenaghan

factors that may influence the onset of Alzheimer's and help develop preventative strategies.

Every week about 1000 Australians are diagnosed with dementia, a disease which costs Australia about \$6 billion annually. Approximately 80 per cent of dementia is caused by Alzheimer's disease.

According to research prepared for Alzheimer's Australia by Access Economics, the number of Australians with dementia is rising exponentially and is expected to exceed 730 000 (almost 3 per cent of the projected population) by 2050.

Tackling this issue, the Preventative Health National Research Flagship established AIBL in conjunction with partners from the University of Melbourne, Edith Cowan University, Neurosciences Australia and the Mental Health Research Institute of Victoria.

AIBL brings together researchers from a variety of disciplines across Australia, linking leading-edge science on Alzheimer's disease with human population studies and data. It will integrate expertise in neuroimaging, biomarkers, neuropsychology, and lifestyle.

Approximately 1000 participants aged over 60 are being recruited from Victoria and Western Australia ranging from healthy volunteers to people diagnosed with early stage Alzheimer's disease.

The study will help researchers develop and confirm a set of diagnostic markers, biomarkers and neuropsychological patterns that can be used to objectively monitor disease progression and to develop hypotheses about diet and lifestyle factors that might delay the onset of Alzheimer's disease.

1.4 Increase the impact of major cross-Divisional activities through a focused strategic investment process

Success measures:

- Major cross-Divisional programs operating successfully⁵
- Tender to become operator/manager of the Australian Synchrotron

The second implementation of CSIRO's Science Investment Process (SIP) commenced with an update and clarification of the Broad Science Directions (see page 106) in September 2006. The subsequent process of Theme development, assessment and iteration was modified in light of the findings of a post implementation review and to support CSIRO's move to a matrix form of organisation. The process has encouraged further cross-Divisional collaboration, such that over 50 per cent of research Themes considered at the Theme review stage now have more than one Division involved. For example, proposals submitted for the new Agricultural Sustainability and Sustainable Cities initiatives involved seven and three Divisions respectively, bringing together capabilities across Divisions to address national issues.

CSIRO's bid to operate the Australian Synchrotron was not successful.

Goal 2 – Delivering world-class science

CSIRO is committed to delivering outputs and solutions that create value for Australian industry and communities. In an increasingly competitive world, this requires CSIRO to be internationally well-connected and respected for its scientific leadership. Disciplined project management is also vital to successful delivery. We recognise that our people are the key to our international reputation for world-class science, and we will continue to build and foster a world-class team of scientists.

2.1 Concentrate people processes on developing, attracting, exciting and retaining talent

Success measures:

- Staff satisfaction index; Staff commitment and engagement (Insight survey)
- Number of postgraduate students, postdoctoral fellows and Federation Fellows

Throughout 2006–07, staff were surveyed using a range of polls and face-to-face feedback meetings including the Research Support Services post implementation survey, Internal Communication survey, Enterprise Feedback Network, Change Partners and Strategy in Action Workshops. This extensive and direct engagement of many hundreds of staff has provided valuable feedback that has been used to fine tune the communication and implementation of our strategy. As previously reported, the last full Insight Survey was conducted by International Survey Research (ISR) in 2005 and CSIRO's Staff Satisfaction Index was 67, which compares favourably with ISR's Global R&D Norm (63) and Australian National Norm (also 63). The combined result for Staff Commitment and Engagement was 152 compared with a target of 156 (the baseline result from the first Insight survey in 2002). It is anticipated that the next full CSIRO Insight survey will be conducted in late 2007.

In order to perform world-class science, CSIRO must continue to retain, develop and recruit world-class scientists. Exceptional scientists ensure CSIRO's future and enhance our ability

⁵ See 'Section 1: Performance – Delivering impact from our science' (pages 11–49) for selected achievements.

to contribute to the prosperity and wellbeing of Australia. As one component of these efforts, the new CEO's Science Leader Scheme aims to attract up to 25 of the best young scientists from across the globe over the next three years and to provide them with resources and flexibility to allow them to deliver outstanding scientific impacts.

The scheme's emphasis is on mid-career scientists in research areas that complement or extend CSIRO's core research areas. Nine CEO Science Leaders have been appointed during 2006–07.

CSIRO is host to many visiting researchers in any given year. Building upon this, a new Distinguished Visiting Scientist Scheme provides support for leading researchers in their field to come and work in CSIRO, normally for a period of six to twelve months. During this period they carry out an agreed research program with a CSIRO team

and deliver a number of seminars. During 2006–07, eleven Distinguished Visiting Scientists received sponsorship to come to CSIRO.

CSIRO Fellows are exceptional scientists who have displayed eminence in a significant field of science or engineering. As part of the continuing strategy of increasing emphasis on high-quality science in CSIRO, the CSIRO Fellows play a key role in mentoring and supporting programs to both develop and help attract more young scientists. Seven new CSIRO Fellows were appointed in February 2007, taking the total to ten.

CSIRO's postgraduate scholarship program provides opportunities in science and engineering for outstanding graduates who enrol at Australian tertiary institutions as full-time postgraduate students for research leading to

Table I: Number of students supervised and sponsored, and number of postdoctoral fellows
employed by CSIRO

Sponsored ^(a)	2002–03	2003–04	2004–05	2005–06	2006–07
PhD	179	219	232	259	256
Masters	4	3		8	4
Honours		13	2	10	16
Total sponsored	194	235	245	277	276 ^(b)
Supervised ^(a)	2002–03	2003–04	2004–05	2005–06	2006–07
PhD	425	464	463	352	582
Masters	48	46	32	40	31
Honours	62	56	43	31	61
Total supervised	535	566	538	423	674 ^(c)
With CRCs	111	126	126	111	132
Postdoctoral fellows ^(d)	2002–03	2003–04	2004–05	2005–06	2006–07
Postdoctoral fellows	207	259	283	290	294

(a) As at 31 May each year. A student may be either sponsored or supervised or both. The total number of individual students sponsored and/or supervised as at 31 May 2007 was 708. See glossary page 217 for definition of sponsorship and supervision. (b) Includes 65 students fully sponsored and 211 students partially sponsored by CSIRO. (c) A significant proportion of the reported increase in 2006–07 is due to improved data collection. (d) As at 30 June each year.

are co-supervised by a university, allowing students to maintain and develop their university connections while being exposed to research in a working environment. Table 1 demonstrates that CSIRO's continuing commitment to postgraduate training, in partnership with university colleagues, remains very strong. In addition to these programs, there was enthusiastic response to the establishment of a corporate PhD scholarship program during the year. Twelve candidates have been appointed to date and a further 20 scholarships will be offered in 2007-08. In addition, CSIRO employed 122 vacation students and 142 industrial trainees during the year.

2.2 Optimise delivery of all research activities by improving project management

the award of a PhD. PhD students at CSIRO

Success measures:

- Customer assessment of CSIRO 'Process and Peoble'
- · Proportion of projects completed on time, on brief and on budget
- · External/internal audit findings on project management practice

CSIRO established a Project Leadership Initiative (PLI) in mid-2005 to identify, recommend and implement approaches to improve project leadership across the Organisation. Over a three-to-five year timeframe, PLI aims to address the wide variation in project leadership and management practices, to improve our skills in working across boundaries and to ensure that CSIRO is well-placed to deliver even greater impact from our research investments.

The focus for 2006–07 was on the Foundations training program which was successfully implemented in five Divisions in late 2006 and will be implemented in the remaining Divisions between April and December 2007. Feedback from participants has been consistently positive. This experiential and interactive learning program provides foundational project leadership skills and communicates new organisational structures to people leading projects. The enduring output is a collaboratively developed project leader role statement and learning program that meets the needs of people working in projects and the new operating environment.

An external assessment of attributes relevant to project management is provided through CSIRO's Customer Value Survey (CVS). The most recent results are shown in Table 2.

Attribute (a)	2003–04	2004–05	2005–06	2006-07 (b)
Product and service				
CSIRO score	7.7	7.1	7.1	7.5
Comparative score	109	104	105	n/a
Process and people				
CSIRO score	7.5	7.1	7.0	7.1
Comparative score	108	105	104	n/a

Table 2: Customer assessment of CSIRO's performance: quality attributes

(a) See the glossary page 216 for a guide to the interpretation of CVS scores. (b) In response to customer feedback, changes were made to the survey instrument and methodology in 2006–07 to improve analysis and interpretation. As a result, the data for 2006–07 are broadly, but not directly, comparable with previous years. There were insufficient data to calculate a comparative score.

Table 3: Project Management Index

Year	2003–04	2004–05	2005–06	2006–07
Project Management Index ^(a)	85	85	78	72

(a) A lower score indicates better compliance with project management policy.

While there were no formal organisation-wide audits of project management during 2006-07, there was a six point improvement in project management practices as measured by CSIRO's project management index (Table 3). The index covers aspects of financial management, appropriate use of information systems, cost attribution and project management training.

2.3 Build our global recognition for leadership in our chosen science domains

Success measures:

- Number of publications by type
- Citations of publications
- Number of publications, excluding client reports, per research scientist/engineer

CSIRO continues to maintain its influence as a world leading scientific institution through the quantity and quality of its scientific publications. Publication output increased by nearly six per cent in 2006 compared with the previous year, continuing the strong trend increase over the past six years (Table 4). This included a 13 per cent increase in the number of published journal articles. The number of publications per research scientist also continued to increase. In addition to these publications, the number of reports delivered to clients rose by 25 per cent over the previous year.

Over the period 2003 to 2007 the average rate at which CSIRO's papers are cited, a critical measure of the impact of our science, has increased from 9.18 citations per paper (cpp) to the current rate of 11.09 cpp. This exceeds the average citation rates for Australia (9.48 cpp) and the world (8.75 cpp). Although citation rates generally have increased over time, CSIRO's rate of increase in citations per paper is greater than the average rate of increase for Australia and for the world.

Type of publication ^(a)	2001	2002	2003	2004	2005	2006
Journal articles	1631	1686	1836	1858	1945	2198
Conference papers	1096	1142	1428	1713	1852	1830
Technical reports	153	240	442	277	620	676
Books and chapters	128	223	240	267	238	227
Total	3008	3291	3946	4115	4655	4931
Publications per research scientist/engineer ^(b)	1.98	2.11	2.49	2.58	2.92	3.00
Client reports	9324	10 486	8451	8242	10 774	13 455

Table 4: CSIRO publications and reports (number in each calendar year)

(a) See glossary page 216 for definition of publication types. (b) Number of publications per full-time equivalent research scientist/engineer.

Amongst Australian institutions that publish across a broad range of research fields, and ranked by citations per paper, CSIRO (11.09 cpp) is a close second to the ANU (11.42 cpp). Worldwide, CSIRO remains in the top one per cent of leading scientific institutions in 13 research fields based on the total number of citations to papers published in these fields. CSIRO has retained its ranking amongst the world's top ten institutions in three fields: plant and animal sciences; agricultural sciences; and environment and ecology.⁶

CSIRO's scientists have also maintained a consistently high-level of publication numbers in prestigious journals such as *Nature* (and its affiliates), *Science* and the *Proceedings of the*

⁶ Institute for Scientific Information (ISI) Web of Knowledge, July 2007 National Academy of Sciences of the United States of America. Almost 80 such articles have been published since 2002.

Transformational biology has been identified as a key area for CSIRO to focus and develop a strong science platform. During the year, CSIRO hosted a workshop to explore international trends in transformational biology, its impact on science today, and to inform the scope and strategy for development of a worldclass enterprise-wide platform. The workshop involved ten overseas speakers in addition to Australian experts. \$3 million has been allocated through the Science Investment Process towards building of the transformational biology platform in 2007–08.

Data pertaining to CSIRO's portfolio of patents and related intellectual property are shown in Table 5.

Category ^(a)	2002	2003	2004	2005	2006	2007
Inventions (patent families)	733	779	754	745	780	734
New inventions	80	92	89	79	134 ^(b)	84
Current PCT applications ^(c)	104	90	92	95	74	91
Granted patents	1801	2002	2079	2048	2113	2067
Live patent cases	3537	3965	3961	3919	4084	3922
Australian trade marks	262	287	290	306	281	287
Foreign trade marks	84	93	92	100	91	104
Australian plant breeder's rights	65	62	77	80	113	119
Foreign plant breeder's rights	17	17	17	21	17	25
Australian registered designs	8	5	3	3	2	3
Foreign registered designs	9	12	12	12	12	12

Table 5: CSIRO intellectual property (number as at 30 June each year)

(a) See glossary page 216 for definitions of patents and inventions. (b) Of the 134 provisional applications in 2006, 45 were multiple applications filed in support of several inventions and these will ultimately finish up as one or two patent families. Therefore, the number of inventions for the purpose of comparison to previous years is approximately 90. (c) Patent Cooperation Treaty applications.

2.4 Help Australia play a leadership role in major international science facilities such as the Square Kilometre Array

Success measures:

- Australian engagement in the Square Kilometre Array (SKA)
- · Initiatives to establish international science facilities

Along with Southern Africa, Australia is one of the two short-listed sites for a mega science project known as the international Square Kilometre Array (SKA). This radio telescope will be 50 times more powerful than any existing radio telescope and is needed to address some of the most fundamental questions in contemporary physics. CSIRO, through the Australia Telescope National Facility (ATNF), is taking a lead role in managing Australia's R&D for the SKA. Australia's bid to host the SKA received a boost from the Australian Government in May 2007 with the allocation to CSIRO of \$51.7 million over four years for research on the innovative Australian SKA Pathfinder radio telescope. This will assist Australia maintain its world-class standing in astronomy and further enhance Australia's strong case for hosting the SKA. Negotiations are continuing with the WA State Government for the SKA core to be located at a site in the Murchison region of mid-west Western Australia, and a CSIRO officer from the ATNF has been seconded on a part-time basis into the Department of Education, Science and Training to provide advice on SKA-related matters. Strong engagement also continues with the international SKA scientific community (see page 34).

Goal 3 – Partnering for community impact

Partnerships allow us to have impact where our efforts alone are insufficient. They also allow us to impact a much broader constituency of communities. CSIRO puts a high value on partnerships and taking a 'Team Australia'

approach to creating community impact. Our approach is to concentrate on increasing the impact of selective partnerships with Cooperative Research Centres (CRCs) and universities, increasing our engagement in a meaningful way with government to impact policy, partnering with agencies to contribute to the global agenda, and continuing to encourage an informed community through our interactions with the public.

3.1 Focus and intensify collaboration with universities, Cooperative Research Centres (CRCs) and other agencies

Success measures:

- Partnerships focused on clear strategic goals
- · Co-location of new facilities
- Feedback from collaboration with universities, CRCs and other agencies
- · Quality of CRC commercial engagement

CSIRO has numerous collaborative mechanisms in place to enhance research delivery, including our formal joint venture arrangements with the Victorian Government (creating Food Science Australia) and with the New Zealand forest research agency Scion (creating Ensis). These joint ventures build a more competitive and effective capability in Food Science and Forestry Research. In accordance with the existing joint venture agreement, CSIRO and Scion are currently looking at ways to further improve this important trans-Tasman collaborative relationship.

CSIRO continues to be committed to the CRC program. CSIRO is the largest single participant in the program, and during 2006–07 was a participant in 37 of the 56 currently active CRCs. Of these 37, CSIRO was a core participant in 34 CRCs, a supporting participant in two CRCs and an affiliate participant in the other. Further details are provided in Note 25 to the Financial Statements (see page 175).

The establishment of the CRC Engagement Office has provided a senior executivelevel conduit between CSIRO and the CRC community, together with an increased focus on the management and governance associated with CSIRO's CRC involvement. Feedback from the CRC community has been positive in terms of clarifying CSIRO's engagements with CRCs, strengthening the relationship with key stakeholders and providing a conduit for issues management.

The Flagship Collaboration Fund is specifically targeted at promoting collaboration with universities and other publicly funded research agencies. Activity levels grew strongly during 2006–07, as reported in Section 1.3 (see page 69). Additional funding received in the May 2007 Federal Budget means that, over the next four years, \$17.5 million will be invested in expanding the existing Flagship Collaboration Fund to provide for more postgraduate scholarships, visiting fellowships and contestable collaborative research programs. A further \$26.4 million will be invested in creating a Flagship Collaboration Innovation Talent Ladders program, and \$21.0 million will be invested in creating the Flagship Collaboration Smart Small and Mediumsized Enterprises (SMEs) Program. For more information on the Flagship Collaboration Fund visit: www.csiro.au/org/ FlagshipCollaborationFundOverview

Some selected highlights of partnership and colocation activity during the year include:

• CSIRO and the Bureau of Meteorology are working together to establish a national centre for climate change research that will bring the two agencies' climate and atmospheric research capabilities together to significantly increase Australia's earth/climate system modelling capability. Over the next ten years it will provide new generation models for Australia and improved operational products for government, industry and the community. A Heads of Agreement was signed in March 2007 and the Centre will commence in the 2007-08 financial year.

- The Western Australian Marine Science Institution (WAMSI) has been established to underpin the conservation and sustainable management of Western Australia's marine environment and resources. A Heads of Agreement was signed with the WA Government in March 2007, enabling the formal commencement of this new 14 partner, five-year investment in marine science (\$21 million from the WA Government and \$50 million from the partners including over \$10 million from CSIRO). CSIRO scientists are leading two of the six research nodes. Also in WA, plans for the Waterford Minerals and Chemistry Precinct are progressing well. The precinct will be home to researchers and students from CSIRO, Curtin University, Chemistry Centre (WA government) and will be headquarters of two CRCs (the A | Parker Centre and the Centre for Sustainable Resource Processing), plus the Western Australian offices of AMIRA International.
- In Queensland, CSIRO made further commitments during the year to the consolidation of its research facilities in Brisbane, and entered into a number of other collaborations with the Queensland Government in eHealth, water research. and tropical sciences. CSIRO and James Cook University (ICU) staff are expected to occupy the new state government funded Australian Tropical Forest Institute building in Cairns in late 2007. The building will house the JCU-CSIRO Tropical Landscapes Joint Venture as well as the Queensland-CSIRO Australian Tropical Herbarium. With state innovation funding of \$14 million, planning is also proceeding for a Tropical Science and Innovation Precinct on the JCU campus in Townsville. The building, which will accommodate CSIRO, JCU and Australian Institute of Marine Science (AIMS) staff, is scheduled for completion in 2010.

- Ongoing engagement with Universities Australia⁷ has provided a significant enhancement of understanding and acceptance of the principles under which CSIRO interacts with Universities in respect of intellectual property management arrangements and student supervision. It has also provided increased transparency for access by the Universities into CSIRO through the development of a list of primary CSIRO contact points for each of the 38 Universities.
- National Collaborative Research Infrastructure Strategy (NCRIS) funding of \$8.5 million has been committed to upgrades for the Australian Animal Health Laboratories and will allow external researchers to work within the facility on animal and human disease projects. CSIRO Plant Industry together with the Australian Centre for Plant Functional Genomics (ACPFG) developed a successful bid for a High Resolution Plant Phenomics Centre. There will be two nodes - one in Canberra involving CSIRO and the Australian National University and the other in Adelaide to be run by the ACPFG. NCRIS funds were also committed to the establishment of an online Atlas of Living Australia which will support research and decision-making in areas such as conservation planning, health and education. CSIRO Entomology will be the lead agency for this initiative.

3.2 Service the needs of government for informed policy setting

Success measures:

- Engagement with the federal and state/territory governments (including Parliament and administration)
- · Government satisfaction with CSIRO

CSIRO services the needs of governments for sound scientific research and advice in a number of ways across a wide range of issues, as illustrated by the following examples.

During 2006–07, CSIRO made submissions to 23 parliamentary, government and state inquiries, and CSIRO Officers appeared at five hearings of inquiries. Submissions such as these are an important mechanism for raising the awareness of the science that is available and required for addressing key issues facing Australia. For example, submissions were made to Commonwealth inquiries and reviews in relation to:

- review of industry policy (Department of Industry, Tourism and Resources)
- geosequestration technology (House of Representatives Standing Committee on Science and Innovation)
- review of Australian privacy laws (Australian Law Reform Commission)
- response to the carbon emissions trading issues paper prepared by the Prime Ministerial Task Group on Emissions Trading
- the future development of the Australian Honey Bee Industry (House of Representatives Standing Committee on Agriculture, Fisheries and Forestry)
- Australia's relationship with Malaysia (Joint Standing Committee on Foreign Affairs, Defence and Trade).

Contributions to state government inquiries included submissions in relation to:

- the health impacts of air pollution in the Sydney Basin (Parliament of New South Wales)
- the development and use of alternative fuels in Tasmania (Parliament of Tasmania)
- the impact of public land management practices on bushfires in Victoria (Environment and Natural Resources Committee of the Parliament of Victoria)

⁷ Formerly the Australian Vice-Chancellors' Committee (AVCC). Engagement through the Deputy Vice Chancellors/Pro-Vice Chancellors (DVC/PVC) subcommittee.

• the cause and effect of lead pollution in the Esperance area of Western Australia (Parliament of Western Australia).

In addition to informing the development of policy by providing scientific information, CSIRO participated in debates on the policy settings for science and innovation. In particular, CSIRO met on several occasions with the Productivity Commission team conducting a study into public support for science and innovation, as well as making two submissions to the Commission.

In the context of developing CSIRO's new policy proposals, a coordinated round of meetings took place with government officials to explore the relevance of CSIRO work to their responsibilities. Bilateral and other discussions also take place with departments on specific issues such as nanotechnology.

The Chief Executive is an active member of the Prime Minister's Science, Engineering and Innovation Council and its Standing Committee; and of the Coordination Committee for Science and Technology. In addition, CSIRO officers have contributed to the work of these bodies through their membership of various working groups and sub-committees.

Five 'Science for Breakfast' briefings, hosted by the Minister for Education, Science and Training, were held for parliamentarians at Parliament House during the course of the year. Most breakfast briefings were accompanied by a series of meetings with relevant Departments, individual briefings to parliamentarians and a briefing to Science Attachés and CSIRO staff.

CSIRO continues to engage with Government around our scientific contribution to the development of Australia's water resources policy, for example, by providing significant input to the National Water Commission in relation to current and future water availability in the Murray-Darling Basin region. A senior CSIRO officer also worked on secondment with the Department of Prime Minister and Cabinet in the preparation of the Prime Minister's water agenda and is currently working with the Bureau of Meteorology.

CSIRO Relationship Managers in Queensland, Victoria and the ACT provide ongoing support for a program of engagement between CSIRO executives and senior bureaucrats around research and infrastructure collaboration in these States.

3.3 Enhance communication to raise public and stakeholder excitement and trust in science

Success measures:

- Trust and excitement in science amongst target audiences
- 'The importance of the CSIRO brand name' (Customer Value Survey)
- Recognition of CSIRO's brand
- Establish benchmarks of brand acceptance and strength

CSIRO has established an Enterprise Communication Council and adopted a refreshed Communication Strategy. This aims to better coordinate communication resources and optimise the delivery and impact of CSIRO's science outcomes, achievements and capabilities.

CSIRO Education continues to be one of Australia's largest informal science education providers. Its wide range of programs reach a million Australian students, teachers and families annually, promoting the vital contribution of scientific research to our community, including the role of CSIRO, and also promoting science careers.

The nine CSIRO Science Education Centres (CSIROSECs) engaged over 360 000 students,

teachers and parents, including school visits in metropolitan and regional areas with the Lab on Legs program. CSIRO's Double Helix Science Club grew to over 25 000 members, up from 22 000 in 2005–06, who enjoyed the club's magazines The Helix and Scientriffic and hundreds of club events. The weekly e-newsletter, Science by Email, continues to receive strong positive feedback, especially from teachers, who make up approximately one third of the subscribers. The number of subscribers has now passed 27 000, up from 18 800 in 2005-06.

The BHP Billiton Science Awards have been operating for 27 years and allow school students undertaking research to compete for over \$11 000 in cash prizes and the chance to compete internationally. Innovative science teachers are also rewarded. CSIRO managed the operation of the BHP Billiton Science Awards for the first time in 2007 and a number of developments are now being introduced.

The CSIRO Discovery Centre had 63 000 visitors during the year, up from 51 000 in 2005–06. Discovery offers an interactive journey through CSIRO and Australian science history, entertaining and educating people of all ages about the fascinating world of research and innovation. The Centre also offers education programs for students, plus a cafe, meeting and conference space.

A new visual identity has been developed for CSIRO that provides for a common visual identity applicable across the whole

Table 6: Importance of the CSIRO brand (a)

Organisation, emphasising a unified and more contemporary organisation. The importance of the CSIRO brand name in choosing an R&D provider (Table 6) has been confirmed by results from CSIRO's revamped Customer Value Survey (CVS). The assessment of brand importance has been significantly enhanced in the current survey (previous results were based on a single question).

CSIRO has sought to increase its profile in the community through sponsorship of important science events such as the Eureka Awards and the ABC New Inventors program. The CSIRO National Roadshow, and events such as CeBIT for the telecommunications industry, and the publication of Solve magazine in the Australian Financial Review, have sought to increase awareness and understanding of the Organisation's current capabilities, achievements and industry collaborations amongst customers and stakeholders in industry and government.

Membership of CSIRO Alumni has grown to over 2200 and members keep in touch through a monthly e-newsletter Siroscope, a dedicated website, organised Alumni events, seminars and activities.

Over the past 12 months, CSIRO.au achieved significant progress as an effective communication channel. Visitor traffic, as measured by page views, doubled over the year to four million per month. Published content grew by 60 per cent. Significant improvements

Brand preference	2003–04	2004–05	2005–06	2006–07 ^(b)
CSIRO score	6.8	6.6	6.5	7.3
Comparative score	119	121	17	n/a

(a) Results from CSIRO's Customer Value Survey. See glossary page 216 for a guide to the interpretation of CVS scores. (b) In response to customer feedback, changes were made to the survey instrument and methodology in 2006–07 to improve analysis and interpretation. As a result, the data for 2006-07 are broadly, but not directly, comparable with previous years. There were insufficient data to calculate a comparative score.

were achieved in navigation, stability and usability. CSIROpod was launched on the website in August 2006 and has enjoyed strong and consistent growth. Over 45 short podcasts featuring an interview with a CSIRO scientist about aspects of their latest research have been placed on the CSIRO.au website. In November 2006, CSIROpod hit number one on the Science and Media list of iTunes Australia. Radio Australia is broadcasting the CSIROpod interviews across Asia and NSW Education is using a CD of CSIROpod in schools throughout NSW.

3.4 Partner with other agencies to advance Australia's global development contributions

Success measures:

- Partnerships with other agencies to advance global development
- Level of global aid funding (including from Australia)
- More focused and effective international effort
- Evidence of impacts on global development ⁸

Consistent with the Australian Government's aid and trade objectives, CSIRO has been engaged in over 735 international activities in 68 countries over the past year on subjects ranging from the effect of mine waste on aquatic environments, to improving forestry practices and improving disease detection skills in South-East Asia.

CSIRO frequently works with developing countries, particularly in the Asia-Pacific region, partnering with government departments and agencies including AusAID, the Australian Centre for International Agricultural Research (ACIAR), global funding agencies such as the Asian Development Bank and the World Bank, and other research institutions, foundations and aid agencies.

Some highlights over the past twelve months include:

- CSIRO has been awarded nine projects under AusAID's Public Sector Linkages Program (PSLP) and, following the 'Capacity Building and Surveillance Program for Indonesian Veterinary Laboratories for the detection of Avian Influenza' undertaken through AusAID last financial year, further funding has been approved for two subsequent projects with the same objectives: to provide laboratory training on identification of avian influenza and development of appropriate surveillance programs in Vietnam (\$870 000) and Sulawesi/ West Papua (\$1.8 million).
- CSIRO, AusAID, the World Bank and the Government of Indonesia have formed a research collaboration to assess the likely economic, ecological and social consequences of alternative development pathways in Indonesia.
- A Strategic Partnership between CSIRO and CSIR India was announced by the Minister for Education, Science and Training in June 2007, to be supported by the Australia-India Strategic Research Fund (AISRF). This followed on from an announcement in April 2007 of funding for three projects (improving the chilling tolerance in chickpeas, the protection of chickpeas against Pod Borer and enzymatic degradation of cyclic organochlorine pollutants) and two workshops in Round one of the AISRF program.
- The PhD scheme developed under the Memorandum of Understanding between CSIRO and the Ministry of Education in China

⁸ See 'Section 1: Performance – Delivering impact from our science' (pages 11–49) for selected achievements.

received 51 applications to host Chinese students within CSIRO. Twenty-one Chinese PhD students will be placed in CSIRO over the next twelve months.

CSIRO also remains an active member of the Global Research Alliance (GRA), joining with eight other leading international 'sister' science organisations to leverage our combined capabilities to target the current United Nations' Millennium Goals in water, energy, health, transport and closing the digital divide. Recent GRA activity involving CSIRO has included working with funding agencies such as the Asian Development Bank, the World Bank and AusAID together with Pacific Island representatives, GRA members and potential collaborators on issues associated with vulnerability of water supply in the Pacific, and advising the National Environmental Engineering Research Institute in CSIR India on the scope and terms of reference for the Kalpasar Project in Gujarat in India. CSIRO is also co-leading the development of a GRA proposal for The Wellcome Trust on improving health in rural communities.

Goal 4 – Serving as a catalyst for industry innovation

By focusing on the current and future needs of our industry customers and stakeholders, we are making significant contributions to science and to Australia's economic prospects. Working closely with industry, we see considerable opportunities to deliver enhanced commercial impact for Australian industry, boosting gross domestic product growth. We have sought to work smarter with businesses of all sizes, and have reinvigorated our ICT capabilities in recognition of the importance of these technologies as a cornerstone for the ongoing success of innovation across all industry segments.

4.1 Intensify engagement with rural research and development corporations to grow regional and new industries

Success measures:

- Value of significant commercial relationships with research and development corporations (RDCs) and States: \$10 million threshold
- Revenue from RDCs and Customer Value Survey results for RDCs 9
- Impact of research co-funded with RDCs and growth of targeted regional industries ¹⁰

Two significant collaborative arrangements with key rural industries have been developed during 2006–07.

- A new joint venture between the Grains Research and Development Council, CSIRO Food Futures Flagship and Limagrain Céréales Ingrédients has been established to develop wheat with a modified starch that will provide health benefits when consumed.
- A proposal for a fully industry funded joint venture for cotton between CSIRO Plant Industry and the Cotton Seed Distributors has been developed and approved. This initiative will mean that the cotton industry is now fully funding its own cotton breeding program.

Rural Research and Development Corporations (RDCs) revenues for 2006-07 were \$43.2 million, against \$44.3 million in 2005–06. RDC revenue is down in 2006–07 as a consequence of the severe drought impacting on RDC cashflows from levy payers, and changed priorities for some RDCs. Our top three

There is no statistically relevant differentiation in CVS scores between the different industry categories the CSIRO score for overall value is reported in section 6.3 (page 91).

¹⁰ See 'Section 1: Performance – Delivering impact from our science' (pages 11-49) for selected achievements.

RDC partners (Grains RDC, Australian Wool Innovation and the Cotton RDC) generated \$20.9 million in 2006–07, or 48 per cent of the total RDC segment.

CSIRO's government business segment increased significantly to \$116.0 million for the year, up from \$96.5 million for the previous year. Commonwealth Agencies generated \$66.3 million (up from \$53.1 million last year) and State and Local Government Agencies invested \$31.3 million in CSIRO research (up from \$26.1 million last year). A number of examples of CSIRO's significant engagements with the States, and contributions to State government inquiries, were highlighted in Sections 3.1 and 3.2 respectively, and in the achievement examples in Section 1.

4.2 Structure deeper and more meaningful relationships with large corporations

Success measures:

- Value of significant commercial relationships with large corporations: \$2 million threshold
- Revenue from large companies and Customer Value Survey results for large companies "
- Lifetime value for contracts with large corporations
- Impact of research for large companies ¹²

Co-investment, consulting and services revenue received from the Australian private sector in 2006–07 was \$58.0 million, compared to \$67.6 million in 2005–06. The majority of this yearon-year difference is associated with the planned conclusion of major contracts with six of our major clients. Revenue from larger companies of \$33.5 million met budget expectations for 2006–07 (corresponding income in 2005–06 was \$41.4 million). Countering in part this fluctuation in revenue, the number of clients from all categories contributing over \$1 million increased from 57 to 62, accounting for 64 per cent of total co-investment, consulting and services revenue for the year.

Significant ongoing customers included Bayer, BHP Billiton, Rio Tinto, Australian Coal Research Ltd, Commonwealth Bank, Orica, and Schering Plough. As an additional example of CSIRO's significant relationships with large corporations, researchers from across CSIRO – through the Western Australian Energy Research Alliance (WAERA) and the Wealth from Oceans Flagship - are working with Chevron, one of the world's largest oil and gas producers, on large-scale projects to develop technologies that will increase recovery rates and reduce costs in the development and operation of Australia's offshore gas fields. Australia has considerable gas resources in deep water that require a change in thinking in the design of wells and the implementation of novel downhole and subsea processing technologies. The research alliance provides a multifaceted approach to address the oil and gas industry's long-term research needs.

4.3 Accelerate the growth of promising technology-based Small and Medium-sized Enterprises (SMEs)

Success measures:

- Number of significant commercial relationships with SME growth stars: \$100 000 threshold
- Revenue from SMEs and Customer Value Survey results for SMEs ¹³
- Australian Growth Partnerships

¹¹ There is no statistically relevant differentiation in CVS scores between the different industry categories – the CSIRO score for overall value is reported in section 6.3 (page 91).

¹² See 'Section 1: Performance – Delivering impact from our science' (pages 11–49) for selected achievements.

¹³ There is no statistically relevant differentiation in CVS scores between the different industry categories – the CSIRO score for overall value is reported in section 6.3 (page 91).

- FastTrack contract simplification process
- Impact of research for SMEs 14

CSIRO received additional funding in the 2007 Federal Budget to extend the reach and impact of Flagship collaborations to SMEs. \$21.0 million will be invested over four years in creating the Flagship Collaboration Smart SMEs Program. This will provide resources to better enable SMEs to utilise Flagship technology outputs and provide new pathways for SMEs to participate in the delivery of Flagship goals.

CSIRO has also been pursuing deeper engagement with the Department of Industry, Tourism and Resources, especially in relation to outreach schemes and Action Agendas. In April, CSIRO hosted successful SME industry forums in both Sydney and Melbourne. The purpose of the forums was to engage industry leaders from a diverse range of fields (including aerospace, medical devices, science industry, electronics, advanced manufacturing and the food industries) to form stronger partnerships with CSIRO.

Four new companies, each of which is an SME in its own right, were formed during the year from CSIRO developed technology:

- Carbon Energy Ltd, a company formed to undertake trials of underground coal gasification technology. This company is a joint venture with ASX-listed Metex Resources Ltd.
- Arista Technologies Pty Ltd, a company formed to develop and commercialise high amylose wheat with our partners GRDC and Limagrain Céréales Ingrédients
- HydroPem Pty Ltd, a company formed as part of a transaction with an AIM listed entity to commercialise technology in the area of fuel cells and membranes for electrolytic separation of hydrogen

• T-Mag Pty Ltd, a company formed to commercialise die casting machines in the area of high-quality magnesium parts. Our partners in this venture include three South Australian based SMEs who will contribute marketing and manufacturing expertise as well as cash (see page 25 for more information).

Co-investment, consulting and services revenue received from SMEs was \$19.1 million in 2006–07, up from \$18.3 million in 2005–06. During 2006–07, CSIRO had relationships with 41 SMEs that generated over \$100 000 each, compared to 45 in 2005-06, and these 41 clients generated more than 60 per cent of overall SME earnings.15

The total number of SMEs that we have had interactions with during the year has remained almost constant as compared to last year, at around 1250.

4.4 Reinvent our ICT capabilities to strengthen Australia's knowledge-based industries

Success measures:

- ICT Centre collaboration across CSIRO
- Demonstrated impact in ICT research

In 2006–07, the CSIRO's ICT Centre participated in all six Flagship programs, three major cross-Divisional initiatives (Secure Australia, Terabyte Science and Minerals Down Under) and worked actively with other CSIRO Divisions. Of particular relevance is the Centre's research in wireless sensor networks, which feeds into the Energy Transformed, Food Futures and Water for a Health Country Flagships.

The ICT Centre again exceeded its external earnings target for the year, and its research continues to deliver considerable impact to

See 'Section 1: Performance – Delivering impact from our science' (pages 11-49) for selected achievements.

¹⁵ Re-classification of customers during the year means that the 2005–06 figures are not the same as those reported in the 2005-06 annual report.

Australia and around the world. Significant outcomes in addition to those reported in Section I include:

- Wireless technology for through-the-rock underground mine safety communications has been licensed to Australian SME Mine Site Technologies Pty Ltd. The technology will reinforce Australia's position as the world leader in mining communications systems.
- Product development and engineering support technology for the Virtual Critical Care Unit (ViCCU[®]) has been licensed to an Australian SME, Promim Pty Ltd. Promim will provide ongoing support to CSIRO's commercialisation partner Telstra in its future sales of ViCCU[®].
- Mining automation technology of Load Haul Dump (LHD) vehicles licensed to Caterpillar has reached a critical milestone in unmanned operations performance in underground mining environments. The technology which enables unmanned high-speed operation of vehicles is now being deployed in mines throughout Europe and Australia.
- Mining automation technology for load explosive emulsions is proceeding to Phase II trials with Orica Ltd. The Autonomous Operational Charging (AOC) control system allows the operator to work remotely away from the extremely hazardous areas at the rock face that are under drilled blast holes.

Goal 5 – Building One-CSIRO capability and commitment

To address major national challenges and opportunities more effectively, CSIRO must leverage its scale and scope through effective multidisciplinary and cross-boundary teamwork. This teamwork enables CSIRO to identify and exploit new opportunities across conventional boundaries. We call this 'One-CSIRO'. Areas of particular focus include aligning our

performance management framework across the Organisation; developing improved access for, and responsiveness to, our top clients; encouraging cross-discipline interactions to generate breakthroughs in science; and improving our internal processes and information technology systems which allow us to collaborate and operate effectively as one enterprise.

5.1 Stimulate future breakthroughs by promoting cross-pollination, especially in frontier research

Success measures:

• Establish an Emerging Science Initiative (ESI) including implementation of the Program Performance Framework

Six cross-cutting science programs that commenced during 2005-06 were again supported through the ESI in 2006–07. These programs involve staff from multiple CSIRO Divisions:

- cellular re-programing to develop high value products for Australian agriculture and health industries
- synchrotron science: extreme chemistry and environmental science
- synchrotron science: high resolution structure determination of integral membrane proteins
- hierarchical material structures: creating novel 3-D porous particulate systems by developing combinatorial and high throughput methodologies
- environmental nanovectors
- synthetic enzymes for synthetic chemistries.

No new programs were launched during 2006-07 as the efficacy of the ESI was reviewed in light of broader science excellence and

talent development initiatives as well as the impact of the modified Science Investment Process (SIP). Over 50 per cent of CSIRO themes supported through SIP this year were multidivisional, further increasing cross pollination in frontier research. In addition, teams have been tasked with the development of crossorganisational and cross-discipline strategies to ensure that CSIRO remains at the very frontiers of scientific endeavour in four platform capabilities: Transformational Biology; Advanced Materials; Sensor Network Technologies; and Computational and Simulation Sciences.

5.2 Be among the best in governance, Health, Safety and Environment (HSE) and performance management processes

Success measures:

- Improved H&S injury indicators and positive performance indicators
- Improved safety culture
- Management of performance and Annual Performance Agreement (APA) completion rates (Insight Survey results) 16
- Implementation of the Performance Measurement Framework
- Improve governance processes in commercial area

A detailed report on CSIRO's health, safety and environment initiatives and key performance indicators can be found in Section 3 (pages 114-119). CSIRO's governance framework, and minor changes implemented in 2006–07 to support the government's response to recommendations of the 'Review of Corporate Governance of Statutory Authorities and Office Holders' (The Uhrig Review), also are described in Section 3 (pages 96-109).

CSIRO's Performance Measurement Framework continues to provide the basis for comprehensive reporting to the Executive Team and the CSIRO Board three times per year. The framework has been updated during the year to incorporate a set of measures which will be used to track implementation of the 2007-2011 CSIRO Strategic Plan with particular reference to impact, science, relationships and resources.

In the commercial area both the Commercial Executive Committee (ComEx) and the Board Commercial Committee continue to function effectively in the provision of advice on major R&D and commercialisation transactions. ComEx reviews all major commercial transactions at the planning stage before they can proceed to final contract negotiation and execution. The scope of transactions covers funds coming into CSIRO, funds being invested by CSIRO, and other major intellectual property, infrastructure and relationship transactions. ComEx meets approximately 18 times per year and during the past year 82 transactions were reviewed.

The Flagship Oversight Committee plays an important role in ensuring sound governance of the National Research Flagships, while the Flagship Advisory Committees provide an important mechanism for the input of advice on research directions and Flagship performance.

5.3 Adopt a unified approach to improve service dramatically and grow top accounts

Success measures:

• Number of active customer service teams

· Increased amount and share of research and services revenue from top five accounts

Following approval of a revised business development (BD) strategy (see Section 6.3, page 91), two senior executive roles reporting to the Executive Director, Business Services have

¹⁶ There was no Insight Survey undertaken during this reporting period.

Performance Strategic objectives

2

been put in place; one focused on support for major client and partner relationships and one focused on support for major transactions.

Operation of the Business Development Council, created in 2005–06, has led to a greater focus on cross-enterprise engagement with BD-related activities, and improved networking within the Organisation's business development community. An outcome of this has been that more client and partner engagements are taking place with a stronger One-CSIRO approach. Benefits to clients and partners include a more consistent engagement with CSIRO, clearer routes into the Organisation, and less time and effort spent on finding the appropriate capability or technology.

These engagements span the major research collaboration programs - such as the CRCs, the National Collaborative Research Infrastructure Strategy (NCRIS) and Commonwealth Environment Research Facilities (CERF) - as well as approaches to RDCs such as GRDC, major Australian Government contracts (for example, the contract from the National Water Commission to report on current and future water availability in the Murray-Darling Basin region), and multiple engagements with the private sector.

All the information and tools associated with commercialisation, legal, marketing, IP management, commercial operations and contract administration that staff need to engage with clients and partners has been consolidated into one Intranet site - the 'Client and Partner Engagement Centre' - facilitating access by staff to the right information, policies and procedures and hence increasing the likelihood of a more professional and consistent experience for clients and partners.

The number of clients contributing over \$1 million increased from 57 to 62, accounting for 64 per cent of total co-investment, consulting

and services revenue for the year with the top five customers contributing 16 per cent of revenue (compared to 19 per cent in 2005–06).

5.4 Implement standard processes and Information Technology (IT) systems to enhance collaboration and efficiency

Success measures:

- Inter-Divisional collaboration in CSIRO-wide support
- Aggregated Insight Survey score for Working Relationships and Work Organisation and Efficiency 17

The Research Support Services (RSS) project continues to proceed well and remains on budget and to plan. The final functional area – Property Services – was successfully implemented in March 2007.¹⁸ Implementations of the Finance: Contract Administration: Commercialisation; Legal Services; People and Culture; and Information Services functions has been completed and they are now operating as 'business as usual'. Two customer feedback surveys have been undertaken for RSS functions. Customer satisfaction with current services ranged from 67 to 83 per cent 'satisfied' or 'very satisfied'.

The Business and Enabling Technologies Replacement (BETR) project is a strategic initiative with the aim of further streamlining enterprise business processes and implementing the enabling technology to support CSIRO's science and business. The scheduled 'go live' of Phase I in March 2007 was postponed following the identification of outstanding issues in the integration testing phase. Internal and external reviews of the project were initiated and, in

¹⁷ There was no Insight Survey undertaken during this reporting period.

¹⁸ With the exception of the property services function at the Australian Animal Health Laboratory which is planned for implementation in October 2007.

response to their findings, a number of changes were made to project governance and the proposed phasing of implementation.

Rationalisation of existing CSIRO websites has progressed with many of the most significant web communications channels now publishing solely through CSIRO.au. These include all of the National Research Flagships, most corporate functions and several Divisions. More Divisions are planning to rationalise their sites in the second half of 2007. New functionality was added in February 2007 to provide end-users with better search and browsing capabilities, simpler content addresses (URLs), improved print and image functionality, automated subscriptions to audio content and automatic site map.

This year CSIRO IT evolved into CSIRO IM&T (Information Management and Technology) with the inclusion of Records and Libraries into the portfolio. This provides a greatly improved platform for delivery of a comprehensive range of information services across CSIRO. Infrastructure and service delivery improvement initiatives have continued in line with the recommendations of the CSIRO IT review. In particular, five major capital projects are at varying stages in the areas of networks, data storage, enterprise data centres, desktop services and server consolidation.

Goal 6 – Securing a financial foundation for growth

At the beginning of the 2003–07 strategic planning period, CSIRO accepted the challenge to 'go for growth' - growing both the impact of the Organisation's work and the financial foundation that needs to be in place to support that growth. While the bulk of our growth must come from attracting stakeholder investment in activities in our core roles, we have also sought to actively manage our intellectual property and other assets to liberate additional funds to reinvest in growth.

In 2006–07, a small operating surplus was achieved. External revenue earned from research and related services increased by 3.9 per cent over the previous year, with particularly strong growth in revenue from the Australian government sector (incorporating Commonwealth, State and Local governments). The trend in CSIRO's financial performance over recent years is summarised in Table 7.

6.1 Secure greater federally funded support for CSIRO science investment

Success measures:

• Appropriation revenue

In 2003, CSIRO secured Triennium Funding for 2004–07, including an additional \$305 million for the National Research Flagships over seven years. On 24 January 2007, the Minister for Education, Science and Training announced a new, four-year funding agreement for CSIRO as the outcome of a very positive Lapsing Program Review. This followed the strong endorsement of the Flagships program by an external review undertaken in June 2006 (as reported last year). This provides for greater security of funding over a longer period, reflecting the long-term nature of much of CSIRO's research activity.

Subsequently, in the 2007–08 Budget, in addition to four-year baseline funding, CSIRO received its single biggest ever increase in appropriation funding – an additional \$244.5 million over four years, comprising:

- \$43.6 million for a new Climate Adaptation Flagship and \$36.2 million for a new Niche Manufacturing Flagship
- \$34.6 million for a new Minerals Down Under Flagship, focusing on development of advanced exploration and mining systems and new processing technologies

					2006–07 CSIRO	Strategic Plan Target for
	2003-04	2004-05	2005–06 ³	2006-07	Group ⁴	2006–07 5
Revenue by Source	\$ m	\$m	\$m	\$m	\$m	\$m
Co-investment, Consulting						
and Services						
Australian Private Sector	66.5	63.9	67.6	58.0	65.8	
Australian Government	83.8	89.7	96.5	116.0	120.4	
Research and Development	49 5	48 0	443	43.2	47.8	
Corporations	77.5	10.0		73.2	-77.0	
Cooperative Research Centres	36.1	35.2	35.2	39.8	41.4	
Overseas Entities	36.8	33.5	36.4	37.2	42.4	
Work in Progress/Deferred	1.4	(07)	(0,0)	(0 E)	(0 E)	
Revenue Adjustment	1.4	(9.7)	(8.0)	(8.5)	(8.5)	
Total Co-investment,	274	260 5	272.0	285.8	309.3	362.0
Consulting and Services	2/7.1	200.5	272.0	205.0	507.5	502.0
Revenue from Intellectual	22.0	22.0	22.4	30.4	20.0	72 0
Property, Royalties, etc	22.0	22.0	52.т	50.0	50.7	75.0
Total Research and Services	296 1	282.5	3044	316.3	340.2	435.0
Revenue	270.1	202.5		510.5	540.2	
Other External Revenue	22.0	22.2	12.0	116	415	9.0
(including interest)	25.0	22.7	cr	ס.דד.0	-TI.J	7.0
Total External Revenue	319.9	316.2	348.3	360.9	381.7	444.0
Appropriation Revenue	568.6	577.I	593.9	610.1	610.1	632.0
Total Revenue (excluding	000 5	002.2	942.2	971.0	001.0	1 076 0
revenue related to assets)	000.5	073.3	742.2	971.0	771.0	1 076.0
Gain/(Loss) on sale of assets ²	5.0	0.0	15.5	2.7	2.8	0.0
Reversals of previous asset	0.0	21	0.0	0.0	0.0	0.0
write-downs	0.0	3.1	0.0	0.0	0.0	0.0
Less: Expenses (excluding	000.0	0170	0470	ד רדס	002 (1.07/.0
value of assets sold)	878.9	917.Z	747.8	712.1	773.6	1 076.0
Operating Surplus/(Deficit)	(5.3)	(20.8)	9.9	1.0	1.0	0.0

The decline in revenues in 2004–05 was impacted by transfer of National Measurement Laboratory (NML) to Department of Industry, Tourism and Resources (\$3 million) and partial transfer of CSIRO's Forestry and Forest Products research activities into the Ensis joint venture (\$6 million).

² The table shows net gain/loss on sale of assets. The gain on sale of assets in 2005–06 includes net gains of \$14.2 million for the sale of Lindfield property in NSW.

³ The previously reported operating surplus for 2005–06 has been adjusted by \$4.6 million, from \$14.5 million to \$9.9 million, due to a change in accounting policy in 2006–07 (AASB 139). The adjustment reflects fair value gains on investment that were previously recognised in the income statement as revenue from intellectual property, royalties etc, that are now recognised directly in equity.

⁴ 'CSIRO Group' includes CSIRO and its interest in the external revenues (excluding partner contributions) of the Food Science Australia joint venture (85 per cent, \$13.1 million) and Ensis joint venture (50 per cent, \$12.0 million). CSIRO's share of the FSA joint venture changed from 50 per cent to 85 per cent in 2004–05. The Ensis joint venture commenced partial operation on 1 July 2004 and full operation on 1 July 2005.

⁵ The CSIRO Strategic Plan 2003–07 target for 2006–07 includes external revenues of \$3 million for NML, \$15 million for FSA and \$6 million for activities transferred to the Ensis joint venture.

- \$59.6 million for an extension of the Energy Transformed Flagship, in the area of alternative transport fuels, with lower greenhouse gas emissions, from coal and gas, and biofuels
- \$51.7 million for development of the Pathfinder demonstrator for the next generation radio telescope, the Square Kilometre Array (SKA)
- \$16.8 million for the Australian Animal Health Laboratory (AAHL) for increased biosecurity diagnostic and emergency response capacity
- \$2 million towards developing a health and wellbeing plan for children.

In total CSIRO will receive \$2.807 billion in funding over the next four years which represents a 19.5 per cent increase over the previous four year period.

6.2 Proactively manage patent and equity portfolios to multiply IP-based revenue streams

Success measures:

- Intellectual Property revenue
- Performance of 'RIPPERS' (Reclaimed Intellectual Property Promising Extraordinary Revenues)

In 2006–07, revenues from intellectual property decreased slightly by \$1.8 million from the record 2005–06 result to \$30.6 million, driven by the effect of drought on cottonseed royalties, which halved. However, spin out and licensing activity continued at good levels and CSIRO was able to grow its equity portfolio value to record levels. Four new companies were formed from CSIRO developed technology (see Section 4.3, page 84), and a total of \$12.5 million was raised during the year from private sector funds by existing portfolio companies contributing to the equity portfolio. Total value of the portfolio increased from \$29 million to \$44 million.

CSIRO continued with efforts to derive significant value for Australia out of its patent holdings in wireless local area network (WLAN) technology. Associated litigation in the US is now concentrated in the Eastern District of Texas. In the leading case, the court upheld CSIRO's position in relation to patent validity and infringement, and granted a permanent injunction restraining further infringement. That case is now on appeal. Other cases are continuing. Commercial uptake of CSIRO's WLAN technology continues to grow significantly around the world.

6.3 Deliver customer value for money and eliminate subsidisation in consulting services

Success measures:

- Aggregate CSIRO customer value score
- Subsidy in consulting services activity
- External revenue by source/market segment

As reported last year, a significant element of CSIRO's strategic agenda for 2006–07 was to evaluate and improve research relationships. This culminated in the development, approval and roll-out of a new business development strategy. The mutually dependent objectives and success measures for this strategy are:

- Increased Impact greater uptake of outcomes to address expectations of 'National Benefit'
- Improved Relationships an equitable and agreed exchange of value with stakeholders and customers
- Sustained Resources the ability to sustain and grow the capability that we need to generate and deliver the impact.

As previously noted, a revamped Customer Value Survey was in place for 2006-07. CSIROwide results are shown in Table 8. Analysis of survey information has identified three lead

Table 8: Customer value assessment - overall value

Survey result ^(a)	Target score ^(b)	2003–04	2004–05	2005–06	2006-07 ^(c)
CSIRO score	8.0	7.0	6.5	6.4	7.0
Comparative score	110	107	102	101	n/a

(a) See the glossary page 216 for a guide to the interpretation of Customer Value Survey scores. (b) The target scores correspond to the 'world-class' benchmark for overall value. (c) In response to customer feedback, changes were made to the survey instrument and methodology in 2006–07 to improve analysis and interpretation, as a result, the data for 2006–07 are broadly, but not directly, comparable with previous years. There were insufficient data to calculate a comparative score.

indicators for improvement of key aspects of customer interactions: project timelines, adherence to transaction management processes, and formal account management arrangements for key customers.

In 2006–07, CSIRO consulting services (excluding National Facilities) returned a net surplus of \$1.7 million compared with a subsidy of \$3.9 million in 2002–03.

External revenue by source is summarised in Table 7, and the results with regard to specific market segments have been discussed in Sections 4.1, 4.2 and 4.3.

6.4 Reduce overhead and purchasing costs and manage balance sheet for reinvestment

Success measures:

- · Purchasing costs
- Overhead and support costs (overhead ratio)
- · Overall financial result

CSIRO has continued to build-up both the scale and number of national procurement contracts it has in place. New arrangements for freight, courier and removal services, credit cards and scientific serial subscriptions were implemented this financial year. It is estimated that annual savings of \$1.6 million will be realised as a result of the implemented initiatives. In addition, CSIRO renewed its national telecommunications and national travel services arrangements and is currently working on national procurement contracts for network security, IP telephony and laboratory gases.

As noted in Section 5.4, implementation of findings from the Research Support Services (RSS) review has proceeded. The CSIRO Finance function was successfully moved to the RSS model over the course of 2006–07 and delivered a better than budgeted result and higher than expected user satisfaction rankings. CSIRO Property Services went 'live' under RSS on 23 March 2007. Libraries and Records are now well established as enterprise functions within the RSS model.

A near final estimate of the overall reductions in full-time equivalent (FTE) staff numbers over the next three years remains at 166 FTE (from 683 to 517) and financial savings are estimated at \$16.8 million by 2009–10. To date there have been 58 redundancies relating to RSS functions.

CSIRO's overall operating result for the year, as per Table 7 and the Financial Statements in Section 4, was a surplus of \$1.0 million (compared with a break-even budget). Contributing to this result was growth in appropriation revenue of 2.7 per cent, growth in total external revenue of 3.6 per cent, and growth in expenses of 2.6 per cent.

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Section 3 Governance and support services

Governance and support services

In CSIRO the two primary enabling functions are:

- Enterprise Strategy and Governance
- Provision of Research Support Services

These enabling functions provide direction, guidance and support for the delivery of the Organisation's core roles in the National Innovation System.

Enterprise Strategy and Governance

Role description:

 sets the framework and direction for CSIRO so it can most effectively achieve its organisational goals

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- ensures a well-communicated and understood strategic and operational framework
- helps CSIRO staff fulfil their roles and helps external organisations interact more effectively with CSIRO
- ensures that appropriate processes are in place for strategic direction setting and for overseeing key management decisions.

In line with CSIRO's Strategic Plan 2003–07, the Board and management have continued to promote governance practices which achieve this role and meet the requirements of CSIRO's complex operating environment.

In 2006–07, achievements included:

- implementing the outcomes of the Government's review of corporate governance – The Uhrig Review
- refining the Science Investment Process and associated improvements in Operational Planning

- continuing Science Assessment Reviews for all Divisions
- reviewing processes and roles as part of the implementation of shared research support services and the development of a uniform business process and reporting system
- reviewing roles and delegations in preparation for the implementation of new organisational design principles from July 2007
- improving the policy framework, documentation and communication of organisational policy.

CSIRO's Governance Framework

Governance covers the way in which CSIRO is organised, directed and managed, the way in which the Organisation operates, engages with the outside world, and the way it is held accountable for decisions and actions.

Good governance requires continuous improvement, open communication and the involvement and commitment of all staff at all levels within the Organisation. Good governance cannot be measured in purely financial terms in a public sector body because performance is measured against broader national, social and community objectives.

CSIRO's Governance Framework incorporates the internal and external elements of the governance of the Organisation. It is designed to improve transparency and understanding about governance in CSIRO.

The CSIRO Governance Framework consists of:

- Overarching elements:
- External including governing legislation and the Organisation's responsibilities to the Minister, the Australian Government and Parliament
- Internal CSIRO's overarching governance

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- Enabling elements:
- Directing including strategic direction, investment decisions, operational planning and organisational policy
- Managing key processes and procedures for the full range of CSIRO's operations
- Assuring including Science Assessment Reviews, the Performance Measurement Framework and internal and external audits.

Governing legislation, functions and powers

CSIRO is an Australian Government statutory authority constituted and operating under the provisions of the *Science and Industry Research Act 1949* (SIR Act).

CSIRO's primary functions as set out in the SIR Act are, in summary:

- to carry out scientific research
 - to assist Australian industry and to further the interests of the Australian community
 - to contribute to national and international objectives and responsibilities of the Australian Government
- to encourage and facilitate the application and use of the results of CSIRO and other scientific research.

Secondary functions include international scientific liaison, training of research workers, publication of research results, technology transfer of other research, provision of scientific services and dissemination of information about science and technology.

In summary, the Organisation has the power to do whatever is necessary for the best performance of its functions. In particular, it may:

- arrange for research and other work to be undertaken outside CSIRO
- form partnerships or companies
- make its discoveries and inventions available for fees, royalties or other consideration
- pay bonuses to staff for discoveries or inventions
- charge fees for research, facilities or services provided to others.

Reporting, accountability and other rules for CSIRO's operations are set out in the *Commonwealth Authorities and Companies Act* 1997 (CAC Act). Commencing in October 2007, CSIRO will be required to complete an annual Compliance Report to the Government regarding the Organisation's compliance with the CAC Act and its financial sustainability. Internal control mechanisms are being examined to support this declaration.

In 2006–07, CSIRO worked closely with the Department of Education, Science and Training (DEST) to implement the Government's response to the 'Review of the Corporate Governance of Statutory Authorities and Office Holders' (The Uhrig Review) and subsequent recommendations arising from an assessment of CSIRO, approved by the Minister for Finance in June 2006. The assessment found CSIRO was operating largely in line with the review's description of best practice for statutory authorities with governing boards.

In summary:

- CSIRO will remain under the Commonwealth Authorities and Companies Act 1997.
- The Science and Industry Research Act 1949 will be amended to remove the requirement for Ministerial approval of contracts over a prescribed value; to enable the CSIRO Board to appoint and remove the Chief Executive; and to clarify the powers of the Board.

- The Portfolio Secretary has resigned from the CSIRO Board to avoid any perceived conflict of interest with the role of the Secretary in supporting and advising the Minister on matters related to CSIRO.
- Statements of Expectations and Intent for 2007–08 have been finalised between the Minister and the CSIRO Board, which outline the Minister's expectations regarding the strategic direction, governance, communication, monitoring and review of the Organisation.
- A memorandum of understanding between CSIRO and DEST will be prepared in 2007–08 detailing communication and information sharing protocols.

The legislative amendments are expected to come into force in mid-2007. These changes will be reflected in the CSIRO Governance Framework.

Responsible Minister

From I July 2006 to 30 June 2007 the Minister responsible for CSIRO was the Honourable Julie Bishop MP, Minister for Education, Science and Training.

Under the Science and Industry Research Act 1949, the Minister has the power to:

- add to the purposes for which CSIRO may carry out scientific research (sub-paragraph 9(1)(a)(iv))
- provide to the CSIRO Board in writing, directions and guidelines with respect to the performance of the functions, or the exercise of the powers, of the Board or of the Organisation (section 13 (1)).

The Minister did not exercise any of these powers during 2006–07.

Under section 28 of the Commonwealth Authorities and Companies Act 1997, the Minister may, after consultation with the Board, notify the Board of a general policy of the Australian Government that is to apply to CSIRO.

The Minister did not notify the Board of such a general policy in 2006–07.

Statement of Expectations and Statement of Intent

In June 2007, the Minister provided a Statement of Expectations for 2007–08 to the CSIRO Board, which responded with a Statement of Intent. The Statements should be read alongside the 2007–2011 Quadrennium Funding Agreement and the 2007–2011 CSIRO Strategic Plan. Both Statements are available at: www. csiro.au/resources/StatementExpectations

2007–08 to 2010–11 Quadrennium Funding Agreement

As from the 2007–08 financial year, CSIRO will be funded on a four-year basis in the form of a Quadrennium Funding Agreement, which replaces the previous triennium agreement. The Agreement will be signed by the Minister for Education, Science and Training, the Minister for Finance and Administration and the Chair of the CSIRO Board. The agreement will include the principles of quadrennium funding, resourcing of outputs, performance reporting and other matters agreed by the parties.

The CSIRO Board

Structure and responsibilities

Under the SIR Act, the CSIRO Board comprises a non-executive Chairman, up to eight other non-executive members and the full-time Chief Executive. All members, including the Chief Executive, are appointed by the Governor-General. Each member brings complementary skills and experience to the Board. Under the SIR Act, the primary functions of the Board are:

- i. to ensure the proper and efficient performance of the functions of the Organisation
- ii. to determine the policy of the Organisation with respect to any matter
- iii. to give directions to the Chief Executive.

The role of the Board is described in detail in the CSIRO Board Charter. In summary, the Board is responsible to the Australian Government (through the responsible Minister) for the overall strategy, governance and performance of CSIRO. This role includes:

- providing strategic direction to CSIRO
- ensuring best practice governance is implemented in CSIRO, including legal compliance, risk management and commercial oversight
- approving strategic and operational plans and monitoring CSIRO's operating performance
- ensuring the Minister is kept properly informed, including approving all matters requiring Ministerial approval.

The Board meets formally every second month for one or two days. In the pursuit of their duties, Board members may take such independent professional advice as is considered necessary, and have complete access to senior management.

The Board has an Audit Committee, a Commercial Committee and a Remuneration Committee. All matters considered and determined by the Committees are submitted to the Board for information and, where appropriate, ratification or decision. Other committees can be established from time to time to assist in the execution of the Board's duties. The Board and Board Committee Charters were reviewed in June 2007 in preparation for the amendments to the SIR Act expected in mid-2007.

The Board Charter requires the Chairman to monitor Board performance and coordinate a review of performance at least every 18 months. In November 2006, the Board discussed progress against the review conducted in late 2005. Board Committee Charters also require them to meet at least once per year to assess their performance and report the outcomes to the Board.

The CSIRO Board

Chairman



Ms Catherine Livingstone BA(Hons) FCA FTSE Company Director | January 2001 -31 December 2006

Members



Dr Geoff Garrett BA(Hons) MA PhD Chief Executive 8 January 2001 -31 December 2008



Dr John Stocker AO BMedSc MBBS PhD FRACP FTSE Company Director 28 June 2007 -27 June 2010



Further details of the 2006-07 Board members, including qualifications, terms of appointment, remuneration, membership of Board Committees and attendance at meetings are shown on pages 186–190 in the Financial Statements.

Mr Peter Willcox BA(Hons) MA Company Director I January 2007 – 29 May 2007 (resigned) 15 February 2006 - 31 December 2006 (member)



Professor Suzanne Cory AC BSc MSc PhD FAA FRS Director The Walter and Eliza Hall Institute of Medical Research 26 June 2002 - 25 June 2009



Dr Terry Cutler BA(Hons) PhD FAIM Principal Cutler and Company Pty Ltd 25 July 2002 - 24 July 2009



Dr Eileen Doyle BMath(Hons) MMath PhD FAICD Company Director 15 February 2006 -14 February 2011

Governance



Mr Brian Keane FAICD Company Director 30 July 2003 -29 July 2008



Ms Deborah O'Toole IIB Company Director 16 April 2003 -15 April 2008



Ms Lisa Paul BA(Hons) PSM Secretary Department of Education, Science and Training 16 December 2004 - 28 March 2007 (resigned)



Professor Alan Robson AM BAgrSc PhD FTSE FAIAS Vice-Chancellor University of Western Australia 30 July 2003 - 29 July 2008

Board Audit Committee

The Board Audit Committee meets quarterly or more frequently as required. The Audit Committee's purpose as detailed in the Committee's Charter is:

- to assist CSIRO and its Board in key governance areas of risk management, internal control and compliance by monitoring and reporting on the following:
- financial performance and the financial reporting process, including the annual financial statements
- the acceptability of, correct accounting treatment for, and disclosure of, significant transactions which are not part of CSIRO's normal course of business
- the operation and implementation of the risk management framework
- the effectiveness of systems of internal control, including delegations, management information systems and safety and environmental performance
- the scope of work, performance and independence of the Risk Assessment and Audit (RA&A) unit
- the scope of work, independence and performance of the external auditor
- CSIRO's process for monitoring compliance with laws and regulations, Government policy and its own Code of Conduct.

Under the CAC Act, the Commonwealth Auditor-General is the external auditor for CSIRO. The Board Audit Committee reviews the Australian National Audit Office (ANAO) audit plan and meets with the external auditor regularly throughout the year and specifically prior to recommending financial statements to be signed by the Board.

Board Commercial Committee

The Board Commercial Committee (BCC) meets at least four times per year. The purpose of the Committee is to assist the CSIRO Board in fulfilling its governance responsibilities in relation to CSIRO's business development and commercialisation activities by:

- recommending to the Board any new policies or directions that are required for these functions
- considering reports and recommendations from CSIRO management on business development and commercialisation functions and providing advice on the proper and efficient performance of these
- monitoring CSIRO processes relating to the business development and commercialisation activities and financial delegations in relation to transactions
- facilitating open communication between the CSIRO Board, Board Commercial Committee, senior management and the Commercial Executive (ComEx) Committee.

The BCC makes recommendations to the Board regarding specific transactions and is supported by management's ComEx Committee which provides advice on internal management processes and oversees commercial activities. The ComEx Committee includes both external advisors and management members and meets approximately 18 times per year.

Board Remuneration Committee

The Board Remuneration Committee meets at least twice per year. The purpose of the Committee is to assist by making recommendations to the Board in relation to the Chief Executive's remuneration arrangements and in ensuring that the Organisation has an appropriate and competitive remuneration structure by: Governance

- determining the remuneration arrangements for, and assessing performance of, the Chief Executive
- ratifying recommendations of the Chief Executive in respect of the remuneration and performance assessment of Executive Team members
- exercising oversight of the remuneration policy of the Organisation including the senior executive banding structure (focus on positions, not individuals) and with references to the market.

In accordance with the Remuneration Tribunal, the CSIRO Board is the employing body for the Chief Executive, as a Principal Executive Officer (PEO). Under Section 12C of the *Remuneration Tribunal Act 1973* the employing body for a PEO may determine terms and conditions (including remuneration and allowances) applying to the office, providing that such terms and conditions are not inconsistent with the PEO framework determined by the Tribunal. The Board consults the Minister on the remuneration and performance pay of the Chief Executive.

The Remuneration Tribunal determines the remuneration and allowances of non-executive Board members.

CSIRO Executive Management Structure and responsibilities

The Board Directions to the Chief Executive set out the formal directions given to the Chief Executive by the Board under the SIR Act. These Directions were reviewed in June 2007.

The Chief Executive is responsible to the Board for the overall development of strategy, management and performance of CSIRO. The Chief Executive manages the Organisation in accordance with the strategy, plans and policies approved by the Board to achieve agreed goals, and is supported by the Executive Team and the Executive Management Council. The Executive Team is supported by a number of Management and Advisory Committees including the Commercial Executive (ComEx) Committee, the Flagship Oversight Committee, the Capital Asset Management Committee, the Enterprise Risk Management Advisory Committee, the Science Investment Process Science Sub-Committee, the Enterprise Communication Council and the Strategic Program Oversight Committee.

Authorities, delegations and disclosure of interests

CSIRO has an Authorities Manual that documents the delegations and authorities conferred by the Chief Executive, and provides information for staff on the principles for the devolution of powers within CSIRO and the policies and procedures for the responsible and accountable exercise of those powers. Commencing in early 2007–08, the Manual will be amended to implement the agreed roles within CSIRO's organisational design principles framework and changes to processes as a result of the move to shared research support services.

Section 10F of the SIR Act requires written disclosure by the Chief Executive to the Minister of all direct or indirect pecuniary interests in any business or in any body corporate carrying on a business. Sections 27F-K of the CAC Act require the disclosure of material personal interests in a matter that is being considered by the Board and prohibits a member from being present during consideration or voting on such matters, unless otherwise determined by the Board or the Minister.

All of these requirements are currently being met.

The CSIRO Code of Conduct applies to the Organisation's Board, management and staff. It provides a benchmark against which conduct can be assessed to ensure the highest ethical standards are met.

The CSIRO Executive Team during 2006–07



Dr Geoff Garrett BA(Hons) MA PhD Chief Executive



Dr Ron Sandland AM BSc PhD AIA FTSE Deputy Chief Executive



Dr Michael Barber BSc PhD FAA Group Executive: Information, Manufacturing and Minerals



Dr Joanne Daly BSc(Hons) PhD PSM Group Executive: Agribusiness (from April 2007)



Dr Michael Eyles BSc(Hons) PhD Executive Director: Leadership and Organisation Development



Dr Rod Hill DSc FTSE FAICD Executive Director: Business Development



Dr Andrew Johnson BAgrSc(Hons) PhD (Queensland) MPA (Harvard) Executive Director: Strategic Change Programs (Acting)



Dr Steve Morton BSc(Hons) PhD Group Executive: Sustainable Energy and Environment



Mr Nigel Poole LLB BCom FAICD Executive Director: Business Services



Dr Alastair Robertson BSc PhD FFSC CChem FRSC Group Executive: Agribusiness Executive Director: Science Strategy and Investment (from April 2007)



Mr Craig Roy MBA MSc BSc GAICD Executive Director: Strategic Change Programs (from April 2007)



Mr Mike Whelan BEc Executive Director: Finance and Governance and Chief Finance Officer

Organisational Chart as at 30 June 2007

Minister

Education, Science and Training - The Hon Julie Bishop MP

CSIRO Board

Dr John Stocker AO (Chairman) Professor Suzanne Cory AC – Dr Terry Cutler – Dr Eileen Doyle Dr Geoff Garrett – Mr Brian Keane – Ms Deborah O'Toole Professor Alan Robson AM

Executive Team

Dr Geoff Garrett – Dr Ron Sandland AM – Dr Michael Barber Dr Joanne Daly – Dr Michael Eyles – Dr Rod Hill Dr Andrew Johnson – Dr Steve Morton – Mr Nigel Poole Dr Alastair Robertson – Mr Craig Roy – Mr Mike Whelan

Executive Management Council¹

Agribusiness

Information, Manufacturing & Minerals

Entomology Livestock Industries Plant Industry Textile & Fibre Technology Ensis² Food Science Australia³

Australia Telescope National Facility Exploration & Mining ICT Centre Industrial Physics Manufacturing & Materials Technology Mathematical & Information Sciences Minerals Molecular & Health Technologies

Sustainable Energy & Environment

Energy Technology Land & Water Marine & Atmospheric Research Petroleum Resources Sustainable Ecosystems

National Research Flagships

Energy Transformed Food Futures Light Metals Preventative Health Water for a Healthy Country Wealth from Oceans

CSIRO-wide Support

Business Services⁴ Communications Finance Information Management & Technology People Services Science Investment Group

¹ The Executive Management Council comprises members of the Executive Team, all Divisional Chiefs, Flagship Directors and a number of other Senior Managers

² joint venture in Forestry and Forest Products R&D with New Zealand's Crown Research Institute Scion Australasia Ltd

³ joint venture with the Victorian Government

⁴ includes: legal, contract administration, commercialisation, property and site services

CSIRO policies

CSIRO has a comprehensive set of organisational policies to govern its activities.

CSIRO commercial policies include specific processes and authorities for complex structures (eg formation of incorporated entities or jointcontrolled operations), as well as transactions that for other reasons are of a sensitive nature. These decisions are supported by the ComEx Committee and subject to BCC, Board and Ministerial approval, as appropriate. In 2006–07, CSIRO further strengthened the governance of unincorporated joint ventures.

ComEx examines transactions over \$1.5 million (lifetime value) and the BCC and Board transactions over \$5 million. Transactions that involve receipt or expenditure of \$5 million or more by CSIRO require approval by the responsible Minister. The Minister is also notified under the CAC Act about complex transactions and significant commercial events.

In 2006–07, a number of administrative procedures were amended as part of the implementation of shared research support services. Measures were undertaken to improve the standardisation of policy across the Organisation and the accessibility and understanding among staff.

Policies were established or updated in the following areas:

- Public Comment by CSIRO Staff
- Science Investment
 - Freedom to Conduct CSIRO Research and Technology Transfer
- Policy Development, Maintenance and Communication
- Health, Safety and Environment
 - Emergency procedures

- Radiation Safety Manual
- Fieldwork procedures
- Plant safety procedure
- Contractor safety management procedure
- Gymnasium facilities guidelines
- Waste management procedure.

Operational policies in the Finance and People and Culture areas were also reviewed with minor amendments.

Future strategy

The CSIRO Strategic Plan for 2007–2011 was developed over the past year and approved with strong support by the CSIRO Board and endorsed by the Minister.

Development of the Strategy involved the input of many of our key stakeholders. This input has been instrumental for confirming our path forward and, importantly, continuing on from the strategic foundations and direction set through the 2003–07 Strategic Plan and its implementation.

Specifically, the Strategy aims to grow CSIRO's impact by delivering great science and innovative solutions for industry, society and the environment through three major elements:

- addressing national challenges and opportunities, faster and better
- focusing and strengthening our core science capability, and delivery
- strengthening our enterprise and enhancing operational excellence.

Taken together, these three strategic elements are designed to maximise CSIRO's continuing contribution to ensuring that: Australia has a strong capability in scientific research and development that delivers ongoing economic, social and environmental benefits and provides science and technology solutions relevant to current and emerging national challenges and opportunities.¹

The three core elements of the strategy will be pursued through five broad strategic initiatives and twelve specific objectives. Further detail on the Strategy can be found at: www.csiro.au/ resources/StratPlan07-11

The science directions CSIRO will pursue during the period of this strategic plan are outlined in the 'Broad Science Directions'.

Broad Science Directions

A key part of CSIRO's approach to ensuring the relevance of its research is to periodically review the Broad Science Directions of the Organisation. This provides the framework for our annual science investment cycle and ensures a balance between progressing longer-term goals and delivering immediate benefits.

The Broad Science Directions have been developed from a comprehensive review process commenced in 2005 and further refined during 2006:

- continue to strengthen our world-class environmental research to provide practical solutions and options for the community, industry and policy makers, with particular emphasis on water supply and utilisation, and adapting to climate change
- increase cross-organisational and crossdisciplinary integration and focus and ensuring more explicit and early consideration for the effective adoption of our science

- build underpinning capability platforms in transformational biology, advanced materials, sensor network technologies and computational and simulation sciences
- combine environmental sustainability expertise with research into agricultural productivity, leading to higher-value agricultural products
- focus our research in health, including the relationship of food with nutrition and benefit of healthier lives for all Australians
- continue our partnership contribution for developing solutions to broader national security and biosecurity issues
- develop technologies to help provide Australia with a competitive edge in the global minerals market, as well as providing solutions for safer and more efficient mining, environmentally sustainable processing, and value-adding products
- increase the intensity of our research into energy including exploration, production, electricity generation, distribution, end-use efficiency and greenhouse gas reduction and alternative transport fuels
- further focus our efforts in renewable energy, by aligning our activities to those in which we have competitive advantage and where we can have significant impact
- fully integrate our world-class ICT expertise with demand-driven community and industry areas
- redirect elements of our physics, mathematics, biology, chemistry and engineering capabilities to grow our impact in the (niche) manufacturing domain
- focus on next-generation radio astronomy through research leading to the successful implementation of the Square Kilometre Array initiative

¹ This is the formal statement of the outcome or purpose for which the government appropriates funds to CSIRO through the budget appropriation bills.
- increase research and development efforts to deliver enhanced services across industries in the economy
- more broadly and deeply integrate our capabilities in mathematics and computational science.

Investment, planning and performance measurement

CSIRO manages its investment into research through the Science Investment Process (SIP). The process is robust and accountable, and informed by CSIRO's advisory mechanisms.

The Sector Advisory Councils (SACs) comprise external representatives from industry and other stakeholder interest and cover energy and transport; environment and natural resource management; health; information, communication and services; manufacturing; and mineral resources sectors. There are also Advisory Committees for each of the National Research Flagships. Details of the Sector Advisory Councils and Flagship Advisory Committees can be found at: www.csiro.au/SAC

Investment decisions made through SIP in 2006–07 informed high-level budget allocations for the 2007–08 financial year as documented in the annual CSIRO Operational Plan approved by the Board. More detailed plans are prepared for each major unit of investment (Theme) and in accordance with CSIRO's project management policy.

In making science investment decisions, CSIRO:

 considers the breadth and complexity of challenges and opportunities facing society and where best to focus and build the Organisation's research capacity to maximise its contribution to Australia

- takes a long-term perspective of global science trends and national research priorities
- considers CSIRO's role in the National Innovation System
- considers the path to effective adoption of science
- considers Australian Government policy and community standards.

The science investment decisions seek to:

- maintain the quality and distinctiveness of CSIRO's science in a globally competitive environment
- increase cross-organisational and crossdisciplinary integration
- build competitive scale by focusing research effort
- build capabilities and position CSIRO's science for the future.

CSIRO's Performance Measurement Framework (PMF) – illustrated in Figure I – plays a crucial role in keeping us 'on track' toward our goals. It also provides the information foundation for reporting in accordance with CSIRO's obligations under the government's 'outcome-output' framework.

Using the PMF, CSIRO's management and Board regularly review progress and assess performance in four key dimensions: strategy implementation; program performance; organisational health; and outcomes (adoption and impact). Taken together, these elements cover strategic and operational considerations relating to performance over both the short and longer-term. They also incorporate both an historical and a forward looking perspective – thus providing a strong foundation of information for analysis and management action.



The continuing quality and relevance of CSIRO's science base is assured through a rolling cycle of externally-led Science Assessment Reviews. Reports are provided to the Board and Minister at the conclusion of each review. (Further details are provided on page 68, Section 1.2 of this report).

Risk management

Recognising and managing risk

The Board has responsibility for ensuring an appropriate risk management framework is in place to identify and manage strategic and operational risks to the Organisation.

An organisational risk profile is completed annually, through the Board Audit Committee (BAC) and endorsed by the Board. Together with management, the Board focuses on strategic organisational risks and the BAC on operational organisational risks. The BAC reviews management's policies and procedures and internal compliance.

Taking organisational risks into account, the internal RA&A unit undertakes a systematic program of organisation-wide functional audits, Divisional assurance audits and project-specific risk assessments, in accordance with a formal charter endorsed by the Audit Committee.

The Executive Team is responsible for the implementation of mitigation strategies. In appropriate circumstances, insurance is used as a method to transfer the financial impact of risk. The Executive Team's risk management activities are supported by an Enterprise Risk Management Advisory Committee chaired by the Chief Finance Officer.

Safeguarding integrity in financial reporting

CSIRO's financial statements and notes are required by clause 1(b) of Schedule 1 to the CAC Act 1997.

The statements are prepared in accordance with:

- Finance Minister's Orders for the reporting period ended 30 June 2007
- Australian Accounting Standards and Accounting Interpretations issued by the Australian Accounting Standards Board that apply for the reporting period.

The financial statements are accompanied by a Management Representation letter to the Australian National Audit Office (ANAO) signed by the Chairman of the Board, Chief Executive and the Chief Finance Officer declaring that the statements present a true and fair view of the financial position, the operating results and the cash flows of the Organisation for the year ended 30 June 2007.

In addition, the statements are supported by a Control Self-Assessment Questionnaire, and Corporate Accountability Checklists relating to compliance with policies, CAC Act and control environment signed by senior managers of the Organisation. This is a mechanism whereby specific assurances can be gained about the Organisation's financial state of affairs, compliance issues and control environment.

Fraud control and security

CSIRO remains committed to the Commonwealth Fraud Control Guidelines. A comprehensive fraud risk assessment was completed in May 2007. A review of the CSIRO Fraud Control Plan will take place in July/August 2007 in compliance with the guidelines. Appropriate fraud prevention, detection, investigation and reporting procedures and processes are in place. Annual fraud data has been collected and reported in accordance with the guidelines.

Protective, physical, personnel and administrative security practices continue in accordance with the CSIRO Corporate Security Plan. The plan was developed by the CSIRO Corporate Security Adviser and Zone Managers using the mandatory requirements contained in the Commonwealth Protective Security Manual 2005 and risk management procedures. The plan is also subject to an annual review process to ensure that it reflects changes to Government and CSIRO Security Policy, and operational requirements.

Service Charter

CSIRO's Service Charter describes the standards of service we aim to deliver to our customers and our commitment to ensuring that these standards are maintained.

In summary:

- we believe our customers and partners are essential to our success
- we maintain relevance in our work through input from the public, government, industry and the research community
- we communicate with our customers in a courteous, helpful and professional manner
- we respect our customers' confidentiality
- we evaluate our services to ensure the highest standards.

Our full Service Charter is available on our website: www.csiro.au/servicecharter

CSIRO welcomes your feedback on our performance. Please contact the CSIRO officer with whom you have been dealing or CSIRO Enquiries who can direct your feedback to the relevant person.

CSIRO Enquiries:

Bag 10, Clayton South, VIC 3169

 Phone:
 1300 363 400

 Fax:
 +61 3 9545 2175

 Email:
 enquiries@csiro.au

Administrative law

Freedom of information

The Freedom of Information Act 1982 ('FOI Act') provides the public with a general right of access to documents held by Australian Government agencies including CSIRO. The general right is limited by exceptions to protect essential public interests or the privacy or business affairs of those who give information to the agency.

The following information is provided in compliance with section 8 of the FOI Act:

- the functions and powers of CSIRO are set out on page 97
- information about CSIRO's procedures for external consultation can be found at: www.csiro.au/SAC
- CSIRO holds the following categories of documents:
 - corporate records including documents relating to government, policy, finance, personnel, business development, commercialisation, communication, real property, intellectual property and education
 - business unit records including documents relating to scientific research and technology transfer
- members of the public may obtain access to scientific and technical publications from CSIRO Publishing (www.publish.csiro.au).
 CSIRO administrative manuals are available from the Freedom of Information Officer.

Part V of the FOI Act confers a right to request amendment of a document to which lawful access has been granted, where the applicant claims that information in the document:

- relates to his or her personal affairs
- is incomplete, incorrect, out-of-date or misleading

 has been used, is being used, or is available for use by the agency or Minister for an administrative purpose.

In the year to 30 June 2007, CSIRO received 10 requests for information under the FOI Act and no requests for amendment in relation to documents provided under the Act.

Archives

CSIRO maintains an archives collection which includes records dating from the establishment in 1926 of the Council for Science and Industrial Research, the predecessor of CSIRO. Certain CSIRO records are held by Australian Archives. Disposal arrangements for CSIRO records are made in accordance with the provisions of the *Archives Act 1983*. Access to records over 30 years old is provided in accordance with that Act.

Privacy

The *Privacy Act 1988* provides for Information Privacy Principles (IPPs) and National Privacy Principles (NPPs). In the year to 30 June 2007, the Privacy Commissioner did not undertake any investigations under section 36 of the *Privacy Act 1988* in relation to CSIRO.

Administrative Decisions (Judicial Review) Act

The Administrative Decisions (Judicial Review) Act 1977 enables a person aggrieved by certain classes of administrative decisions made by Australian Government agencies, including CSIRO, to obtain reasons for or challenge those decisions. In the year to 30 June 2007, CSIRO received no challenges or requests for statements of reasons under the ADJR Act.

Contact

All enquiries under the above legislation (including FOI requests) should be directed to:

Freedom of Information Officer and Privacy Officer

CSIRO, PO Box 225, CAMPBELL ACT 2602

 Phone:
 02 6276 6123

 Fax:
 02 6276 6437

 Email:
 rosemary.caldwell@csiro.au

Research Support Services

Role description:

• under this role, CSIRO provides the Research Support Services and infrastructure required



to enable and facilitate research, technology transfer and community/industry engagement

Core functions include laboratory management and support; corporate finance and accounting; corporate property management; payroll and human resources benefit administration; CSIRO communications; procurement; and management of IT systems.

Staff demographics

CSIRO staff are employed under section 32 of the *Science and Industry Research Act 1949.* At 30 June 2007, CSIRO had a total staff of 6331, which has an equivalent full-time (EFT) value of 5695. The numbers of staff employed in different job categories are shown in Table 1.

The longer-term trend in staff numbers is shown in Figure I. While CSIRO staff numbers have decreased from 6743¹ in 1998 to 6331 in 2007, the number of research staff (Research Scientists, Research Managers and Research Consulting) has increased from 1664 in 1998 to 1904 in 2007.

Table 1: Staff by gender and principal functional area as at 30 June

	Female	Male	Total
	2007	2007	2007
	(2006)	(2006)	(2006)
Research Scientists	362	1326	1688
Research Scientists	(328)	(1302)	(1630)
Research Project staff	916	1283	2199
	(976)	(1382)	(2358)
Sonior Specialists	3	22	25
	(7)	(31)	(38)
Possarch Managament	13	175	188
Research Hanagement	(13)	(174)	(187)
Possarch Consulting	3	25	28
Research Consulting	(5)	(28)	(33)
Tachnical Sarvicas	78	503	581
	(78)	(544)	(622)
Communication and Information Somucos ²	236	148	384
Communication and mormation services	(275)	(164)	(439)
Conoral Services	44	31	75
	(46)	(41)	(87)
Administrativo Support	780	266	1046
	(761)	(280)	(1041)
Conoral Managament	29	88	117
	(33)	(90)	(123)
TOTAL	2464	3867	6331
	(2522)	(4036)	(6558)

Includes casual staff. The total staff figure of 6600 provided in the 1997–98 CSIRO Annual Report omitted 143 casual staff.

² Includes CSIRO Education; Discovery Centre; Library and Records; CSIRO IT; and CSIRO Publishing.



Figure 1: Trend in CSIRO headcount *

* CSIRO Officers only. Headcount as at 30 June each year.

Governance

Health and safety performance

The quality and impact of our Health, Safety and Environment (HSE) initiatives in the HSE Strategic Plan 2004–07 is reflected in the significant improvement to HSE performance.

The HSE function is close to completing the priorities identified in the Plan. This is a major achievement and an excellent reflection on the dedication and professionalism of our HSE staff. CSIRO staff are coached to achieve a greater understanding and application of their HSE responsibilities to achieve heightened levels of awareness and improved behaviours. It is these

qualities that are driving our performance and safety culture.

CSIRO's health and safety performance is now one of the highest for all Australian Government agencies, and this is reflected in our Workers Compensation Premium (Table I). Our Premium Rate, determined on four year injury and claims performance, is one of the lowest amongst all agencies.

Significant improvements in Health and Safety performance over the last five years (see Table 2 and Figures 1 and 2) include:

Table I: CSIRO's workers compensation premium

Premium rate (% of payroll)	2004–05	2005–06	2006–07	2007–08
CSIRO	0.74%	0.77%	0.83%	0.68%
All agencies	1.67%	1.77%	1.77%	1.55%

Table 2: CSIRO's Health and Safety performance 2003 to 2007

Year to date	Incidents	Number of claims	LTI > I day	Cost to date (\$)	Time lost to date (weeks)	MTFR	LTIFR	ATLR
June 2003	1 044	238	67	457 910	264	17	5.0	3.0
June 2004	975	278	70	594 728	145	20	4.4	1.9
June 2005	774	189	34	314 447	139	17	3.1	3.8
June 2006	689	176	35	425 305	177	14	2.7	5.1
June 2007	641	148	24	454 404	136	13	2.1	4.6

Definitions

Lost Time Injury Frequency Rate (LTIFR) is the number of incidents involving lost time from work greater than or equal to one full day or shift per million hours worked

Medical Treatment Frequency Rate (MTFR) is the number of compensation claims per million hours worked

Average Time Lost Rate (ATLR) is the average time lost for the number of incidents during the period



Figure I: CSIRO's injury frequency rates

- 39% improvement in incidents
- 38% improvement in claims
- 65% improvement in lost time injuries
- 49% improvement in time lost
- 38% improvement in lost time injury frequency rate
- 24% improvement in medical treatment frequency rate



Figure 2: CSIRO's average time lost rate

The Average Time Lost Rate (ATLR) has not improved as expected. Whilst Lost Time Injury (LTI) and Time Lost have decreased the ATLR has indicated that staff are taking longer off work per LTI.

Notifiable incidents and investigations

Notifiable incidents are reported to Comcare under the OHS Act and other authorities such as the Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) under their legislation. The incidents reported are those that result in death, serious personal injury, incapacity of more than 30 successive days or shifts, or a dangerous occurrence which could have produced any of these conditions.

CSIRO reports and investigates any incident deemed to have caused or have the potential for causing an injury or an illness through the HSE incident reporting, recording and investigation procedure.

Twenty-five notifiable incidents were reported in 2006–07 which is an improvement on 2005–06 in which there were 35. Comcare conducted seven investigations of notifiable incidents in CSIRO Divisions. Recommendations have been provided by Comcare for CSIRO to address. Two of the seven investigations have recommendations which are yet to be completed whilst the remaining investigation outcomes have adequately met the expectations of Comcare.

Comcare conducted three reviews of previous notifiable incident investigations conducted in 2002 and 2005 to ensure that CSIRO actions had been implemented adequately. Comcare reported their satisfaction that the action taken had been properly implemented.

Health and safety improvement initiatives

Musculoskeletal Management Strategy 2006–07

Reducing high impact/high frequency incidents was a priority in the CSIRO HSE Strategic Plan 2004–07. To meet this objective a Musculoskeletal Management Strategy was established and approved by CSIRO executives and launched at the 2006 HSE Conference. The strategy includes an Ergonomics@work program to assist in the implementation of the strategy across Divisions. This program has been developed using a risk profile based on potential and actual risk specific for each Division and/or site.

The Musculoskeletal Management Strategy priorities are to:

- implement an Ergonomics@Work program in all Divisions
- update the current procedures on Manual Handling and Overuse Injuries
- design and distribute brochures on ergonomic awareness and overuse injuries in the laboratory
- evaluate and purchase a breaks and exercise software program for PC workstations
- provide advice on the purchase of office equipment
- establish an organisation-wide early intervention program.

HSE in nanotechnology

CSIRO has taken proactive steps to ensure the safe conduct of research and associated activities related to nanotechnology. These include the following:

- instigating an HSE review of all CSIRO nanotechnology projects
- holding a workshop for scientists and HSE staff involved in or potentially involved in establishing nanotechnology projects
- developing HSE guidelines for nanotechnology
- developing an HSE supplement to the Health,

Safety and Environment Assessment and Control of Work form set to assist with risk identification, assessment and control

- raising awareness of nanotechnology risks at the Executive Management Council
- reviewing and monitoring international literature addressing nanotechnology HSE standards and protocols.

HSE inspections of PABX/server room

When our Information Management Technology staff reformed into a research support service, HSE staff provided support with HSE inspections of all PABX/server rooms. This survey assisted management and staff to identify safety issues and plans for improvements.

Maritime vessels safety survey

CSIRO manages over 25 vessels ranging from small 3.5 metre tinnies to the 66 metre *Southern Surveyor*. The survey requires CSIRO to report to the Australian Maritime Safety Authority on the survey and safety certification status of CSIRO vessels. The survey was completed in March 2007 resulting in an updated vessels register and established the safety condition of equipment and vessels.

SafetyLaw – online database

CSIRO subscribes to a Health and Safety (H&S) legal obligations directory covering all State and Territory (H&S) legislation. The latest component in the SafetyLaw directory that came on-line in May 2007, provides access to Commonwealth H&S legislation. This online system is an extremely valuable source of information and resource for all staff. Regular updates are provided ensuring that CSIRO keeps abreast of its H&S legal obligations.

CSIRO Health and Safety Committee

The joint management/union CSIRO Health and Safety Committee formally merged with the Environmental Management Systems Committee to form the CSIRO HSE Committee in 2006. Joint meetings have been deemed a success as they allow common issues to be actioned with the input and consensus in a single functioning Committee. This required our health and safety representatives to assume some environmental responsibility. Training was provided to enable them to accomplish this new activity.

Updated procedures

Several new procedures have been developed in addition to a number of updates to procedures due for review. This activity enables us to meet our strategic organisational objectives:

- HSE emergency procedures: The guidelines provide practical guidance and information to assist with the development and implementation of emergency management plans covering all aspects of HSE emergencies.
- Radiation Safety Manual: CSIRO completed a review of the original 2002 Radiation Safety Policy and Radiation Safety Manual to ensure that radiation management practices within CSIRO maintain a consistently high standard and to reflect changes in legislation or licence conditions.
- Fieldwork procedures: This provides a consistent CSIRO-wide approach to managing the HSE risks associated with working in the field.
- Plant safety procedures: This procedure outlines the steps required to protect the health and safety of staff, contractors and other people from the hazards associated with the operation of plant in the workplace.

- Contractor safety management procedures: This provides advice, guidance and a consistent approach to the roles and responsibilities of CSIRO staff who engage and manage contractors and the issues associated with all contracted works. In addition, it incorporates the new Commonwealth Regulations for Construction Work.
- Working from home procedures: This provides detailed guidance on the HSE aspects relating to working from home. It incorporates more formalised procedures for seeking approval to perform home based work, including the requirement for an HSE inspection of the proposed home work site.
- **Gymnasium facilities guidelines:** This supports sites that are establishing on-site gymnasiums.

Health and safety management

Under the changes to the Occupational Health and Safety (Commonwealth Employment) Amendment Act 2006, all Commonwealth agencies are required to develop and implement new Health and Safety Management Arrangements (HSMAs) in consultation with staff by September 2008.

HSMAs are flexible, efficient, tailored arrangements between employers and employees on the management, promotion and development of measures to ensure the health and safety of employees at work. They provide a framework for employers and employees to work together to manage workplace risks and hazards. CSIRO is embarking on the development of its HSMAs through a consultative process.

HSE Annual Conference and Annual Report

Since 2002, CSIRO has held an annual HSE conference aimed at building and strengthening

the network, benchmarking its practices with industry and exploring current and future directions in HSE. Our goal is to assist CSIRO toward its strategic goal of being among the best in HSE management. A key to achieving this goal is to actively support our staff to learn more about work practices and issues that impact across the Organisation.

The CSIRO HSE Conference 2006, 'Enabling Knowledge for Sustainable Workplaces' was held in Melbourne in October and was opened by the Chief Executive, Dr Geoff Garrett. The conference consisted of plenary sessions with external presenters from government and commercial enterprises and internal presenters from across CSIRO delivering on topics of risk management, environmental sustainability and health and wellbeing. Day two consisted of an interactive workshop to share experiences, discuss issues and develop solutions. Key topics included contractor management, plant safety and environmental risk.

The HSE Annual Report records the performance standards achieved and documents the actions we have taken each year to meet our HSE organisational strategic goals of caring for our staff and others, our environmental and social responsibilities. The annual report for 2006 can be viewed at: www.csiro.au/ OHSReport2006

State Coroner for Victoria findings and recommendations

On 23 April 2007, the State Coroner for Victoria handed down the findings on the death of a CSIRO employee at the Australian Animal Health Laboratory (AAHL) in December 2001 following an Inquest held at Geelong on 5, 6 and 7 June 2006. The Coroner found that Mr Set Van Nguyen died as a consequence of acute hypoxia. Since the release of the Coronial Report into Mr Van Nguyen's death, AAHL management has taken positive steps to address the Coroner's recommendations. The Coroner accepted that by the time of the Inquest, CSIRO had been:

- thorough in its own investigation into the circumstances surrounding Mr Van Nguyen's death
- thorough in responding to Comcare's investigation
- genuine in its endeavours to identify design and system weaknesses and to implement improvements to its systems at AAHL in an endeavour to prevent a similar critical incident occurring again.

A 2002 CSIRO Committee of Inquiry report made 24 recommendations regarding the operations at AAHL and a further eight recommendations across CSIRO. All of these recommendations have been implemented to the satisfaction of Comcare.

Mr Van Nguyen's death was a tragedy and CSIRO has implemented systems and operations to ensure a similar accident will not happen again. The accident and its causes did not involve any threat to the biosecurity of AAHL.

Commonwealth disability strategy

For the purposes of the Commonwealth Disability Strategy (CDS), CSIRO's 'Role' is that of an 'Employer'. Activities relevant to the Strategy form part of CSIRO's Workplace Diversity Plan.

As a result of a major review of CSIRO's support services during 2006–07, many human resources activities (including planned disability work) were placed on hold. This was to enable People and Culture staff to focus on the significant staffing implications arising from the implementation of new structures and delivery models for corporate support functions. This included the simultaneous restructuring of the People and Culture function itself.

CSIRO's Workplace Diversity Plan expired at the end of 2006. Discussions are underway with staff and their representatives to determine priorities for inclusion in the new Plan. In addition, with the implementation of the new People and Culture structure, there is increased resourcing for workplace diversity, which will allow more time to be devoted to disability matters.

Performance against the indicators issued by the Office of Disability is detailed in Table 1.

Performance indicator	Actions 2006–07
Employment policies, procedures and practices comply with the requirements of the <i>Disability</i> <i>Discrimination Act (DDA) 1992.</i>	In this reporting period the review of policies and practices was largely completed. Now in a 'routine maintenance' phase, they will be reviewed annually.
Recruitment information for potential job applicants is available in accessible formats on request.	All web authors must comply with the Web Content Accessibility Guidelines. The establishment of a dedicated team of recruitment specialists as part of the restructure of People and Culture will ensure greater consistency of presentation and accessibility.
Agency recruiters and managers apply the principle of 'reasonable adjustment'.	CSIRO policy encourages managers to make adjustments to accommodate the needs of staff with a disability so that they can satisfy the inherent requirements of the job.
Training and development programs consider the needs of staff with disabilities.	Development programs are conducted at venues that can cater to the needs of participants with disabilities.
Training and development programs include information on disability issues as they relate to the program.	The Organisation's Managing People Program covers managing diversity, including staff with a disability. There are various other CSIRO supported programs which provide information on disability issues such as Contact Officer Training courses and information sessions, programs for CSIRO conducted by Diversity@Work and information materials and presentations by the Diversity Contact Officer Network.
Complaints/grievance mechanism, including access to external mechanisms, in place to address issues and concerns raised by staff.	CSIRO has well-developed and publicised internal mechanisms for resolving complaints both formally and informally. In the formal stages matters involve investigation by an independent investigator. There is also scope to refer the matter to the Human Rights and Equal Opportunity Commission.

Table 1: Disability strategy performance

Environmental management, energy and heritage

CSIRO is committed to acting in an environmentally responsible manner in all of its operations and research programs. Our approach to environmental management is incorporated in the CSIRO's Environment Policy which commits CSIRO to ensuring that environmental management of operations remains a high priority and a key to sustainable development for the Organisation. CSIRO monitors environmental performance using positive performance indicators and resource usage across all Divisions.

CSIRO is required to report annually on ecologically sustainable development (ESD) and environmental matters under section 516A of the *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*.

Legislative compliance

CSIRO subscribes to an environmental legal obligations directory covering all Commonwealth, State and Territory environmental legislation. This online system is an extremely valuable source of information for all staff. Regular updates are provided ensuring that CSIRO keeps abreast of its environmental legal obligations.

Environmental risk profile

The environmental risks associated with CSIRO's activities are identified and assessed through Divisional project or work area risk assessments. These Divisional risks are collated to form an organisation-wide environmental risk profile.

During 2006, CSIRO Divisions undertook a review of their environment risks and the measures used to manage those risks. The review indicated that, from an organisational perspective, no high or significant residual environmental risks remained, compared to six areas in 2003. However, one of the potential environmental hazards – sewer discharge – continues to pose a moderate risk to the environment.

The reduction in environmental risk reflects the increased focus that has been placed on the management of environmental hazards. Implementation of site-based environmental management systems and targeted auditing has assisted with the management of environmental issues, through implementation of environmental improvement plans and strategies. Further improvements to environmental management for 2007 will continue to focus on trade waste management, development of site-specific waste management plans and improved staff awareness of waste management processes.

Environmental management system

CSIRO sites operate under an environmental management system (EMS), based on the international environmental management standard ISO 14001. The site-based EMSs focus on the management of environmental risks associated with the unique research activities that occur on each site. The last major CSIRO site to complete their Preliminary Environment Assessment was Energy Technology in Newcastle. Review of the activities in Newcastle showed that the impact on the environment was minimal and the potential risk of a serious environmental incident is considered extremely low.

The site-based nature of the EMS has resulted in the development and implementation of multiple, site-focused procedures. In many instances, the effort to develop operational procedures for a site has been duplicated on other sites, resulting in a high administrative load on the EMS staff. To reduce the bureaucratic nature of the EMS on site staff, CSIRO has commenced a project to streamline the EMS into an organisational-wide approach. The expected implementation timeframe of the streamlined EMS is late 2008.

ISO 14001 certification

In accordance with Australian Government recommendations, the Australian Animal Health Laboratory (AAHL), located at Geelong, Victoria achieved certification to ISO 14001 in May 2005. The site has maintained certification throughout the past 18 months, having participated in four surveillance audits that have identified minor improvements to the site EMS. The on-going certification of the AAHL EMS has been achieved by the commitment of the local EMS committee and staff.

Updated procedures

To enable us to meet our strategic organisational objectives, several procedures have been updated or new ones developed. These include:

- Emergency procedures: CSIRO has ensured that environmental emergencies have been incorporated into the new emergency procedures to assist in protecting the environment once an incident has occurred.
- Plant safety procedures: Whilst the focus in the procedure is predominantly health and safety, environmental considerations have also been included.
- Contractor safety management procedures: Environmental risks are considered in the development and planning of work to be undertaken by contractors on behalf of CSIRO. This commences with the tender process and the scope of works. Environmental risks are considered at the commencement of a project with the use of land, choice of materials, goods and services, use of natural and energy resources, greenhouse gas emissions, waste, disposal and clean up.

Environmental Sustainability Strategy

The CSIRO Environmental Sustainability Strategy (ESS) is under development by a leadership team of representatives from the CSIRO Executive

Management Council, Finance, HSE, Operational Performance, Procurement and Property Services which aims to:

- integrate environmental sustainability considerations in CSIRO strategy and decision-making
- protect the natural and built environment through minimising adverse environmental impact; reduction in consumption of resources; efficient use of energy and materials; and implementation of environmental sustainability considerations into building design
- include environmental sustainability considerations in research being undertaken.

Whilst the various Division or site initiatives to reduce consumption and waste are recognised and applauded, a more consistent and beneficial approach for the Organisation is required. The enterprise wide strategy will have a variety of programs to be implemented across CSIRO and will focus on:

- initiatives to reduce the generation of greenhouse gases
- energy reduction initiatives
- initiatives to reduce the quantity of air travel undertaken by CSIRO staff
- decreased consumption of natural resources, particularly water
- increased 'green' choice in procurement
- improved reporting systems for collection and collation of environmental data
- staff engagement in environmental sustainability activities.

Implementation of the ESS will demonstrate that CSIRO is committed to conducting scientific research in a manner that supports sustainable resource use whilst caring for the environment. Reporting on ESS initiatives and outcomes is expected to commence in late 2007 and a full report provided in 2008.

Notifiable environmental incidents

CSIRO investigates all incidents that have potential for environmental impact. CSIRO experienced 11 minor environmental incidents in 2006–07. Incidents that have the potential to cause significant environmental harm are reported or 'notified' to environmental regulatory bodies, such as the State Environmental Protection Agencies.

During 2006–07, CSIRO did not have any 'notifiable' environmental incidents.

Environmental positive performance indicators

CSIRO collates data on several environmental positive performance indicators (PPIs), including:

- percentage of sites with an environmental emergency response procedure and have conducted an environmental emergency drill in the past 12 months
- percentage of sites with environmental improvement plans in place

• percentage of sites with a waste management program.

The majority of CSIRO sites have environmental emergency procedures and environmental improvement programs in place. During 2006–07, the number of sites that conducted emergency drills with an environmental component increased compared to the previous year, as shown in Figure I. However, the number of sites that have active environmental improvement programs and waste management programs in place decreased slightly during 2006–07. Implementation of the CSIRO Environmental Sustainability Strategy during 2007–08 will strengthen the environmental improvement programs on all sites.

Figure 1: CSIRO environmental positive performance indicators (2004–05 to 2006–07)





Figure 2: CSIRO water consumption 2002–06 kilolitres (kL)

Total Water (kL)

Resource performance indicators

Accurate measurement and monitoring of environmental resource usage is an important part of effective and efficient science, management and business. The indicators selected for resource performance reporting are water and energy consumption, specifically electricity. In addition, greenhouse gas emissions from electricity, natural gas and transport are also reported.

Water

CSIRO has achieved a 32 per cent reduction in water consumption over the past two years. Consumption fell from I 220 III kilo litres (kL) in 2003–04 to 822 615 kL in 2005–06 (see Figure 2).

The decline in water consumption can be attributed to improved water reduction practices and water re-use/recycling projects, particularly as a result of the drought conditions



Figure 3: CSIRO's electricity consumption 2002-06 Terajoules (TJ)



Figure 4: CSIRO's greenhouse gas emissions 2000-06

across Australia. For example, recycling of process water, capture and use of rainwater and the installation of water efficient devices into new and refurbished buildings have contributed to a decrease in the volume of water consumed.

Electricity

CSIRO has achieved a decrease in electricity consumption from 481 Terajoules (TJ) in 2003–04 to 445 TJ in 2005–06, which is a decrease of 7.5 per cent in consumption over the last three years (see Figure 3). The reduction in electricity consumption is due to a number of factors, including inclusion of energy efficient design principles into new and refurbished buildings.

Greenhouse gas emissions

CSIRO's greenhouse gas emissions (GHG) have fallen 7.8 per cent over the last two years. Whilst GHG emissions for transport and natural gas have increased, reduction in electricity use has been achieved (see Figure 4). To proactively reduce our emissions from electricity further, CSIRO has negotiated the purchase of 12.5 per cent green power (produced from clean, renewable sources that do not harm the environment) building on the current 10 per cent green power. It is planned that by 2008, 15 per cent of our electricity will be from green power. This will ensure the Organisation continues to lead the Australian Greenhouse Office (AGO) laboratories category for green power.

National pollutant inventory reporting

Five CSIRO sites burn greater than 17.8 terajoules of fuel per annum, resulting in the need to report into the National Pollutant Inventory at the end of each financial year. Three of the sites, namely Black Mountain (ACT), Riverside (NSW) and Clayton (VIC) are large, multi-Divisional sites. The East Geelong and Belmont sites have significant power requirements due to the operation of plant and equipment associated with the specialist research activities conducted on those sites.

Waste management audit

As a result of a waste management audit of several CSIRO Divisions by the CSIRO Risk Assessment and Audit (RA&A) Unit in 2005, an action plan was developed to address the identified issues.

Many of the recommendations require organisational waste targets and these are being built into the Environmental Sustainability Strategy. A new Waste Management Procedure is nearing completion to assist Divisions in establishing specific plans for their sites in an enterprise approach.

Energy services

CSIRO Property Services provides professional technical advice and assistance on energy, water and sustainability initiatives across the Organisation to minimise the environmental impact, carbon footprint and energy costs of CSIRO's operations. It does this by improving energy efficiency of its facilities, reducing greenhouse gas emissions, purchasing green energy products and promoting sustainability. Financial sustainability has been achieved through value-for-money energy tariffs and resource management accountability.

CSIRO is committed to the Australian Government's Energy-Efficiency in Government Operations by voluntarily reducing its greenhouse gas emissions through the efficient use of energy. CSIRO reports its energy use to the government annually through the Department of the Environment and Water Resources.

Property Services is responsible for negotiating energy supply contracts for CSIRO including the purchase of accredited green power. A contract was negotiated in 2006 from a single supplier for the three year supply of electricity to CSIRO sites within the Australian Capital Territory (ACT), New South Wales (NSW), Queensland, Victoria and South Australia until 30 June 2009. The contract requires that 10 per cent of CSIRO's electricity supply is green power and that by 2008, 15 per cent of its supply will be green power, which will result in at least a 12 per cent reduction in CSIRO's total greenhouse gas emissions each year by 2008. Preparation is currently underway for an electricity supply agreement under Full Retail Contestability across all remaining CSIRO sites in the National Electricity Market. Property Services has also recently consolidated gas supply for ACT, NSW and Victorian sites.

CSIRO's enterprise-wide procurement strategy through consolidating national and State-based electricity and natural gas supply agreements will continue to provide ongoing cost savings and reduction in greenhouse emissions for the Organisation.

Heritage sites

CSIRO has a strong association over its 81year history with the development of industry, agriculture, environment and social aspects of Australia's history. As a community leader and Australian Government agency, CSIRO has an obligation, both statutory (EPBC Act) and morally, to protect and maintain the heritage within its control. CSIRO holds its heritage responsibility in high importance and is proactive in assessing and maintaining any of its assets of architectural, natural, cultural and social significance.

CSIRO Property Services has developed a Heritage Strategy for its estate. Whilst CSIRO occupies 55 sites, it owns or controls for the purpose of the EPBC Act, 40 properties. Three properties contain assets on the Commonwealth Heritage List. Other properties have a range of heritage values, albeit natural, indigenous, social, physical or a combination. Prior to any development activity occurring on a CSIRO owned or controlled property, heritage values are assessed and incorporated into the development proposal. Mindful of both its own and Australia's history, CSIRO strives to retain those elements in developing its facilities whilst ensuring it provides a scientific and research capability to support an economic and environmentally sustainable future for Australia.

As part of the Heritage Strategy, CSIRO will publish on its public website details of its heritage including:

- assets on the Commonwealth Heritage List
- assets of heritage significance but not on the Commonwealth Heritage List
- assets under consideration for their heritage values
- national collections
- other items of heritage (land and buildings) or environmental (natural, endangered species) importance
- heritage assets not owned or controlled but of interest to CSIRO.

CSIRO will, this year, commence reporting to government on assets of national significance, any new listing on the Commonwealth Heritage List, expenditure on the management and maintenance of heritage assets, and actions of significance impacting on heritage values.

CSIRO locations







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Section 4 Financial Statements



INDEPENDENT AUDITOR'S REPORT

To the Minister for Education, Science and Training

Matters relating to the Electronic Presentation of the Audited Financial Statements

This auditor's report relates to the financial statements published on the website of the Commonwealth Scientific and Industrial Research Organisation for the year ended 30 June 2007. The members of the Board are responsible for the integrity of the website.

This auditor's report refers only to the primary statements, schedules and notes named below. It does not provide an opinion on any other information which may have been hyperlinked to/from the audited financial statements.

If the users of this report are concerned with the inherent risks arising from electronic data communications they are advised to refer to the hard copy of the audited financial statements in the Commonwealth Scientific and Industrial Research Organisation's annual report.

Scope

1 have audited the accompanying financial statements of Commonwealth Scientific and Industrial Research Organisation for the year ended 30 June 2007, which comprise: a statement by Board Members and Chief Executive; income statement; balance sheet; statement of changes in equity; cash flow statement; schedules of commitments and contingencies; a summary of significant accounting policies; and other explanatory notes.

The Responsibility of the Board Members for the Financial Statements

The members of the Board are responsible for the preparation and fair presentation of the financial statements in accordance with the Finance Minister's Orders made under the *Commonwealth Authorities and Companies Act 1997* and the Australian Accounting Standards (including the Australian Accounting Interpretations). This responsibility includes establishing and maintaining internal controls relevant to the preparation and fair presentation of the financial statements that are free from material misstatement, whether due to fraud or error; selecting and applying appropriate accounting policies; and making accounting estimates that are reasonable in the circumstances.

Auditor's Responsibility

My responsibility is to express an opinion on the financial statements based on my audit. My audit has been conducted in accordance with the Australian National Audit Office Auditing Standards, which incorporate the Australian Auditing Standards. These Auditing Standards require that I comply with relevant ethical requirements relating to audit engagements and plan and perform the audit to obtain reasonable assurance whether the financial statements are free from material misstatement.

> GPO Box 707 CANBERRA ACT 2601 19 National Circuit BARTON ACT 2600 Phone (02) 6203 7300 Fax (02) 6203 7777

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

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

Independence

In conducting the audit, I have followed the independence requirements of the Australian National Audit Office, which incorporate the ethical requirements of the Australian accounting profession.

Auditor's Opinion

In my opinion, the financial statements of the Commonwealth Scientific and Industrial Research Organisation;

- (a) have been prepared in accordance with the Finance Minister's Orders made under the Commonwealth Authorities and Companies Act 1997, and the Australian Accounting Standards (including the Australian Accounting Interpretations); and
- (b) give a true and fair view of the matters required by the Finance Minister's Orders including the Commonwealth Scientific and Industrial Research Organisation's financial position as at 30 June 2007 and of its financial performance and its cash flows for the year then ended.

Australian National Audit Office

John McCullough Acting Executive Director

Delegate of the Auditor-General

Canberra 28 August 2007

COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION STATEMENT BY BOARD MEMBERS AND CHIEF EXECUTIVE

In our opinion, the attached financial statements for the year ended 30 June 2007 are based on properly maintained financial records and give a true and fair view of the matters required by the Finance Minister's Orders made under the *Commonwealth Authorities and Companies Act 1997*.

In our opinion, at the date of this statement, there are reasonable grounds to believe that the Organisation will be able to pay its debts as and when they become due and payable.

This Statement is made in accordance with the resolution of the Board Members.

John W Stocker Chairman of the Board 23 August 2007

Geoff G Garrett Chief Executive and Board Member 23 August 2007

1/2/10

Michael S Whelan Chief Financial Officer 23 August 2007

COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION INCOME STATEMENT For the year ended 30 June 2007

	Notes	2007 \$'000	2006 \$'000
INCOME			
Revenue			
Revenues from Government	5.1	610 060	593 928
Sale of goods and rendering of services	5.2	285 772	272 037
Interest	5.3	6 406	7 626
Rents	5.4	6 361	6 173
Royalties	5.5	17 135	20 508
Other revenues	5.6	30 707	29 641
Total Revenues		956 441	929 913
Gains			
Net gains from sale of property, plant and equipment	5.7	2 714	15 467
Net gains from sale of equity investments and intellectual	5.0	10,110	11.010
property	5.8	13 442	11 910
Net fersion evenence soins	5.9	749	-
Total Gaina	5.10	16.005	27 562
		10 905	27 502
TOTAL INCOME		973 346	957 476
EXPENSES		550.004	544.005
Employee benefits	6.1	559 884	544 925
Suppliers	0.2 6.3	332 399 75 731	320 103
Einance costs	6.4	3 101	79 930
Write-down and impairment of assets	6.5	1 214	(829)
Net foreign exchange losses	6.6	174	(023)
	0.0		
TOTAL EXPENSES		972 703	947 783
		643	9 693
Share of net operating surplus/(deficit) of joint ventures accounte for using the equity method	d 9	376	279
	J	0,0	213
Surplus/(Deficit)		1 019	9 972

The above Statement should be read in conjunction with the accompanying notes.

COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION BALANCE SHEET As at 30 June 2007

	Notes	2007 \$'000	2006 \$'000
ASSETS		\$ 000	Ψ 000
Financial Assets			
Cash and cash equivalents	7	131 048	153 328
Trade and other receivables	8	57 157	63 648
Investments accounted for using the equity method	9	1 050	795
Other investments	10	50 154	34 728
Total financial assets		239 409	252 499
Non-Financial Assets			
Land and buildings	11	998 022	1 008 561
Plant and equipment	12	235 131	221 239
Investment properties	13	37 723	37 810
Intangibles	14	31 515	17 954
Properties held for sale	15	4 405	-
Inventories held for sale	16	1 075	1 064
Other non-financial assets	17	22 390	19 889
		1 330 201	1 300 517
TOTAL ASSETS		1 569 670	1 559 016
LIABILITIES			
Payables			
Suppliers	18	55 370	50 006
Other payables	19	71 085	62 478
Total payables		126 455	112 484
Interest Bearing Liabilities			
Leases	20	72 004	76 200
Deposits	21	16 866	19 705
Total interest bearing liabilities		88 870	95 905
Provisions			
Employee provisions	22	186 034	184 673
Total provisions		186 034	184 673
TOTAL LIABILITIES		401 359	393 062
NET ASSETS		1 168 311	1 165 954
FOUNTY			
Assets revaluation reserves		709 411	710 476
Other reserves		6 993	4 590
Retained surpluses		451 907	450 888
TOTAL EQUITY		1 168 311	1 165 954
Current assets		216 075	237 929
Non-current assets		1 353 595	1 321 087
Current liabilities		315 852	309 348
Non-current liabilities		85 507	83 714

The above Balance Sheet should be read in conjunction with the accompanying notes.

Financial Statements

COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION STATEMENT OF CHANGES IN EQUITY

As at 30 June 2007

	Retained Asset Surpluses F		Asset Rev Reser	Asset Revaluation Other Reserves Reserves			Total Equity		
	2007 \$'000	2006 \$'000	2007 \$'000	2006 \$'000	2007 \$'000	2006 \$'000	2007 \$'000	2006 \$'000	
Opening balance at 1 July	455 478	440 916	710 476	710 476	-	-	1 165 954	1 151 392	
Adjustment for changes in accounting policies (Note 1.13)	(4 590)	-	-	-	4 590	-	-	-	
Adjusted opening balance	450 888	440 916	710 476	710 476	4 590	-	1 165 954	1 151 392	
ncome and expenses									
ncome and expenses recognised directly in equity:									
Fair value gains adjustment on 1 July 2005 on investment Fair value gains on investment					-	39	-	39	
Classified as available for sale per AASB 139 Impairment of assets recognised					2 562	4 551	2 562	4 551	
directly in equity			(1 065)	-			(1 065)	-	
Impairment of financial asset recognised in Income Statement (Note 6.5) Realisation of fair value gains/(losses) on investments recognised in Income Statement					590	-	590	-	
(Note 5.9) Subtotal income and expenses					(749)	-	(749)	-	
recognised directly in equity	-	-	(1 065)	-	2 403	4 590	1 338	4 590	
period	1 019	9 972					1 019	9 972	
Fotal income and expenses directly recognised in equity	1 019	9 972	(1 065)	-	2 403	4 590	2 356	14 562	
Fransactions with owners Distributions to owners Contributions by owners	-	-	-	-	-	-	-	-	
Subtotal transactions with owners	-	-	-	-	-	-	-	-	
Closing balance at 30 June	451 907	450 888	709 411	710 476	6 993	4 590	1 168 311	1 165 954	

The above Statement should be read in conjunction with the accompanying notes.

COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION CASH FLOW STATEMENT For the year ended 30 June 2007

Notes	s 2007	2006 \$'000
OPERATING ACTIVITIES	\$ 000	\$ 000
Cash received		
Appropriations	610 060	593 928
Goods and services	366 899	347 770
Interest	6 572	7 055
Net GST received	10 344	8 506
Deposits	-	4 587
Total cash received	993 875	961 846
Cash used		
Employees	593 058	555 611
Suppliers	316 927	336 107
Finance costs	3 101	3 677
Deposits	2 839	-
Total cash used	915 925	895 395
Net cash from or (used by) operating activities23	77 950	66 451
Cash received		
Proceeds from sale of property plant and equipment	10 738	33 085
Proceeds from sale of equity investments and intellectual	14 625	16 461
property	11020	10 101
Loans repaid	-	1 025
Total cash received	25 363	50 571
Cash used		
Purchase of property, plant and equipment	107 436	98 841
Purchase of equity investments	13 961	19 912
Total cash used	121 397	118 753
Net cash from or (used by) investing activities	(96 034)	(68 182)
Cash used for other financing activities	4 196	3 616
	4 190	3 616
Net cash from or (used by) financing activities	(4 196)	(3.616)
Net outsh from or (used by) maneing activities	(4 130)	(0010)
Net increase or (decrease) in cash held	(22,280)	(5 347)
Cash at beginning of the reporting period	153 328	158 675
Cash at end of the reporting period 7	131 048	153 328

The above Statement should be read in conjunction with the accompanying notes.

COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION SCHEDULE OF COMMITMENTS As at 30 June 2007

	2007	2000
ВҮ ТҮРЕ	\$1000	\$1000
Capital commitments		
Land and buildings ¹	25 677	13 890
Plant and equipment ²	294	1 703
Investments ³	3 029	2 662
Total capital commitments	29 000	18 255
Other commitments		
Operating leases ⁴	377 239	367 316
Research and development commitments ⁵	276 283	246 020
Other commitments	8 666	15 128
Total other commitments	662 188	628 464
Commitments receivable		
Research and development commitments	226 430	185 857
Other receivables	13 700	12 797
Total commitments receivable	240 130	198 654
Net commitments by type	451 058	448 065
BY MATURITY		
Capital commitments		
One year or less	27 067	16 927
From one to five years	1 933	1 328
Total capital commitments	29 000	18 255
Operating lease commitments		
One year or less	32 975	29 040
From one to five years	122 461	92 580
Over five years	221 803	245 696
Total operating lease commitments	377 239	367 316
Other commitments		
One year or less	177 385	153 527
From one to five years	107 564	104 322
Over five years	-	3 299
Total other commitments	284 949	261 148
Commitments receivable	(240 130)	(198 654)
Net commitments by maturity	451 058	448 065

SCHEDULE OF COMMITMENTS (cont)

- 1. Land and building commitments are outstanding contractual payments for buildings under construction.
- 2. Plant and equipment commitments are for the purchase of plant and equipment.
- 3. Investment commitments are commitments for additional contributions for equity investment.
- 4. Operating leases are effectively non-cancellable and comprise:

Nature of lease	General Description of leasing arrangement
Leases for office and scientific research accommodation	Lease payments are subject to annual increase in accordance with the terms of agreement eg. upward movements in the Consumer Price Index. The accommodation leases are still current and each may be renewed at the Organisation's option.
Leases for motor vehicles	No contingent rentals exist. There are no purchase options available to the Organisation.
Leases for computer equipment	Lessor provides computer equipment designated as necessary in the supply contract for a general period of 2–3 years.

5. Research and development commitments are Agreements Equally Proportionately Unperformed commitments payable and receivable for research and development contracts.

Commitments are GST inclusive where relevant.

The above Schedule should be read in conjunction with the accompanying notes.

COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION SCHEDULE OF CONTINGENCIES As at 30 June 2007

	Notes	Guarantees		Claims for Damages or Costs		Total	
		2007 \$'000	2006 \$'000	2007 \$'000	2006 \$'000	2007 \$'000	2006 \$'000
Contingent assets	24						
Balance from previous period		-	-	-	-	-	-
New		-	-	4 817	-	4 817	-
Re-measurement		-	-	-	-	-	-
Assets crystallised		-	-	-	-	-	-
Expired		-	-	-	-	-	-
Total contingent assets		-	-	4 817	-	4 817	-
Contingent liabilities	24						
Balance from previous period		-	44	250	525	250	569
New		-	-	-	-	-	-
Re-measurement		-	-	-	(275)	-	(275)
Liabilities crystallised		-	-	-	-	-	-
Obligations expired		-	(44)	-	-	-	(44)
Total contingent liabilities		-	-	250	250	250	250
Net contingent assets/(liabilitie	s)					4 567	(250)

Details of each class of contingent liabilities and assets, including those not included above because they cannot be quantified, or are considered remote, are shown at Note 24: Contingencies.

The above Schedule should be read in conjunction with the accompanying notes.

COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION NOTES TO AND FORMING PART OF THE FINANCIAL STATEMENTS For the year ended 30 June 2007

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COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION NOTES TO AND FORMING PART OF THE FINANCIAL STATEMENTS For the year ended 30 June 2007

Note 1 Summary of Significant Accounting Policies

1.1 Basis of Preparation of the Financial Report

The financial statements and notes are required by Clause 1(b) of Schedule 1 to the *Commonwealth Authorities and Companies Act 1997* and are a General Purpose Financial Report.

The continued existence of the Organisation in its present form and with its present programs is dependent on Government policy and on continuing appropriations by Parliament for the Organisation's administration and programs.

The financial statements and notes have been prepared in accordance with:

- Finance Minister's Orders (or FMOs) for reporting period ended 30 June 2007; and
- Australian Accounting Standards and Accounting Interpretations issued by the Australian Accounting Standards Board (AASB) that apply for the reporting period.

The Financial Report has been prepared on an accrual basis and is in accordance with the historical cost convention, except for certain assets at fair value. Except where stated, no allowance is made for the effect of changing prices on the results or the financial position.

The financial report is presented in Australian dollars and values are rounded to the nearest thousand dollars unless otherwise specified.

Unless an alternative treatment is specifically required by an Accounting Standard or the FMOs, assets and liabilities are recognised in the Balance Sheet when and only when it is probable that future economic benefits will flow to the Organisation and the amounts of the assets or liabilities can be reliably measured. However, assets and liabilities arising under agreements equally proportionately unperformed are not recognised unless required by an Accounting Standard. Liabilities and assets that are unrecognised are reported in the Schedule of Commitments and the Schedule of Contingencies (other than unquantifiable or remote contingencies, which are reported at Note 24).

Unless alternative treatment is specifically required by an accounting standard, revenues and expenses are recognised in the Income Statement when and only when the flow, consumption or loss of economic benefits has occurred and can be reliably measured.

1.2 Significant Accounting Judgements and Estimates

In the process of applying the accounting policies listed in this note, the Organisation has made the following judgements that have the most significant impact on the amounts recorded in the financial statements:

- The fair value of land and buildings designated for possible sale and investment property has been taken to be the market value of similar properties as determined by an independent valuer. However, land and buildings which will continue to be used for research activities have been valued by the Organisation's registered valuer using fair value methodology.
- The fair value of plant and equipment has been valued by the Australian Valuation Office using fair value methodology.

• The fair value of investments in unlisted companies is based either on independent review, the recent price paid by investors, or at cost and assessed for impairment. The fair value of investments disclosed in the financial statements has been reviewed and endorsed by the Board Commercial Committee of the Organisation.

No accounting assumptions or estimates have been identified that have a significant risk of causing a material adjustment to carrying amounts of assets and liabilities within the next accounting period.

1.3 Statement of Compliance

Australian Accounting Standards require a statement of compliance with International Financial Reporting Standards (IFRSs) to be made where the financial report complies with these standards. Some Australian equivalents to IFRSs and other Australian Accounting Standards contain requirements specific to not-for-profit entities that are inconsistent with IFRS requirements. The Organisation is a not for profit entity and has applied these requirements, so while this financial report complies with Australian Accounting Standards including Australian Equivalents to International Financial Reporting Standards (AEIFRSs) it cannot make this statement.

<u>Adoption of new Australian Accounting Standard requirements</u> No accounting standard has been adopted earlier than the effective date in the current period.

The Organisation is required to disclose Australian Accounting Standards and Interpretations which have been issued but are not yet effective that have not been early adopted by the Organisation. The following adopted requirements have resulted in a change to the Organisation's accounting policies or have affected the amounts reported in the current or prior periods or are estimated to have a financial affect in future reporting periods.

Restriction of the fair value option under AASB 139

The AASB through 2005-4 Amendments to Australian Accounting Standards (AASB 139, AASB 132, AASB 1, AASB 1023 and AASB 1038) restricted the option to designate a financial asset or liability at fair value through profit or loss.

The change was introduced with effect from the beginning of the comparative reporting period (1 July 2005). The Organisation had previously designated equity investment, including associate and joint venture companies at fair value through profit or loss. The amendment means that these investments can no longer be designated as such. The Organisation has elected to change the designation of these financial assets as 'available for sale' under AASB 139, *'Financial Instruments: Recognition and Measurement'*. Under the transitional provision this designation can be the date of the de-designation (1 July 2005).

The category (available for sale) of financial instrument while continued to be carried at fair value has resulting changes in value taken directly to equity reserve, named 'fair value gains/losses reserve on investment' instead of the Income Statement. Upon derecognition or sale of the financial asset the reserve is transferred to the Income Statement.

Other effective requirement changes

The following amendments, revised standards or interpretations have become effective but have had no financial impact or do not apply to the operations of the Organisation.

Amendments:

- 2005-1 Amendments to Australian Accounting Standards [AASBs 1, 101, 124]
- 2005-6 Amendments to Australian Accounting Standards [AASB 3]
- 2006-1 Amendments to Australian Accounting Standards [AASB 121]
- 2006-3 Amendments to Australian Accounting Standards [AASB 1045]

Interpretations:

- UIG 4 Determining whether an Arrangement contains a Lease
- UIG 5 Rights to Interests arising from Decommissioning, Restoration and Environmental Rehabilitation Funds
- UIG 7 Applying the Restatement Approach under AASB 129, Financial Reporting in Hyperinflationary Economies
- UIG 8 Scope of AASB 2
- UIG 9 Reassessment of Embedded Derivatives

UIG 4 and UIG 9 might have impacts in future periods, subject to existing contracts being renegotiated.

Future Australian Accounting Standard requirements

The following new standards, amendments to standards or interpretations have been issued by the Australian Accounting Standards Board but are effective for future reporting periods. It is estimated that the impact of adopting these pronouncements when effective will have no material financial impact on future reporting periods.

Financial instrument disclosure

AASB 7 *Financial Instruments: Disclosures* is effective for reporting periods beginning on or after 1 January 2007 (the 2007–08 financial year) and amends the disclosure requirements for financial instruments. In general AASB 7 requires greater disclosure than that presently. Associated with the introduction of AASB 7 a number of accounting standards were amended to reference the new standard or remove the present disclosure requirements through 2005-10 Amendments to Australian Accounting Standards [AASB 132, AASB 101, AASB 114, AASB 117, AASB 133, AASB 139, AASB 1, AASB 4, AASB 1023 and AASB 1038]. These changes have no financial impact but will effect the disclosure presented in future financial reports.

<u>Other</u>

The following standards and interpretations have been issued but are not applicable to the operations of the Organisation.

- AASB 1049 Financial Reporting of General Government Sectors by Governments
- UIG 10 Interim Financial Reporting and Impairment

1.4 Consolidation

The Organisation has investments in a number of companies (see Note 10) over which it has control. These companies have been established for the purpose of (i) commercialisation of the Organisation's intellectual property, (ii) provision of specific services to owners or (iii) participation in the Ensis joint venture.

The Organisation's policy is to only consolidate these entities where they have a material impact on the Organisation's financial statements.

As none of these entities is assessed as having a material impact on the financial position and/or operations of the Organisation, no consolidated financial statements have been prepared.

1.5 Revenue

Revenues from Government

Amounts appropriated for the Organisation's outputs appropriations for the year (adjusted for additions and reductions) are recognised as revenue.

Other Types of Revenue

Revenue from rendering of contract research and development services is recognised by reference to the stage of completion of contracts at the reporting date. The Organisation undertakes contract research and development services on behalf of third parties when the outcome of a service can be reliably estimated. Contract revenue and expenses are incurred and recognised by reference to the stage of completion of a contract. The balances of contract research and development activities in progress are accounted as either contract research work in progress (Note 17), being the gross unbilled amount expected to be collected from clients for contract research and services performed as at 30 June 2007 or contract research revenue received in advance (Note 19), where revenue for contract research and services received and/or billed exceeded revenue earned. Where necessary, a surplus or deficit is recognised progressively for each contract research and development services.

Revenue from sale of other goods (including non-current assets) and other services is recognised upon delivery of goods and services performed and when:

- the risks and rewards of ownership have been transferred to the buyer
- the seller retains no managerial involvement nor effective control over the goods and services
- the revenue and transaction costs incurred can be reliably measured
- it is probable that the economic benefits associated with the transaction will flow to the Organisation.

Receivables for goods and services, which have 30 day terms, are recognised at the nominal amounts due less any provision for doubtful debts. Collectability of debts is reviewed at balance date. Provisions are made when collectability of the debt is no longer probable.

Interest revenue is recognised using the effective interest method as set out in AASB 139 *Financial Instruments: Recognition and Measurement.*

Royalty revenue is recognised on an accrual basis in accordance with the substance of the relevant royalty agreements.

1.6 Gains

Resources Received Free of Charge

Services received free of charge are recognised as revenue when and only when the fair value can be reliably determined and the services would have been purchased if they had not been donated. Use of those resources is recognised as an expense.

Resources received free of charge are recorded as either revenue or gains depending on their nature ie. whether they have been generated in the course of the ordinary activities of the Organisation.

Contributions of assets at no cost of acquisition or for nominal consideration are recognised as gains at their fair value when the asset qualifies for recognition, unless received from another Government Authority or Authority as a consequence of a restructuring of administrative arrangements.

Sale of Assets

Gains from disposal of non-current assets are recognised when control of the asset has passed to the buyer.

1.7 Research and Development Expenditure and Intellectual Property

All research and development costs, including costs associated with protecting intellectual property (eg. patents and trademarks) are expensed as incurred.

1.8 Employee Benefits

Liabilities for services rendered by employees are recognised at the reporting date to the extent that they have not been settled.

Liabilities for 'short-term employee benefits' (as defined in AASB 119) and termination benefits due within twelve months are measured at their nominal amounts. The nominal amount is calculated with regard to the rates expected to be paid on settlement of the liability.

All other employee benefit liabilities are measured at the present value of the estimated future cash outflows to be made in respect of services provided by employees up to the reporting date.

Leave

The liability for employee benefits includes provisions for annual leave, long service leave and severance payments. No provision has been made for sick leave as all sick leave is non-vesting and the average sick leave taken in future years by employees is estimated to be less than the annual entitlement for sick leave.

The leave liabilities are calculated on the basis of employees' remuneration, including the Organisation's employer superannuation contribution rates to the extent that the leave is likely to be taken during service rather than paid out on termination.

The liability for long service leave has been determined by reference to the work of an actuary as at 30 June 2007. The estimate of the present value of the liability takes into account attrition rates and pay increases through promotion and inflation.

Separation and redundancy

Provision is made for separation and redundancy benefit payments in circumstances where the Organisation has developed a detailed formal plan for the termination and informed those employees affected that it will carry out the termination.

Superannuation

Employees of the Organisation are members of the Commonwealth Superannuation Scheme (CSS), the Public Sector Superannuation Scheme (PSS), or the PSS accumulation plan (PSSap).

The CSS and PSS are defined benefit schemes for the Australian Government. The PSSap is a defined contribution scheme.

The liability for defined benefits is recognised in the financial statements of the Australian Government and is settled by the Australian Government in due course.

The Organisation makes employer contributions to the CSS and PSS at rates determined by an actuary to be sufficient to meet the cost to the government of the superannuation entitlements of the Organisation's employees. The Organisation accounts for the contributions as if they were contributions to defined contribution plans. In addition a 3% Employer Productivity Superannuation Contribution is paid for CSS and PSS members.

From 1 July 2006, new employees have been subject to the Superannuation Choice arrangements applying to Commonwealth non-Australian Public Service agencies. Depending on their circumstances the default fund can be PSSap or AGEST. Employees who choose to join AGEST or other eligible funds (other than the CSS, PSS or PSSap) have a superannuation guarantee contribution paid into their nominated funds.

1.9 Workers' Compensation

The Organisation's workers' compensation liability is covered by the premium paid to the Commission for the Safety, Rehabilitation and Compensation of Commonwealth Employees 'Comcare' and no additional provision for liability is required.

1.10 Insurance

As part of its risk management strategy, the Organisation has insured for risks through the Australian Government's insurable risk managed fund 'Comcover'.

1.11 **Financial Risk Management**

The Organisation's activities expose it to normal commercial financial risks for which it has developed internal policies to effectively manage those risks. The Organisation's exposure to market, credit, liquidity, cash flow, fair value and interest rate risks is considered to be low.

1.12 **Cash and Cash Equivalents**

Cash and cash equivalents means notes and coins held and any deposits held at call with a bank or financial institution. Cash is recognised at its nominal amount.

1.13 Investments

In accordance with AASB 139, Financial Instruments: Recognition and Measurement, the Organisation had elected to initially designate its equity investments at fair value through profit or loss as at 1 July 2005 with the net fair value gains of \$4.56 million in 2005-06 recognised in the Income Statement that year. However, with the restriction in the designation of equity investments at fair value through profit or loss stated in Note 1.3 under 'Restriction of the fair value option under AASB 139', the Organisation has changed the designation of its equity investments, including associate and joint venture companies as available for sale. As a result of this change, the total net fair value gains of \$2.56 million in 2006-07 was recognised directly in equity as per AASB 139.

Disclosure requirements have been made in accordance with AASB 132, Financial Instruments: Presentation and Disclosures and applying the fair value method.

For start up listed investments the quoted market price is their fair value. However, for start up unlisted companies (including controlled, joint venture and associate entities disclosed in Note 10) which have been established for the purpose of commercialisation of the Organisation's Intellectual Property, the Organisation has determined the fair values of these companies in accordance with the Australian Venture Capital Association Ltd's Valuation Guidelines.

However, for investments in special purpose entities disclosed in Note 10(b) (eg. AARNet, VERNet and Provisor), where investments are made to gain access to research facilities/networks or to provide services to owners, the Organisation is a long-term shareholder and they are not for sale. These investments are valued at cost and tested for impairment loss each year.

1.14 Property, Plant and Equipment

Asset Recognition Threshold

Purchases of property, plant and equipment are recognised initially at cost in the Balance Sheet, except for purchases costing less than \$3 000, which are expensed in the year of acquisition (other than where they form part of a group of similar items which are significant in total).

Assets acquired at no cost or for nominal considerations are initially recognised as assets and revenues at their fair value at the date of acquisition.

Revaluations

Following initial recognition property, plant and equipment, including assets under finance leases are carried at fair value less accumulated depreciation and accumulated impairment losses. Valuations are conducted with sufficient frequency to ensure the carrying amount of assets do not differ materially from the assets' fair value as at reporting date. The regularity of independent valuation depends upon the volatility of movements in the market values for the relevant assets. The last revaluation at fair value was undertaken as at 30 June 2005 using fair value methodology. The Organisation has planned for a revaluation of its property, plant and equipment in 2007–08.

Revaluation adjustments are made on a class basis. Any revaluation increment is credited to asset revaluation reserve under equity, except to the extent that it reverses a previous revaluation decrement of the same asset class that was previously recognised through surplus and deficit. Revaluation decrements for a class of assets are recognised directly through surplus and deficit except to the extent that they reverse a previous revaluation increment for that class.

Any accumulated depreciation as at the revaluation date is eliminated against the gross carrying amount of the asset and the asset restated to the revalued amount.

Land, which will continue to be used for research activity, is valued by the Organisation's registered valuer at fair value, ie.' existing use value', and the valuation methodology has been endorsed by independent valuers. Existing use contemplates the continued use of the asset for the same application as at the date of valuation, having regard to the asset's capacity to continue contributing to the value of the Organisation but ignoring alternative uses.

Buildings and leasehold improvements, which will continue to be used for research activities, are valued using the fair value methodology. This valuation approach determines the depreciated replacement cost using current building prices to arrive at current gross replacement cost less accumulated depreciation having regard to the age, condition and suitability for research and development activities. Building valuations include plant, fit-outs, fixtures and fittings, which form an integral part of the building.

Investment properties, includes land and buildings where the carrying amount is at fair value, determined by the Organisation's registered valuer, Ross Stevens (FAPI) having an appropriate recognised professional qualification and recent experience in the location and category of the property being valued. Fair value was determined having regard to recent market transactions for similar properties.

Investment properties comprise two properties that are leased to third parties with terms varying from monthly to 10 year periods. Total lease rental income of \$2.21 million from these investment properties was disclosed in the Income Statement. No separate record was maintained for direct operating expenses (including repairs and maintenance) for these investment properties.

All plant and equipment have been revalued by the Australian Valuation Office using the fair value methodology. Assets which would not be replaced, or are surplus to requirements, are valued at net realisable value.

Property, plant and equipment which are purchased from contract research funds and where the control and subsequent sale proceeds are refunded to contributors under the terms of the agreements, are expensed during the year of purchase. Separate records for these assets are maintained and disclosed in Note 26.

Depreciation and Amortisation

Depreciable property, plant and equipment assets are written-off to their estimated residual values over their estimated useful lives to the Organisation using, in all cases, the straight-line method of depreciation. Leasehold improvements are depreciated on a straight-line basis over the lesser of the estimated useful life of the improvements or the unexpired period of the lease.

Depreciation/amortisation rates (useful lives), residual values and methods are reviewed at each reporting date and necessary adjustments are recognised in the current, or current and future reporting periods, as appropriate.

Depreciation rates applying to each class of depreciable asset are based on the following useful lives:

	2007	2006
Building on freehold land	40 to 50 years	40 to 50 years
Leasehold improvements	Lease term	Lease term
Passenger vehicles	7 years	7 years
Agricultural and transport equipment	3 to 20 years	3 to 20 years
Computing equipment	2 to 5 years	2 to 5 years
Scientific equipment	5 to 20 years	5 to 20 years
Furniture and office equipment	5 to 15 years	5 to 15 years
Workshop equipment	20 to 25 years	20 to 25 years
Research vessels	25 years	25 years
Australia Telescope	15 to 58 years	15 to 58 years

Impairment

All assets were assessed for impairment at 30 June 2007. Where indications of impairment exist, the asset's recoverable amount is estimated and an impairment adjustment made if the asset's recoverable amount is less than its carrying amount.

The recoverable amount of an asset is the higher of its *fair value less costs to sell* and its *value in use*. *Value in use* is the present value of the future cash flows expected to be derived from the asset. Where the future economic benefit of an asset is not primarily dependent on the asset's ability to generate future cash flows, and the asset would be replaced if the Organisation were deprived of the asset, its *value in use* is taken to be its depreciated replacement cost.

1.15 Intangibles

The Organisation's intangibles comprise internally developed and acquired software for internal use. These assets are carried at cost, except where the estimated cost of the software is less than the \$250 000 threshold, which are expensed in the year of acquisition.

Software is amortised on a straight-line basis over its anticipated useful life. The useful lives of the Organisation's software are 2 to 10 years. (2005–06 2 to 10 years).

All software assets were assessed for indications of impairment as at 30 June 2007 and no indications of impairment were found.

1.16 Inventories

Inventories held for sale represent books, CD-ROMs and videos of publishing and media products. They are valued at the lower of cost and net realisable value.

1.17 Consumable Stores

Stocks of consumable stores, which are not held for resale, are expensed in the year of purchase. These stores mainly consist of fuel and lubricants, chemical supplies, maintenance materials and stationery. The total value is not considered material in terms of total expenditure or total assets.

1.18 Leases

A distinction is made between finance leases, which effectively transfer from the lessor to the lessee substantially all the risks and benefits incidental to ownership of leased noncurrent assets. An operating lease is a lease that is not a finance lease. In operating leases, the lessor effectively retains all such risks and benefits.

Where a non-current asset is acquired by means of a finance lease, the asset is capitalised at either the fair value of the lease property or, if lower, the present value of minimum lease payments at the inception of the contract and a liability recognised at the same time and for the same amount.

The discount rate used is the interest rate implicit in the lease. Leased assets are amortised over the period of the lease. Lease payments are allocated between the principal component and the interest expense.

Operating lease payments are expensed on a straight line basis which is representative of the pattern of benefits derived from the leased assets.

1.19 Suppliers and Other Payables

Suppliers and other payables are recognised at their nominal amounts, being the amounts at which the liabilities will be settled. Liabilities are recognised to the extent that the goods or services have been received (and irrespective of having been invoiced).

1.20 Foreign Currency Transactions

Transactions denominated in a foreign currency are converted at the exchange rate prevailing at the date of the transaction. Foreign currency receivables and payables are also translated at the exchange rates prevailing at balance date. Associated currency gains and losses are brought to account in the Income Statement. The Organisation does not enter into specific forward exchange contracts during the reporting period.

1.21 Taxation/Competitive Neutrality

Taxation

In accordance with section 53 of the *Science and Industry Research Act 1949*, the Organisation is exempt from all forms of Australian taxation except Fringe Benefits Tax (FBT) and the Goods and Services Tax (GST). The Organisation pays applicable taxes in overseas countries.

Revenues, expenses and assets are recognised net of GST:

- except where the amount of GST incurred is not recoverable from the Australian Taxation Office
- except for receivables and payables.

Competitive neutrality

The Australian Government *Competitive Neutrality Guidelines for Managers* require government bodies to operate with no net competitive advantages over private sector competitors. For the Organisation, Competitive Neutrality policy is applied to consulting and services. Neutrality is achieved by incorporating tax equivalence and rate of return components in pricing of these services.

1.22 Joint Ventures

Joint venture operations – Co-operative Research Centres (CRCs)

The proportionate interest in CRCs regarded as joint venture operations are disclosed in the financial statements under appropriate headings. Their primary source of funding is from the Australian Government and funding is progressively drawn down over the life of the CRCs and distributed to participants such as CSIRO and Universities for research and development work. The Organisation's contributions to the CRCs are expensed as incurred and funds received from CRCs are recognised as revenue to the extent that work has been performed in the Income Statement. Details of specific 'joint venture operations' are disclosed in Note 25.

Joint venture entities – unincorporated

The interest in a joint venture entity is accounted for using the equity method.

Food Science Australia (FSA) – The Organisation's 85% interest in FSA is accounted for using the equity method (refer Note 9). However, in 2005–06 the Organisation's investment in FSA had been reduced below zero due to its share of FSA's accumulated losses. As a result, the equity method was not adopted in 2005–06.

Murray Darling Freshwater Research Centre (MDFRC) – The Organisation's 50% interest in the MDFRC is accounted for using the equity method (refer Note 9).

Ensis – The Organisation's 50% interest in the joint venture entity, Ensis is via its fully owned subsidiary, CSIRO FFP Pty Ltd. The Organisation's 50% share of Ensis' gross margin for the year has been accounted for by CSIRO FFP Pty Ltd using the equity method. Details of CSIRO FFP Pty Ltd's share of Ensis gross profit margin are disclosed in Note 9.

1.23 Borrowing Costs

All borrowing costs are expensed as incurred.

1.24 Contingent Liabilities and Contingent Assets

Contingent Liabilities and Assets are not recognised in the Balance Sheet but are reported in the relevant schedules and notes. They may arise from uncertainty as to the

existence of a liability or asset, or represent an existing liability or asset in respect of which settlement is not probable or the amount cannot be reliably measured. Contingent assets are reported when settlement is probable, and contingent liabilities are recognised when settlement is greater than remote.

1.25 Comparative Figures

Where necessary, comparative figures have been adjusted to conform to changes in presentation in these financial statements.

Note 2 Economic Dependency

The Organisation was established by the *Science and Industry Research Act* 1949 and is controlled by the Commonwealth of Australia. It receives approximately two thirds of its funding from Commonwealth Parliamentary appropriations. The current Triennium Funding Agreement with the Australian Government covers the period 2004–05 to 2006–07.

The Organisation is dependent on appropriations from the Parliament of the Commonwealth of Australia for its continued existence and ability to carry out its normal activities.

Note 3 Segment Reporting

The Organisation principally operates in the field of scientific and industrial research and development in Australia with a small overseas presence related to specific Australian research objectives. It is therefore considered that for segment reporting, it operates in one industry (scientific research and development) and principally one geographical location (Australia).

Note 4 Events Occurring After Reporting Date

At the time of completion of this note, the Organisation was not aware of any events occurring after reporting date.

	Note	s	2007	2006
Note 5	Income		\$'000	\$'000
	Revenues			
5.1	Revenues from Government			
	Appropriations for outputs	-	610 060	593 928
5.2	Sale of goods and rendering of services			
	Provision of goods – related entities		40	-
	Provision of goods – external entities		8 896	7 637
	Total sales of goods	1	8 936	7 637
	Rendering of services – related entities		110 263	76 968
	Rendering of services – external entities		166 573	187 432
	Total rendering of services		276 836	264 400
	Total sales of goods and rendering of services	1	285 772	272 037
		Ī		
	Cost of goods sold – inventories only		883	1 025
5.0	Indexe ad			
5.3	Interest Bank and term denosite		6 406	7 606
	Bank and term deposits	-	0 400	1 020
5.4	Rents			
	Rental income		6 361	6 173
5.5	Royalties			
	Royalties	-	17 135	20 508
5.6	Other revenues			
	Vehicle contributions – staff		78	88
	Sale of primary produce		986	879
	Share of FSA operating surplus 9		-	337
	FSA cost recovery, except employee costs		9 316	4 581
	FFP research support cost recovery 9		2 851	4 447
	FFP direct cost recovery, except employee costs 9		7 088	6 484
	Donations		60	138
	Education programs and subcriptions		2 963	2 183
	Livestock services		1 959	2 554
	Other		5 406	7 950
	Total other revenues		30 707	29 641

Note 5	Income (cont)	otes	2007 \$'000	2006 \$'000
	Gains		\$ 000	φ 000
5.7	Net gains/(losses) from sale of property, plant and equipment			
	Land and Buildings			
	Proceeds from sale		9 806	30 566
	Less, Net book value		(6 410)	(15 067)
	Selling expenses		(132)	-
	Net gains/(losses)		3 264	15 499
	Plant and equipment			
	Proceeds from sale		931	2 519
	Less, Net book value		(1 481)	(2 551)
	Net gains/(losses)		(550)	(32)
	Total net gains/(losses) from sale of property,			
	plant and equipment		2 714	15 467
5.8	Net gains from sale of equity investments and			
	intellectual property			
	Proceeds from sale of equity investments		1 320	2 618
	Proceeds from sale of IP to subsidiaries		-	2 969
	other entities		13 062	63/1
	Total proceeds		14 382	11 928
	Loss Not book value		(930)	(18)
	Selling expenses		(10)	-
	Total net gains		13 442	11 910
5.9	Realisation of fair value gains reserve			
	Realisation of fair value gains reserve on sale of		740	
	Investment Total realisation of fair value gains		749	-
	Total realisation of fair value gallis		/49	-
5.10	Net foreign exchange gains			
	Non-speculative		-	186

		Notes	2007	2006
		_	\$'000	\$'000
Note 6		Expenses		
	6.1	Employee benefits		
		Wages and salaries	433 585	422 157
		Superannuation	80 186	76 567
		Leave and other entitlements	70 584	72 407
		Separation and redundancy	9 529	7 079
			593 884	578 210
		Less,		
		Recovery of employee expenses from Food		(
		Science Australia	(19 479)	(19 520)
		FEP Pty I td	(14 521)	(13 765)
		Total employee benefits	559 884	544 925
				011 020
	6.2	Suppliers		
		Provision of goods – related entities	814	427
		Provision of goods – external entities	71 980	71 187
		Rendering of services – related entities	23 888	14 212
		Rendering of services – external entities	220 667	219 784
		Operating lease rentals:		
		Minimum lease payments	11 962	11 381
		Workers' compensation premiums	3 288	3 174
		Total supplier expenses	332 599	320 165
	63	Depreciation and amortisation		
	0.0			
		Plant and equipment	29 275	33 869
		Buildings and leasehold improvements	45 295	45 339
			74 570	79 208
		Amortisation		
		Intangibles – computer software	1 161	722
		Total depreciation and amortisation	75 731	79 930
	C 4	Einenee eeste		
	6.4	Finance costs	2 101	3 500
			5 101	5 552
	6.5	Write-down and impairment of assets		
		Bad debts	80	268
		Increase in provision for doubtful debts	544	3
		Impairment of financial assets	590	-
		Reversal of other provisions 23	-	(1 100)
		Total write-down and impairment of assets	1 214	(829)
	6.6	Net foreign exchange losses		
	0.0	Non-speculative	174	-

	No	tes	2007 \$'000	2006 \$'000
Note 7	Cash and cash equivalents (current)		<i></i>	ψ σσσ
	Cash at bank and on hand		26 048	38 328
	Deposits		105 000	115 000
	Total cash and cash equivalents		131 048	153 328
	Total cash includes deposits held on behalf of third			
	parties totalling \$16 866k (2006 – \$19 705k).	21		
Note 8	Trade and other receivables			
	Goods and services		52 029	53 073
	Net GST receivable		-	1 134
	Interest receivable		920	1 086
	Loans receivable		400	400
	Other receivables		4 806	8 595
	Total gross receivables		58 155	64 288
	Provision for doubtful debts		(998)	(640)
	Total net trade and other receivables		57 157	63 648
	Gross receivables are aged as follows:			
	Not overdue		47 974	48 928
	Overdue by:			
	Less than 30 days		5 787	7 943
	30 to 60 days		1 883	3 221
	60 to 90 days		808	977
	More than 90 days		F903	61 299
	ו סנמו שו ששש וומעב מווע טוובו ובטבוימטובא		30 133	04 200
	Current		57 755	63 888
	Non current		400	400
	Total gross trade and other receivables		58 155	64 288

		2007 \$'000	2006 \$'000
Note 9	Investments accounted for using the equity method		
	Joint venture entities – unincorporated		
	Food Science Australia (FSA)	411	-
	Murray-Darling Fresh Water Research Centre (MDFRC)	639	795
	Total Investments accounted for using the equity		
	method	1 050	795

Murray-Darling Fresh Water Research Centre (MDFRC)

CSIRO's 36.59% (2006 50%) investment in MDFRC is accounted for using the equity method. During the year, MDFRC incurred an operating surplus (unaudited) of \$196k (2006 \$252k). In accordance with the joint venture agreement, the operating surplus is shared equally between the joint venture parties. CSIRO's share of MDFRC's operating surplus for the year was \$72k (2006 \$126k).

Movements of carrying amount of investment in MDFRC joint venture entity is as follows:

Carrying amount at beginning of the financial year	795	516
Share of MDFRC's net operating surplus/(deficit)		
for the year	72	147
Adjustment based on 2005–06 audited accounts	(21)	132
Adjustment due to the admittance of a new		
participant in the joint venture in 2006–07.	(207)	-
	(156)	279
Carrying amount of investment in MDFRC as at		
30 June	639	795

Са 30

Food Science Australia (FSA)

CSIRO's 85% investment in FSA is accounted for using the equity method. During the vear, FSA incurred an operating surplus (unaudited) of \$614k (2006 \$410k). In accordance with the joint venture agreement the operating surplus/(deficit) of FSA is shared 85/15 between the joint venture parties. CSIRO's share of the operating surplus was \$522k (2006 \$337k surplus).

Movements in carrying amount of investment/(liability) in FSA joint venture entity is as follows:

Carrying amount at beginning of the financial year	(122)	(459)
Adjustment to 2005–06 share of FSA operating		
deficit base on audited accounts	11	-
Share of FSA's net operating surplus/(deficit) for the year	522	337
	533	337
Carrying amount of investment in (liability to)		
FSA as at 30 June	411	(122)

Ensis

The equity accounting method has not been applied to the Ensis joint venture as it is conducted through CSIRO's wholly owned subsidiary, CSIRO FFP Pty Ltd.

CSIRO has established a fully owned subsidiary, CSIRO FFP Pty Ltd to enter into an unincorporated 50/50 joint venture named Ensis between CSIRO and Scion.

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Note 9 Investments accounted for using the equity method (cont)

CSIRO's contributions and direct costs attributable to Ensis are charged to Ensis via CSIRO FFP Pty Ltd. Ensis gross contribution margin for the year (unaudited) of \$6.59 million (2006 \$8.32 million) is shared 50/50 by the participants. CSIRO FFP Pty Ltd adopts the equity method to account for its 50% share of Ensis' gross contribution margin and that amounted to \$3.29 million (2006 \$4 million). This is offset by the CSIRO's research support and overhead charges totalling \$3.29 million (2006 \$3.99 million).

Joint venture entities

Name	Principal Activities
Murray Darling Fresh Water Research Centre (MDFRC)	A collaborative joint venture for the purpose of Murray- Darling Basin freshwater research and the generation of knowledge required to ensure the sustainable management of water and associated environmental resources of the Murray-Darling Basin.
Food Science Australia (FSA)	Undertakes both strategic and applied research, helping the food industry to develop, package, preserve and transport food products.
Ensis	Conducts research and development into forestry, wood and paper science. The joint venture is conducted through the Organisation's wholly owned subsidiary.

The following is a summary of the financial performance and position of CSIRO's joint venture entities:

Total	Net	Total	Total	Net
Revenues	Operating	Assets	Liabilities	Assets
	Surplus*			
(100%) \$'000	(100%) \$'000	(100%) \$'000	(100%) \$'000	(100%) \$'000
41 416	614	9 938	9 938	-
6 301	196	3 727	1 982	1 745
40 459	410	11 575	11 575	-
4 993	252	3 188	1 638	1 550
	Total Revenues (100%) \$'000 41 416 6 301 40 459 4 993	Total Net Revenues Operating Surplus* (100%) (100%) \$'000 \$'000 41 416 614 6 301 196 40 459 410 4 993 252	Total Net Total Revenues Operating Surplus* Assets (100%) (100%) (100%) \$'000 \$'000 \$'000 41 416 614 9 938 6 301 196 3 727 40 459 410 11 575 4 993 252 3 188	Total Net Total Total Revenues Operating Surplus* Assets Liabilities (100%) (100%) (100%) (100%) \$'000 \$'000 \$'000 \$'000 41 416 614 9 938 9 938 6 301 196 3 727 1 982 40 459 410 11 575 11 575 4 993 252 3 188 1 638

The following is a summary of the financial performance and position of Ensis, the joint venture entity operated through CSIRO's wholly owned subsidiary, CSIRO FFP Pty Ltd:

2007 (unaudited)					
Ensis	50 175	6 598	7 344	3 430	3 941
2006 (audited)					
Ensis	52 147	8 316	7 756	3 296	4 460

* For Ensis, this relates to the gross contribution margin as per the Ensis joint venture agreement.

		2007 \$'000	2006 \$'000
Note 10	Other Investments (non-current)		
	The following investments are classified as 'available for sale' with fair value gains or losses recognised directly in equity as per AASB 139 (refer Notes 1.3 and 1.13)		
	(a) Listed companies for commercialisation of intellectual property – fair value		
	Advanced Magnesium Ltd	4	4
	Biota Holding Ltd	2 182	-
	EvoGenix Ltd (Sold during 2006–07)	-	929
	Phoslock Water Solutions Ltd	980	555
	Prima Biomed Ltd	10	-
	Starpharma Holdings Limited	1 693	-
	XRF Scientific Ltd	68	-
	Total listed companies	4 937	1 488
	(b) Unlisted companies – fair value		
	(i) Controlled entities	4 480	4 480
	(ii) Associate and joint venture entities	21 005	10 769
	(iii) Other entities	19 732	17 991
	Total unlisted companies	45 217	33 240
	Total other investments	50 154	34 728

(b) Unlisted companies - fair value

Name	% CS Inter	IRO rest	Contr Enti	olled ties ¹	Asso ar Joint \ Enti	ciate nd /enture ties ²	Oti Enti	her ities
	2007	2006	2007 \$'000	2006 \$'000	2007 \$'000	2006 \$'000	2007 \$'000	2006 \$'000
Start up investment companies for	comme	rcialisa	tion of i	ntellecti	ual prope	erty or un	its in Fu	nd
Advanced Polymerik Pty Ltd	20.5	18.7				-	767	767
Arista Cereal Technology Pty Ltd	45.3	-			4 095	-		
Ausmodel Pty Ltd	16.7	16.7					-	-
Avipep Pty Ltd	50.0	50.0			1 300	406		
Betabiotics Pty Ltd	93.9	93.9	-	-				
ComEnergy Pty Ltd	-	50.0			-	-		
Carbon Energy Pty Ltd	55.6	-			2 500	-		
DataTrace DNA Pty Ltd	50.0	50.0			3 700	3 696		
EpiTactix Pty Ltd	21.5	21.5					-	164
Funnelback Pty Ltd	100.0	100.0	2 200	2 200				
Gene Shears Pty Ltd	50.0	50.0			-	-		
Catapult Genetic Pty Ltd	4.5	10.0					826	826
HySSIL Pty Ltd	24.6	29.7					1 092	1 092
HRZ Wheats Pty Ltd	28.0	32.1					-	-
Innovative Carbon Technology Pty								
Ltd	16.5	16.5					-	-
Intalysis Pty Ltd	100.0	100.0	2 280	2 280				
Intellection Pty Ltd	31.9	40.4					6 675	5 135
PolyNovo Biomaterials Pty Ltd	36.1	40.0			7 500	6 000		
SciVentures Pre-Seed Fund	3.4	3.4					525	277
T-Mag Pty Ltd	27.7	-			750	-		
VacTX Pty Ltd	11.6	11.6					310	345
Windlab Pty Ltd	17.8	37.3			1 160	667		
WQI Ltd	11.3	10.6					-	-
XRT Ltd	25.1	25.1					-	774
Special purpose companies/Fund -	- invest	ment m	ade to g	ain acce	ess to re	search fa	cilities/n	etworks
AARNet Pty Ltd	2.6	2.6					1	1
Provisor Pty Ltd	44.1	41.4					2 146	2 146
Synchotron Beamline Trust Fund	-	-					5 000	5 000
VERNet Pty Ltd	15.0	13.7					2 390	1 464
Special purpose vehicle companies	s – esta	blished	to prov	ide serv	ices to o	owners		
CSIRO FFP Pty Ltd	100.0	100.0	-	-				
CO2 CRC Management Pty Ltd	7.7	7.7					-	-
Dunlena Pty Ltd	47.0	47.0			-	-		
HydroPem Pty Ltd	100.0	-	-	-				
MDFRC Pty Ltd	33.3	-			-	-		
R&D Syndication Companies	100.0	100.0	-	-				
WLAN Services Pty Ltd	100.0	100.0	-	-	04.005	10 700	40 700	17.001
			4 480	4 480	21 005	10 /69	19732	17 991

¹ The Organisation does not prepare consolidated financial statements. refer accounting policy Note 1.4 on Consolidation.

 2 Not accounted for under the equity method as the above associates and joint venture entities are classified at 'as available for sale' as per AASB 139. refer accounting policy Notes 1.3 and 1.13 on Investments.

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Note 1

Unlisted companies - at fair value

Name	Principal Activities				
(i) Controlled entities					
Betabiotics Pty Ltd	Develop a new class of antibiotics.				
CSIRO FFP Pty Ltd	A special purpose company established by CSIRO to enter into an unincorporated joint venture named Ensis between CSIRO and Scion.				
Funnelback Pty Ltd	An enterprise search engine providing search requirements for a specific entity's website and intranet site.				
HydroPem Pty Ltd	A special purpose company established by CSIRO to commercialise Proton Exchange Membrane technology.				
Intalysis Pty Ltd	Commercialise Low Frequency Microwave Moisture Analyser technology that measures the moisture content in minerals.				
R&D Syndication Companies	The following 7 companies were acquired prior to 2001–02 when investors in the Syndication exercised their put options under the agreements. They have not traded since acquisition and are in the process of being wound up.				
	Exsynd 1 Pty LtdExsynd 5 Pty LtdExsynd 2 Pty LtdExsynd 6 Pty LtdExsynd 3 Pty LtdExsynd 7 Pty LtdExsynd 4 Pty LtdExsynd 7 Pty Ltd				
WLAN Services Pty Ltd	The Organisation is not for profit special purpose service company.				
(ii) Associate and joint ver	nture entities				
Arista Pty Ltd	Develop and breed non-GM high amylose wheat varieties for food products.				
Avipep Pty Ltd	A start-up biotechnology company undertaking research and development of anti-body like proteins for the treatment of major diseases.				
ComEnergy Pty Ltd	Utilise technology that generates electricity from coal waste and mine drainage gases. (sold during 2006–07)				
Carbon Energy Pty Ltd	Research, exploit and commercialise underground coal gasification technologies.				

Name	Principal Activities
DataTraceDNA Pty Ltd	Develop and commercialise Luminescent Marker Technology as an identification technology.
Dunlena Pty Ltd	A trustee company for intellectual property generated by Dupont/CSIRO joint venture research.
Gene Shears Pty Ltd	Investigate licensing and development of its Ribozyme technology for commercial applications.
MDFRC Pty Ltd	A management agent company for MDFRC.
PolyNovo Biomaterials Pty Ltd	Commercialise biomaterials technology platform to improve biomedical and surgical outcomes.
Windlab Pty Ltd	Develop and market ' <i>Windscape</i> ' technology to locate the best wind farm sites faster.
(iii) Other entities	
AARNet Pty Ltd	Provide internet services to the education and research communities.
Advanced Polymerik Pty Ltd	A company established by the CRC for Polymers to commercialise its technology. The company holds a 65% interest in Ceram Polymerik Pty Ltd in trust for the CRC participants including CSIRO.
Australian Wool Innovation Ltd	Initiate research, development and innovation in the Australian Wool industry.
Ausmodel Pty Ltd	A company established by the Predictive Minerals Discovery CRC to commercialise its intellectual property.
CO2 CRC Management Pty Ltd	A Centre agent management company for a CRC.
Catapult Genetics Pty Ltd	DNA marker research, development and commercialisation for sheep and cattle.
Epitactix Pty Ltd	Develop and conduct semi-conductor business activities.
HRZ Wheats Pty Ltd	Design profitable new milling wheat varieties for farmers.
Innovative Carbon Technology Pty Ltd	A CRC spin off company to commercialise the CRC technology.
Intellection Pty Ltd	Production and sale of complete systems that are used for process improvement in large mineral process operations.

Name	Principal Activities
Provisor Pty Ltd	Provide world-class research facilities to grape and wine industries.
SciVentures Pre-Seed Fund	A venture capital fund primarily targeting commercially promising R&D opportunities at the pre-seed stage.
Synchrotron Beamline Trust Fund	The Organisation has as at 30 June 2007 contributed \$5 million (2006 \$5 million) towards the establishment of the Australian Synchrotron facility in Victoria. It is anticipated that a company will be incorporated and contributors will be issued shares in the company based on contributions made.
VacTX Pty Ltd	A CRC company to commercialise peptide vaccine technologies.
VERNet Pty Ltd	A collaborative initiative between Universities and TAFE institutions in Victoria, including CSIRO to establish and implement intra-state connections for an advanced broadband network.
WQI Ltd	Commercialise new technologies and knowledge that improve wood quality.
XRT Ltd	Build X-ray ultra microscopes and licence imaging technology to manufacturers of X-ray imaging equipment.

		2007	2006
		\$'000	\$'000
Note 11	Land and Buildings (non-current)		
	Freehold land – fair value	170 145	176 620
	Buildings on freehold land		
	– fair value	1 481 691	1 494 166
	 accumulated depreciation 	(907 082)	(896 755)
		574 609	597 411
	 work in progress 	60 238	38 020
		634 847	635 431
	Leasehold improvements		
	– fair value	160 961	155 082
	 accumulated depreciation 	(62 857)	(58 229)
		98 104	96 853
	Buildings under finance lease		
	– fair value	133 438	133 391
	 accumulated amortisation 	(38 512)	(33 734)
		94 926	99 657
	Total land and huildings	998 022	1 008 561
	rotarianu anu bununiys	000 022	1000001
Note 10	Dient and Equipment (new surrent)		
Note 12	Plant and Equipment (non-current)		
	Plant and equipment		
		572 541	545 005
	- accumulated depreciation	(362.064)	(3/1/76)
		210 477	203 529
	- work in progress	16 592	8 608
	North In progress	227 069	212 137
	Research vessel		
	– fair value	13 889	13 659
	 accumulated depreciation 	(8 560)	(8 174)
	·	5 329	5 485
	Plant and equipment under finance lease		
	– fair value	5 285	6 214
	 accumulated amortisation 	(2 552)	(2 597)
		2 733	3 617

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		2007 \$'000	2006 \$'000
Note 13	Investment Properties (non-current)		
	Investment properties – fair value (Note 1.14)	37 723	37 810

Notes 11 – 13 Land and Building, Investment Property and Plant and Equipment

(a) Reconciliation of the Opening and Closing Balances of Land and Building, Investment Property and Plant and Equipment (2006–07)

Item	Land	Buildings	Land and Buildings	Investment Property	Plant & Equipment	Total
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
As at 1 July 2006						
Gross book value	176 620	1 820 659	1 997 279	37 810	573 485	2 608 574
Accumulated depreciation/ amortisation and						
impairment	-	(988 718)	(988 718)	-	(352 246)	(1 340 964)
Net book value as at 1 July 2006	176 620	831 941	1 008 561	37 810	221 239	1 267 610
Additions	-	47 607	47 607	-	43 591	91 198
Reclassification	(4 200)	(5 774)	(9 974)	-	1 636	(8 338)
Revaluations and impairments through						, , , , , , , , , , , , , , , , , , ,
equity	-	(486)	(486)	-	(579)	(1 065)
Depreciation/		(45 206)	(45 206)		(20, 275)	(74 571)
Disposale	(2 275)	(45 290)	(45 290)	- (87)	(29 275)	(74 57 1)
Not book value as at	(2 210)	(110)	(2 000)	(07)	(1401)	(3 936)
30 June 2007	170 145	827 877	998 022	37 723	235 131	1 270 876
Net book value as at 3	30 June 200)7 represente	ed by:			
Gross book value	170 145	1 836 329	2 006 474	37 723	608 308	2 652 505
Accumulated depreciation, amortisation and						
impairment	-	(1 008 452)	(1 008 452)	-	(373 177)	(1 381 629)
Net book value as at 30 June 2007	170 145	827 877	998 022	37 723	235 131	1 270 876

Notes 11 – 13 Land and Building, Investment Property and Plant and Equipment (cont)

(b) Reconciliation of the Opening and Closing Balances of Land and Building, Investment Property and Plant and Equipment (2005–06)

Item	Land	Buildings	Land and Buildings	Investment Property	Plant & Equipment	Total
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
As at 1 July 2005						
Gross book value	203 616	1 841 345	2 044 961	5 699	546 947	2 597 607
Accumulated						
depreciation/						(1 000 7 17)
amortisation	-	(991 130)	(991 130)	-	(329 617)	(1 320 747)
1 July 2005	203 616	850 215	1 053 831	5 699	217 330	1 276 860
						-
Additions	100	47 147	47 247	-	40 329	87 576
Reclassification	(12 400)	(19 711)	(32 111)	32 111	-	-
Depreciation/						
amortisation expense	-	(45 339)	(45 339)	-	(33 869)	(79 208)
Disposals	(14 696)	(371)	(15 067)	-	(2 551)	(17 618)
Net book value as at						
30 June 2006	176 620	831 941	1 008 561	37 810	221 239	1 267 610
Net book value as at 3	80 June 200	6 represente	d by:			
Gross book value	176 620	1 820 659	1 997 279	37 810	573 485	2 608 574
Accumulated						
depreciation/		(000 740)			(050.040)	(1.0.40.00.4)
amonisation	-	(988 718)	(988 /18)	-	(352 246)	(1 340 964)
Net DOOK value as at 30 June 2006	176 620	831 941	1 008 561	37 810	221 239	1 267 610

Notes 11 - 13 Land and Building, Investment Property and Plant and Equipment (cont)

(c) National Facilities

The Australian Animal Health Laboratory (AAHL), the Australia Telescope (AT), and the Research Vessel (RV) 'Southern Surveyor' have been established by the Australian Government as National facilities to satisfy an identified national research need. The term 'National Facility' denotes substantial instrumentation, equipment and costs of such magnitude that the expense can only be justified on the basis of shared use by researchers from several organisations. The primary criteria require that the facilities are specifically designated for national use and that they are made available to scientists according to the merit of their proposals. These facilities are controlled and administered by the Organisation on behalf of the Australian Government.

Details of National Facilities included in the above total of Land and Buildings and Plant and Equipment are as follows:

	AAHL \$'000	AT \$'000	RV \$'000	Total \$'000
Land	10 800	-	-	10 800
Buildings	537 983	-	-	537 983
Accumulated depreciation	(260 875) 277 108	-	-	(260 875) 277 108
Plant and equipment Accumulated depreciation	8 452 (5 625) 2 827	137 464 (75 665) 61 799	13 889 (8 560) 5 329	159 805 (89 850) 69 955
Net book value as at 30 June 2007	290 735	61 799	5 329	357 863
Net book value as at 30 June 2006	302 838	60 472	5 613	368 923

The operating expenses for the above National Facilities for the financial year amounting to \$76 453k (2006 \$75 193k) are included in the Organisation's Income Statement.

		Notes	2007 \$'000	2006 \$'000
Note 14	Intangibles (non-current)			
	Computer software – at cost Internally developed and acquired	1.15		
	software – in use		7 676	7 800
	Acquired software – in progress		4 172	4 026
	Internally developed – in progress		21 919	7 219
			33 767	19 045
	Accumulated amortisation		(2 252)	(1 091)
	Total intangibles		31 515	17 954

(a) Reconciliation of Opening and Closing Balances for Intangibles (2006–07)

	Description	Computer software internally developed	Computer software purchased	Total
		\$'000	\$'000	\$'000
	As at 1 July 2006			
	Gross book value	14 775	4 270	19 045
	Accumulated amortisation	(1 050)	(41)	(1 091)
	Net book value as at 1 July 2006	13 725	4 229	17 954
	Movements:			
	Additions by purchase or internally developed	14 730	-	14 730
	Transfer	(153)	153	-
	Amortisation	(1 080)	(81)	(1 161)
	Disposals	-	(8)	(8)
	Net book value as at 30 June 2007	27 222	4 293	31 515
	Net book value as at 30 June 2007 represented by:			
	Gross book value	29 352	4 415	33 767
	Accumulated amotisation	(2 130)	(122)	(2 252)
	Net book value as at 30 June 2007	27 222	4 293	31 515
(b)	Reconciliation of Opening and Closing Balance	es for Intang	ibles (2005–0	06)
	As at 1 July 2005			
	Gross book value	7 556	221	7 777
	Accumulated amortisation	(369)	-	(369)
	Movements:	/ 18/	221	7 408
	Additions by purchase or internally developed	7 219	4 049	11 268
	Amortisation	(681)	(41)	(722)
	Net book value as at 30 June 2006	13 725	4 229	17 954
	Net book value as of 30 June 2006 represented by:			
	Gross Book Value	14 775	4 270	19 045
	Accumulated amortisation	(1 050)	(41)	(1 091)
	Net book value as at 30 June 2006	13 725	4 229	17 954

	Notes	2007 \$'000	2006 \$'000
Note 15	Properties Held for Sale (current)		
	Properties held for sale – at the lower of carrying amount and fair value.	4 405	_
	Represent two properties identified as surplus to the Organisation and classified as held for sale. These are expected to be sold in the market and settled within the next 12 months. One property was reclassified and sold during 2006–07. Net gain on the sale of the property was \$1.69 million, and included in (Note 5.7)		
Note 16	Inventories Held for Sale (current)		
	Books and media products – at lower of cost and net realisable value 1.16	1 075	1 064
Note 17	Other Non-Financial Assets (current)		
	Contract research work in progress – at cost 1.5 Prepaid property rentals Other prepayments	15 000 1 453 5 937	15 417 1 478 2 994
	Total other non-financial assets	22 390	19 889
Note 18	Suppliers (current)		
	Trade creditors	55 370	50 006
Note 19	Other Payables (current)		
	Contract research revenue received in advance Net GST payable	59 800 781	51 764 -
	Other creditors and accrued expenses Amount owing to FSA 10	10 504 -	10 592 122
	Total other payables	71 085	62 478

Notes	2007 \$'000	2006 \$'000
Note 20 Leases		
Finance leases	72 004	76 200
Total finance leases	72 004	76 200
Payable:		
Within one year		
Minimum lease payments	7 138	7 260
Deduct: future finance charges	(2 913)	(3 063)
Total payable within one year (current)	4 225	4 197
In one to five years		
Minimum lease payments	25 735	26 779
Deduct: future finance charges	(10 219)	(10 774)
Total payable in one to five years	15 516	16 006
In more than five years		
Minimum lease payments	67 253	73 347
Deduct: future finance charges	(14 990)	(17 349)
Total payable in more than five years	52 263	55 998
Total payable one to more than five years		
(non-current)	67 779	72 004
Total finance leases recognised on the balance		
sheet	72 004	76 200

Finance leases exist in relation to certain buildings and major equipment assets. The leases are non-cancellable and for fixed terms ranging from 2 to 25 years. The Organisation guarantees the residual values of all assets leased. There are no contingent rentals. The interest rate implicit in the leases averaged 4% (2006 4%). The lease liabilities are secured by the lease assets.

Note 21 Deposits (current)

Deposits	16 866	19 705
Deposits represent monies held on behalf of the		
following third parties:		
Cooperative Research Centres	5 867	6 272
National Aeronautical Space Agency (NASA)	6 475	8 015
Energy Solutions for a Sustainable Future	158	1 775
Australian National Wildlife Collection		
Foundation	252	314
Lower Emissions Energy Centre	3 670	2 674
Others	444	655
Total deposits	16 866	19 705

	Notes	2007	2006
Note 22	Employee Provisions	\$1000	\$1000
	Accrued wages and salaries	4 594	5 024
	Annual leave	52 766	50 375
	Long service leave	119 256	118 294
	Severance pay	5 180	7 032
	Redundancy	4 238	3 948
	Total employee provisions	186 034	184 673
		170 504	470.040
	Current	172 531	1/2 949
	Non-current	13 503	11 /24
	i otal employee provisions	186 034	184 673
Note 23	Cash Flow Reconciliation		
	(a) Reconciliation of cash and cash equivalents		
	as per Balance Sheet to Cash Flow Statement		
	Cash and cash equivalents as per:		
	Cash Flow Statement	131 048	153 328
	Balance Sheet	131 048	153 328
	Difference 7	-	-
	(b) Reconciliation of operating surplus/(deficit) to net cash from operating activities		
	Operating surplus/(deficit)	1 010	0 072
	Depreciation and amortisation of property	1019	5 512
	plant and equipment	74 570	79 208
	Amortisation of intangibles	1 161	722
	Net write down and impairment of assets	1 214	-
	equipment	(2714)	(15 467)
	(Gains)/loss from sale of investments and IP	(13 442)	(11 910)
	Realisation of fair value gain on sale of investment	(749)	-
	Unrealised foreign exchange variances	67	-
	(Increase)/decrease in receivables	6 490	(8 361)
	(Increase)/decrease in inventories	(11)	(97)
	Increase/(decrease) in other assets	(2 501)	1 987
	Increase/(decrease) in employee liabilities	1 361	6 253
	Increase/(decrease) in liability to suppliers	5 365	(6 313)
	Increase/(decrease) in other liabilities	8 606	5 991
	Increase/(decrease) in GST receivable	353	(120)
	Net cash from/(used by) operating activities	(2 839)	4 58/
	caon nons (acca s), oporating activition	11 900	00 45 1

		2007 \$'000	2006 \$'000
Note 24	Contingencies		
	Contingent assets		
	Organisation has a receivable asset, to be received at a		
	future date upon the conditions of the agreement being met.		
	At this stage, it is too early to determine whether the conditions of the agreement will be met and predict when		
	the amount will be received.		
	The Organisation's net share of the contingent	4 817	_
	Contingent liabilities	1017	
	Estimated legal claims arising from employment, motor		
	vehicle accidents, commercial and patent disputes. The Organisation has denied liability and is defending the		
	claims. The estimate is based on precedent in such cases.	250	250
	Total net contingent asset/(liability)	4 567	(250)

Unquantifiable Contingencies

CSIRO is currently involved in several legal proceedings in the US related to a wireless local area network (WLAN) patent which it owns and wishes to license broadly. These proceedings are in various phases. If successful, CSIRO expects to earn significant revenue from royalty payments which would exceed the associated legal costs over time. At this stage, the revenue and costs are considered unquantifiable.

At 30 June 2007, the Organisation had a number of legal claims arising from employment, motor vehicle accidents, commercial and patent disputes. The Organisation has denied liability and is defending the claims. It is not possible to estimate the amounts of any eventual payments that may be required in relation to these claims. An aggregate estimate of \$250k has been included as a quantifiable contingent liability.

Remote Contingencies

Remote contingent liability

The Organisation provides certain indemnities and warranties as part of its business activities. The Organisation would not under normal business arrangements generally provide guarantees or letters of comfort.

In 2006–07, the Organisation continued efforts to reach understandings with all relevant Commonwealth agencies to allow parties to intra-Commonwealth contracts to comply with the Commonwealth's 'Guidelines for Issuing and Managing Indemnities, Guarantees, Warranties and Letters of Comfort' (September 2003). Significant progress was made towards this goal, particularly with the Department of Education, Science and Training and the Research and Development Corporations. Negotiations with other agencies are continuing.

Note 24 Contingencies (cont)

The Organisation has procedures in place to capture all contracts likely to contain warranties, indemnities, guarantees and letters of comfort which may create a liability for the Organisation and to determine the extent and materiality of any such undertakings.

The Organisation had insurance coverage in 2006–07. The Organisation has renewed this insurance coverage with Comcover for 2007–08. This includes coverage for indemnities and warranties on a case by case basis in accordance with the terms of the policy.

Most warranties do not extend the Organisation's liability beyond that at common law or statute. That is, if they were to be triggered by an event of default, the Organisation's legal liability would generally be the same as if the warranty had not been given because it is implied by the general law or statute in any case. The Organisation considers that there is a remote chance of one or more events occurring under these warranties that would result in an uninsured liability being recognised. Due to the inherent uncertainty of the basis of the claims, such warranties are assessed as being not material.

Of the contractual indemnities issued by the Organisation, the majority relate to liabilities for which the Organisation would otherwise be liable in the absence of the indemnity (either under common law or statute). The Organisation considers that there is a remote chance of one or more events occurring under these indemnities that would result in an uninsured liability being recognised. Due to the inherent uncertainty of the basis of the claims, the indemnities are assessed as being not material.

Note 25 Joint Ventures – Cooperative Research Centres (CRCs)

CSIRO was a party to 37 CRCs during 2006–07, of which 12 were incorporated and 25 were unincorporated. These are accounted for in accordance with AASB131 *'Interest in Joint Ventures'*.

All CRCs have been classified as joint venture operations as the purpose is for the pursuit of collaborative scientific research where participants share in the scientific outcomes and outputs of the CRCs. In the event that CRC research results in a move to commercialisation, a separate legal entity is established and CSIRO's share of the new entity is treated either as an equity investment, joint venture or associate in the balance sheet as appropriate.

CSIRO's total cash and in-kind contribution (eg. staff and use of assets) to CRCs from its own resources was \$42.7 million (2006 \$60.5 million). Contributions made by CSIRO are expensed as incurred and these are included in the Income Statement.

Approximately \$8 million (2006 \$19.1 million) of CSIRO's plant and equipment are used for CRC activities. Plant and equipment includes specialised scientific equipment and instruments and general assets such as vehicles.

No contingent liabilities were reported by the CRCs in which CSIRO is a participant. CSIRO's interest in the output of each CRC is determined by the individual CRC agreement. These are:

Name of CRC & Principal Activity	% CSIRO Interest	In-kind & Cash Contributions 2006–07 '\$000	CRC Funding Received 2006–07 '\$000	Estimated value of P&E used 2006–07 '\$000	Termination date
INCORPORATED CRCs					
Bushfire CRC conducts a range of research projects that collectively aim to enhance the management of the bushfire risk to the community in an economically and ecologically sustainable way.	9.00%	2 393	922	151	30-Jun-10
CAST CRC focuses on the provision and implementation of quality research and education on important issues for light metals processing and manufacturing.	12.58%	2 411	1 764	408	30-Jun-12

Note 25

Joint Ventures - Cooperative Research Centres (CRCs) (cont)

Name of CDC & Dringing	0/	In Irind 9	000	Fatimated	Tormination
Name of CRC & Principal Activity	% CSIRO Interest	Cash Contributions 2006–07 '\$000	Funding Received 2006–07 '\$000	Estimated value of P&E used 2006–07 '\$000	date
INCORPORATED CRCs (c	ont)				
Cotton Catchments Communities CRC undertakes collaborative research, education and commercialisation activities to provide innovative knowledge for the benefit of the Australian Cotton Industry.	18.30%	2 982	2 626	390	30-Jun-12
CRC for Advanced Automotive Technology aims to provide the automotive industry with the opportunity to work with research providers in design, engineering and manufacturing research to enhance the industry's international competitiveness	5.00%	1 115	1 015	220	30- lun-12
CRC for Beef Genetic Technologies aims to use emerging gene discovery and gene expression technologies to focus on a much broader range of beef industry priority issues to equip Australia for precision cattle breeding and management.	-	1 697	1 483	85	30-Jun-12
CRC for Advanced Composite Structures aims to provide a focus for the development of advanced technologies which foster the growth of an efficient, globally- competitive, Australian composite industry.	6.00%	258	265	49	30-Jun-10
CRC for Forestry aims to manage challenges across the forestry business chain, from site selection to delivery of wood at mill gate.	7.00%	1 919	1 209	98	30-Jun-12

Note 25 Joint Ventures – Cooperative Research Centres (CRCs) (cont)

% CSIRO Interest	In-kind & Cash Contributions 2006–07 '\$000	CRC Funding Received 2006–07 '\$000	Estimated value of P&E used 2006–07 '\$000	Termination date
ont)				
9.00%	2 307	2 691	178	30-Jun-12
22.90%	3 443	1 889	239	30-Jun-12
18.40%	1 410	1 320	58	30-Jun-12
10.000/	0.007	4 500	0.050	20 lus 10
	% CSIRO Interest ont) 9.00% 22.90% 18.40%	% In-kind & Cash Cash Contributions 2006-07 9.00% 2 307 9.00% 2 307 22.90% 3 443 18.40% 1 410 49.00% 8 927	% In-kind & CRC Cash Cash Funding Received 2006-07 3000 interest Contributions 2006-07 's000 ont) 9.00% 2 307 2 691 9.00% 2 307 2 691 22.90% 3 443 1 889 18.40% 1 410 1 320 49.00% 8 927 4 588	% In-kind & CRC Estimated value of P&E used 2006-07 Interest Contributions Received 2006-07 9.8000 9.00% 2 307 2 691 178 9.00% 2 307 2 691 178 22.90% 3 443 1 889 239 18.40% 1 410 1 320 58

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Note 25

Joint Ventures - Cooperative Research Centres (CRCs) (cont)

Name of CRC & Principal Activity	% CSIRO Interest	In-kind & Cash Contributions 2006–07 '\$000	CRC Funding Received 2006–07 '\$000	Estimated value of P&E used 2006–07 '\$000	Termination date
INCORPORATED CRCs (cc	ont)			· · · · ·	
The Vision CRC aims to establish Australia as a world leader in research, education and delivery of vision correction, improve international eye care and maximise commercial opportunities for the Centre and the eye care industry.	8.61%	1 494	667	14	30-Jun-10
UNINCORPORATED CRCs					
Australian Biosecurity CRC aims to protect Australia's public health, livestock, wildlife and economic resources through research and education that strengthens the national capability to detect, identify, diagnose, assess, predict and respond to emerging infectious disease threats on national and regional biosecurity.	40.00%	4 412	752	Nil	30-Jun-10
CRC for National Plant Biosecurity focuses on innovative research and development, in key areas that will deliver benefits across a range of plant commodity groups.	10.30%	397	388	Nil	30-Jun-12
Australian Sheep Industry CRC aims to ensure the Australian sheep industry has the technology and know- how to deliver, in a profitable and sustainable manner, products highly desired by domestic and export customers.	34.00%	1 124	718	239	30-Jun-07
Note 25 Joint Ventures – Cooperative Research Centres (CRCs) (cont)

Name of CRC & Principal Activity	% CSIRO Interest	In-kind & Cash Contributions 2006–07 '\$000	CRC Funding Received 2006–07 '\$000	Estimated value of P&E used 2006–07 '\$000	Termination date
UNINCORPORATED CRCs	s (Cont)				
CRC for Antarctic Climate and Ecosystems aims to understand the variability of Antarctica and the Southern Ocean processes and their role in regional and global climate change, and Australia's future.	13.70%	1 545	876	259	30-Jun-10
CRC for Australian Weed Management aims to enhance the sustainability of farming systems and the conservation status of natural ecosystems that targets generic control problems using integrated weed management.	13.80%	1 094	711	26	30-Jun-08
CRC for Coal in Sustainable Development aims to optimise the contribution of coal to a sustainable future, including control of pollutant emissions, coal in coke making and iron making.	14.00%	1 014	855	Nil	30-Jun-08
CRC for Coastal Zone, Estuary and Waterway Management aims to study areas and application of new technologies and techniques around the Australian coast.	27.00%	25	80	147	30-Dec-06
CRC for Construction Innovation focuses on the needs of the property, design, construction and facility management sectors.	22.00%	1 731	992	140	30-Jun-08

Note 25

Joint Ventures - Cooperative Research Centres (CRCs) (cont)

Name of CRC & Principal Activity	% CSIRO Interest	In-kind & Cash Contributions 2006–07 '\$000	CRC Funding Received 2006–07 '\$000	Estimated value of P&E used 2006–07 '\$000	Termination date
UNINCORPORATED CRC	s (Cont)				
CRC for Diagnostics aims to develop and exploit diagnostic platforms to enable more patient specific screening of predisposition of selected diseases and medical conditions.	24.80%	817	220	Nil	30-Jun-08
CRC for Functional Communication Surfaces aims to develop new products and manufacture processes to make substrates and their coating materials 'smart' to take advantage of new computer-related teachadenica	10.000/	1 120	540	001	20. km 00
technologies.	19.00%	1 138	542	261	30-Jun-08
CRC for Greenhouse Gas Technologies focuses on carbon dioxide capture and geological storage (geosequestration).	8.70%	2 197	1 249	27	30-Jun-10
CRC for Innovative Dairy Products aims to apply cutting-edge genetic research to provide diary farmers, processors and manufacturers with access to advanced technologies and products.	7.00%	888	691	128	30-Jun-08
CRC for Predictive Mineral Discovery's aims to generate a shift in exploration practice and cost-effectiveness by developing a vastly improved understanding of mineralising processes and an understanding of the evolution of the geology of mineralised terrains	16.00%	1 596	2 011	20	30- Jun-08
evolution of the geology of mineralised terrains.	16.00%	1 596	2 011	20	30-Jun-08

Note 25

Joint Ventures - Cooperative Research Centres (CRCs) (cont)

Name of CRC & Principal Activity	% CSIRO Interest	In-kind & Cash Contributions 2006–07 '\$000	CRC Funding Received 2006–07 '\$000	Estimated value of P&E used 2006–07 '\$000	Termination date
UNINCORPORATED CRCs	(Cont)				
CRC for Irrigation Futures aims to deliver research, education and training which gives confidence to growers, industry, governments and the communities to invest in better irrigation, a better environment and a better future	16 00%	1 467	1 195	10	30- lun-10
CRC for Landscape Environments and Mineral Exploration aims to develop a greater understanding of Australia's terrain when applied to mineral exploration and environmental management, dry land salinity, water supply	10.00%	1407	1100	10	
and water quality. CRC for Plant-Based Management of Dryland Salinity focuses on solving the problem of salinity, which will require a 'revolution' in agriculture, with change to agricultural systems across the landscape on	28.00%	2 071	3 756	762	30-Jun-08
a massive scale. CRC for Sugar Industry Innovation through Biotechnology aims to combine strengths in molecular genetics, sugarcane biology, agriculture, and industrial extraction that will value-add to the	7.00%	1 346	1 025	66	30-Jun-07
Sugarcane industry. CRC for Sustainable Aquaculture of Finfish aims to develop technologies which will enable the sustainable and rapid growth of finfish equencieurs	19.00%	1 866	1 679	153	30-Jun-10
ninish aquaculture.	14.40%	497	2/3	143	30-Jun-08

Note 25

Joint Ventures - Cooperative Research Centres (CRCs) (cont)

Name of CRC & Principal Activity	% CSIRO Interest	In-kind & Cash Contributions 2006–07 '\$000	CRC Funding Received 2006–07 '\$000	Estimated value of P&E used 2006–07 '\$000	Termination date
	s (Cont)				
CRC for Sustainable Resource Processing aims to create new methods to produce minerals and metals in a way that benefits the environment and industry and find technical solutions for progressively eliminating waste and emissions in					
the materials cycle. CRC for the Australian Poultry Industries aims	23.00%	2 471	1 626	96	30-Jun-10
to enhance the competitiveness of the Australian egg and chicken meat industries.	-	2 239	830	40	30-Jun-10
CRC for Tropical Savannas Management aims to ensure that Australia's tropical savannas are healthy and managed to provide long-term benefits to those who use them and to sustain the biodiversity band habitat endemic to them.	19.00%	700	443	105	30-Jun 08
CRC for Viticulture II aims to accelerate quality viticultural management, ensuring the economic and environmental sustainability of Australia's grape- growing industries	24.00%	172	262	5	20. lun 07
CRC for Water Quality and Treatment II focuses on issues relating to water quality management and health risk reduction, from catchments and reservoir management and water treatment to the distribution of	24.00%	172	202	5	30-Jun-07
consumers' taps.	8.00%	354	207	Nil	30-Jun-08

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Note 25 Joint Ventures – Cooperative Research Centres (CRCs) (cont)

Name of CRC & Principal Activity	% CSIRO Interest	In-kind & Cash Contributions 2006–07 '\$000	CRC Funding Received 2006–07 '\$000	Estimated value of P&E used 2006–07 '\$000	Termination date
UNINCORPORATED CRCs	s (Cont)				
CRC for Wood Innovations aims to provide the timber and wood products industries with applied technologies and training.	5.00%	712	379	53	30-Jun-08
Desert Knowledge CRC aims at linking indigenous and local knowledge with science and education to improve desert livelihoods.	8.00% _	1 078	547	189	30-Jun-10
Total		63 307	42 746	8 026	

Note 26 Resources made available to the Organisation and not included in the Balance Sheet

	Land	Buildings	Plant and Equipment	Total
	\$'000	\$'000	\$'000	\$'000
At cost or fair value Accumulated depreciation	3 738 -	908 (908)	29 469 (25 986)	34 115 (26 894)
Net value as at 30 June 2007	3 738	-	3 483	7 221
Net value as at 30 June 2006	3 860	-	3 637	7 497

The above assets are made available to the Organisation at little or no cost in accordance with formal agreements with contributors. They have either been purchased out of contract research monies and expensed in the year of purchase in accordance with accounting policy Note 1.6, or made available to the Organisation at little or no cost. The assets include vehicles, computers and scientific equipment.

These assets are controlled and accounted for in the contributors' books and any proceeds from their disposal are refundable to the contributors in accordance with formal agreements on equity share and there are some restrictions on how these assets are operated. The fair value of in-kind contributions of these assets could not be reliably determined and therefore is not brought to account in the Income Statement.

Note 27	Monies Held in Trust	2007 \$'000	2006 \$'000
	Monies held in trust represented by cash, deposits and investments for the benefit of the Organisation, which are not included in the Balance Sheet are:		
	Sir Ian McLennan Achievement for Industry Award – established to award outstanding contributions by the Organisation's scientists to national development.	291	272
	The Elwood and Hannah Zimmerman Trust Fund – established to fund weevil research and the curation of the Australian National Insect Collection (ANIC) weevil collection.		
		2 270	1 993
	The Schlinger Trust – established to research the taxonomy, biosystematics, general biology and biogeography of Australasian Diptera conducted by the Australian National		
	Insect Collection.	1 317	846
	Total monies held in trust as at 30 June	3 878	2 671

Movement summary of monies held in trust:

	McLennan	Zimmerman	Schlinger	Total
	\$'000	\$'000	\$'000	\$'000
Balance at 1 July 2006	272	1 993	846	3 111
Receipts during the year	-	-	395	395
nterest and dividends	19	277	76	372
Expenditure	-	-	-	-
Balance at 30 June 2007	291	2 270	1 317	3 878

Note 28 Collections

The Organisation owns several collections used for scientific research. The Organisation's collections have been established over time and cover an extensive range of evolution and change in species. The collections are irreplaceable, bear scientific and historical value and are not reliably measurable in monetary terms. Therefore, the Organisation has not recognised them as an asset in its financial statements. The main collections held by the Organisation are:

Australian National Herbarium (ANH) – The ANH is one of the largest plant collections in Australia with approximately one million preserved plant specimens. It is unique among the Australian Herbaria in having a national focus for its collections, acquisition and research programs.

Australian National Insect Collection (ANIC) – The ANIC has over 11 million specimens and is the largest research collection of Australian insects and related organisms in the world.

Australian National Wildlife Collection (ANWC) – The ANWC, with over 80 000 specimens, holds land vertebrate collections, including the most comprehensively documented collections of Australian-New Guinean birds in the world.

CSIRO National Fish Collection (ANFC) – CSIRO's ANFC, also known as the 'ISR Munro Ichthyological Collection', houses more than 80 000 registered adult and 40 000 registered larval specimens of almost 3 000 species from Australasia, Asia, Antarctica, and the Sub Antarctic Islands. It is among Australia's most diverse ichthyological collections and contains one of the largest collections of sharks, rays and deepwater fishes in the Southern Hemisphere.

Other Collections – These include the Australian Tree Seed Collection, CSIRO's Dadswell wood collection, CSIRO collection of living microalgae and wood inhabiting fungi collection.

Note 29 Remuneration of Auditors 2007 2006 \$ \$ \$ \$ Financial statement audit services are provided to the Organisation by the Auditor General 266 860 202 000 The fair value of the services provided was No other services were provided by the Auditor-General. 266 860 202 000

		2007 \$	2006 \$
Note 30	Remuneration of Board Members		
	Remuneration and superannuation benefits received or due and receivable by full-time and part- time Board Members, excluding the Chief Executive Officer were:		
	Board Members' remuneration Payments to superannuation funds for Board	354 060	344 610
	Members	30 923	30 604
	Total remuneration	384 983	375 214

The remuneration of the Chief Executive Officer, who is also a Board Member of the Organisation, is reported under Note 31 Remuneration of Senior Executives.

The number of Board Members whose total remuneration fell within the following bands were:

\$	Number	Number
Nil – 14 999	2	3
15 000 – 29 999	-	2
30 000 – 44 999	1	3
45 000 – 59 999	7	2
60 000 – 74 999	-	-
75 000 – 89 999	-	1
Total	10	11
te 31 Remuneration of Senior Executives	\$	\$
The aggregate amount of remuneration for officers	11 292 456	10 960 745
The aggregate amount of separation and redundancy/termination benefit payments during the financial year to Senior Executives shown below	216 500	101 079

Note 31 Remuneration of Senior Executives (cont)

The number of Senior Executives, who received or were due to receive total remuneration of \$130 000 or more and includes officers concerned with taking part in the management of the Organisation.

During 2006–07 those positions were: the Chief Executive and other members of the Executive Team (12), Chiefs of Divisions (16), joint venture Chief Executive Officer (1) and Flagship Directors (6), a total of 35 positions.

\$	2007	2006
120,000 144,000	Number	Number
130 000 - 144 999	1	-
145 000 - 159 999	-	-
175 000 180 000	-	- 1
100 000 - 204 000	-	1
$190\ 000 = 204\ 999$	- 1	1
203000 = 234999	1	3
220000 = 234999	1	1
250000 = 249999	2	5
250000 = 279999	6	J 1
280 000 - 294 999	0	4
200 000 - 204 000	2	5
310 000 - 324 999	2	1
325 000 - 339 999	3	3
340 000 - 354 999	1	3
355 000 - 369 999	<u>.</u>	-
370 000 - 384 999	2	3
385 000 - 399 999	2	-
400 000 - 414 999	- 1	1
415 000 - 429 999	1	1
430 000 - 444 999	2	-
445 000 – 459 999	-	-
460 000 - 474 999	1	-
475 000 – 489 999	-	-
490 000 – 504 999	-	1
520 000 – 534 999	1	-
535 000 – 549 999	1	-
Total	35	37

The above table is not confined to payroll expenditures only and reflects additional items that come within the definition of remuneration under AASB119, *Employee Benefits* (for example accrued annual leave).

The actual position numbers can vary from the nominal position numbers, ie in a given year more than one person may occupy the same position due to the timing of appointments (or cessations) and be in excess of the \$130 000 threshold, or the exclusion of an officer below that threshold where the Senior Executive did not occupy the position for the full reporting period. In addition, the table includes changes associated with a number of promotions and/or job changes.

Note 32 Meetings of the CSIRO Board and Board Committees

During the financial year, eight Board meetings, six Board Audit Committee meetings, five Board Remuneration Committee meetings and thirteen Board Commercial Committee meetings were held. The number of meetings attended by each of the Board member was as follows:

					Boa	ard	Boa	Ird
			Board	Audit	Remun	eration	Comm	ercial
Board Member	Boa	ard	Comm	Committee		Committee		nittee
	Number		Number		Number		Number	
	eligible to		eligible to		eligible to		eligible to	
	attend		attend		attend		attend	
	as a	Number	as a	Number	as a	Number	as a	Number
	member	attended	member	attended	member	attended	member	attended
S Cory	8	7	-	-	-	-	-	-
T A Cutler	8	8	6	6	1	1	13	13
E J Doyle	8	7	-	-	-	-	13	9
G G Garrett	8	8	-	-	-	-	13	12
B F Keane	8	8	3	3	5	5	13	13
C B Livingstone	4	4	3	3	3	3	6	4
D M O'Toole	8	8	6	6	-	-	-	-
L Paul	5	4	-	-	-	-	-	-
A D Robson	8	8	-	-	5	5	-	-
J W Stocker	-	-	-	-	-	-	-	-
P J Willcox	4	4	3	3	-	-	1	1

C B Livingstone completed term 31 December 2006

L Paul resigned on 28 March 2007

J W Stocker appointed on 28 June 2007, appointment announced 2 July 2007 P J Willcox stood aside 15 February 2007 and resigned 29 May 2007

Note 33 Related Party Disclosures

Board Members – The Board Members of the Organisation during the financial year were:

C B Livingstone (Chairman until completed term 31 December 2006) P J Willcox (Chairman from 1 January 2007, stood aside 15 February 2007, resigned 29 May 2007) J W Stocker (Chairman appointed 28 June 2007) S Cory T A Cutler (Fill the role of Chairman from 20 February 2007 to 27 June 2007) E J Doyle G G Garrett (Chief Executive) B F Keane L Paul (resigned 28 March 2007) D M O'Toole A D Robson

Remuneration – The aggregate remuneration of Board Members is disclosed in Note 30.

Note 33 Related Party Disclosures (cont)

Board Members' interest in contracts

Since 1 July 2006 no Board Member of CSIRO has received or become entitled to receive a benefit, other than a benefit included in the aggregate amount of remuneration received or due and receivable shown in Note 30 by reason of a contract made by CSIRO with the Board Member or with a firm of which the Board Member is a member or with a company in which the Board Member has a substantial financial interest.

Other transactions of Board Members - related entities

Ms C B Livingstone is a Director of Telstra Corporation Ltd and Macquarie Bank Ltd. All contracts and transactions between these entities and CSIRO are based on normal commercial terms and conditions and there is no personal benefit to the CSIRO Board Member.

Mr P J Willcox is a Director of Telstra Corporation Ltd and a member of the Advisory Board of CVC Asia Pacific (Australia). He was the Chairman of Mayne Pharma Ltd until February 2007. All contracts and transactions between these entities and CSIRO are based on normal commercial terms and conditions and there is no personal benefit to the CSIRO Board Member.

Dr J W Stocker is the Company Chairman of Sigma Pharmaceuticals Ltd and is a Director of Telstra Corporation Ltd, Nufarm Ltd and Circadian Technologies Ltd. He is also a Principal and Director of Foursight Associates Ltd. He was appointed to the CSIRO Board on 28 June 2007 and was not involved in commercial or procurement decisions by CSIRO in 2006–07. CSIRO had a contract with Foursight Associates in 2006–07 which was wound up on announcement of Dr Stocker's appointment to the CSIRO Board. All contracts and transactions between these entities and CSIRO are based on normal commercial terms and conditions.

Professor S Cory is Director of the Walter and Eliza Hall Institute of Medical Research and Professor of Medical Biology at the University of Melbourne. She is also a Director of Bio21 Australia Ltd and a member of the Council of the Cancer Council Victoria and the National Research Priorities Standing Committee. All contracts and transactions between these entities and CSIRO are based on normal commercial terms and conditions and there is no personal benefit to the CSIRO Board Member.

Dr T A Cutler is the Principal of Cutler & Company, a consultancy in information and communications technology. He is also Chairman of ACID Pty Ltd (the Australasian Cooperative Research Centre for Interaction Design) and a Director of Innovation Xchange Australia Ltd, Churchill Club Ltd, Multimedia University (Universiti Telekom Sdn Bhd) and MSC Technology Centre Sdn Bhd, Malaysia. He is a member of the International Advisory Panel, Multimedia Supercorridor, Malaysia, Innovation Economy Advisory Board, Victoria and the Council of the Queensland University of Technology. All contracts and transactions between these entities and CSIRO are based on normal commercial terms and conditions and there is no personal benefit to the CSIRO Board Member.

Dr E J Doyle is Chair of Port Waratah Coal Services and the Hunter Valley Research Foundation. She is also a Director of OneSteel, Hunter Medical

Note 33 Related Party Disclosures (cont)

Research Institute, State Super Financial Services, Ross Human Directions Ltd and Steel & Tube Ltd, New Zealand. She is a Conjoint Professor at the University of Newcastle Graduate School of Business. All contracts and transactions between these entities and CSIRO are based on normal commercial terms and conditions and there is no personal benefit to the CSIRO Board Member.

Mr B F Keane is the Principal of Brian Keane and Associates, a management and insurance consulting firm. He is a Director of Medibank Private Ltd, Law Cover Pty Ltd (NSW Solicitors Professional Indemnity Fund), Hollard Insurance Company and Aurora Energy Pty Ltd. All contracts and transactions between these entities and CSIRO are based on normal commercial terms and conditions and there is no personal benefit to the CSIRO Board Member.

Ms D M O'Toole is a Director of Norfolk Group Ltd and Raheny Consulting Pty Ltd. She is also a member of the Queensland Biotech Advisory Council and a member of the Advisory Committee for the Banking and Finance School of the Queensland University of Technology. All contracts and transactions between these entities and CSIRO are based on normal commercial terms and conditions and there is no personal benefit to the CSIRO Board Member.

Ms L Paul is the Secretary of the Department of Education, Science and Training. All contracts and transactions between the Department and CSIRO are based on normal commercial terms and conditions and there is no personal benefit to her either as the CSIRO Board Member or as the Secretary of the Department of Education, Science and Training.

Professor A D Robson is Vice Chancellor of the University of Western Australia and member of the Premier's Science Council (Western Australia). He is a Director of AARNet and Universities Australia. All contracts and transactions between these entities and CSIRO are based on normal commercial terms and conditions and there is no personal benefit to the CSIRO Board Member.

Dr G Garrett has no involvement in related entities.

Average Staffing Levels	2007	2006
	Number	Number
The average staffing levels measured on full- time equivalent basis for the Organisation		
during the reporting period.	5 755	5 879

Note the actual staff numbers based on headcount at 30 June 2007 was 6 331 (2006, 6 558).

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(a) Interest rate risk

					Fixed	Interest Rat	e Maturinç	i							
		Floating Ir	nterest											Weighted	Average
Financial Instrument	Notes	Rate		1 year o	r less	1 to 5 y	ears	> 5 ye	ars	Non Interes	t Bearing	Tota	_	Effective Int	erest Rate
		2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006
		\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	%	%
Financial assets															
Cash at bank and cash on hand	7	26 048	38 328									26 048	38 328	5.9	5.4
Deposits	7			105 000	115 000							105 000	115 000	6.3	5.7
Receivables for goods and															
services	8									51 031	52 433	51 031	52 433	n/a	n/a
Loans receivable	8									400	400	400	400	n/a	n/a
Net GST receivable	8									•	1 134	•	1 134	n/a	n/a
Other receivables	8									5 726	9 681	5 726	9 681	n/a	n/a
Investments	9-10									51 204	35 523	51 204	35 523	n/a	n/a
Total financial assets		26 048	38 328	105 000	115 000	•	•	•	•	108 361	99 171	239 409	252 499		
Total assets												1 569 670	1 559 016		
Financial liabilities															
Finance lease liabilities	20			4 225	19 090	15516	3 909	52 263	53 201			72 004	76 200	4.6	4.6
Trade creditors	18									55 370	50 006	55 370	50 006	n/a	n/a
Net GST payable	19									781	•	781	•	n/a	n/a
Research revenue received in advance	ę									50 800	51 76A	FO RUU	51 67A	e/u	e/u
Deposits	2 5	16 866	19 705									16 866	19 705	5.9	5.5
Other creditors	19									10 504	10 714	10 504	10 714	n/a	n/a
Total financial liabilities		16 866	19 705	4 225	19 090	15 516	3 909	52 263	53 201	126 455	112 484	215 325	208 299		
Total liabilities												401 359	393 062		
Liabilities not recognised															
Legal claims and guarantees	24									250	250	250	250	n/a	n/a

Note 35 Financial Instruments

(b) Fair values of financial assets and liabilities

		20	07	20	006
		Total	Aggregate	Total	Aggregate
		carrying	net fair	carrying	net fair
		amount	value	amount	value
	Notes	\$'000	\$'000	\$'000	\$'000
Financial assets (recognised)					
Cash at bank and on hand	7	26 048	26 048	38 328	38 328
Deposits	7	105 000	105 000	115 000	115 000
Receivables for goods and services	8	51 031	51 031	52 433	52 433
Loans receivable	8	400	400	400	400
GST receivable	8	-	-	1 134	1 134
Other receivables	8	5 726	5 726	9 681	9 681
Investments	9-10	51 204	51 204	35 523	35 523
		239 409	239 409	252 499	252 499
Financial liabilities (recognised)					
Finance lease liabilities	20	72 004	72 004	76 200	76 200
Trade creditors	18	55 370	55 370	50 006	50 006
GST payable	19	781	781	-	-
Research revenue received in					
advance	19	59 800	59 800	51 764	51 764
Deposits	21	16 866	16 866	19 705	19 705
Other creditors	19	10 504	10 504	10 714	10 714
		215 325	215 325	208 389	208 389
Financial liabilities (unrecognised)					
Legal claims and bank guarantee	24	250	250	250	250

(c) Credit risk exposures

The Organisation's maximum exposure to credit risk at reporting date in relation to each class of recognised financial assets is the carrying amount of those assets as indicated in the Balance Sheet.

The Organisation has no significant exposures to any concentrations of credit risk.

All figures for credit risk referred to do not take into account the value of any collateral or other security.

Note 36 Reporting of Outcomes and Outputs

(a) Reporting of outcome

The Organisation's outputs contribute to a single outcome:

'The application or utilisation of the results of scientific research delivers:

- Innovative and competitive industries
- Healthy environment and lifestyles
- A technologically advanced society'.

(b) Net cost of outcome delivery

	2007 \$'000	2006 \$'000
Total expenses	972 703	947 783
Other external revenues:		
Sale of goods and rendering services – to related entities	110 303	76 968
Sale of goods and rendering services – to external entities	175 469	195 069
Interest	6 406	7 626
Net gains from sale of assets	2 714	15 467
Donations	60	138
Rents	6 361	6 173
Royalities	17 135	20 508
Net gains from sale of investments	13 442	11 910
Realisation of fair value gains reserve	749	-
Sale of primary produce	986	879
Other	30 037	29 089
Total other external revenues	363 662	363 826
Net cost of outcome	609 041	583 957

Note to accompany the following table:

During the 2006–07 financial year, the Organisation applied the same methodology as 2005–06 for the allocation of corporate costs to enable a more accurate pricing of outputs. This methodology involves management estimation and decision as to the most appropriate choice of cost drivers such as staff numbers, floor space and divisional function per output.

In addition, the Organisation allocates direct costs and revenues to outputs derived from the use of project codes within the Organisation project based accounting system and Divisional support costs are allocated to projects using appropriate cost drivers such as floor space and direct labour hours.

Financial Statements

Note 36 Reporting of Outcomes and Outputs (cont)

(c) Major Organisational Revenues and Expenses by Output Groups

	Outpr	ut 1	Outp	ut 2	Outpi	ut 3	Outpr	ut 4		
	Research pro services for I Techno Manufactu Servi	oducts and Information Slogy, ring and ces	Research pr services for Minerals ar	oducts and Sustainable nd Energy	Research pri services for E and Natural	oducts and invironment Resources	Research pro services for A and He	oducts and gribusiness ealth	Tot	Ē
	2007	2006	2007	2006	2007	2006	2007	2006	2007	2006
	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000	\$'000
Operating Expenses										
Employees	178 601	186 312	90 919	87 282	165 007	153 086	125 357	121 419	559 884	544 925
Suppliers	91 493	96 423	50 330	45 840	84 370	72 061	106 406	102 668	332 599	320 165
Depreciation and amortisation	23 074	25 305	10 240	11 128	15 248	15 129	27 169	28 367	75 731	79 930
W rite-down of assets	447	(64)	124	(161)	305	(301)	338	(303)	1 214	(829)
Other	1 092	1 491	539	488	810	762	834	851	3 275	3 592
Total operating expenses	294 707	309 467	152 152	144 577	265 740	240 737	260 104	253 002	972 703	947 783
Funded by:										
Revenues from Government	192 401	202 089	95 615	90 790	166 304	146 218	155 740	154 832	610 060	593 928
Sale of goods and services	75 415	86 579	49 375	48 748	101 408	80 754	59 574	55 957	285 772	272 037
Royalties	6 780	4 510	1 640	1 565	493	730	8 222	13 703	17 135	20 508
Net gains on sale of property, plant and	100	0	010		L		FCO	010		
Gains on sale of investments. IP and	00/	4,009	002	2,404	000	4,130	1 70	4,240	2114	104 01
realisation of fair value gain reserve	3 545	11 139	957	4 030	3 331	862	6 358	430	14 191	11 910
Other	3 615	7 723	1 705	1 616	2 730	6 964	35 800	27 601	43 850	43 903
Total operating revenues	282 544	316 698	149 542	149 153	275 121	239 684	266 515	256 771	973 722	957 754

The Organisation's outcomes and outputs are described in Note 36 (a).

Note 37 Appropriations

Acquittal of the Organisation to Draw Cash from the Consolidated Revenue Fund for Ordinary Annual Services Appropriations

Particulars	Outp	outs	Lo	bans	Eq	uity	Т	otal
	2007 \$'000	2006 \$'000	2007 \$'000	2006 \$'000	2007 \$'000	2006 \$'000	2007 \$'000	2006 \$'000
Year ended 30 June								
Balance carried forward from previous year	-	-	-	-	_	-	-	-
Appropriation Act 1	610 060	593 928	-	-	-	-	610 060	593 928
Appropriation Act 3	-	-	-	-	-	-	-	-
Total available for payment	610 060	593 928	-	-	-	-	610 060	593 928
Total payments made	610 060	593 928	-	-		-	610 060	593 928
Balance carried forward to next year	-	-	-	-	-	-	_	-

This table reports on appropriations made by the Parliament of the Consolidated Revenue Fund (CRF) for payment to the Organisation. When received by the Organisation, the payments made are legally the money of the Organisation and do not represent any balance remaining to the CRF.





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Appendix I

Consultancy services

CSIRO's policy on selection and engagement of consultants is based on the principles of:

- value for money
- open and effective competition
- ethics and fair dealing
- accountability and reporting
- national competitiveness and industry development
- support for other Australian Government policies.

These principles are included within CSIRO's Procurement Policy and Procedures.

CSIRO engages individuals and companies to provide professional services, taking account of the skills and resources required for the task, the skills available internally and the costeffectiveness of these options.

CSIRO spent \$1 237 354 (including goods and services tax (GST)) on consultancies during 2006–07 (\$1.75 million in 2005–06). There were 36 consultancies let during the year with the total whole-of-life value of \$1 595 577 (including GST) (\$1.58 million in 2005–06). The following table provides details of consultancy services let by CSIRO during 2006–07 with a contract value, GST inclusive, of \$10 000 or more.

Registration number	Consultant	Nature and purpose of consultancy	Estimated total life cost of consultancy (GST inclusive)	Reason for consultancy	Procurement method
2006/07/01	The Cape Group	Development of workforce plan for CSIRO Information Management and Technology (IM&T).	\$46 200	SS	8
2006/07/02	Duncan Buckeridge– Insight Economics	Economic impact assessment of the e-Health Research Centre.	\$33 000	SS	EX
2006/08/01	Commercialisation Connections	Market analysis to determine the potential market position and advantages of GLO2.	\$14 080	SS	Å.
2006/08/02	Professor Peter Lillford	The consultant will liaise and advise with the Flagship Office, Theme Leader and Project staffing order to progress new project areas and give strategic advice to the Flagship.	\$49 000	SS	Ĕ
2006/08/03	PricewaterhouseCoopers	Revision of CSIRO property portfolio including Sydney portfolio, accommodation requirements and financial analysis of consolidation plan.	\$75 482	<u>S</u>	Σ
2006/08/05	2nd Road	Facilitation of planning session for a number of large inter-related CSIRO IM&T Foundation Infrastructure Projects.	\$26 000	<u>S</u>	EX
2006/08/06	ACIL Tasman Ltd	Stage two review study of CSIRO's impact including economic analysis.	\$288 662	S	EX
2006/08/07	Channel Financial Communication	Review: current communications strategy; the brand and marketing study findings; and the internal review of the communications function and development of an implementation plan for the new strategy.	\$55 200	$\overline{\mathbf{v}}$	Ĕ

u Appendixes

Registration number	Consultant	Nature and purpose of consultancy	Estimated total life cost of consultancy (GST inclusive)	Reason for consultancy	Procurement method
2006/10/01	PCT Engineers	Conduct independent risk assessment and subsequent report on Pellet endurance furnace project.	\$15 565	S	EX
2006/10/02	Skye Point Innovation	Act as a principle advisor to the Centre for Sustainable Resource Processing on biomass R&D program, including development of ten year plus horizon vision for promotion of project to industry and government agencies.	\$38 500	SS	Ĕ
2006/10/03	Belinda Everingham	Provide ongoing assistance with optimising the Food Futures Flagship investment in its research portfolio, through developing valuations of the impact of each project and building a probability of success tool to help measure risk.	\$49 500	S	X
2006/10/04	ACIL Tasman Ltd	The consultant will undertake a commercialisation study of CSIRO spin-off companies.	\$24 890	S	EX
2006/11/01	Port Jackson Partners Ltd	Consultant will provide independent, expert process guidance, facilitation skills, external strategic advice and external calibration for the Strategic Plan.	\$33 000	PA	Q.
2006/11/02	BigPic	Consultant will produce a document that provides a clear strategy which will enable CSIRO in Queensland to work with existing and emerging stakeholders to identify, prioritise and resource opportunities for continued growth.	\$26 400	S	X
2006/12/01	Hassall and Associates	Consultant will provide independent advice regarding the market positioning of the Cotton Decision Support Systems.	\$44 000	<u>S</u>	OT

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Registration number	Consultant	Nature and purpose of consultancy	Estimated total life cost of consultancy (GST inclusive)	Reason for consultancy	Procurement method
2006/12/02	The Temaplan Group	Consultant will provide techno-economic modelling assistance for the Technological and Social Drivers in Transport Fuels Use project.	\$49 000	SS	EX
2007/01/01	JLH Consulting	Independent advice on market place for project IP arising grain protection gene collaboration with the Grains Research and Development Corporation.	\$27 500	IS	RQ
2007/01/02	Croft IP	The consultant will provide independent commercial advice to the CEO as part of CSIRO's governance process (ComEx) in the commercial arena.	\$55 000	SS	RQ
2007/02/04	SAP Australia	CSIRO eXtensible Resource Provisioning Management and user-centred design solution reviews.	\$38 792	SS	EX
2007/02/05	Danika Bakalich	Stakeholder Management Proposal recommending processes to build a sustainable funding base with respect to project funding by the Department of Communications, Information Technology and the Arts.	\$ 11 000	SS	Ж
2007/03/01	OTM Consulting	Market testing, initiation and management service for a joint industry project focused on development of Near Wellbore Characterisation Tool.	\$ 16 000	SS	EX
2007/03/02	PricewaterhouseCoopers	Review of the BETR (Business and Enabling Technologies Replacement) project.	\$82 000	IS	EX
2007/03/04	Bio-Link Associates	Strategic and Market Assessment of CSIRO's nanoBang TM Technology.	000 \$	IS	Ë

4 Appendixes

Registration number	Consultant	Nature and purpose of consultancy	Estimated total life cost of consultancy (GST inclusive)	Reason for consultancy	Procurement method
2007/03/04	Gramercy Venture Advisors Pty Ltd	Deep market assessment of Maya and CGI plug-in technology.	\$15 000	S	EX
2007/03/05	Deloitte Touche Tohmatsu	Review of current state of CSIRO.au, assessing appropriateness of original vision within current CSIRO organisational environment.	\$47 515	S	Σ
2007/05/01	ltasca Consulting Group Inc	Report for Wealth from Oceans Flagship on the nature and occurrence of sand production.	\$230 000	SS	EX
007/05/02	GHD Pty Ltd	Report on the structural condition of the Parkes 64-metre antenna tower.	\$30 094	SS	ST
2007/05/03	Deloitte Touche Tohmatsu / Eclipse	Review the vignette enterprise-wide technology solution implementation.	\$37 400	S	Ъ
2007/05/04	Parker & Partners Public Affairs	Subject matter expert for Avian Flu announcement.	\$22 000	S	X H
2007/06/01	Clifton Coney Group Pty Ltd	Study into the viability of a collaborative data centre between Monash University, the University of Melbourne and CSIRO.	\$55 466	<u>N</u>	R Q
Total value o	f consultancies below \$10 00	00	\$48 331		
Total value c	of consultancies let during 2	.006–07	\$1 595 577		

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Notes to table

Reason code IS	Reason for consultancy Need for independent study/evaluation.
PA	Need for professional assistance to manage and facilitate change and its consequence.
SS	Specialist skills were not otherwise available.
Procurement code	Procurement method
Ы	An existing panel member – this category includes standing offers, common use arrangements and approved supplier
	panels.
OT	Tenders sought from the market place (Request for Proposal, Request for Tender, Expressions of Interest).
ST	Tenders being sought from suppliers who have pre-qualified through some form of previous competitive process.
RQ	Purchasing thresholds consistent with CSIRO's minimal standards.
EX	Exemption arrangement such as sole supplier, pre-eminent expertise or urgency and/or practicality.



Appendix 2

Science and Industry Endowment Fund Statements



Appendixes

Independence

In conducting the audit, I have followed the independence requirements of the Australian National Audit Office, which incorporate the ethical requirements of the Australian accounting profession.

Auditor's Opinion

In my opinion, the financial statements of the Science and Industry Endowment Fund:

- (a) have been prepared in accordance with the Australian Accounting Standards (including the Australian Accounting Interpretations); and
- (b) give a true and fair view of the matters required by the Australian Accounting Standards (including the Australian Accounting Interpretations) including the Science and Industry Endowment Fund's financial position as at 30 June 2007 and of its financial performance and its cash flows for the year then ended.

Australian National Audit Office

John McCullough Acting Executive Director

Delegate of the Auditor-General

Canberra 28 August 2007

SCIENCE AND INDUSTRY ENDOWMENT FUND STATEMENT BY TRUSTEE

In our opinion, the attached financial statements for the year ended 30 June 2007 have been prepared based on properly maintained financial records and in accordance with Australian Accounting Standards and other mandatory financial reporting requirements in Australia, and give a true and fair view of the financial position of the Fund as at 30 June 2007 and of its performance for the year then ended.

In our opinion, at the date of this statement, there are reasonable grounds to believe that the Fund will be able to pay its debts as and when they become due and payable.

/ aret Joh

Geoff G Garrett Chief Executive

23 August 2007

Michaelen

Michael S Whelan Chief Financial Officer

23 August 2007

SCIENCE AND INDUSTRY ENDOWMENT FUND INCOME STATEMENT For the year ended 30 June 2007

Notes	2007	2006
INCOME	\$	\$
Revenue		
Interest	32 299	28 109
Total revenue	32 299	28 109
Gains		
In-kind contributions received 4	3 454	5 834
Total gains	3 454	5 834
TOTAL INCOME	35 753	33 943
EXPENSES		
Scientific research grants	-	23 804
Bank fees	24	30
In-kind expenses:		
 advertising and approval fees 4 	-	2 000
 accounting, secretarial and audit 4 	3 454	3 834
TOTAL EXPENSES	3 478	29 668
Surplus/(deficit)	32 275	4 275

Appendixes

SCIENCE AND INDUSTRY ENDOWMENT FUND BALANCE SHEET As at 30 June 2007

	Notes	2007	2006
ASSETS		φ	¢
Financial Assets			
Cash	5	517 271	487 047
Receivables	6	15 235	13 184
Total assets		532 506	500 231
LIABILITIES			
Payables			
Awards		-	-
I otal liabilities		-	-
NET ASSETS		532 506	500 231
EQUITY			
Contributed equity		200 000	200 000
Accumulated surpluses		332 506	300 231
Total equity		532 506	500 231
Current assets		532 506	500 231
Non-current assets		-	-
Current liabilities		-	-
Non-current liabilities		-	-

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SCIENCE AND INDUSTRY ENDOWMENT FUND STATEMENT OF CHANGES IN EQUITY As at 30 June 2007

Accum Surple	ulated uses	Contribute	ed Equity	Total E	quity
2007 \$	2006 \$	2007 \$	2006 \$	2007 \$	2006 \$
300 231	295 956	200 000	200 000	500 231	495 956
32 275	4 275	-	-	32 275	4 275
332 506	300 231	200 000	200 000	532 506	500 231

Opening balance at 1 July

Surplus/(deficit) for the period

Closing balance at 30 June

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SCIENCE AND INDUSTRY ENDOWMENT FUND CASH FLOW STATEMENT For the year ended 30 June 2007

Notes	2007	2006
	\$	\$
OPERATING ACTIVITIES		
Cash received		
Interest	30 248	41 642
Total cash received	30 248	41 642
Cash used		
Grants	-	23 804
Other	24	30
Total cash used	24	23 834
Net cash from/(used by) operating activities 7	30 224	17 808
Net increase/(decrease) in cash held	30 224	17 808
Cash at the beginning of the reporting period	487 047	469 239
Cash at the end of the reporting period	517 271	487 047

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SCIENCE AND INDUSTRY ENDOWMENT FUND NOTES TO AND FORMING PART OF THE FINANCIAL STATEMENTS For the year ended 30 June 2007

Note 1 Summary of Significant Accounting Policies

1.1 Basis of Preparation of the Financial Report

The financial statements are required by section 10 of the *Science and Industry Endowment Act 1926* and are a general purpose financial report.

The financial statements and notes have been prepared in accordance with:

Australian Accounting Standards and Accounting Interpretations issued by

Australian Accounting Standards Board that apply for the reporting period The financial statements have been prepared on an accrual basis and are in accordance with the historical cost convention. No allowance is made for the effect of changing prices on the results or the financial position.

The Financial Report is presented in Australian dollars and values are rounded to the nearest dollar unless otherwise stated.

Assets and liabilities are recognised in the Balance Sheet when and only when it is probable that future economic benefits will flow and the amounts of the assets or liabilities can be reliably measured.

Revenues and expenses are recognised in the Income Statement when and only when the flow or consumption or loss of economic benefits has occurred and can be reliably measured.

1.2 Cash

For the purpose of the Cash Flow Statement, cash includes cash at bank and deposits at call. They are readily convertible to cash.

1.3 Revenue

Interest revenue is recognised on a proportional basis taking into account the interest rates applicable to the financial assets.

1.4 Resources Received Free of Charge

Services received free of charge are recognised as gains when and only when a fair value can be reliably determined and the services would have been purchased if they had not been donated. Use of those resources is recognised as an expense.

1.5 Financial Instruments

Accounting policies for financial instruments are stated in Note 8.

Note 2 Contingencies and Commitments

No contingent liabilities and commitments exist as at 30 June 2007.

Note 3 Principal Activity

The Fund was established under the *Science and Industry Endowment Act 1926* with the Trustee of the Fund being the CSIRO Chief Executive. An appropriation of 100 000 pounds was received at the time the Fund was established. The Fund is invested and has subsequently earned interests over time.

The principal activity of the Science and Industry Endowment Fund is to provide assistance to persons engaged in scientific research and in the training of students in scientific research.

Note 4	In-kind Contributions Received	2007	2006
	Estimated value of resources provided free of charge by CSIRO are as follows: – accounting and secretarial services – advertising and approval fees	\$ 2 554 -	\$ 2 234 2 000
	 auditors remuneration paid and payable to the 		
	Auditor-General for auditing the financial statements of SIEF	900	1600
		3 454	5 834
Note 5	Cash (current)		
	Cash at bank	17 193	3 050
	Deposits – at call	500 078	483 997
		517 271	487 047
Note 6	Receivables (current)		
	Interest receivable	15 235	13 184
	Gross receivables are aged as follows: Not overdue	15 235	13 184



		2007	2006
		\$	\$
Note 7	Cash Flow Reconciliation		
	Reconciliation of cash and cash equivalents as per Balance Sheet to Cash Flow Statement		
	Cash and cash equivalent as per:		
	Cash Flow Statement	517 271	487 047
	Balance Sheet	517 271	487 047
	Difference	-	-
	Reconciliation of operating result to net cash from operating activities:		
	Operating surplus/(deficit)	32 275	4 275
	(Increase)/decrease in net receivables	(2 051)	13 533
	Increase/(decrease) in supplier payables	-	-
	Net cash from/(used by) operating activities	30 224	17 808

Note 8 Financial Instruments

The aggregate net fair value of cash, deposits at call, and receivables disclosed in the Balance Sheet are their total carrying amounts.

Interest Rate Risk – Average rate of return on cash and short-term deposits was 5.93% (2006 5.9%)

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Acronyms

AAHL	Australian Animal Health Laboratory
ACIAR	Australian Centre for International Agricultural Research
ACPFG	Australian Centre for Plant Functional Genomics
ADJR Act	Administrative Decisions (Judicial Review) Act 1977
AEIFRS	Australian Equivalents to International Financial Reporting Standards
AFMA	Australian Fisheries Management Authority
AGO	Australian Greenhouse Office
AIMS	Australian Institute of Marine Science
AISRF	Australia-India Strategic Research Fund
ANAO	Australian National Audit Office
ANSTO	Australian Nuclear Science and Technology Organisation
AOC	
	Autonomous Operational Charging
APA	Autonomous Operational Charging Annual Performance Agreement
APA APGs	Autonomous Operational Charging Annual Performance Agreement Annual Performance Goals
APA APGs ARPANSA	Autonomous Operational Charging Annual Performance Agreement Annual Performance Goals Australian Radiation and Nuclear Safety Agency
APA APGs ARPANSA ATLR	Autonomous Operational Charging Annual Performance Agreement Annual Performance Goals Australian Radiation and Nuclear Safety Agency Average Time Lost Rate
APA APGs ARPANSA ATLR ATNF	Autonomous Operational Charging Annual Performance Agreement Annual Performance Goals Australian Radiation and Nuclear Safety Agency Average Time Lost Rate Australia Telescope National Facility
APA APGs ARPANSA ATLR ATNF AWTA	Autonomous Operational Charging Annual Performance Agreement Annual Performance Goals Australian Radiation and Nuclear Safety Agency Average Time Lost Rate Australia Telescope National Facility Australian Wool Testing Authority
APA APGs ARPANSA ATLR ATNF AWTA BAC	Autonomous Operational Charging Annual Performance Agreement Annual Performance Goals Australian Radiation and Nuclear Safety Agency Average Time Lost Rate Australia Telescope National Facility Australian Wool Testing Authority Board Audit Committee
APA APGs ARPANSA ATLR ATNF AWTA BAC BCC	Autonomous Operational Charging Annual Performance Agreement Annual Performance Goals Australian Radiation and Nuclear Safety Agency Average Time Lost Rate Australia Telescope National Facility Australian Wool Testing Authority Board Audit Committee Board Commercial Committee

BETR	Business and Enabling Technologies Replacement
BPPS	Brand Positioning and Performance Study
CAC Act	Commonwealth Authorities and Companies Act 1997
CDS	Commonwealth Disability Strategy
CERF	Commonwealth Environment Research Facilities
ComEx	Commercial Executive
CRC	Cooperative Research Centre
CSIR	Council for Scientific and Industrial Research
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CSIROSEC	CSIRO Science Education Centre
CVS	Customer Value Survey
CVS DDA Act	Customer Value Survey Disability Discrimination Act 1992
CVS DDA Act DEST	Customer Value Survey Disability Discrimination Act 1992 Department of Education, Science and Training
CVS DDA Act DEST DSTO	Customer Value Survey Disability Discrimination Act 1992 Department of Education, Science and Training Defence Science and Technology Organisation
CVS DDA Act DEST DSTO ECC	Customer Value Survey <i>Disability Discrimination Act 1992</i> Department of Education, Science and Training Defence Science and Technology Organisation Enterprise Communication Council
CVS DDA Act DEST DSTO ECC EMC	Customer Value Survey <i>Disability Discrimination Act 1992</i> Department of Education, Science and Training Defence Science and Technology Organisation Enterprise Communication Council
CVS DDA Act DEST DSTO ECC EMC EMS	Customer Value SurveyDisability Discrimination Act 1992Department of Education, Science and TrainingDefence Science and Technology OrganisationEnterprise Communication CouncilExecutive Management CouncilEnvironmental Management System
CVS DDA Act DEST DSTO ECC EMC EMS EPBC Act	Customer Value Survey Disability Discrimination Act 1992 Department of Education, Science and Training Defence Science and Technology Organisation Enterprise Communication Council Executive Management Council Environmental Management System Environment Protection and Biodiversity Conservation Act 1999
CVS DDA Act DEST DSTO ECC EMC EMS EPBC Act ESD	Customer Value Survey Disability Discrimination Act 1992 Department of Education, Science and Training Defence Science and Technology Organisation Enterprise Communication Council Executive Management Council Environmental Management System Environment Protection and Biodiversity Conservation Act 1999 Economically Sustainable Development
CVS DDA Act DEST DSTO ECC EMC EMS EPBC Act ESD	Customer Value Survey Disability Discrimination Act 1992 Department of Education, Science and Training Defence Science and Technology Organisation Enterprise Communication Council Executive Management Council Environmental Management System Environment Protection and Biodiversity Conservation Act 1999 Economically Sustainable Development Emerging Science Initiative
FOI Act	Freedom of Information Act 1982
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GHG	Greenhouse gas
GPS	Global positioning satellite
GRA	Global Research Alliance
H&S	Health and Safety
HS&E	Health Safety and Environment
ICT	Information and Communication Technologies
IP	Intellectual Property
IPCC	Intergovernmental Panel on Climate Change
IPPs	Information Privacy Principles
ISI	Institute for Scientific Information
JCU	James Cook University
LHD	Load Haul Dump
LTIFR	Lost Time Injury Frequency Rate
MOU	Memorandum of Understanding
MTFR	Medical Treatment Frequency Rate
MXDPs	Major Cross-Divisional Programs
NCRIS	National Collaborative Research Infrastructure Strategy
NIS	National Innovation System
NPP	National Privacy Principles
NRP	National Research Priorities
NSW	New South Wales
PIN	Provisional Improvement Notice
PLI	Project Leadership Initiative
PMF	Performance Management Framework

PPF	Program Performance Framework
PPIs	Positive Performance Indicators
PSLP	Public Sector Linkages Program
QCAT	Queensland Centre for Advanced Technologies
RA&A	Risk Assessment and Audit
R&D	Research and Development
RDC	Research and Development Corporation
RIPPERS	Reclaimed Intellectual Property Promising Extraordinary Revenues
RQF	Research Quality Framework
RSS	Research Support Services
SAC	Sector Advisory Council
SIA	Strategy in Action
SIEF	Science and Industry Endowment Fund
SIP	Science Investment Process
SIR Act	Science and Industry Research Act 1949
SKA	Square Kilometre Array
SME	Small and Medium sized Enterprise
ViCCU®	Virtual Critical Care Unit
WAERA	Western Australian Energy Research Alliance
WAMSI	Western Australia Marine Science Institution
WLAN	Wireless local area network

Glossary

Customer Value Survey

CSIRO's Customer Value Survey has been conducted quarterly since 2001. It was reviewed and revised in 2006. The survey covers aspects of the interaction with CSIRO that our customers have told us are important to their overall satisfaction with the value of what they have received.

CSIRO score: Survey respondents are asked to rate CSIRO's performance on a scale of 1 to 10.

Comparative score: Respondents are also asked to rate an alternative provider. The comparative score is calculated as the ratio of CSIRO's score to the alternative provider's score multiplied by 100 (for example, 7.81 / 7.65 * 100 = 102). A comparative score greater than 100 indicates that the customer rates CSIRO more highly than their main alternative R&D provider on the attribute in question.

Intellectual Property

Inventions: This is the number of inventions where one or more patent/applications are current. Accordingly an invention might include a granted patent that is near the end of its life (eg 20 years), or it might include a provisional patent application that has only recently been filed. Furthermore, one invention might relate to a patent application in one country only, or it might relate to over 20 patents/applications in different countries covering the one invention.

New inventions: This is the number of new inventions where an application (normally an Australian provisional application) is filed for the first time to protect that invention. A major implication of filing that provisional application is that it provides the applicant with an internationally recognised priority date. A small percentage of CSIRO's new inventions are filed as US provisional applications.

PCT applications: International PCT (Patent Cooperation Treaty) applications are a

'temporary' phase in any international patenting process and these have a life span of 18 months. This type of application is very common in major international corporations and is used by CSIRO when it considers its invention may have wide commercial application. In view of the 18-month time span, it is reasonable to approximate that two-thirds of the reported number were filed in the previous 12 month period.

Granted patents: Once a patent application has been examined and satisfies various patentability criteria it becomes a granted patent. It remains a granted patent until the end of the patent period (normally 20 years) provided renewal fees are paid.

Live patent cases: A live patent case is where either a patent application or a granted patent exists. It does not include cases that have lapsed, expired or been withdrawn. Applications may include provisional applications, PCT applications, and applications pending in Australia or foreign jurisdictions.

Publications

Journal articles: Includes journal articles and other items published as part of a journal (for example, an editorial or book review).

Conference papers: Includes published conference papers, abstracts or edited proceedings.

Technical reports: Includes individually authored chapters as well as whole reports that are subject to peer review and usually publicly released.

Books and chapters: Includes monographs, complete or individual chapters, usually published by a commercial publisher.

Client reports: Includes whole reports and individually authored chapters produced under collaborative or contractual arrangements. Client reports are often confidential and are not publicly released.

Student supervision and sponsorship

Sponsored students: Students are deemed to be sponsored if they receive a full or partial scholarship paid from CSIRO funds to pursue a research project leading to a PhD or Honours/Masters degree. This excludes CSIRO employees, whose study expenses are considered to be 'training and development'.

Supervised students: Students are deemed to be supervised if they have a CSIRO staff member appointed officially by the University as the supervisor for their research project. Normally, CSIRO staff are joint supervisors in conjunction with a university academic.

Themes, Streams and Projects

CSIRO's research is organised into Themes, Streams and Projects. This classification has been adopted across the Organisation to ensure the alignment of individual projects with high-level strategic goals and to facilitate the monitoring of progress toward these goals.

Theme: A Theme refers to a significant area of research that is directed towards a specified outcome with a clear strategic purpose. For example, the goal for the Urban Water Theme in the Water for a Healthy Country Flagship is: 'To provide science and technology that enables the delivery of socially acceptable, affordable and environmentally beneficial management solutions for Australia's urban water infrastructure and natural water systems – to address the projected 2030 water deficit of up to 1000 gigalitres in our cities.' Increasingly, individual Themes draw on capabilities drawn from across the Organisation and external partners.

Stream: A Stream represents a collection of related projects that address a particular aspect of the Theme goal. For example, the goal of the Urban Water Theme is pursued through five mutually supporting streams of activity: integrated water systems; demand management; recycling and diversified supply; infrastructure technologies; and urban water environments. Each Stream has an explicit medium-term stream objective supported by annual performance goals (APGs). APGs include both scientific/ technical milestones and other milestones – specifically engagement with delivery partners – that are necessary for the achievement of the stream objectives and the outcomes articulated in the theme goal.

Project: A Project is the core unit of research activity and budgetary control. Individual projects are required to have a project plan in accordance with CSIRO's project management policy.

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Contact Us

Phone: 1300 363 400 +61 3 9545 2176

Email: Enquiries@csiro.au Web: www.csiro.au

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