www.csiro.au

CSIRO

Annual Report

2011–12

CSIRO

CSIRO – the Commonwealth Scientific and Industrial Research Organisation – is one of the largest and most diverse scientific organisations in the world. It has over 6,400 staff located across 57 sites throughout Australia and one overseas.

Our purpose

CSIRO's purpose is defined through the functions we undertake for the benefit of Australia, which are set down in the *Science and Industry Research Act 1949.* These primarily include:

- to carry out scientific research for the following purposes:
  - assisting Australian industry
  - furthering the interests of the Australian community
  - contributing to the achievement of Australian national objectives or the performance of the national and international responsibilities of the Commonwealth
  - any other purpose determined by the Minister
- to encourage or facilitate the application or utilisation of the results of such research.

Our mission

We deliver innovative solutions for industry, society and the environment through great science.

Our vision

Our science is used to make a profound and positive impact for the future of Australia and humanity.

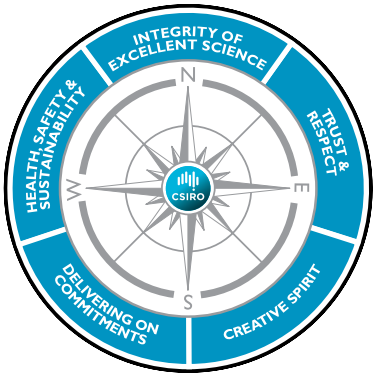
Responsible Minister

Senator the Hon Christopher Evans
Minister for Tertiary Education, Skills, Science and Research.

CSIRO's Values Compass

Our values guide our decisions and interactions with our colleagues and with our external partners and stakeholders. Our values are symbolised through the CSIRO Values Compass:

- Embracing **scientific excellence** and working together ethically and with **integrity** in everything we do.
- Building **trust and respect** each day with our communities, partners and colleagues, knowing that with trust comes accountability.
- Igniting our **creative spirit**, exploring new horizons and creating an environment where innovation thrives.
- Consistently **delivering on our commitments**. 'Do what we say we will do'.
- Striving towards a **healthy, safe and sustainable** future.



Cover: Positive impact. Whatever we do, whatever we touch, we aim to leave a positive and lasting impact for future generations. A positive impact on the air that we breathe, on the food that we eat, on the land that we walk on, in the communities we live in and the lives that we lead.

www.csiro.au

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18 September 2012

Senator the Hon Christopher Evans
Minister for Tertiary Education, Skills, Science and Research
Parliament House
CANBERRA ACT 2600

We have pleasure in submitting to you, for presentation to Parliament, the sixty-fourth Annual Report of the Commonwealth Scientific and Industrial Research Organisation (CSIRO). 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.

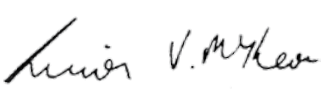
This report presents fairly the information required by the Minister for Finance and Deregulation as set out in the *Commonwealth Authorities and Companies (Report of Operations) Orders 2011*.

The report has been approved for presentation to you, signed this 23rd day of August 2012 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 (the 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.

The CAC Act requires CSIRO to report developments since the end of the financial year, giving particulars of any matter or circumstance that has arisen and has significantly affected or may significantly affect CSIRO's operations or state of affairs. On 1 July 2012, two new National Research Flagships were formed, the Biosecurity Flagship and the Digital Productivity and Services Flagship.

We commend the Organisation's achievements to you.



Simon McKeon AO
Chairman of the Board

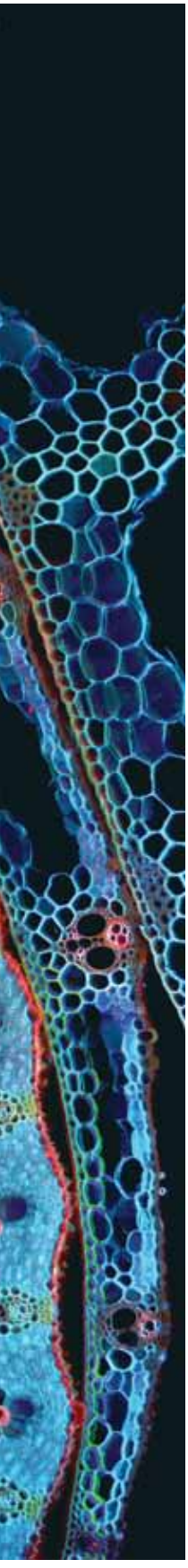
Megan Clark
Chief Executive

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 in Australia.

Today, CSIRO is a trusted source of creative ideas and practical technologies to deliver impact for the nation.



Contents

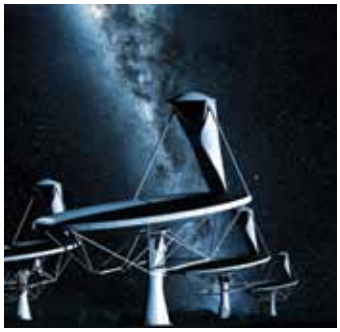
Part one
overview

Highlights of 2011–12

This report highlights a wide array of our recent science and its applications. Here are just a few examples of the impact science has on our lives, our industries and our environment.

CSIRO invented and patented wireless networking technology in the 1990s – a technology that has given us the freedom to work wirelessly in our homes, classrooms and offices, using devices such as laptops and smart phones. In April 2012, the Minister for Tertiary Education, Skills, Science and Research, Senator the Hon Chris Evans, announced that a major part of CSIRO's most recent US litigation involving its wireless local area network (WLAN) patent had been settled prior to trial. The WLAN team also won the European Patent Office Non-European Inventor Award for 2012 (more on page 53).

Image: iStockPhoto



In May 2012, the Square Kilometre Array (SKA) Organisation announced that the $2.5 billion Square Kilometre Array radio telescope would be deployed in Australia, New Zealand and South Africa. The SKA will be the world's largest and most sensitive radio telescope and will help address unanswered questions about our universe, including how the first stars and galaxies were formed (more on page 52).

Image: SKA Organisation/ Swinburne Astronomy

The *State of the Climate 2012* report is the second produced by CSIRO and the Australian Bureau of Meteorology. It provides a summary of observations of Australia's climate and analysis of the factors that influence it. The report confirms that, in Australia, each decade has been warmer than the previous decade since the 1950s (more on page 49).

The Energy Transformed Flagship installed Australia's first commercial-scale solar cooling system at the Hunter Institute of Technology, New South Wales. The system provides cool air in summer and heating in winter, and is projected to save 5,000 tonnes of greenhouse gas over the next decade (more on page 25).

CSIRO teamed up with defence research partners and developed a new manufacturing process and infrastructure for cost-effective armour production in Australia. In 2012, Australian Defence Apparel was awarded a $4 million grant from the Australian Government to establish an advanced armour processing plant in Bendigo, Victoria, based on this technology. This is expected to create more than 40 new jobs (more on page 28).

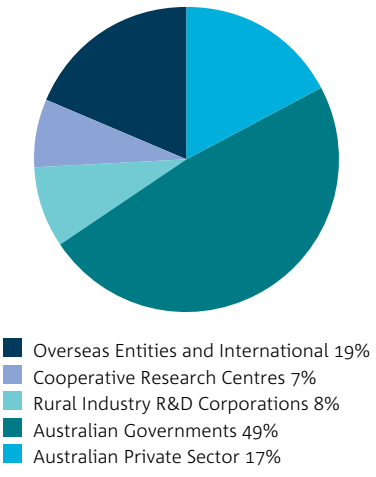
Lubrizol Corporation in the USA has created advanced highly-viscose polymers, known as Asteric™ Viscosity Modifiers, using CSIRO's RAFT (Reversible Addition Fragmentation chain Transfer) technology. This first RAFT-based product was launched in August 2011 at the American Chemical Society Conference and is now commercially available. Dr Ezio Rizzardo and Professor David Solomon received the Prime Minister's Science Prize for 2011 for their work on polymers. (more on page 55).

Image: Bearcage

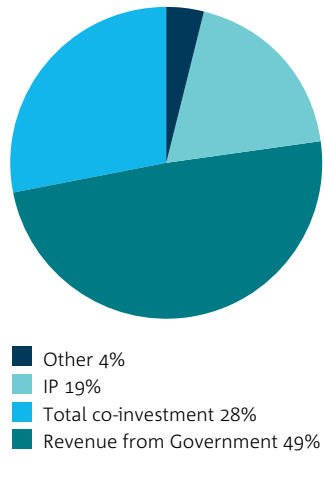
Financial performance 2011–12

CSIRO's financial result for 2011–12 was a surplus of $200.5 million, which includes net income of $228.6 million attributable to the wireless networking technology patent (WLAN) licensing agreements. Total revenue for the year was $1,476.0 million and total expenses were $1,275.5 million. CSIRO's financial performance for 2011–12 is summarised in Table 2.1 on page 3.

SOURCES OF CSIRO REVENUE IN 2011–12



SOURCES OF CO-INVESTMENT, CONSULTING AND SERVICES REVENUE 2011–12



Foreword by the Chairman

During 2011–12, Dr Megan Clark, Chief Executive CSIRO, and I had the privilege of travelling around our fabulous nation to launch the CSIRO 2011–15 Strategy. This strategy is founded on our passion for making a positive impact on the most significant challenges and opportunities facing Australia and humanity.

CSIRO seeks to play a central role in the world of applied science – science with purpose, science in use – by leading and connecting people, organisations and ideas in the areas in which we are strong. The consistent feedback that we received was that our strategy was the right one to help us tackle, with our partners, the key challenges facing the nation.

In this Annual Report we present a wonderful list of scientific achievement that, through application, is making a significant contribution to industry, society and the community. It illustrates how CSIRO and its partners are making a difference in areas such as climate change, renewable energy, human health, manufacturing and food security.

On my travels, I have sought to promote the important role science is playing in delivering benefits to our community and to our industries. CSIRO is providing scientific data and knowledge to our leaders to help them make the big decisions that we, as a nation, need to make to secure our future health and prosperity.

In this time of instant communication through social media, it is important that CSIRO maximises the use of this technology. To this end, we have been making a real effort to make our stories heard and meet our ambitious goal of more Australians being able to name an impact CSIRO has had on their lives. I congratulate these new communication efforts.

On behalf of the CSIRO Board, I would like to congratulate the CSIRO individuals and teams that received recognition through an impressive array of awards and honours throughout the year. There were two memorable moments for me in 2011–12. It was my great honour to attend the Prime Minister's Science Prize ceremony at Parliament House and to see Dr Ezio Rizzardo and Professor David Solomon recognised for their long and distinguished research careers that led to a revolution in polymer science, which has so profoundly impacted the level of control we have over polymer structure and function. I also had the pleasure of awarding the CSIRO Chairman's Medal to Dr Greg Constable and the Cotton Breeding and Biotechnology Team for their work on a new variety of cotton.

And, of course, there have been numerous other achievements and I congratulate the management and staff of CSIRO for a very strong performance in 2011–12.

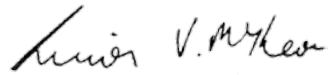
On behalf of the Board of CSIRO, I would also like to acknowledge, with appreciation, the continued support of the Australian Government and our many research and commercial partners, as well as the members of our advisory committees.

Simon McKeon (CSIRO Chairman)

During the year, we welcomed Dr Don Russell, Professor Peter Høj and Ms Shirley In't Veld to the CSIRO Board. We also farewelled the Honourable John Kerin AM and Professor Ian Chubb AC, who is focusing on his important role as the nation's Chief Scientist. I sincerely thank them for their valuable contribution to the governance of CSIRO.

CSIRO is committed to the health and safety of its staff, visitors and the communities in which we work and recognises the importance of positive interventions to enhance this. As the year has progressed, securing an even healthier and safer workplace has become a primary focus of the CSIRO Board and we continue to support Dr Clark and the Organisation in this endeavour.

I am pleased to say CSIRO continues to conduct great science and deliver innovative solutions and a positive impact for Australia.



Simon McKeon AO
Chairman of the CSIRO Board

Chief Executive's report 2011–12 – Year in review and looking ahead

Year in review

Over the past year we launched our new 2011–15 Strategy. This strategy will see us fully embrace our distinct role as the nation's leading, large-scale, multidisciplinary, mission-directed science and technology organisation. It also builds roles that will differentiate us over time – our role in providing deep connections across the innovation system and our role in providing trusted scientific advice to the nation.

CSIRO hit new benchmarks in its engagement with industry and had a record number of active licences for its technology. We set new benchmarks for our national and global collaborations and had a record performance in the depth and breadth of our science excellence and journal publications.

Our financial performance has strengthened with a solid operating result and a stronger balance sheet. Another successful round of licences for our wireless local area network (WLAN) technology delivered an additional $228.6 million. This was on top of a record $518 million of external revenue, which demonstrates the value placed on innovation by our external partners in difficult global financial conditions. The Federal Government confirmed CSIRO's appropriation of $736.7 million for 2012–13. This represents an increase of $11.9 million or 1.6 per cent over 2011–12 and is consistent with our Quadrennium Funding Agreement.

Our people and our values

Our people are at the heart of our achievements and goals. Every day I am humbled by the talent and creative spirit at CSIRO. We work in diverse teams with each person bringing something special. Innovation and science are global and more and more of our achievements come from national and global collaborations bringing the very best together to deliver profound impact.

I sincerely thank all our people and our partners for their extraordinary effort and commitment in what has been a record year for CSIRO. It is through your commitment and contributions that we are building a proud track record.

We continue to improve our health, safety and environmental reporting, train our leaders and review and improve our areas that have proved high risk in the past. While some parts of our Organisation achieved zero lost time injuries this year, we still have yet to achieve this across all our activities. We are raising the importance of the health and wellbeing of our staff, including mental health. It is not enough to go home safely. We will not be successful until we work in an environment of trust and respect and everyone also goes home with a sense of pride about their contribution to CSIRO.

This year we worked with our staff to complete a detailed survey of our culture and where we can improve *how* we work not just *what* we do. I believe that if we are clear about how we work together what we do will surprise and inspire.

Our performance

We welcomed the announcement that South Africa, Australia and New Zealand are to share the Square Kilometre Array (SKA) – a giant radio telescope that will consist of thousands of separate radio dishes and other antennae spread across an area the size of a continent. This €1.5 billion project will address fundamental questions about the Universe, including the formation of black holes, the origins of the first stars and the generation of magnetic fields. It will incorporate CSIRO's receiver technology and grow our presence in radio astronomy.

We continued to focus on our **National Research Flagship Programs**, putting the very best of our science to work on some of the most significant challenges facing the nation and the world. The **Energy Transformed Flagship** installed the

Dr Megan Clark (CSIRO Chief Executive) and Sembawang Shipyard's Managing Director Mr P K Ong, look on as the first two sections of the keel of CSIRO's new state-of-the art research vessel, *Investigator*, are brought together at a keel laying ceremony in Singapore. Image: Chris Dickinson

first commercial-scale solar cooling system at the Hunter Institute of Technology.

Our **Wealth from Oceans Flagship** is working with industry to improve Australia's response to marine oil spills.

Our **Future Manufacturing Flagship** is working with Australian Defence Apparel to manufacture, from Bendigo, advanced armour for our soldiers.

The **Minerals Down Under Flagship** worked with the States and Territories, Geoscience Australia, NASA and the Japanese space agencies to produce the world's first suite of mineralogical maps of the Australian continent.

Our **Food Futures Flagship,** with co-funding from the Grains Research and Development Corporation, developed up to 30 per cent yield increases in glasshouse trials in wheat by switching off a gene involved in carbohydrate metabolism.

Our Divisions and portfolios provide multidisciplinary support to our Flagships, but also lay the foundations for future breakthroughs. An example of this science is the polymer technique called RAFT. This year the first RAFT-based product became available to improve performance in car transmission fluids.

Dr Ezio Rizzardo and Professor David Solomon received the Prime Minister's Science Prize for 2011 for their work on polymers.

This year saw record engagement with industry with CSIRO working with over 1,500 Australian companies of all sizes and more than 350 multinational companies from 50 countries. We also had a record 247 active licences of our technologies with our partners.

This year we provided scientific advice on national and global issues. This included the *State of the Climate 2012* with the Bureau of Meteorology, the global Commission on Sustainable Agriculture and Climate Change, the Marine Climate Report Card, the Murray-Darling Basin plan, the Northern Australian Sustainable Yields Project, the Prime Minister's Taskforce on Manufacturing and advice to the community on nutrition for diabetes and heart disease.

Internationally, we have partnerships in 97 countries. Highlights were opening the Northern Node of the CSIRO-Chile International Centre of Excellence in Mining and Minerals Processing in Antofagasta, a deeper research partnership with the Brazilian Enterprise for Agricultural Research, Embrapa and delivering the first scientific breakthroughs from our partnership with the Chinese Academy of Sciences.

Our five major capital projects, with over $490 million investment, all progressed well. *The Atlas of Living Australia* was delivered on time, ahead of scope and under budget. The Atlas is a collaboration between Australia's natural history collections and custodians of biological data. It is Australia's first virtual national facility that reaches out to researchers, scientists and the community with over 32 million biodiversity records online. The Australian SKA Pathfinder project installed all 36 dishes and the first of the advanced CSIRO receiver technology. It is on track to be operational next year. The Marine National Facility – *RV Investigator* is on track for delivery next year; the Pawsey Supercomputer, for iVEC, is on track and we progressed renewable energy investment in solar and geothermal for the SKA project.

We will continue to work with others to build global precincts, and national and regional centres, making it a priority to develop plans and actions for these centres. We deepened our partnership with the University of Tasmania, and the Institute of Marine and Atmospheric Science in Hobart is under construction alongside CSIRO and will bring some 800 researchers and students together, creating a scientific powerhouse in the southern hemisphere.

The year ahead

We will continue to embed our 2011–15 Strategy, review our priorities and work to position CSIRO and Australia's innovation capacity beyond 2016. We will continue to grow our strategic partnerships and work with others to build global precincts and national and regional centres of excellence.

Our shared commitment to CSIRO values will provide confidence to our investors, our research partners and importantly to the Australian people.

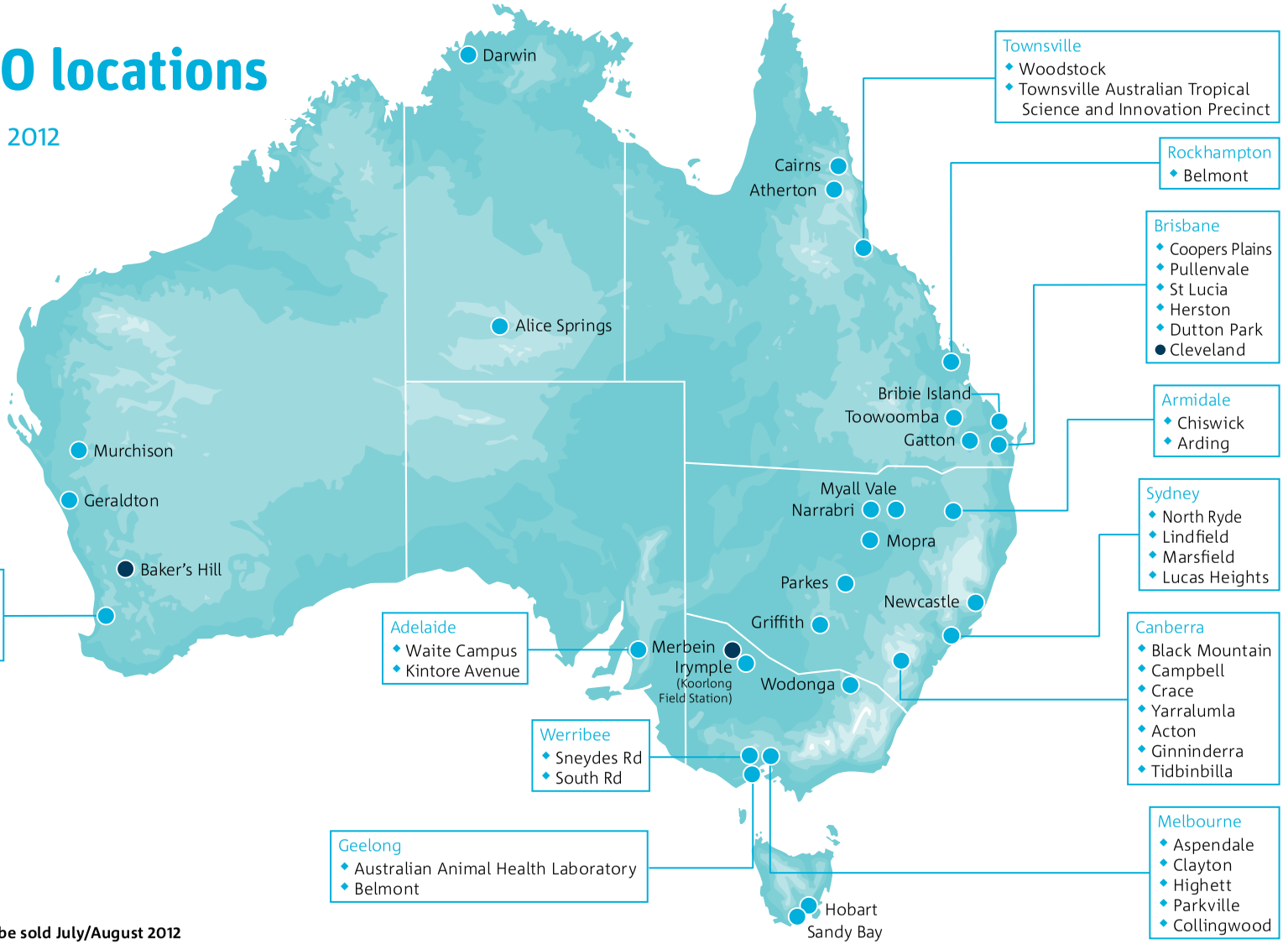
I would like to thank everyone in CSIRO for their dedication and hard work this year, as well as the members of the CSIRO Board and Executive Team for their insights, enthusiasm and support. I look forward to the opportunities and challenges in the year ahead.

Megan Clark
Chief Executive

September 2012

CSIRO locations

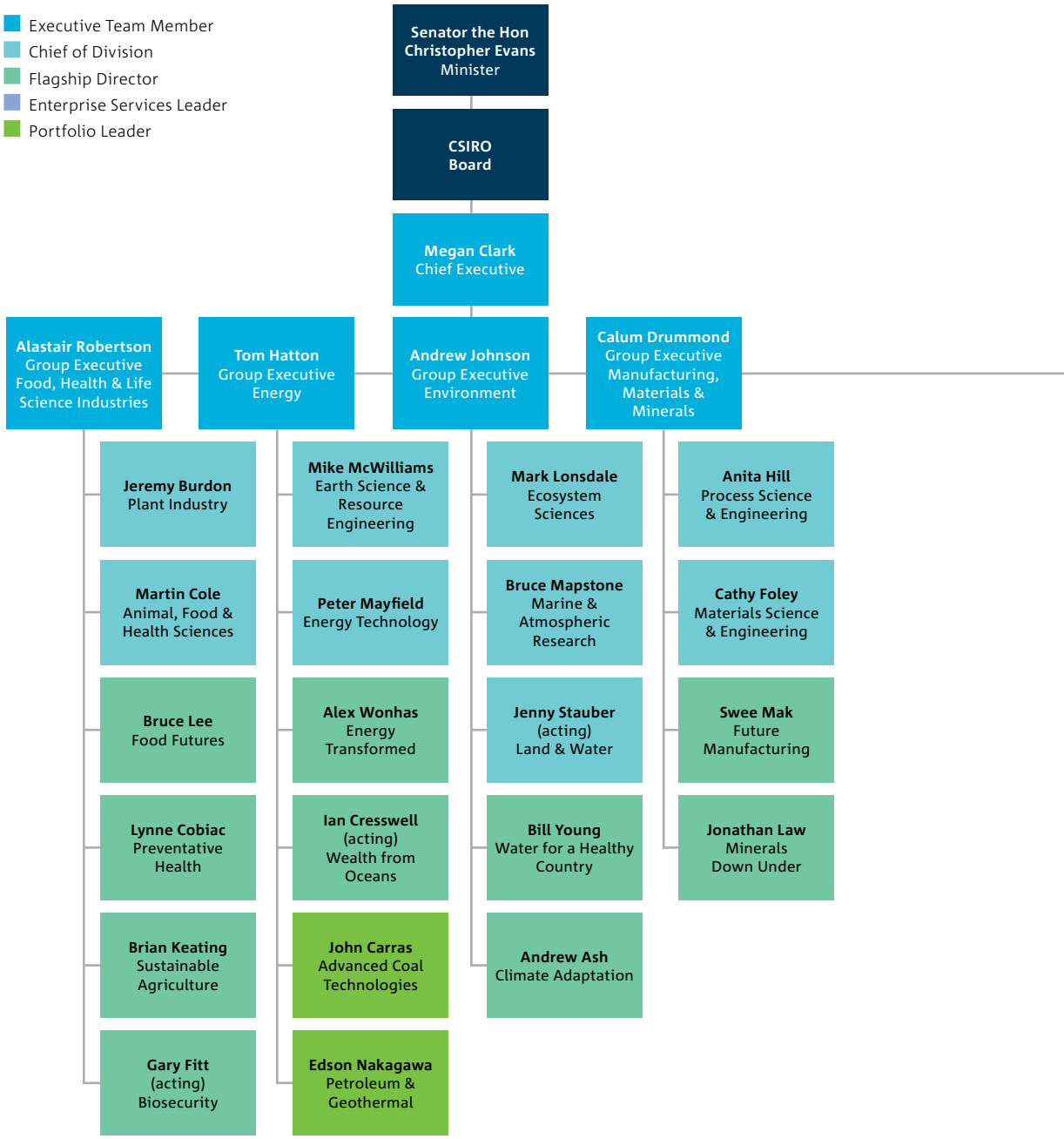
As at June 2012

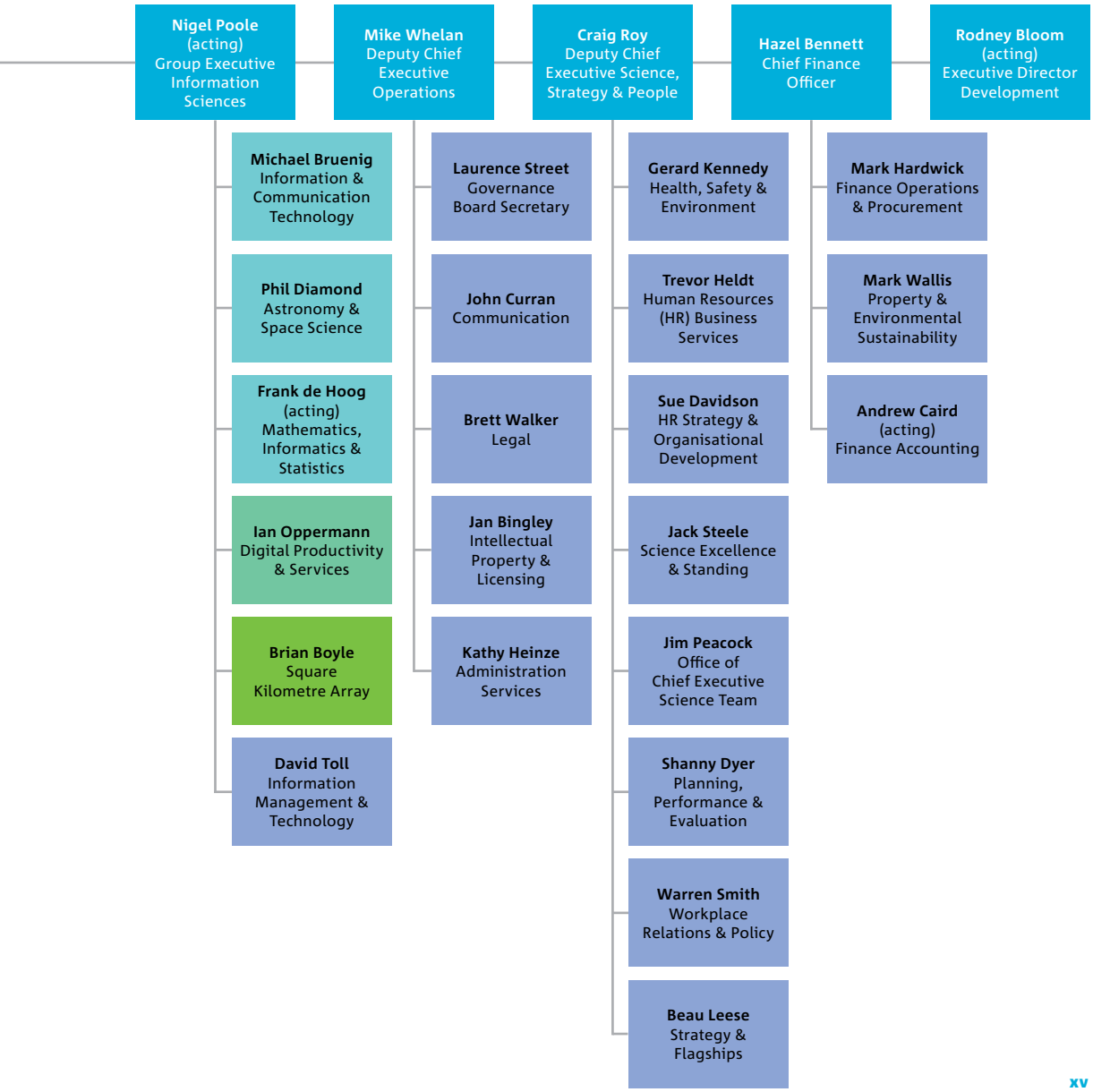


● **Property to be sold July/August 2012**

CSIRO Organisational Chart

as at August 2012




Nigel Poole (acting) Group Executive Information Sciences
Mike Whelan Deputy Chief Executive Operations
Craig Roy Deputy Chief Executive Science, Strategy & People
Hazel Bennett Chief Finance Officer
Rodney Bloom (acting) Executive Director Development
Michael Bruenig Information & Communication Technology
Phil Diamond Astronomy & Space Science
Frank de Hoog (acting) Mathematics, Informatics & Statistics
Ian Oppermann Digital Productivity & Services
Brian Boyle Square Kilometre Array
David Toll Information Management & Technology
Laurence Street Governance Board Secretary
John Curran Communication
Brett Walker Legal
Jan Bingley Intellectual Property & Licensing
Kathy Heinze Administration Services
Gerard Kennedy Health, Safety & Environment
Trevor Heldt Human Resources (HR) Business Services
Sue Davidson HR Strategy & Organisational Development
Jack Steele Science Excellence & Standing
Jim Peacock Office of Chief Executive Science Team
Shanny Dyer Planning, Performance & Evaluation
Warren Smith Workplace Relations & Policy
Beau Leese Strategy & Flagships
Mark Hardwick Finance Operations & Procurement
Mark Wallis Property & Environmental Sustainability
Andrew Caird (acting) Finance Accounting

Part two
our performance

Part two: Our performance

Measuring our performance

CSIRO plays an important role in Australia's National Innovation System. Our combination of size, breadth and depth in capability, active research portfolio management and expertise in conducting large-scale, multidisciplinary, mission-directed research is unique. CSIRO is a leader in addressing major challenges that matter to Australia's future, including the complex interactions of human activity with the natural and built environments. This unique position enables CSIRO, to act as:

- a connector and collaborator across the innovation system to help Australia gain access to global knowledge
- a manager of research capabilities and facilities that are critical for national preparedness to understand national challenges and opportunities and support national priorities
- a Trusted Advisor to the nation.

Over 90 per cent of our resources are directed to the Government's National Research Priorities and our activities are strongly aligned with the National Innovation Priorities. To achieve this, the CSIRO Strategy 2011–15 is underpinned by five strategic objectives:

1. National Flagships
2. Science Excellence and Preparedness
3. Deep Collaboration and Connection
4. Innovation Organisation
5. Trusted Advisor

The Organisation intends to plan progressively, implement change initiatives and embed these processes and practices as 'business as usual' to ensure we deliver on our five strategic objectives over the life of the strategy. The 2011–12 Operational Plan and Portfolio Budget Statements provide an overview of the priorities, planned programs, change initiatives and other key activities, along with the resources to implement these for the first year of the new strategy.

CSIRO's activities and achievements are outlined in this section of the annual report and provide evidence of our performance against the Operational Plan and the Portfolio Budget Statements. In addition to this annual report to Parliament, CSIRO also monitors its performance throughout the year by providing:

- regular reports to the CSIRO Executive Team and Board to assist them with their decision-making and governance responsibilities
- detailed planning and review processes operating at a range of levels, including research portfolios and Divisions, functional areas and individuals.

Financial performance

In 2011–12, CSIRO delivered a surplus from ongoing operations of $13.8 million. However, our overall position was a surplus of $200.5 million due to the recognition of $228.6 million attributable to WLAN licensing agreements offset by other adjustments including the write–down and impairment of assets. Total revenue of $1,476.0 million included appropriation from government of $724.9 million and $751.0 million in revenue generated from other sources (representing a 50.1 per cent increase over prior year). Compared with 2010–11, the net value of CSIRO's non-financial assets increased by $52 million, which was largely due to an increase in assets under construction.

CSIRO's parent financial performance in 2011–12 is summarised in Table 2.1, page 3, (by source of revenue) and CSIRO's consolidated financial performance by PBS Program is summarised in Table 2.2, page 3.

TABLE 2.1: CSIRO FINANCIAL PERFORMANCE 2011–12, $M[1]

FINANCIAL PERFORMANCE					
REVENUE SOURCE	2007–08	2008–09	2009–10	2010–11	2011–12
Co-investment, consulting and services					
Australian private sector	68.2	62.1	61.0	65.0	74.2
Australian Governments	119.5	161.4	189.3	202.7	201.8
Rural Industry R&D corporations	30.2	33.8	33.5	37.7	35.0
Cooperative Research Centres	38.2	43.6	38.8	32.3	30.0
Overseas entities and international	35.3	61.5	71.6	74.5	77.5
Work in progress / deferred revenue	-1.4	-14.5	-13.6	5.9	-7.6
Total co-investment, consulting and services	**290.0**	**347.9**	**380.4**	**418.1**	**410.9**
IP – royalty and licence revenues	81.7	229.6	46.7	29.2	278.5
Total research and services revenue	**371.7**	**577.5**	**427.1**	**447.3**	**689.4**
Other external revenue	41.3	31.3	28.2	47.9	61.3
Gain / (loss) on sale of assets	4.8	25.6	3.9	4.9	0.4
Other fair value gains and reversals	10.8	0.3	-	0.1	-
Total external revenue	**428.6**	**634.7**	**459.2**	**500.2**	**751.0**
Revenue from Government	663.2	668.1	704.9	720.4	724.9
Total revenue	**1,091.8**	**1,302.7**	**1,164.1**	**1,220.6**	**1,476.0**
Less expenses	1,044.1	1,180.8	1,333.1	1,231.1	1,275.5
Operating result	47.7	122.0	-169.0	-10.5	200.5

TABLE 2.2: CSIRO – FINANCIAL SUMMARY BY PBS PROGRAM[2], 2011–12, $M

	ACTUAL	PBS 2011–12 BUDGET	VARIANCE
Government revenue	724.9	724.9	0.0
External revenue	741.7	552.5	-189.2
Other revenue	5.5	0.0	-5.5
Total revenue	**1,472.1**	**1,277.4**	**-194.7**
Program 1 – National Research Flagships	554.9	566.2	11.3
Program 2 – Core Research and Services	575.5	562.4	-13.1
Program 3 – Science Outreach: Education and Scientific Publishing	32.1	36.6	4.5
Program 4 – National Research Infrastructure: Facilities and Collections	100.4	114.8	14.4
Program 5 – Science and Industry Endowment Fund	15.6	18.7	3.1
Total expenses	**1,278.6**	**1,298.7**	**20.1**

1 Previous year historical segment balances (07–08 to 10–11) may have changed due to updated classification methodology.
2 Portfolio Budget Statement Programs. For information on these programs, see page 16.

Strategy progress – Enterprise Strategy Measures

Multiple lines of evidence are used to monitor overall achievement against our strategy, including reporting against ten Enterprise Strategy Measures (ESMs). The ten ESMs are designed to provide evidence of our performance across four dimensions that are critical to the success of the CSIRO Strategy 2011–15. These dimensions are:

- *Impact:* Delivering results with relevance and impact across areas of importance for Australia
- *Science:* Performing high-quality science
- *People:* Building and maintaining strong relationships with customers, partners, staff and other stakeholders
- *Resources:* Effective resourcing of CSIRO's activities.

Table 2.3 provides a summary of actions taken and progress achieved against our ESMs.

TABLE 2.3: ENTERPRISE STRATEGY MEASURES

IMPACT	
●●◖○○[1]	**1. Develop measures in 2011–12 for benchmarking our performance for delivery of triple-bottom-line[2] impact through evaluating realised benefits. Be recognised as one of the top three global applied science organisations by 2014–15 for impact delivery as measured against our 20 global peers.** In 2011–12, CSIRO commenced the process of developing a balanced scorecard to measure the Organisation's performance in terms of financial, people, outputs and adoption of research to benchmark against its global peers. The aim is to demonstrate that, by 2014–15, CSIRO is recognised as one of the top three applied science organisations globally. The next steps to achieve this will be to work with peers to coordinate the data collection process during 2012–13, with a view to reporting the first set of results in 2013–14.
●●●●◖	**2. Develop future impact pipelines for at least 80 per cent of the Flagships Portfolio by June 2012; evaluate potential triple-bottom-line value for at least 50 per cent of the Flagship future pipeline by June 2013 and 80 per cent by June 2014. Deliver Flagships' goals at a rate meeting or exceeding initial time-to-goal expectations** As at 30 June 2012, 89 per cent of the National Research Flagships Portfolio (eight of the nine Flagships) successfully completed development of their future intended impact statements. This included defining the triple-bottom-line outcome statements and time-to-goal estimates for the various themes of science research that deliver the eight Flagships. This work has laid the foundation for evaluating the estimated time-to-goal delivery for the Flagship's outcomes and provides a base against which CSIRO can ensure initial time-to-goal expectations are being met or exceeded. For more information see the Operational Plan Key Executive Actions on page 8.
●●○○○	**3. Baseline customers' 'willingness to recommend' in 2011–12 and improve our performance year-on-year over the strategy.** This year, CSIRO completed a trial to test the validity of a proposed customer satisfaction survey. Results of this trial are being incorporated into a final survey, which is expected to be implemented in 2012–13 and performance benchmarked in 2013–14.

1 The coloured circles represent a rating of the overall progress towards the 2012–2015 CSIRO Strategy Plan Enterprise Strategy Measure on a scale from one to five.

2 The triple-bottom-line refers to economic, social and environmental impacts.

●●○○○[3] **4. Increase the community awareness of impact derived from CSIRO activities from the established baseline in 2010–11 to 75 per cent by 2014–15.**

In 2011, 40 per cent of Australians questioned in an on-line survey were able to name at least one contribution they believed CSIRO had made to their life. In an effort to increase this result to 75 per cent by 2014–15, CSIRO developed a five-year community engagement strategy designed to increase community awareness of the impact of CSIRO's research.

For more information see Program 3 – Science Outreach: Education and Scientific Publishing on page 59.

SCIENCE

●●●●○ **5. Science quality is maintained or improved in Environment and Ecology, Agricultural Sciences, Plant and Animal Sciences, and Geosciences as measured through benchmarking against global peers (science productivity, citations per paper, collaboration). CSIRO maintains breadth in at least 14 fields in the top one per cent globally based on ISI/Thomson Reuters total citation data.**

In 2011–12, CSIRO remained in the top 0.1 per cent of global institutions in four major research fields – Environment and Ecology, Agricultural Sciences, Plant and Animal Sciences, and Geosciences. These four fields account for 60 per cent of CSIRO's total output in terms of citations and publication numbers. In addition, CSIRO ranks in the top 1 per cent of global science institutions across a further ten fields. In total, across 22 globally recognised research fields, CSIRO has maintained its position of being in the top 1 per cent of global institutions in 14 of these fields.

For more information see Program 2 – Core Research and Services on pages 40–45.

●●●○○ **6. Progress towards establishing precincts of global standing in the Plant and Agricultural Sciences, Resource Sciences, Environmental Sciences, Materials and Manufacturing Sciences and Human Life Sciences meets Precinct Development Plans by 2014–15.**

The CSIRO Board approved the establishment of five global precincts (see Figure 2.1) to consolidate resources and optimise opportunities to build on and integrate, research and development.

For more information see the Operational Plan Key Executive Actions on page 9.

FIGURE 2.1: GLOBAL PRECINCTS BY RESEARCH FOCUS AND LOCATION

RESOURCE SCIENCES: PERTH
Leading minerals and energy research development centre.

ECOSCIENCES: BRISBANE
World's largest environmental sciences hub solving the nation's critical environmental challenges and opportunities.

NATURAL & ENVIRONMENTAL SCIENCES: CANBERRA
Focused on natural and environmental sciences. Integrate academia, applied research, government and industry.

HUMAN LIFE SCIENCES: PARKVILLE
Integrate world-class healthcare, research and education to rapidly translate discoveries into clinical practice.

MANUFACTURING & MATERIALS SCIENCES: CLAYTON
Enabling capability in advanced materials and clean manufacturing technologies.

3 The coloured circles represent a rating of the overall progress towards the 2012–2015 CSIRO Strategy Plan Enterprise Strategy Measure on a scale from one to five.

●●◖○○[4] **7. No fatalities or major injuries of CSIRO people. Lost time injury frequency rate (LTIFR)[5] and medical treatment injury frequency rate (MTIFR)[6] improves year-on-year and is in the top quartile of like organisations by 2014–15.**

In 2010–11, CSIRO introduced a new method of reporting major injuries for LTIFR and MTIFR. Using this new approach for the first full year, the reported LTIs were 53 and the MTIs were 80. CSIRO's Energy Technology Division achieved the best performance in terms of our Zero Harm objective with no LTIs or MTIs reported.

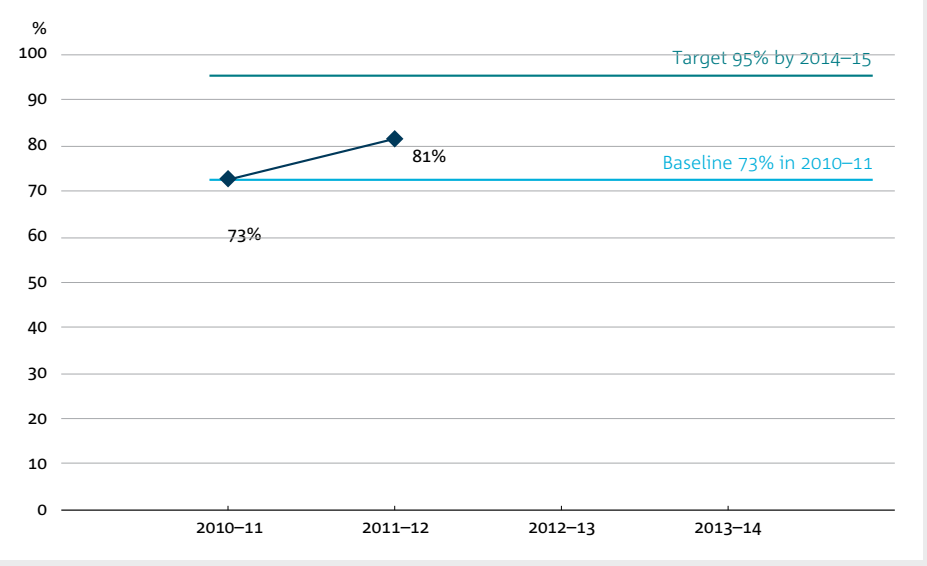
Muscular skeletal type injuries present the greatest risk across CSIRO, with 53 per cent of LTIs and 63 per cent of MTIs resulting from body stressing. An enterprise team is currently developing an intervention plan with activities to reduce body stressing type injuries.

For more information on CSIRO's Health, Safety and Environment see pages 84–86.

●●●●○ **8. Awareness of CSIRO's Values increases from the established baseline of 73 per cent (2010–11) to 95 per cent in 2011–12. A baseline for the use of Values in guiding behaviours and decision-making is established by June 2012 and improves year-on-year over the strategy period.**

Results from an all Staff Survey indicated an eight per cent increase in staff's awareness of CSIRO's Values between 2010–11 and 2011–12 (see Figure 2.2). This positive result is evident by the improved overall awareness and application of CSIRO's Values. Results indicated that staff are actively applying CSIRO's Values.

FIGURE 2.2: AWARENESS OF CSIRO VALUES



CSIRO continues to review responses to survey questions to improve the application of our values in the Organisation. Progress against this metric will be assessed through subsequent surveys.

4 The coloured circles represent a rating of the overall progress towards the 2012–2015 CSIRO Strategy Plan Enterprise Strategy Measure on a scale from one to five.

5 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.

6 MTIFR is the number of incidents requiring medical treatment (beyond first aid) per million hours worked.

RESOURCES

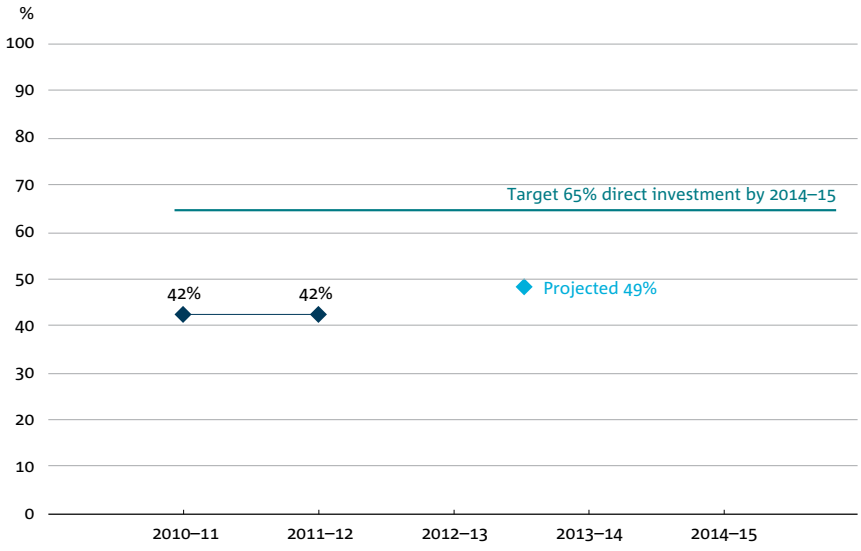
●●●●○[7] **9. CSIRO's financial, operating and capital management performance meets approved annual budget.**

CSIRO's financial, operating and capital management performance was within the approved annual budget. The final result for the year is an overall surplus. This result can be attributed to the wireless local area network (WLAN) licence settlement late in the financial year. CSIRO will not fully spend its capital budget due principally to an underspend on major projects.

●●●○○ **10. Direct investment of CSIRO resources towards major national challenges and opportunities through the National Research Flagships increases to 65 per cent by 2014–15.**

In 2011–12, direct investment in the National Research Flagships Program remained consistent with previous years at 42 per cent (see Figure 2.3). This is expected to increase to 49 per cent in 2012–13 due to the establishment of the Biosecurity and Digital Productivity and Services Flagships on 1 July 2012.

FIGURE 2.3: DIRECT INVESTMENT OF CSIRO RESOURCES IN NATIONAL RESEARCH FLAGSHIPS



For more information see the Operational Plan Key Executive Actions on page 8.

7 The coloured circles represent a rating of the overall progress towards the 2012–2015 CSIRO Strategy Plan Enterprise Strategy Measure on a scale from one to five.

Operational Plan implementation

The 2011–12 Operational Plan identified 20 Key Executive Actions (KEAs) to progress the CSIRO Strategy. These actions are designed to focus the Board and the Executive Team's attention on the most important priorities of the Organisation[3]. Table 2.4 provides a summary of actions taken and progress achieved.

TABLE 2.4: STRATEGY IMPLEMENTATION 2011–12

STRATEGIC OBJECTIVE AND KEY EXECUTIVE ACTION	ASSESSMENT OF PROGRESS[1]	SUMMARY OF PROGRESS
Strategic objective 1 – National Research Flagships		
Focus and increase the Organisation's resources invested in delivering profound impact in response to national challenges and opportunities through the National Research Flagships Program.		
Develop investment cases for new Flagships in Biosecurity and Digital Productivity and Services, secure stakeholder support with a view to commencing, as appropriate, the Flagships in 2012–13.	●●●●●	In June 2011, the CSIRO Board approved the establishment of two new National Research Flagships, which began operations on 1 July 2012. The Biosecurity Flagship will support Australia's social, environmental and economic wellbeing by reducing the incidence of pest and disease incursions and increase the effectiveness of incursion mitigation and eradication responses by 2042. The Digital Productivity and Services Flagship will create $4 billion in added value per annum to the Australian economy by developing and delivering more efficient and innovative services that improve citizen wellbeing and prosperity by 2025. For more information on the existing National Research Flagships see Program 1 – National Research Flagships on pages 16–39.
Implement first key initiatives from a finalised strategic plan for the 'Integrated Carbon Pathways' project.	●●●○○	The Integrated Carbon Pathways (ICP) project completed a strategic review including soliciting feedback on proposed activities from key stakeholders in government and industry as part of the strategic plan development process. The review concluded that CSIRO should prepare a regular National Outlook report every 2–3 years, to provide a science based assessment and forecast for Australian sustainability, resource use and natural capital. The project is also developing ICP capacity to deliver analysis and projects across interconnected energy, food, water, landscapes and urban systems.
Map our intended future Flagship impact and establish routine evaluation processes, using common methodologies across the Flagship's portfolio.	●●●◖○	On 30 June 2012, an 18-month pilot initiative to plan, monitor and evaluate the future intended impact of the Flagship's Portfolio was completed. The initiative developed a methodology which was independently reviewed and validated by the Centre for International Economics (CIE). A review of the pilot initiative is due to be finalised in September 2012. Following this review, CSIRO will commence embedding the methodology into its enterprise planning and review processes to enable the development of measures and evaluation. For more information see Enterprise Strategy Measure two on page 4.

1 The coloured circles represent a rating of the overall progress compared to the 2011–12 Operational Plan Key Executive Action on a scale from one to five.

3 CSIRO Operational Plan 2011–12, see page 10–11 at: **www.csiro.au/operational-plan**

STRATEGIC OBJECTIVE AND KEY EXECUTIVE ACTION	ASSESSMENT OF PROGRESS[1]	SUMMARY OF PROGRESS
Strategic objective 2 — Science excellence and preparedness		
Invest in people and infrastructure to maintain and develop national scientific breadth and depth in support of delivering profound impact and scientific preparedness.		
Develop an integrated program to drive our global science standing, which includes attracting, developing and retaining world-class people.	●●●◖○	Our focus this year has been on refining the science capability strategy to ensure investment in our people and infrastructure is strategically aligned to deliver profound impact and scientific preparedness into the future. The key factors identified through this alignment process have been included in a draft roadmap for CSIRO to maintain its competitive advantage and influence nationally and globally. The roadmap is expected to be finalised in 2012–13. For more information see Program 2 — Core Research and Services on pages 40–55.
Refresh the long-term capital investment strategy and obtain approval by the CSIRO Board.	●●●○○	A refreshed long-term capital investment strategy was developed. The strategy will provide a solid foundation for strategic investment in infrastructure in line with the breadth and depth of CSIRO's scientific excellence and preparedness. The strategy will be presented to the CSIRO Board next year.
Establish a shared science and impact vision for Global Precincts (including science focus; partners; funding options) and establish internal governance arrangements to support CSIRO investments.	●●●○○	CSIRO continues to work towards the establishment of global precincts in Brisbane, Canberra, Melbourne (Clayton and Parkville) and Perth. The precincts will support Australia's innovation potential, improve Australia's research and development competitiveness, and position our National Innovation System to better address national and global challenges. To support this process, CSIRO established a Precinct Oversight Committee to oversee the precinct program, including development of precinct plans and appointment of leaders to each of the five sites. In addition, two sites (Brisbane and Perth) have also established site specific governance arrangements to coordinate engagement between key stakeholders. For more information see Enterprise Strategy Measure six on page 5.
Evaluate options for a coordinated national approach to national biological collections and seek support for integration of our major biological collections within a wider vision of a Canberra Precinct.	●●●◖○	In 2011–12, eight major biological collections were consolidated into a new virtual Australian National Biological Collections Facility. This new virtual facility became operational on 1 July 2012. In addition, the five largest collections were evaluated within the context of the national landscape to determine their research significance which was high. In 2012–13, CSIRO will establish a national approach to biological collections and include their scope and vision for the Canberra precinct. For more information see Program 4 — National Research Infrastructure: National Facilities and Collections on pages 61–68.
Develop and commence implementation of enterprise-level research data management processes and systems aligned with CSIRO's e-Research and e-Enablement strategy.	●●●●○	Significant progress has been made on the development and implementation of the enterprise-level research data management processes and systems. As at 30 June 2012, 500 records were deposited in a new Research Data Service that covers a wide range of CSIRO research domains, 300 of which are available externally. This leading-edge system development involving comprehensive workflow support, provides the enterprise-level capability to describe, store, curate, reuse and enable access to research data assets created by CSIRO research groups.

1 The coloured circles represent a rating of the overall progress compared to the 2011–12 Operational Plan Key Executive Action on a scale from one to five.

STRATEGIC OBJECTIVE AND KEY EXECUTIVE ACTION	ASSESSMENT OF PROGRESS[1]	SUMMARY OF PROGRESS
Strategic objective 3 — Deep collaboration and connection		
Build deep connections with and among the best partners in Australia and the world to complement our science capability and accelerate impact delivery.		
Grow national and international alliances with major industry, government and community partners in 2011–12 especially in domains critical to the delivery of Flagship's goals.	●●●●○	Strategies have been developed and implemented to build alliances and expand our strategic partnerships with key stakeholders especially in domains critical to the delivery of Flagship's goals. Some examples of strengthened strategic research alliances this year include: ◆ forming a five-year $25 million strategic research program with Boeing, which builds on a 23-year relationship and increases existing connections by 30 per cent with a number of major clients conducting more than $1 million research ◆ securing $2.9 million additional funding from AusAID to undertake a two-year 'Pathways to Food Security' in West Africa's research program ◆ securing $9.15 million from the Australian Government's Filling the Research Gap funding program, which is part of the Carbon Farming Futures Program. The funds will be used to research abatement technologies, strategies and innovative management practices to reduce greenhouse gas emissions, sequester carbon and enhance sustainable agricultural practices. For more information see Collaborations, connections and advice on pages 13–15.
Execute strategies to improve relations and expand collaborations with five key international and ten key national research partners.	●●●●○	CSIRO expanded and improved relations with the European Union, United Nations (through the Spatial Data Infrastructure project in Indonesia), Orica, AusAid, the National Oceanic and Atmospheric Administration and the Chinese Academy of Science, through collaborations on various internationally focused initiatives. In addition, CSIRO continued to explore major research initiatives through the Global Research Alliance. CSIRO also hosted joint high-level activities with Embrapa (Brazil), the Japanese National Institute of Advanced Industrial Science and Technology, and opened the CSIRO-Chile Centre of Excellence in Mining and Mineral Processing in December 2011. On a national scale, collaborations have also strengthened with State Governments, the Department of Agriculture, Fisheries and Forestry, and the Australian Solar Institute. CSIRO also executed a Strategic Relationship Agreement with the University of Melbourne, and is expected to finalise similar agreements with other universities in 2012–13. For more information see Collaborations, connections and advice on pages 13–15 or Publication collaboration in Program 2 — Core Research and Services on pages 40–45.

1 The coloured circles represent a rating of the overall progress compared to the 2011–12 Operational Plan Key Executive Action on a scale from one to five.

STRATEGIC OBJECTIVE AND KEY EXECUTIVE ACTION	ASSESSMENT OF PROGRESS[1]	SUMMARY OF PROGRESS
Support Australia's bid for the Square Kilometre Array (SKA) and evaluate (and execute as appropriate) options for CSIRO's level of involvement, noting the SKA site decision is due early 2012.	●●●●○	In May 2012, following a comprehensive tendering process for the SKA project, it was announced by the SKA Organisation that Australia would be one of three host countries (Australia, New Zealand and South Africa) for the first phase of the SKA Survey telescope (2016–20). The decision by the SKA Organisation is viewed positively by the Government, with broad recognition of CSIRO's leadership role in the project. For more information see Program 2 – Core Research and Services on page 52.
Review and refresh our partner alliances and science directions for regional sites.	●●●○○	A Regional Sites Working Group was established to anticipate the science directions of our regional sites. Following consultation with staff, the Working Group presented a report to CSIRO's Consultative Council and the Executive. The report made ten recommendations, with implementation expected to commence in 2012–13 and be completed by 2015.
Strategic objective 4 — Innovation organisation **Boost our capacity to operate as one organisation to respond to the changing nature of science, deliver profound impact and build capability for the future.**		
Further develop and apply an Innovation Maturity Model to understand the key drivers of innovation in a CSIRO context, baseline our existing maturity and identify key improvement opportunities.	●●●●○	Significant progress has been made in increasing the Organisation's capacity to respond appropriately to the changing nature of science. The results of an all Staff Survey released in June 2012 were key in identifying opportunities to enhance CSIRO's capacity to innovate. The results also provided a baseline measure to assess future performance of CSIRO's innovation maturity. For more information see Our people on page 93.
Review and realign (as appropriate) our Learning and Development curriculum and service offering, to ensure it prepares our people to deliver against CSIRO's distinctive role.	●●●●○	In late 2011, CSIRO's learning and development priorities were realigned to support the delivery of the 2011–15 Strategy. To support this refreshed curriculum, a new Learning Management System (LMS) was developed to enable CSIRO to better understand and strategically align investment in learning and development. Feedback from key stakeholders about the LMS has been extremely positive. For more information see Our people on page 91.
Further develop and implement strategic workforce capability plans for all our Divisions using a One-CSIRO approach.	●●●◖○	Strong progress has been made in a One-CSIRO approach to Workforce Planning, including the endorsement of a new Diversity and Inclusion Plan for 2012–15 by the Board Remuneration and Nomination Committee. This new plan, along with development of annual workforce plans for all Divisions, led to the most comprehensive view of Divisional capability the Organisation has had in recent history.

1 The coloured circles represent a rating of the overall progress compared to the 2011–12 Operational Plan Key Executive Action on a scale from one to five.

STRATEGIC OBJECTIVE AND KEY EXECUTIVE ACTION	ASSESSMENT OF PROGRESS[1]	SUMMARY OF PROGRESS
Actively manage CSIRO's financial position to achieve a non-consolidated underlying operating and capital result consistent with the Board approved budget.	●●●○○	CSIRO continued to actively manage its financial position to achieve a non-consolidated operating and capital result. The WLAN licence settlement has added to this position, resulting in an overall surplus outcome for the year. Further refinement of management processes for operating and capital budgets are planned for 2012–13 to ensure the Organisation maintains a sustainable financial position. CSIRO's financial performance for 2011–12 is summarised in Table 2.1 on page 3.
Implement the Health, Safety and Environment (HSE) 2011–15 Strategy across the Organisation as we continue to build towards a 'Zero Harm' culture.	●●●○○	Solid progress has been achieved against the 2011–15 HSE Strategy, particularly in the areas of awareness raising and the overall HSE maturity of the Organisation. For more information on CSIRO's HSE see pages 84–86.
Strategic objective 5 — Trusted Advisor **Play a leading role in the trusted delivery of scientific evidence, advice and interpretation to the Australian government, public and industry.**		
Develop and execute a systematic engagement strategy across CSIRO's impact domains including CSIRO position statements on national interest issues (for example, climate change) and emergency response issues (for example, biosecurity).	●●●○○	During the year, the Prime Minister's Taskforce on Manufacturing and related review processes provided a catalyst for CSIRO to demonstrate to stakeholders the wide range of impact achieved across a number of science fields. The CSIRO Board approved an Industry Engagement Strategy, which developed a collection of facts and case studies for staff to use when engaging externally. For more information see Collaborations, connections and advice on pages 13–15.
Revitalise CSIRO branding and marketing strategies (with associated co-branding options) and run three to five consumer orientated campaigns to increase awareness of CSIRO.	●●●●◖	A revitalised CSIRO brand was successfully launched with positive feedback from stakeholders. This new visual identity has been actively adopted internally and for external use by education, publishing, on-line and for traditional communication campaigns including, Food Security, State of the Climate, SKA and WLAN.
Execute a strategy to use social media tools to communicate with selected key audiences.	●●●◖○	This year CSIRO successfully launched a range of social media initiatives. All media channels have grown in terms of authors and followers. A snapshot as at 30 June 2012 showed that our three newly launched blogs: news@csiro, solar@csiro and investigator@csiro reached approximately 38,000 followers a month. Social media tools are a key part of the strategy to reach target audiences and increase awareness of CSIRO's impact and role in delivering trusted scientific advice. For more information see Enterprise Strategy Measure four on page 5.

1 The coloured circles represent a rating of the overall progress compared to the 2011–12 Operational Plan Key Executive Action on a scale from one to five.

Collaboration, connections and advice

UNIVERSITY COLLABORATION

CSIRO partners with 37 of the 39 public universities in Australia and with universities from more than 120 countries. These partnerships enable CSIRO to remain a key player in the training of future researchers, which will help build Australia's scientific capability and capacity.

CSIRO and partners are developing a number of innovation precincts, with the aim of increasing the proportion of CSIRO researchers co-located with our research partners. To support this, over 50 per cent of CSIRO staff are now located on, or adjacent to, an Australian university.

Some examples of collaborations during 2011–12 include:

- the successful completion of the South-East Queensland Climate Adaptation Research Initiative, the first comprehensive, regional study of climate change adaptation in Australia
- the signing of a strategic relationship agreement to encourage collaboration in human life sciences, water and materials with the University of Melbourne
- working with the University of Western Australia and Curtin University to understand the impact of extreme weather events on Western Australia's world heritage listed Shark Bay
- applying mathematics and computing to improve the management of mining supply chains with the University of Newcastle
- research with Swinburne University and other astronomers from Australia, Germany, Italy, America and the United Kingdom that identified a planet made of 'diamonds' (more on page 66)
- ongoing support for a number of joint PhD programs including the Quantitative Marine Science program with the University of Tasmania and the Integrated Natural Resource Management Science program with the University of Queensland.

COOPERATIVE RESEARCH CENTRES

CSIRO remains the largest single participant in the Cooperative Research Centre (CRC) program. Throughout the life of the program, CSIRO has been a participant in 134 of the 190 CRCs that have existed, (rounds 1–13 inclusive). CSIRO's direct contribution to CRCs was $27 million in 2011–12.

CSIRO will participate in five of the six successful Round 14 CRCs and will conduct research for a total cost of $59 million over the lifetime of the CRCs, receiving $34 million from the CRCs over the same period. This represents a total net investment by CSIRO of $25 million. The new CRCs commenced operations on 1 July 2012.

CSIRO engages in CRCs to build critical mass in research ventures, which tackle clearly articulated major challenges for end-users and Australia.

CUSTOMER ENGAGEMENT

CSIRO aims to be a Trusted Advisor to its partners – increasingly undertaking longer-term and more strategic research partnerships. Between 2008–09 and 2011–12, there was a 17 per cent increase in clients co-funding research worth $1 million or more annually with CSIRO.

CSIRO added to its strategic research alliances in 2012 with the formation of a five-year, $25 million strategic research program with Boeing, building on a 23-year relationship. CSIRO's long-standing partnership with Cotton Seed Distributors was further cemented with a five-year, $35 million extension. CSIRO's existing alliances continued with clients including Orica Ltd, AusAID, Bayer and General Electric.

In 2011–12, CSIRO engaged with more than 2,500 clients, including more than 1,000 Australian small-to-medium enterprises. CSIRO's top five clients are Cotton Seed Distributors, NASA, AusAID, the Department of Sustainability, Environment, Water, Population and Communities and the Grains Research and Development Corporation.

CSIRO realigned its Business Development capability around five Group Business Development Leaders, resulting in integrated strategic planning and coordination of activities. CSIRO also conducted a review in 2012 of engagement with major corporate and Government clients and identified a series of initiatives to improve relationship management, to be implemented in 2012–13.

FLAGSHIP COLLABORATION FUND

The Flagship Collaboration Fund supports CSIRO's National Research Flagships Program, which addresses issues of national significance. In 2011–12, the Fund provided $17 million to external partners, including support for three new collaborative research clusters, spanning more than ten Australian and international universities. The clusters will address issues around minerals exploration, flexible electronics and measuring methane. There are currently 12 operational clusters of the 27 that have been funded by CSIRO.

Dr Megan Clark (CSIRO Chief Executive) with the Chilean Minister for Mines, Mr Hernan de Solminihac (second from right) and Chilean representatives, at the opening of the new CSIRO-Chile International Centre of Excellence in Mining and Mineral Processing in Santiago, Chile. Image: Miguel Candia Ceballos

During the year, the Fund advertised its seventh competitive cluster round that will result in new work around climate engineering for extreme events, a future energy network and improved understanding of ocean carbon. Over 20 new projects and several visiting fellowships were also funded to the value of $1 million, as well as the highly successful student scholarships program. Over 30 new scholarships were supported which span well over 20 different national and international research partners.

INTERNATIONAL ENGAGEMENT

During 2011–12, CSIRO participated in more than 800 international activities in 76 countries, including scientific collaborations, commercial partnerships, capacity building, representational activities and the provision of advice on scientific matters to Government and other key stakeholders.

In December 2011, the CSIRO-Chile International Centre of Excellence in Mining and Mineral Processing was officially opened in Chile. The Centre will address major challenges facing both the Australian and Chilean mining industries.

CSIRO also signed a Memorandum of Understanding with the Brazilian Agricultural Research Corporation and with Japan's National Institute of Advanced Industrial Science and Technology, and have extended already strong relationships with key partners such as Boeing, AusAID and the Chinese Academy of Sciences.

Our participation in global knowledge networks also continues to grow through leading roles in programs such as the African Food Security Initiative and the Global Research Alliance (GRA), whose secretariat is now based at CSIRO. The GRA is an international organisation promoting the application of science and technology to solve large-scale issues facing developing countries. CSIRO is a founding member, along with eight of the world's leading applied-research agencies.

INDIGENOUS ENGAGEMENT STRATEGY

During 2011–12, the Indigenous Engagement Strategy focused on recruiting Indigenous cadets and trainees. CSIRO entered into an agreement with an Indigenous employment organisation, Habitat Personnel, to develop an advertising and recruitment campaign. Ten positions were identified for traineeships and 25 for cadetships across Australia, with candidates filling traineeship positions in September 2012 and cadetships later in 2012.

Additionally, CSIRO recruited one Indigenous cadet in our Astronomy and Space Science Division, two in the Division of Ecosystem Sciences, one in Human Resources, and provided temporary employment for one candidate in Communications.

In 2011–12, Strategic Cultural Awareness programs were held in Brisbane, Canberra and Perth, engaging staff in scenarios aimed at experiencing contemporary Australian Indigenous societal issues.

The Indigenous Engagement Steering Committee met three times during the year. A review of the governance arrangements of the Indigenous Engagement Strategy was considered by the Committee in order to engage more effectively in seeking input from Aboriginal and Torres Strait Islander experts.

An officer of CSIRO's Office of Indigenous Engagement was appointed by the Minister to an Indigenous Expert Working Group on Indigenous Engagement with Sciences (EWGIES). The EWGIES project ensures the:

- development of a national strategy, aligned with Government and Inspiring Australia priorities, which will strengthen science engagement with Indigenous Australians
- facilitation of collaboration between stakeholders including government, business, academia, research, community groups and the broader community
- analysis of opportunities to improve and encourage science engagement with Indigenous Australians.

The Indigenous Expert Working Group's goal was to clearly outline recommendations for new and improved science engagement strategies for the science community.

GOVERNMENT ENGAGEMENT

A critical part of CSIRO's broader relationship with Government is its role as a Trusted Advisor, providing relevant scientific and technical input and advice to decision-makers. Key activities during 2011–12 included:

- Regular meetings with Ministers and parliamentarians and with senior staff from relevant government departments to provide scientific information and advice to inform policy development and program implementation and evaluation. Examples include ongoing engagement on issues of sustainability and carbon management, as well as the development of the National Plan for Environmental Information, the National Food Plan and the National Innovation System. CSIRO's Chief Executive has also been active in a number of Government forums including the Prime Minister's Science, Engineering and Innovation Council and the Prime Minister's Taskforce on Manufacturing.
- CSIRO made six submissions to Federal parliamentary inquiries and CSIRO officers attended ten hearings to provide further evidence to these inquiries.
- CSIRO held four Science for Breakfast briefings at Parliament House.

Program performance

CSIRO's outcome and program structure

CSIRO receives approximately 57 per cent of its operating revenue in appropriation funding through the Federal Budget. Our commitment to the parliament and people of Australia, set out in the 2011–12 Portfolio Budget Statements, is to contribute to the following outcome:[4]

Innovative scientific and technological solutions to national challenges and opportunities to benefit industry, the environment and the community, through scientific research and capability development, services and advice.

In pursuit of this outcome in 2011–12, CSIRO allocated funds across five Programs listed below and as outlined in Table 2.2, page 3:

- Program 1 – National Research Flagships
- Program 2 – Core Research and Services
- Program 3 – Science Outreach: Education and Scientific Publishing
- Program 4 – National Research Infrastructure: National Facilities and Collections
- Program 5 – Science and Industry Endowment Fund

These Programs reflect the Organisation's focus on delivering scientific solutions to Australian industry and communities, while simultaneously helping to build Australia's science base to meet ongoing challenges and opportunities.

The following sections provide a report against the deliverables and key performance indicators specified for each Program in the Portfolio Budget Statements.

Program 1 – National Research Flagships

Objectives and deliverables

Since the launch of the first three National Research Flagships in 2003, CSIRO has committed an increasing proportion of its resources to addressing major national challenges and opportunities through the National Research Flagships Program. In 2011–12, CSIRO devoted 42 per cent of its resources to nine Flagships: **Climate Adaptation; Energy Transformed; Food Futures; Future Manufacturing; Minerals Down Under; Preventative Health; Sustainable Agriculture; Water for a Healthy Country;** and **Wealth from Oceans.**

The Flagships address complex challenges by forming large-scale multidisciplinary research partnerships with Australian Universities and publicly funded research institutions, the private sector and selected international organisations. They target clearly defined goals, framed from a careful analysis of the needs of people and enterprises, and have a strong focus on adoption and impact.

Program performance

The performance of the Flagship Program is assessed through five key performance indicators and a series of independent Flagship reviews. Table 2.5 provides a summary of progress. More detailed analysis and trend data follow the Table.

4 The relevant section of the Portfolio Budget Statements can be viewed at **www.innovation.gov.au**. The Outcome is the formal legal statement of the purpose for which funds are appropriated to CSIRO.

TABLE 2.5: PERFORMANCE INDICATORS FOR PROGRAM 1 – NATIONAL RESEARCH FLAGSHIPS

KEY PERFORMANCE INDICATOR	TARGET	PERFORMANCE
Demonstrated adoption and impact of Flagship outputs.	Growing economic, social, environmental and intangible benefits	One external Flagship review was undertaken in the reporting year, with a final report to be submitted in late 2012. The process remains a robust and rigorous assessment of the adoption and impact of Flagship outputs by independent experts. Recent achievements from each of the nine Flagships are reported on pages 22–39.
The number of refereed Flagship publications.	Maintain or increase	In 2011, CSIRO maintained its output in refereed Flagship publications, with 913 journal articles[1], 461 conference papers[2], 86 books or book chapters and 158 technical reports (more on pages 18–19).
Financial support by Flagship partners.	Maintain or increase	The total revenue from external partners increased to $212 million (from 20 per cent to 40 per cent) of the Program's total investment (more on page 19).
Customer satisfaction.	Maintain	A customer satisfaction survey trial was conducted in 2011–12. A baseline against which we will track performance will be established in 2012–13 (more on page 20).
Investment of the Flagship Collaboration Fund.	As per plan	As at 30 June, over $121 million has been committed for the life of the Fund, including contractual arrangements to 2014–15. This exceeds the original government allocation of $114.25 million (more on page 20).

1 Source: CSIRO's electronic publications repository 'ePublish'.

2 For technical reasons, these figures may underestimate the number of CSIRO papers that were produces in part or in whole from Flagships.

Economic, social, environmental and intangible benefits (including Flagship peer reviews)

To maximise achievement of Flagship goals, CSIRO conducts a three-to-four year cycle of independent reviews of each Flagship. Each review is conducted by a panel of experts from Australia and overseas. The results from the reviews completed to date can be seen in Figure 2.4. Table 2.6 shows the independent review panel's ratings (according to a five point scale) for probable impact on end-users and quality of science.

FIGURE 2.4: RESULTS OF FLAGSHIP SCIENCE REVIEWS

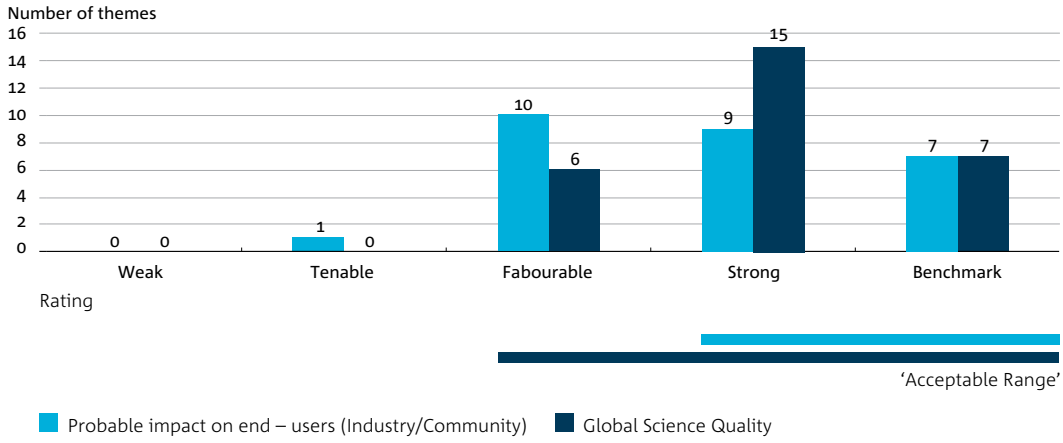


TABLE 2.6: RATINGS FOR TWO DIMENSIONS PROVIDED BY INDEPENDENT REVIEW PANELS[5]

	PROBABLE IMPACT ON END-USERS (COMMUNITY / INDUSTRY)	QUALITY OF THE SCIENCE
Benchmark	The research results are used to set the pace and direction of commercial, environmental, community or policy development – recognised in industry or the community for this. The Flagship is on track to achieve and exceed the goals necessary for the declared outcome.	Sustained scientific leader – well recognised in the international research community.
Strong	The research results enable commercial, environmental, community or policy development that distinguishes user organisations from peers or competitors. The Flagship is on track to meet its timelines and milestones toward output goals.	Able to set and sustain new scientific/technical directions within the international research community.
Favourable	The research results enable commercial, environmental, community or policy development that organisations use to improve their position relative to peer or competitors. The Flagship will contribute outputs to the path to cited goals.	Able to maintain a good position within the international research community; not a scientific leader except in niches outside mainstream areas.
Tenable	The research results are used by organisations for commercial, environmental, community or policy development that maintains, but does not improve, their position relative to peers or competitors. The Flagship will make contributions towards meeting its milestone and output timelines.	Not able to set or sustain independent scientific/technical directions – a sense of being continually a follower.
Weak	The research results are not able to be used by organisations to even maintain their position relative to peers or competitors. The Flagship will not significantly advance Australia towards meeting the national challenge.	Declining quality of scientific/ technical output compared with other research groups. Often a short-term reactionary focus.

As at 30 June 2012, seven Flagships had been reviewed since 2002 by a panel through the Flagship Science Review process[6]. In 2011–12, an eighth Flagship, the Sustainable Agriculture Flagship was reviewed. The report from the review panel will be submitted to CSIRO in late 2012 and results will be reported in the CSIRO Annual Report 2012–13. Figure 2.4 shows that 60 per cent (16 of 27) of themes that make up the Flagships were within the 'acceptable' range for the community / industry dimension of the assessment. This rating is slightly less than CSIRO's Divisional Science Reviews (for more information see page 44). This result has been attributed to the Flagships' being a new portfolio or the Flagship activities having less short-term consulting-type work within the portfolio.

In 2012–13, reviews of the following Flagships are scheduled: Future Manufacturing; Energy Transformed; and Preventative Health. This will commence the start of the second round of reviews for Flagships.

In addition to this process, CSIRO can also commission independent reviews by consultants on the economic, social, environmental and intangible benefits of individual Flagships and/ or the National Research Flagships Program as a whole. In 2011–12 no independent reviews were commissioned.

Flagship publications

In 2011, CSIRO implemented an electronic publications repository, 'ePublish'. The repository is now able to identify Flagship affiliation from CSIRO publications. However, the repository is still being developed and numbers are, therefore, subject to review.

Table 2.7 shows the number of Flagship publications, by type. Total CSIRO publications are shown in Figure 2.8, page 42.

5 Terms of Reference for CSIRO Flagship Reviews.

6 The seven Flagships reviewed to date include: Climate Adaptation Flagship, Light Metals Flagship (LMF merged with Minerals Down Under and Future Manufacturing on 1 July 2011), Minerals Down Under Flagship, Preventative Health Flagship, Sustainable Agriculture Flagship, Water for a Healthy Country Flagship, and Wealth from Oceans Flagship.

TABLE 2.7: NUMBER OF FLAGSHIP PUBLICATIONS BY TYPE, 2011[7]

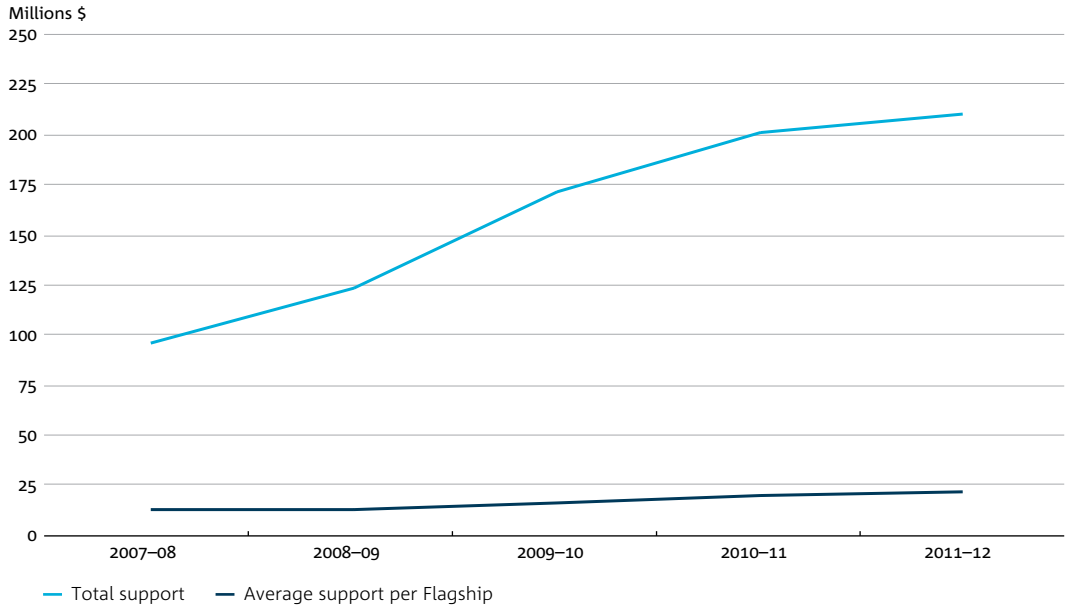
PUBLICATION TYPE[1]	NUMBER
Conference papers	461
Journal articles	913
Books / book chapters	86
Technical reports	158
Total	**1,618**

1 See glossary page 185 for definition of publication types.

Financial support by Flagship partners

In 2011–12, the National Research Flagship Program increased its revenue from external partners to $212 million. This amount represents 40 per cent of the Program's total investment, up from 20 per cent in 2007–08. The average external revenue received per Flagship has also increased over the same five-year period from $10 to $23 million and this growth is shown in Figure 2.5.

FIGURE 2.5: FINANCIAL SUPPORT FOR FLAGSHIPS FROM EXTERNAL PARTNERS



7 Source: CSIRO's electronic publications repository 'ePublish'.

Customer satisfaction

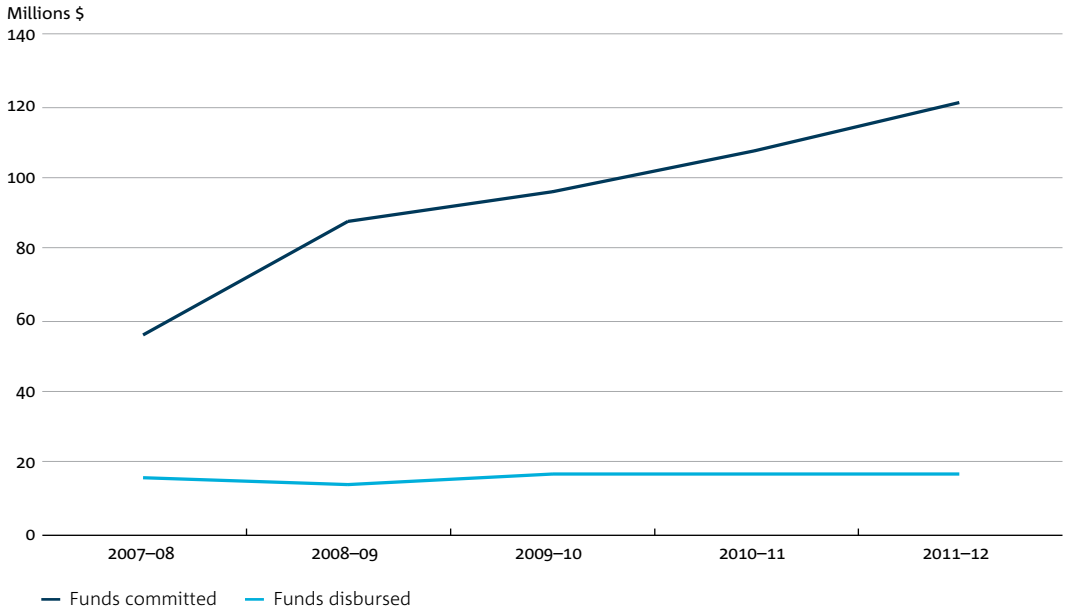
Following a successful pilot, CSIRO has begun implementation of a formal customer satisfaction measurement program to measure customers' 'willingness to recommend CSIRO'. The program will scale up further through the coming months. Baseline results for the Organisation will be available in 2012–13. In parallel, CSIRO will also undertake a series of executive interviews for key customer relationships.

Investment of the Flagship Collaboration Fund

In 2011–12, investment in the Flagship Collaboration Fund[8] continued as planned with $17 million disbursed to external research partners. As at 30 June 2012, over $121 million has been committed for the life of the Fund, including contractual arrangements to 2014–15. The original government allocation of $114.25 million is on track to be fully dispersed by 2013–14, see Figure 2.6.

During the reporting year, almost 80 per cent of the dispersed funds were provided to research clusters, including funding for three new clusters involving 11 Australian Universities. The Fund also supported over 20 new projects and visiting fellowships, 30 student scholarships and existing commitments.

FIGURE 2.6: FLAGSHIP COLLABORATION FUND DISBURSEMENTS AND COMMITMENTS



8 For more information see: **www.csiro.au/org/FlagshipCollaborationFundOverview.html**

Climate Adaptation Flagship

Analysis of performance

During 2011–12, the Climate Adaptation Flagship contributed to improving the readiness of government, business and society to plan and act for climate impacts. The Flagship engaged closely with stakeholders, providing quality scientific advice to deliver on its goal. This has made a positive contribution to policy decision-making, business and community decision-making, public awareness, and the international aid and development agenda.

This year the Flagship and partners assisted local councils and their communities in south-east Queensland to be more aware of their options to adapt to the impacts of a changing climate. These options included upgrading building codes for new housing for better tropical cyclone preparedness, and behavioural changes relating to the use of air-conditioners to enable local energy suppliers better manage peak energy demand.

Throughout the year, the Flagship provided advice to help guide strategic policy directions for government, as demonstrated in a partnership with the Australian Government Department of Sustainability, Environment, Water, Population and Communities, where CSIRO provided information on the extent of the likely impacts of climate change on biodiversity and the National Reserve System.

As part of the AusAID-CSIRO Research for Development Alliance, the Flagship helped the United Nations World Food Program (WFP) re-assess its priority sub-districts based on vulnerability assessments until 2030. Through the WFP's partnership with the Indonesian Government's Department of Food Security, these new priorities form the basis of the 2012 Food and Nutrition Action Plan, and the Strategy and Action Plan for Food Security and Climate Change. These plans were ratified in law by Governor Bupati's Decrees in April 2012.

CLIMATE ADAPTATION FLAGSHIP ROADMAP

Theme	1–3 years		4–9 years	10+ years
Pathways to adaptation	Define new approaches to vulnerability and adaptation assessments.	Adaptive capacity of communities and industries assessed; innovative approaches to climate projections.	Identify social and economic adaptation outcome within different sectors and regions.	Biophysical social and institutional dimensions of adaptive capacity more effective for Australia.
Sustainable cities and coasts	Develop methods to assess climate risk and vulnerability in cities and coasts and community adaptive capacity and governance.		Flexible models of utilities, social sciences and governance for climate adapted urban planning and management.	Planning, design infrastructure, management and governance solutions for Australia's cities and coasts responding to climate change.
Managing species and natural ecosystems	Studies of regions, single species and simple species interactions.	Greater model realism. Focus on threats and tools to assist natural resource managers.	Complex studies of biotic interactions and community ecology. Refine tools for ecosystems managers.	Deliver adaptation options to protect Australia's marine and terrestrial species and ecosystems from the impacts of climate change.
Adaptive primary industries, enterprises and communities	Improve analysis of interaction between climate drivers and managers' responses on farms.	Develop technologies and practices for local industry adaptation.	Shifts in vulnerability to climate change understood. Identify when transformational options may be needed.	Adaptation strategies provide economic benefits and improve livelihoods from primary industries, enterprises and communities.

▲ Current position

Flagship goal: To equip Australia with practical and effective options to adapt more effectively to climate change and variability and in doing so create $3 billion a year in net benefits by 2030.

The Indian Ocean Climate Initiative

CSIRO scientists, in partnership with the Bureau of Meteorology and the Government of Western Australia (WA), formed the Indian Ocean Climate Initiative (IOCI) in 1997. The IOCI partnership came from a need to better understand and plan for the dramatic and continuing rainfall reductions in south-west Western Australia. At the time, the role of the Indian Ocean on Western Australia's climate was poorly understood.

From the 1980s, south-west WA's drying trend led water agencies to examine the need to secure alternative water sources. Crucially, independent and objective research from the IOCI showed this drying was not temporary or cyclical, hastening and strengthening the case for a seawater desalination plant. In November 2006, as a result of IOCI research, Australia's first large-scale desalination plant was commissioned. This research also assisted the WA Government, in July 2011, to make an informed decision to approve a $450 million expansion of south-west WA's second desalination plant to meet the region's urgent need for a new water source.

IOCI research is informing decision-makers on water supply and in the agriculture, mining and petroleum, health and safety sectors. In the agricultural sector, for example, the information provided by the IOCI has been adopted to demonstrate the best use of land in different parts of south-west WA under future climate scenarios. The WA Department of Agriculture and Food provides this information to farmers to help them make informed investment decisions.

Decreasing rainfall has prompted new adaptation measures in south-west WA. This includes the city of Perth, where IOCI research played an important role by hastening and strengthening the case for Australia's first major desalination plant. Image: iStockPhoto

Energy Transformed Flagship

Analysis of performance

The Energy Transformed Flagship has been working on one of Australia's key challenges – to mitigate climate change. Finding the most cost-effective ways to reduce emissions from the energy and transport sectors (which contribute two-thirds of Australia's emissions), while maintaining energy security, has been the key priority.

To meet these challenges, the Flagship is developing Australian specific technologies to reduce carbon emissions. These technologies include algal biodiesels, biofuels from waste biomass, renewable energy storage solutions, electric vehicle-to-home integration, concentrated solar thermal and photovoltaic systems.

In 2011–12, the Flagship delivered a world-first analysis of one of solar energy's biggest challenges: intermittency (the variability of sunshine due to cloud cover). Funded by the Australian Solar Institute, the study found that there are no insurmountable barriers to increasing the use of large-scale solar energy in Australia's electricity grid.

In March 2012, the Flagship, in partnership with the Department of Climate Change and Energy Efficiency, delivered CSIRO EnergySavers to low income and financially constrained households. The program provides householders with advice and information on how to reduce their energy bills and greenhouse gas emissions.

As further demonstration of our work in clean, low-emission energy, the Flagship, in collaboration with a number of international and national partners, began work on a range of demonstration-scale concentrated solar thermal technologies, including solar fuels, high temperature storage, solar air turbines and steam turbines.

ENERGY TRANSFORMED FLAGSHIP ROADMAP

Theme	1–3 years	4–9 years	10+ years
Carbon futures	Develop models and reports to inform policy, industry and research. Undertake social attitude mapping. Hold stakeholder energy forum.	Hold transport sector stakeholder forums. Undertake longitudinal and larger population social analysis studies; commercialise software. Initiate integrated carbon assessment service.	Deploy an integrated energy, water, food and carbon assessment service to help Australia identify the least cost and risk transition pathways to a prosperous and secure low carbon future.
Sustainable stationary energy and transport	Develop technologies for low-cost solar power production and energy storage. Prioritise potential fuel crops for large-scale, sustainable biofuels production.	Demonstrate significant technologies at pilot scale, with industry and government support.	Drive the cost-effective take-up of renewable electricity and transport fuels in Australia to 2020 and beyond and maximise the long-term renewables uptake to 2050.
Local energy systems	Develop low-emission distributed energy technologies. Identify and begin engagement with partners.	Develop distributed generation and efficient options model to inform government and industry. Commercialise technologies.	Reduce greenhouse gas emissions by driving the uptake of distributed energy solutions, demand reduction and energy efficiency measures to 2020.

▲ Current position

Flagship goal: To develop, demonstrate and ensure deployment by 2020 of integrated low carbon pathways for Australia and alternative stationary and transport energy solutions that realise a reduction of Australia's carbon dioxide equivalent emissions greater than 20 million tonnes per annum by 2030 and greater than 50 million tonnes per annum by 2050.

Solar cooling Australia's homes

Air conditioning our homes and offices contributes around seven per cent to Australia's greenhouse gas emissions and places a heavy demand on our electricity supplies. To address this challenge, the Energy Transformed Flagship has developed ground-breaking solar cooling technology.

Solar cooling is powered by the heat of the sun and uses a minimal amount of electricity compared to conventional cooling systems. CSIRO's new technology consists of a desiccant wheel which removes moisture from incoming hot, humid air making it cooler so that it can be used immediately or chilled further via an evaporative cooler. The system is a low-emission, low-cost alternative to electricity powered air-conditioners.

Funded by the New South Wales Government, the Flagship installed Australia's first commercial scale solar cooling system at the Hunter Institute of Technology, New South Wales in September 2011. The system provides the Institute with cool air in summer and heating in winter, and is projected to save 5,000 tonnes of greenhouse gas emissions over the next decade.

In November 2011, the National Heating Ventilation and Air Conditioning Performance Test Facility, located at CSIRO's Energy Centre in Newcastle, New South Wales, was officially opened. The commercial facility provides state-of-the-art testing facilities for industry and government to evaluate the performance of conventional and solar-powered air-conditioning systems.

Funded by the Australian Solar Institute, CSIRO and industry partners will be investigating the complete benefits of solar cooling technology in terms of energy savings, reducing peak demand and the financial benefits. As part of the study, solar cooling systems will soon be installed in some Australian homes.

An artist's impression of a solar cooling system.

Food Futures Flagship

Analysis of performance

In 2011–12, the Food Futures Flagship continued to deliver results and significant impact in a number of areas, supported by partnerships and collaborations with industry and research organisations.

The Flagship is continuing to provide economic benefits to the Australian aquaculture industry through partnerships in selective breeding and aquafeed technology. During the reporting year, the Atlantic salmon selective breeding program was commercialised and industry adoption of the elite Black Tiger prawn breeding program expanded. This saw a 30 per cent increase in the number of aquaculture ponds stocked with the prawns.

First commercial farm trials were held of the Flagship's novel bioactive aquafeed (Novacq™). The trials demonstrated that the new aquafeed ingredient increased prawn growth rates by 20 per cent, offering significant potential to reduce reliance on fish meal for aquafeed, easing the pressure on global fish stocks.

The Flagship contributed to the grains industry and the health of Australians by progressing the development of grains that offer increased health benefits in the form of omega-3 oils, dietary fibre and higher levels of resistant starch. This was supported by new evidence supporting the bowel health benefits of resistant starch. Additionally, the range of consumer products that contain the high resistant starch grain BARLEYmax™ has expanded beyond breakfast cereals to include flat-bread wraps.

The Flagship's development of biosensor technology has progressed, with a US patent lodged for a method that can detect an odour continuously. This will allow instant odour monitoring for applications including disease detection in humans, and safety and quality evaluation throughout the food supply chain.

FOOD FUTURES FLAGSHIP ROADMAP

Theme	1–3 years	4–9 years	10+ years
Future grains	Optimise carbohydrate in grains, optimise omega-3 oils in plants and investigate genetic traits for improved quality and nutrition.	Combine beneficial traits for farmers and consumers, breed and commercialise long chain omega-3 oils in plants and commercialise quality and nutrition traits.	Increase returns to Australia by $550 million per annum through enhanced grain quality attributes and human health benefits.
Breed engineering	Animal management systems adopted and breeding technology developed with commercial partners.	Industry adoption of testes cell transfer techniques, success of aquatic breeds and novel feeds and optimal genetics in livestock and aquaculture.	Boost the value of Australia's animal-based food industries by $350 million per annum for beef and $550 million for seafood.
Quality biosensors[1]	Development of test technology, odours predicting grape and wine quality identified.	Biosensor developed and adoption commenced in defence domain. Benchtop prototype completed and field prototype commenced. Applications for food safety and quality in development.	Apply technology to food safety and process control, clinical diagnosis, biosecurity and security/law enforcement, delivering value in excess of $750 million per annum.

Current position

1 The Quality Biosensors Theme has changed to reflect the wider applicability of the technology.

Flagship goal: To transform the international competitiveness of the Australian Agrifood sector, adding $3 billion in annual value, by applying frontier technologies to high potential industries.

Increasing yield and oil production in plants

The Food Futures Flagship has developed two new technologies that will enable the production of more food, potentially having a profound impact on agricultural food, feed and feedstock production globally.

Global agricultural production needs to nearly double by 2050 if current population trends continue and there is a need to increase yield in crop species and plant based oil production to meet this demand. Food Futures Flagship researchers have identified two genetic modification techniques that offer the potential to significantly increase the biomass, grain and oil production of crops.

In a world-first, Flagship researchers, with co-funding from the Grains Research and Development Corporation, have discovered that turning off the glucan water dikinase gene increases wheat yield by up to 30 per cent in glasshouse trials. Traditional plant breeding in wheat usually results in a one to two per cent increase in yield each year, so an increase in yield of ten per cent or more has enormous implications for food security globally.

Additionally, the global demand for oil from plants will double within 20 years to meet increasing food, feed and industrial requirements. This new demand will be difficult to meet using current plant sources. By using genetic modification, Flagship researchers have identified a unique way to significantly increase the amount of oil produced in the seeds and leaves of plants.

This new technique can be applied in common oilseed plants, such as canola, as well as in the leaves of plants not currently regarded as significant oil producers. Each single per cent increase in oil production is estimated to be worth $300 million globally, and this new technology provides an opportunity to significantly expand the plant oil industry.

By combining these two new technologies we hope to see an increase in the yield and oil production of plants, which will contribute significantly to global food security.

Food Futures Flagship researchers working with experimental canola in a Black Mountain glasshouse in Canberra.

Future Manufacturing Flagship

Analysis of performance

Throughout 2011–12, the Future Manufacturing Flagship has made significant progress toward its goal of enabling the uptake of resource efficient, clean and transformational technologies by the manufacturing industry. A testament to this is our successful partnership with Boeing who are now using our topcoat reactivation technology in more than 850 of its new aircraft worldwide.

Our expertise in advanced ceramics was crucial to the establishment of a world-competitive armour manufacturing facility in Bendigo, Victoria. The Flagship's leadership in growing an Australian additive manufacturing industry is also assisting local businesses in becoming suppliers of titanium products for the aerospace industry.

Our strategic industry clusters and alliances with companies such as Orica, General Electric and Boeing are equipping Australian businesses with technologies that help them access global markets.

As a Trusted Advisor, we are also working with industry and government agencies to provide technology-based information and leadership to policy development through initiatives such as the Australian Sustainable Manufacturing Initiative; Green Growth Partnerships Program; Manufacturing Trends 2020 and the Technical Working Group of the Prime Minister's Manufacturing Taskforce.

The Flagship is delivering benefits through the development of better products, processes and services. Through effective partnering, we are helping Australian firms deliver to global markets and create wealth for Australia.

FUTURE MANUFACTURING FLAGSHIP ROADMAP

Theme	1–3 years	4–9 years	10+ years
Advanced engineered components	Materials and process development for sustainable transport solutions.	Commercialise emerging technologies.	Growth in the Australian advanced engineered components sector.
Advanced fibrous and protective materials	Establish relationship clusters in filtration and defence, personal protection and environment sectors.	Commercialise first and second generation products.	Growth in the Australian advanced textiles manufacturing sector.
Flexible electronics	New materials discovery, device prototype optimisation and ruggedisation and scale up.	Translate discoveries to create vibrant manufacturing industries based on flexible electronics.	Creation and growth of world-leading Australian companies in flexible electronics.
Sustainable materials	Develop technologies for economically and environmentally sustainable construction materials and processes.	Deploy new platform technologies in partnership with industry.	Sustainable environmentally conscious manufacturing in Australia.
Titanium technologies[1]	With industrial partners, advance technology readiness for new titanium production and manufacturing processes.	Commercialise new processes and guide technologies to production levels, manage and strengthen industry relationships; build direct manufacturing capability for domestic industry.	Creation of a world-scale titanium industry for Australia.

Current position

1 The Titanium Technologies Theme joined the Future Manufacturing Flagship on 1 July 2011 following the merger of the Light Metals Flagship with the Minerals Down Under and Future Manufacturing Flagships.

Flagship goal: To create $2 billion of additional annual value for Australia's manufacturing industry by 2025 through the development and application of resource efficient, clean and transformational technologies.

CSIRO's expertise helps manufacturing company Textor

The Future Manufacturing Flagship has been working with Textor Technologies, a family-owned Victorian manufacturing company, to consolidate Textor's position as a key supplier of specialised fluid transfer fabrics to world markets. With assistance from a CSIRO textile and fibre specialist, Textor Technologies have developed more comfortable hygiene products.

Hygiene products such as baby nappies, adult incontinence protection, feminine hygiene and wound care, are worth billions of dollars worldwide. With CSIRO's expertise and world-class textile research facilities, Textor has developed fabrics with tailored properties to improve the product – in this case, products which are softer and keep the wearer drier for longer.

This joint project is helping Textor to grow its business by developing competitive advantages for its product range. Textor is also using the Flagship's extensive capacity in materials analysis and its processing facilities to help with screening and process development.

Textor Technologies is an Australian small-to-medium enterprise that designs and produces non-woven textiles engineered for specific purposes. The company produces an array of products used in applications for the hygiene, health care, wipes, industrial fabrics, and food packaging markets. As a leader in leaner, smarter manufacturing processes, Textor is influencing and shaping Australian manufacturing as companies look to develop more efficient and competitive production processes.

Textor is supported by the Future Manufacturing Flagship and the Department of Industry, Innovation, Science, Research and Tertiary Education's Enterprise Connect Researchers in Business Program, which enables small-to-medium sized businesses to access research skills.

In addition to the Researchers in Business project, Textor's collaboration with CSIRO has resulted in a $6 million project aimed at establishing a nanofibre production and processing facility within Textor. This project has a longer-term focus and will generate a new range of products within five years.

CSIRO's expertise in textile and fibre technology is helping to make hygiene products more comfortable. Image: Dreamstime

Minerals Down Under Flagship

Analysis of performance

During 2011–12, the Minerals Down Under Flagship focused on delivering research outcomes that created increased opportunities for the Australian minerals industry and produced new detection tools that facilitated mineral discovery.

In the mining sphere, automated location and navigation technology devices for machinery are being commercialised by Australian company, Minetec, with the first commercial systems to be launched in 2013.

In collaboration with industry, the Flagship is gaining significant traction in the commercialisation of mineral processing activities including processing gold without the use of cyanide.

Work on a new nickel laterite process is on track to enable the economic processing of millions of tonnes of low-grade nickel laterite ores, potentially making $350 billion of previously uneconomic ore viable.

The Flagship and partners are trialling a groundbreaking low-emission integrated steel making process, one of the few technologies able to reduce carbon emissions at minimal cost to smelters. Estimated savings to industry are $42 billion over the next 20 years, annual greenhouse gas reductions of 81 million tonnes and annual savings in fresh water use of 146 gigalitres.

MINERALS DOWN UNDER FLAGSHIP ROADMAP

Theme	1–3 years	4–9 years	10+ years
Driving sustainability through systems innovation	Develop concepts to reduce greenhouse gas and water use. Assess the implications of plausible futures.	Proof of concept for new eco-efficient technologies. New planning tools to support social licence to operate.	Demonstration of whole system approach. Social negotiation tools embedded in technology and project development.
Discovering Australia's mineral resources	Identify new exploration tools. Enable data interoperability. Build multi-party collaborations.	New 3D exploration tools developed and applied to buried deposits and new Greenfield sites.	3D visualisation, modelling and targeting embedded as an industry standard leading to new discoveries.
Transforming the future mine	Engagement with industry to develop innovative mining concepts and establish investment.	Field trials of novel automated continuous selective mining systems and integrated light weight drill systems.	Adoption of new drilling, rock extraction and sorting systems. A vibrant mining technology and services sector.
Securing the future of Australia's carbon steel materials industry	Develop infrastructure for precision iron ore and coke characterisation. Build relationships with industry.	Beneficiation and agglomeration process improvements being commissioned with resulting efficiency gains.	Low-grade iron ores gaining traction in the Australian export market.
Creating wealth through advanced processing technologies	Laboratory testing of new ore characterisation, ore concentration and mineral/metal extraction techniques.	Continuous improvements of existing plant. Pilot plant and field trials of new techniques.	New ore reserves on-stream. In-situ leaching viable. Australian mineral processing technology preferred.
Transforming productivity through on-line analysis	Collaborative projects for concept development. Technology trials with industry.	Industry partnerships for platform development. Spin-offs and commercialisation.	On-line analysis embedded in Australian operations with significant efficiency gains and reduced cut-off grades.
Growing Australia's light metals industry[1]	Large laboratory testing of new metallurgical processes. Working closely with industry on process optimisation.	Pilot plants for new metallurgical processes. Efficiency gains being delivered to existing industries.	Australia's light metal technologies preferred. Australia's light metal industries global leaders in efficiency.

▲ Current position

1 Growing Australia's Light Metals Industry Theme joined Minerals Down Under Flagship on 1 July 2011 following the merger of the Light Metals Flagship with the Minerals Down Under and Future Manufacturing Flagships. From 1 July 2012, the number of themes will be consolidated from seven to five.

Flagship goal: Delivering science and technology options for the discovery and efficient development of Australia's mineral resource endowment that will lead to $1 trillion in-situ value by 2030 and enable flow-on benefits to the wider national economy.[1]

A new national resource for mineral explorers

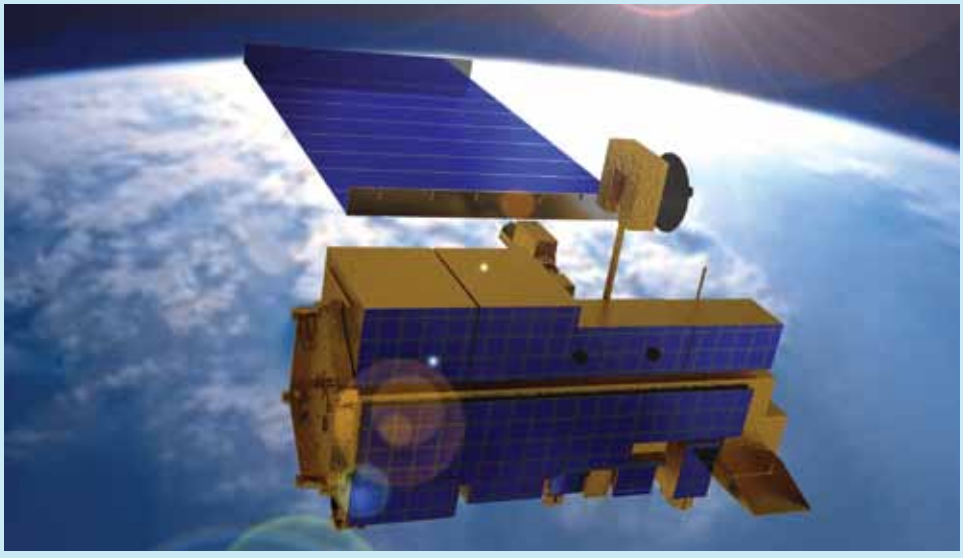
In a world-first, CSIRO has used country-wide satellite data to detail the surface mineralogy of the Australian continent.

By accessing a ten-year archive of raw Advanced Spaceborne Thermal Emission and Reflection (ASTER) satellite data collected by NASA and the Japanese Government's Earth Remote Sensing and Data Applications Center, CSIRO scientists have developed software that has transformed that data into a continent-wide suite of mineral maps.

The ASTER maps provide a Google-like 'zoom', which allows users to view images from thousands of kilometres wide down to just a few kilometres. This will fill a critical gap in geoscience information required by mineral explorers to help them better target drilling programs to improve exploration outcomes and reduce costs.

The maps are the first step in empowering geoscientists with spatially-comprehensive mineral information. They have the potential to transform mineral exploration in Australia, leading to valuable new mineral resource discoveries. The satellite data and maps can also be used to monitor links between geology and the biosphere in applications as diverse as soil science, agriculture and environmental mapping. They are already changing the way that geoscientists look for mineral deposits by providing more accurate and detailed information than ever before.

This national resource builds on a collaboration that spans over 20 years with Japanese space agencies and NASA, as well as industry, Geoscience Australia and each of the State and Territory geological survey organisations.



Japanese ASTER sensors on board the US Terra satellite platform. Image: NASA

1 Following consultation with stakeholders, our goal was modified in July 2012 in response to changing needs, to support the growth of the Australian economy.

Preventative Health Flagship

Analysis of performance

During the reporting year, scientists have made considerable inroads towards the Flagship's objectives in the early detection of, and protection against, disease and cancer.

Working with our Australian Imaging, Biomarkers and Lifestyle (AIBL) partners, CSIRO has identified plasma biomarkers that can help distinguish people suffering from Alzheimer's disease, from those with healthy brain function. Alzheimer's is the most feared disease of our ageing population and the most common form of dementia. Approximately 280,000 Australians are living with dementia and this is projected to increase to one million by 2050 as our population lives longer. The new biomarkers are a first step towards developing methods for early detection of the disease. From there, drug and/or lifestyle interventions can be undertaken to prevent, delay or slow progression. Toward this end, early research by CSIRO and AIBL collaborators has identified elements of a Mediterranean diet that has protective benefits.

Additionally, CSIRO and the Australian e-Health Research Centre, working with the McCusker Alzheimer's Research Foundation and AIBL, are investigating whether the characteristics of blood vessels in the retina at the back of the eye might serve as a possible early indicator for Alzheimer's.

Our work into stroke prevention continues, with CSIRO and STroke, imAging, pRevention and Treatment (START) collaborators identifying blood and imaging biomarkers that measure the time since the patient experienced a stroke. This information could substantially increase a patient's eligibility for therapies that have been shown to dramatically improve the chances for a full recovery, with the potential to significantly reduce or prevent long-term disability.

Despite a significant increase in the levels of fibre in Australian diets in the last 20 years, incidences of bowel cancer remain high with approximately 90 people dying from the disease each week. CSIRO scientists are continuing research into the health benefits of resistant starch, which can protect against bowel and colon cancer.

PREVENTATIVE HEALTH FLAGSHIP ROADMAP

Theme	1–3 years	4–9 years	10+ years
Colorectal cancer and gut health	New knowledge, early detection and prevention of colon and rectal cancer and inflammatory bowel disease.	Translation into marketable diagnostics and protective foods.	Reduced morbidity and mortality from colon and rectal cancer and inflammatory bowel diseases in Australia.
Neurodegenerative diseases	New knowledge about the aetiology and early detection of neurodegenerative disease.	Develop and commercialise neuro protective agents and biomarkers for early detection and prevention.	Delay the onset of Alzheimer's and other neurodegenerative diseases in Australia by five years.

Current position

Flagship goal: To improve the health and wellbeing of Australians and save $2 billion in annual direct health costs by 2020 through the prevention and early detection of chronic diseases.

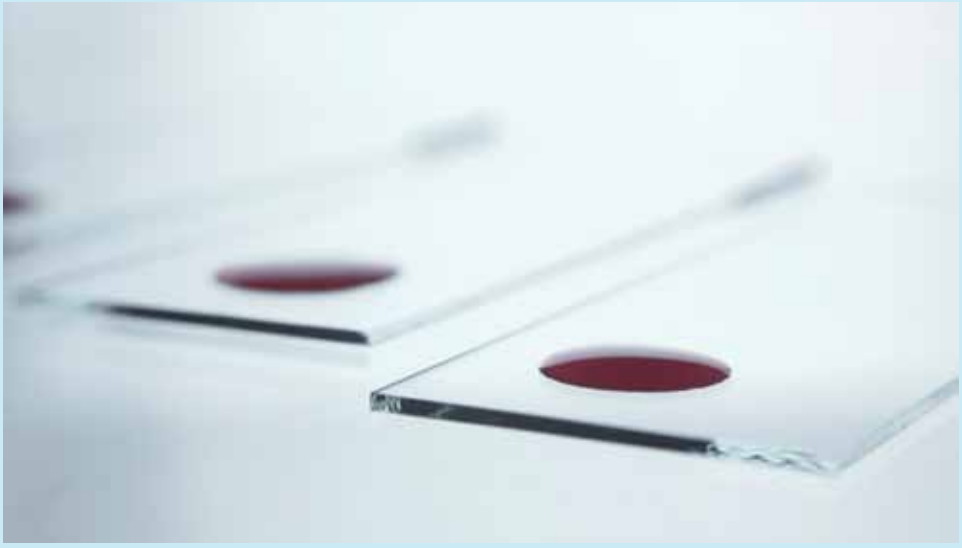
New blood test for bowel cancer

CSIRO and partners have identified new genes that show identifiable changes in the blood of people with bowel cancer. A new cost-effective blood test is being developed that will signal the early stages of the disease. The blood test could save thousand of lives by supplementing existing screening programs and encourage those at risk to have a colonoscopy.

The new blood test is currently being trialled with patients from Australia, the United States and Europe. Preliminary results have shown excellent detection rates for bowel cancer, with a high degree of accuracy in samples drawn from people at high-risk.

While the results are highly promising, further research is needed before a blood based test of this nature is available in the community. Scientists are collaborating with other research groups, both locally and internationally, to ensure that the test is undertaken under the same conditions in different laboratories. This will allow further evaluation of the test in larger numbers of blood samples drawn from a diverse population, whose disease status is not previously known.

A blood test may be more acceptable to the public than the current stool-based analysis. If it is introduced as a screening test, it should significantly improve patient participation in bowel cancer screening programs. This blood test is the product of a close alignment of clinical research using advanced genomics, epigenetics and biological statistics and is the result of over five years of scientific collaboration between CSIRO, Flinders University and Australian biotechnology company, Clinical Genomics.



Blood tests for bowel cancer should significantly increase participation in screening programs. Image: iStockPhoto

Sustainable Agriculture Flagship

Analysis of performance

During 2011–12, the Sustainable Agriculture Flagship reached several milestones on its path towards its goal. In addressing the carbon emissions challenge, the Flagship played an instrumental role with the Department of Climate Change and Energy Efficiency informing the development and implementation of the Carbon Farming Initiative. This initiative will allow farmers and land managers to voluntarily participate in the carbon market by using CSIRO tested techniques to accurately measure changes in their greenhouse gas emissions. The Flagship also launched an $8 million major new research cluster, along with six other Australian universities, targeting the measurement and reduction of emissions from livestock in northern Australian cattle.

On the productivity front, the Flagship was a key partner in the development of several farmer decision support tools including the '5 Easy Steps' guide for sustainable phosphorus application and the Fertiliser Optimiser, which allows farmers to calculate their return on investment from adopting precision agriculture techniques. Tools like these have contributed to the increase in adoption of precision agriculture from 5 per cent to 30 per cent Australia-wide.

SUSTAINABLE AGRICULTURE FLAGSHIP ROADMAP

Theme	1–3 years	4–9 years	10+ years
Reducing net greenhouse gas emissions while increasing storage of new carbon in our lands.	Develop greenhouse gas mitigation practices and technologies, measurement, accounting and bio-sequestration options.	Total system greenhouse gas outcomes for different management, history, climate and soil combinations quantified with defined uncertainty and co-benefit assessment.	New carbon sinks and mitigation practices created within profitable and sustainable agricultural system.
	Support national policy decisions on land use management for carbon storage and greenhouse gas mitigation.	Conduit for science and integration for industry and government.	National dialogue, policy and action are informed by robust science.
Advancing agricultural productivity and environmental health.	Identify challenges and prospects for food and fibre productivity increases in key industries, regions and systems.	Direct links between genetics, breeding and farming systems research underpin accelerated improvements in food and fibre productivity.	Step-change in productivity achieved via industry adoption of agro-ecological innovations for 'smart' food and fibre production systems.
	Characterise resource and labour-use, soil and water constraints to sustained productivity.	Integrated whole-farm analyses support diverse sustainable enterprise options for efficient resource management.	More sustainable production practices adopted with enhanced resources-use efficiency.
	Evaluate agro-ecological tradeoffs in farming systems to improve productivity and natural resource management outcomes.	Assess environmental impacts of emerging productivity and mitigation practices, technologies and policies.	New markets developed and in use for effective on-farm environmental and biodiversity stewardship schemes.
Informing land use planning, policy and natural resource management.	Observation of current status and historic change in key land management drivers.	Develop life-cycle based sustainability assessments for agri-food value chains.	Multi-scale temporal assessment of land use change.
	Enhance national soil and terrain data systems.	Triple-bottom-line modelling framework for land use systems.	International system for forest and carbon tracking.
Addressing global food and fibre security challenges through partnerships at home and abroad.	Deliver enhanced science and impact via an integrated approach to international project portfolio.	Deepen partnerships with international R&D institutions leading to enhanced capacity building.	Monitoring and evaluation confirm realised sustainable livelihood benefits in target regions.

▲ **Current position**

Flagship goal: To secure Australian agriculture and forest industries by increasing productivity by 50 per cent and reducing carbon emission intensity by at least 50 per cent between 2010 and 2030.

Record wheat yield for Queensland

CSIRO, in collaboration with the Grains Research and Development Corporation (GRDC), has developed a set of new management guidelines to assist farmers produce record wheat yields in irrigated cropping areas of Queensland and northern New South Wales.

Traditionally, irrigated wheat crops thrive early in the season, becoming thick and lush in the warm and wet conditions. However, these lush crops can become too tall, with weak stems and roots, and are more likely to bend and fall over once mature. Fallen (lodged) crops are difficult to harvest and a farmer's economic loss from a lodged crop can be significant. In 2008, $20 million was lost due to widespread lodging in these areas.

CSIRO's new guidelines provide farmers with detailed advice on how to conduct soil tests; optimise sowing time and seeding rate; and how to choose which variety of crop to sow. They provide advice on irrigation scheduling and the best time to apply nitrogen fertiliser with the aim of reducing lodging and boosting wheat yields.

In 2012, a Queensland farmer, whose crop was managed according to the guidelines, recorded the highest commercial wheat yield ever in the State. Following CSIRO's recommendations, the farmer sowed 60 hectares of wheat in June 2011 and, in November 2012, the crop yielded 8.2 tonnes per hectare, two tonnes more than he had ever achieved using traditional methods.

'Next year we'll use the guidelines again to see if we can achieve similar yields. This crop has really helped us to bounce back from the floods.' Hamish Bligh, farmer.

Hamish Bligh and family followed a strict irrigation regime in accordance with the Achievable Yield Guidelines prepared by CSIRO and funded by GRDC. Image: Clarisa Collis, Coretext, courtesy of the GRDC.

Water for a Healthy Country Flagship

Analysis of performance

In 2011–12, the Water for a Healthy Country Flagship's research informed water policies and strategies across Australia, including leading a review of the science behind the proposed Murray-Darling Basin sustainable diversion limits (more on page 37).

During the year, CSIRO published *Water: Science and Solutions for Australia*, which provides comprehensive information on Australia's water challenges and prospects. The book aims to assist government, business and the wider community make informed decisions about the challenges of water resource management.

In late 2011, CSIRO, the Australian National University, the Bureau of Meteorology, Geoscience Australia and the Defence Imagery and Geospatial Organisation, completed a computer model of Australia's ground surface topography and river networks, providing new information on Australia's terrain.

This financial year, CSIRO and Australia Pacific LNG launched the $14 million Gas Industry Social and Environmental Research Alliance. The Alliance undertakes research into the environmental and socio-economic impacts of gas development.

The five-year Urban Water Security Research Alliance, a partnership between CSIRO, the Queensland Government, Griffith University and the University of Queensland finished in 2012. The Alliance helped inform technical management in south-east Queensland's water industry and informed policy, guidelines, regulations and education.

WATER FOR A HEALTHY COUNTRY FLAGSHIP ROADMAP

Theme	1–3 years	4–9 years		10+ years
Urban water	Develop new tools and technologies for sustainable integrated management of water systems and infrastructure from city/regional to household level.	Inform state and national urban water policy through applied research of integrated urban water systems technologies.	Decision support systems, system performance knowledge, and new water management technologies to plan and deliver sustainable integrated urban water services.	To provide socially acceptable, affordable environmentally beneficial management solutions for Australia's urban water systems.
Integrated water information systems	In partnership with the Bureau of Meteorology, develop water reporting and forecasting tools. Develop sensor networks to improve real-time monitoring.	Enable water information interoperability through research investments in standards development, web service integration, semantic web and model interoperability.	Widely accessible national water information network based on open standards. Reporting and forecasting tools used in water demand regions.	Establish the platform for an Australia-wide network of integrated water information systems that deliver water accounts, assessments and forecasts.
Healthy water ecosystems	Establish a network of integrated models and evaluation tools and embed these in the adaptive management of high priority water ecosystems.	Inland and coastal water ecosystems managed through the use of integrated knowledge platforms.	Significantly reduced long-term impacts of pollutants and changed flow regimes in priority water ecosystems.	To provide the knowledge to protect or restore Australia's major water ecosystems while enabling sustainable use of water resources.
Regional water	Enable water savings in irrigation systems, and establish improved water efficiency and sustainability through improved surface and ground water management options.	Develop options for improved institutional water use arrangements and evaluation of their economic, social and environmental consequences.	Achieve greater water supply certainty, enhanced substitution options, and improved productivity through integrated management of river basins and aquifers.	To provide systems knowledge and analysis tools for river basins and aquifers to ensure water security for all users.

▲ Current position

Flagship goal: Consistent with Australia's national interest, develop science and technologies that improve the social, economic and environmental outcomes from water, and deliver $3 billion per year in net benefits for Australia by 2030.[1]

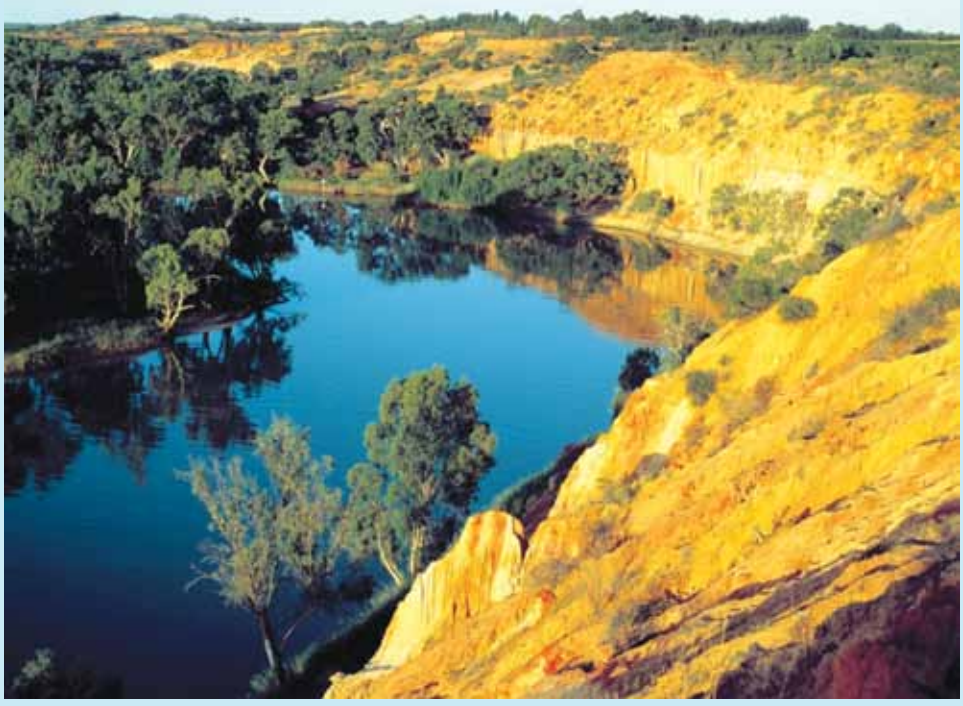
Delivering a sustainable future for the Murray-Darling Basin

In 2011, CSIRO was commissioned by the Murray-Darling Basin Authority (MDBA) to assess the environmental and economic benefits of returning 2,800 gigalitres of water per year to the Murray-Darling Basin.

This work identified the substantial environmental benefits that could be achieved from recovering this water, including improved water quality, healthier river environments, healthier red gum forests, and increased numbers of native fish and water birds. Although not all benefits could be given a monetary value, the value of those which could was estimated to be between $3 billion and $8 billion.

The largest economic benefits would come from improved ecosystem services — the benefits provided by natural ecosystems, such as maintenance of water quality and habitat to the Murray Mouth, Lower Lakes and Coorong, South Australia. Carbon sequestration (capturing carbon dioxide) from healthier forests across the river ecosystems is also worth hundreds of millions of dollars.

This work has helped the MDBA evaluate the proposed Basin Plan and has informed community discussions about the Plan.



Headings Cliffs on the Murray River, South Australia. In 2011–12, CSIRO delivered two reports to inform water management in the Murray-Darling Basin.

1 The goal was modified in late 2011 to reflect growing international focus and to provide a more balanced representation of the benefits provided from water and water-dependent ecosystems.

Wealth from Oceans Flagship

Analysis of performance

The Flagship led an international research team to account for all the contributions, such as glacial melting and thermal ocean expansion, that contribute to the rise in sea-levels globally. This research resolved the issue that the sum of these contributions has been less than the observed rise in sea-level over recent decades. The team used new and updated estimates, including a new estimate of groundwater depletion, to provide a more accurate estimate of rising sea-levels. This enabled the team to balance the results in actual observed sea level rise from 1972 to the present. More accurate estimates can be used for planning and adaptation, such as coastal planning.

As part of the South-East Queensland (SEQ) Healthy Waterways Partnership, CSIRO has developed a next generation 3D model of Moreton Bay. The model will assist SEQ to manage, more effectively, the water catchments that feed into the bay and will help planners to incorporate climate change scenarios into their plans to minimise environmental impacts. This 3D model is the first of its kind and enables government and planning authorities to look at and plan for future scenarios. The model is also proving useful for assessing the future impacts of the 2011 floods on Moreton Bay.

A scientific plan to rebuild the southern bluefin tuna stock was accepted by the Commission for the Conservation of Southern Bluefin Tuna (CCSBT). The management approach underpinning the plan was developed by CSIRO in collaboration with the Australian Bureau of Agricultural and Resource Economics and Sciences, and members of the CCSBT Scientific Committee in response to a need to rebuild the stock to 20 per cent of its unfished level by 2035. It is the first time such a management approach has been adopted and implemented for any of the internationally managed tuna and will lead to rebuilding of the stock, while increasing the economic value of the fishery.

WEALTH FROM OCEANS FLAGSHIP ROADMAP[1]

Theme	1–3 years	4–9 years	10+ years
The dynamic ocean	Synoptic forecasting system for major marine industries delivered (BLUElink 3).	Deliver littoral zone forecasting system for defence and industry applications.	National, seamless near-real ocean prediction and forecasting system operationalised.
Our resilient coastal Australia	Coastal management strategy evaluation system implemented and operational in three regions nationally.	Integrated observation modelling and visualisation system (eReefs) guiding management of the Great Barrier Reef Marine Park.	National shelf-scale hydrodynamic model (BROWNlink) nationally implemented and used for oceanographic services.
Sustainable ocean ecosystems and living resources	CSIRO R&D underpinning marine bioregional plans and National Representative System of Marine Protected Areas.	Adoption of CSIRO marine incident emergency response system.	Operationalisation of a National Ocean and Coastal Information System, as part of Australia's National Environmental Information System.

▲ Current position

1 The Flagship underwent an impact review in 2010. Recommendations included a stronger focus on future project investment to enable successful uptake by key end users. The Flagship refined its key focal research areas and identified the key outputs to be delivered to end users to achieve maximum impact. The roadmap represents the consolidation of the impact statements and therefore direct comparison against last year's roadmap is not possible.

Flagship goal: To provide Australia with the knowledge and tools to protect coastal and ocean environments, increase their value to society and create a net economic benefit of $3 billion per annum.

CSIRO assists in maritime safety

The Wealth from Oceans Flagship is working with industry and government to ensure that extracting and transporting marine energy resources is done safely. Part of delivering safety involves improving industry's and government's response to marine emergencies. CSIRO's science and technologies have been proven in response to the Gulf of Mexico oil spill and were called upon on 8 January 2012, when the Panamanian-flagged *MV Tycoon* broke its mooring in the rough seas of Flying Fish Cove, Christmas Island and foundered against the cliff edge of the harbour. The vessel had approximately 102 tonnes of intermediate fuel oil, 11 tonnes of lubricants, 32 tonnes of diesel oil and 260 tonnes of bagged phosphate dust on board. Fortunately, minimal oil or phosophate spilt into the sea, avoiding catastrophic impact on Christmas Island's unique ecosystems.

As part of an emergency response team, the Australian Maritime Safety Authority (AMSA) asked for CSIRO's support in developing a marine impacts monitoring program, which included an informal peer review of the draft monitoring plan.

CSIRO scientists identified biodiversity likely to be threatened by the spill and, drawing upon work conducted in 2009 with Geoscience Australia, were able to define the conservation values for the area and assist in designing environmental monitoring strategies.

The *MV Tycoon* foundering highlighted the usefulness of an Australian Atlas of Marine Information, which would include information about biodiversity to governance arrangements. A key component of the Flagship's work is to improve marine environmental planning and management in Australia. As a result of this event, CSIRO and AMSA are now investigating a more formal arrangement for CSIRO to assist with any potential future environmental incidents.

CSIRO's expertise helped to identify conservation resources in the area that were likely to be threatened by the foundered *MV Tycoon*. Image: Kelana Arshad

Program 2 – Core Research and Services

Objectives and deliverables

CSIRO's Core Research and Services Program covers a range of non-Flagship research portfolios and capabilities which target improvements in industry, the environment and community wellbeing through the provision of advice, information and solutions.

In 2011–12, CSIRO's five Research Groups delivered new and improved technologies, management systems, intermediate and final products, catalyst services for business, advice relevant to policy development, and new knowledge and skills through a range of portfolios. These portfolios accounted for 43.2 per cent of total resources. The Research Groups are also responsible for the development and nurturing of research capability, ensuring the excellence of CSIRO's science and its relevance to current emerging needs.

Core Research and Services – Program performance

The performance of CSIRO's Core Research and Services Program is assessed through four key performance indicators. Table 2.8 provides a summary of progress with more detailed analysis and trend data following the Table.

TABLE 2.8: PERFORMANCE INDICATORS FOR PROGRAM 2 – CORE RESEARCH AND SERVICES

KEY PERFORMANCE INDICATOR	TARGET	PERFORMANCE
Demonstrated adoption and impact of core research outputs.	Growing economic, social, environmental and intangible benefits	Recent achievements from each of the five Research Groups are reported on pages 46–55.
The number of refereed Core Research publications[1].	Maintain or increase	In 2011, CSIRO maintained a high output of refereed core research publications, with journal articles increasing by 7.6 per cent from the previous year (more on pages 40–43).
Customer Satisfaction.	Maintained	A customer satisfaction survey trial was conducted in 2011–12. A baseline against which we will track performance will be established in 2012–13 (more on page 20).
Science excellence in CSIRO research capabilities as assessed through a rolling program of rigorous peer review.	Maintain or increase	2012 saw the second round of Divisional Science Assessment Reviews completed. The aggregated results showed the impact of CSIRO's science excellence was maintained, with ratings by the panels of peers for the majority of themes being strong or favourable (more on pages 44–45).

1 Core Research Publications include all publications produced by CSIRO including Flagship refereed publications.

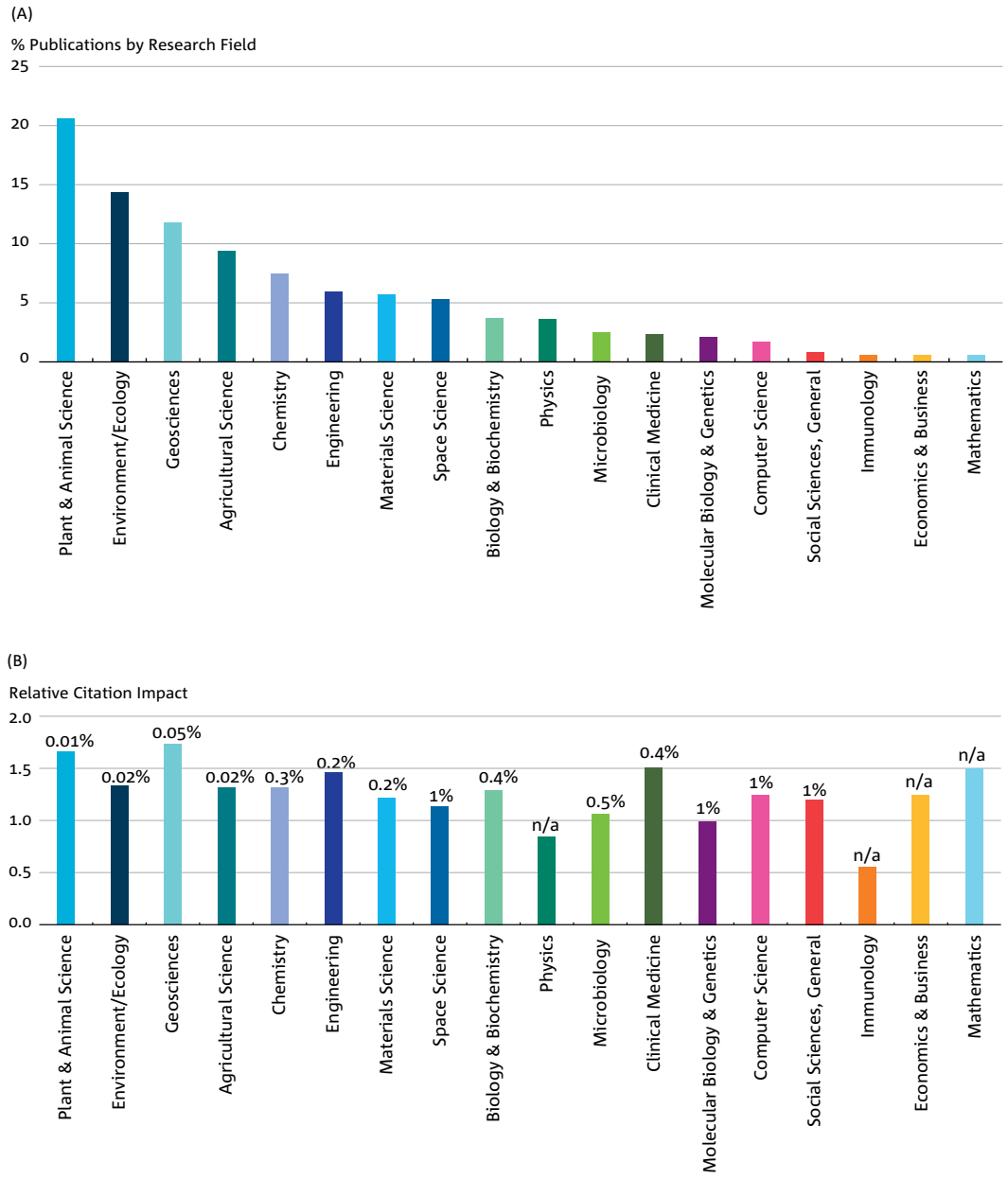
Refereed Core Research journal publications

In the 2011 calendar year, CSIRO produced 5.6 per cent of Australia's research publications, with Australia representing 3.1 per cent of the global research publications. In addition, CSIRO ranks in the top 0.1 per cent of global institutions in Plant and Animal Sciences; Agricultural Sciences; Environment and Ecology; and Geosciences (based on total citations).

Approximately 60 per cent of all CSIRO's publications are produced in its four highest ranking fields, see Figure 2.7 (A). The remaining ten fields in which CSIRO ranks in the top 1 per cent are shown in Figure 2.7 (B). Figure 2.7 (B) also includes research fields in which CSIRO is not in the top 1 per cent globally.

Citation impact is measured as CSIRO's average citation rate relative to the world average for each field.

FIGURE 2.7: CSIRO PUBLICATION (A) OUTPUT AND (B) CITATION IMPACT BY RESEARCH FIELD, 2002–11.[9]



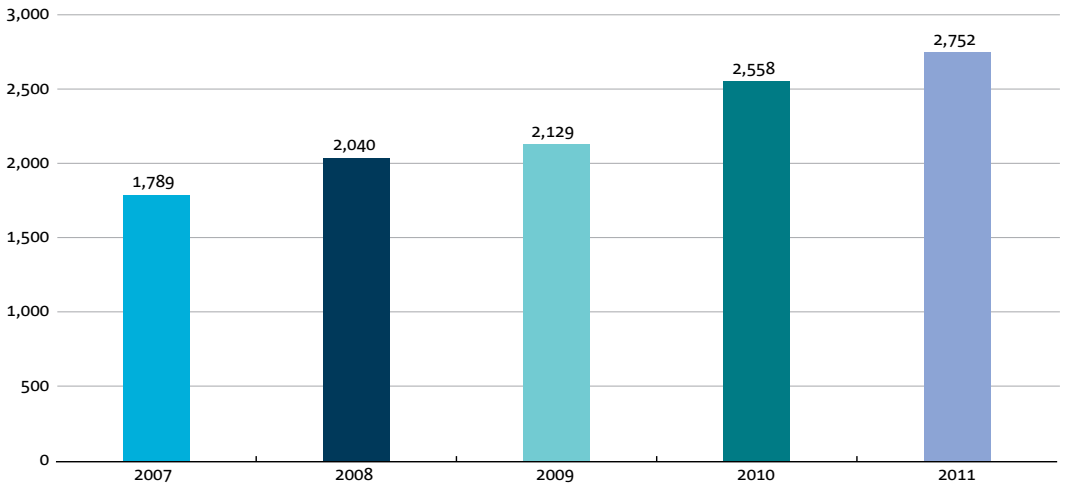
- - world average

% = relative percentile in global institutions, total citations. This is only available for fields where CSIRO is in the top 1% of institutions.

These results are consistent with historical and collaboration trends. Figure 2.8 shows the number of journal articles produced by CSIRO, which has been trending upwards over the last five years. This year this has been supported by the total number of articles and reviews in the journal *Nature* and its affiliates, *Science* and the *Proceedings of the National Academy of Sciences of the USA*, and increased from 24 in 2010 to 34 in 2011.

9 ISI Essential Science Indicators and InCites, Thomson-Reuters

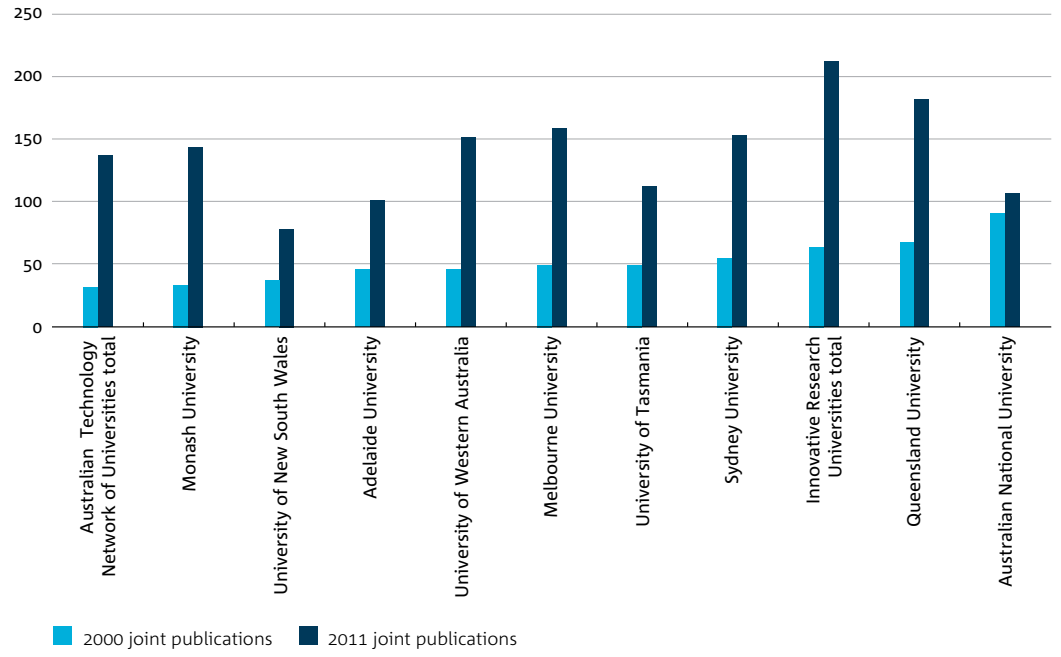
FIGURE 2.8: CSIRO JOURNAL ARTICLE PUBLICATIONS[10]



In 2011, CSIRO produced 80 per cent of its publications in collaboration with authors from other institutions. Forty-eight per cent were produced with international co-authors and 54 per cent with authors from other Australian institutions.

Figure 2.9 shows that CSIRO's collaboration with Australian universities has increased substantially since 2000 (as measured by joint publications). CSIRO continues to collaborate with the Group of Eight universities, with universities in the Australian Technology Network of Universities (31 joint publications in 2000 to 137 in 2011) and with those in the Innovative Research Universities (64 joint publications in 2000 to 213 in 2011), which has also increased.

FIGURE 2.9: JOINT RESEARCH PUBLICATIONS WITH AUSTRALIAN UNIVERSITIES[11]



10 Source: Web of Science, Thomson-Reuters
11 Source: Web of Science, Thomson-Reuters

Internationally, CSIRO has also significantly increased the rate of collaboration with organisations overseas (as measured by joint publications), see Figure 2.10. Joint publications with institutes in China have increased from 23 in 2000 to almost 200 in 2011. Over the same period joint publications with USA institutes have almost doubled.

FIGURE 2.10: JOINT RESEARCH PUBLICATIONS WITH TOP TEN COUNTRIES[12]

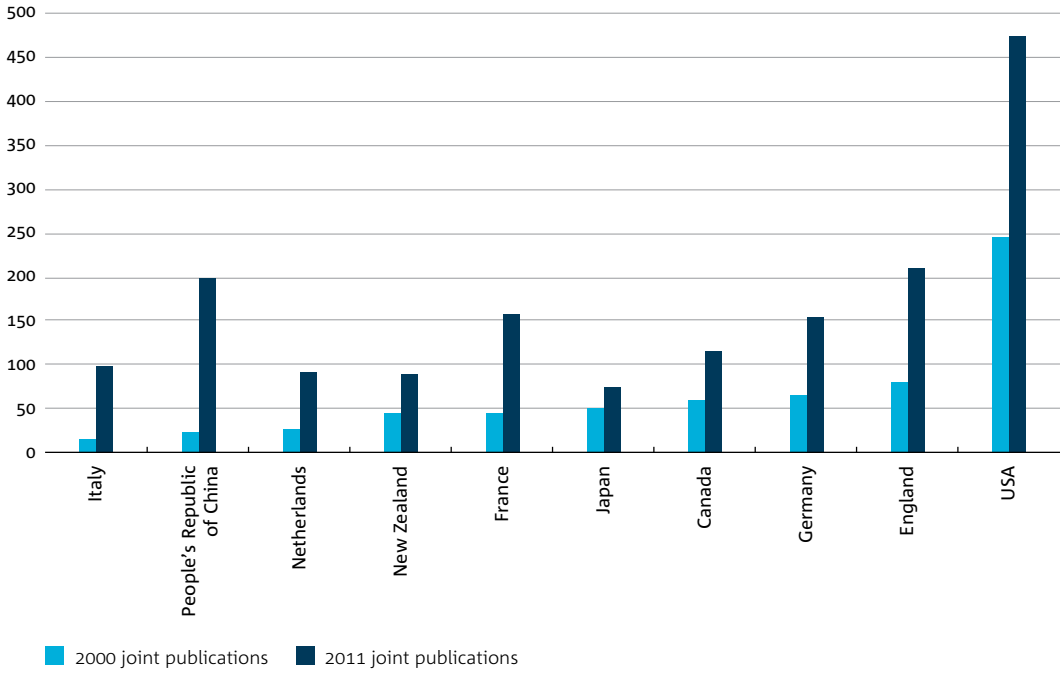
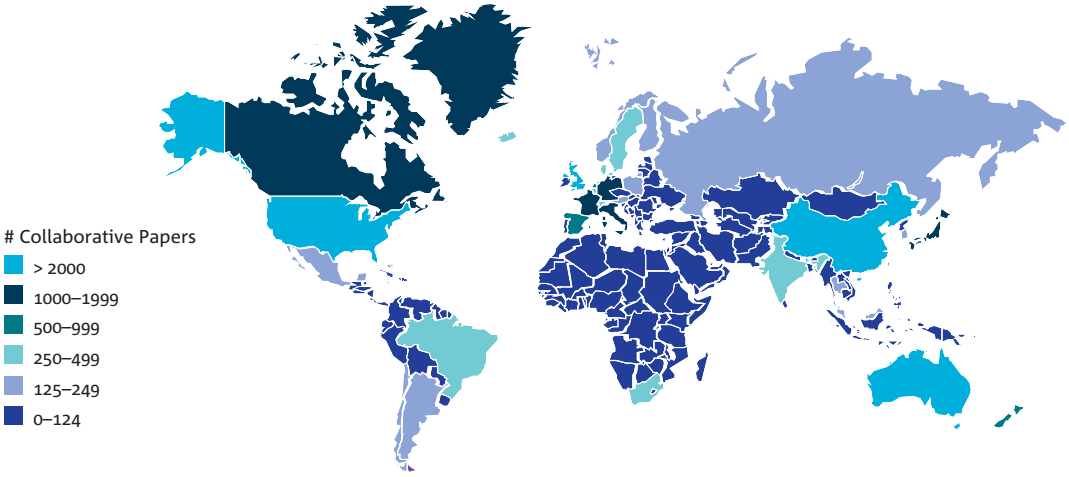


Figure 2.11 shows the potential impact of our science capability through collaboration with international authors. The top ten countries with which CSIRO co-publishes with in descending order are: USA, United Kingdom, China, France, Germany, Italy, Japan, Canada, New Zealand and the Netherlands.

FIGURE 2.11: CSIRO JOINT PUBLICATIONS WITH INTERNATIONAL AUTHORS, 2002-11[13]



12 Source: Web of Science, Thomson-Reuters
13 Source: Web of Science, Thomson-Reuters

Research capability and scientific excellence – Science assessment reviews

A key element in CSIRO's success has been its development and continued maintenance of high-quality scientific capability (including world-class researchers, research infrastructure and collaborative relationships). Since 2005, CSIRO has maintained this high standard in research capability through a cyclical (three to five year) review program of independent robust and rigorous Divisional reviews.

The assessments are led by a panel of independent scientific experts (usually three from overseas and two from Australia) whose knowledge and skills provide an appraisal of the capability performance of a Division, as well as suggestions as to how the performance of research teams can be increased.

This financial year concluded the second cycle of the review program, including an assessment of 141 Research Groups/capabilities in total. The results from this cycle of reviews can be seen in Figure 2.12. Ratings for the Research Groups / capabilities are against two key dimensions of the review; community / industry and international research capability. Table 2.9 shows the independent review panel's ratings (according to a five point scale) for probable impact on end-users and quality of science.

FIGURE 2.12: AGGREGATE RATINGS FOR CYCLE TWO SCIENCE ASSESSMENT REVIEWS COMPLETED AS AT 30 JUNE 2012

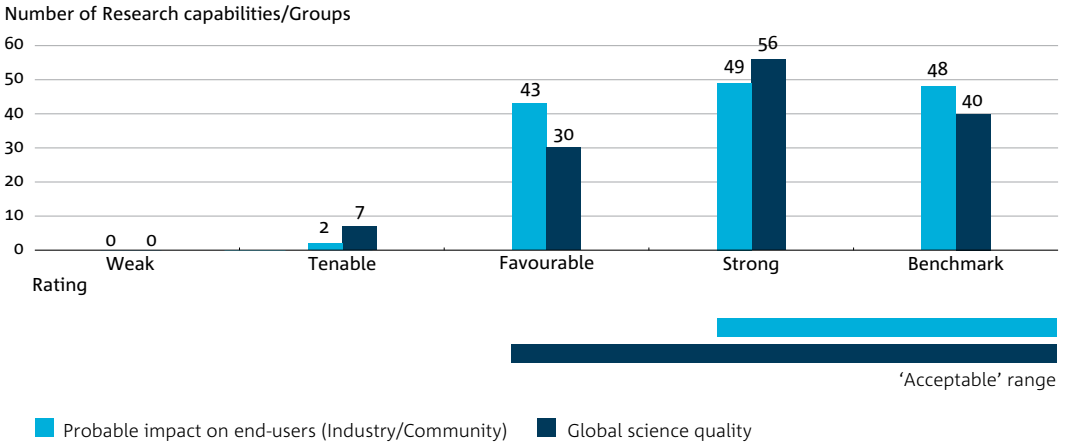


TABLE 2.9: RATINGS FOR TWO DIMENSIONS PROVIDED BY INDEPENDENT REVIEW PANELS[14]

	COMMUNITY / INDUSTRY (PROBABLE IMPACT ON END-USERS)	INTERNATIONAL RESEARCH (QUALITY OF THE SCIENCE)
Benchmark	The research results are used to set the pace and direction of commercial, environmental, community or policy development – recognised in industry or the community for this.	Sustained scientific leader – well recognised in the international research community.
Strong	The research results enable commercial, environmental, community or policy development that distinguishes user organisations from peers or competitors.	Able to set and sustain new scientific/ technical directions within the international research community.
Favourable	The research results enable commercial, environmental, community or policy development that organisations use to improve their position relative to peer or competitors.	Able to maintain a good position within the international research community; not a scientific leader except in niches outside mainstream areas.

14 Divisional Review Assessment Criteria.

	COMMUNITY / INDUSTRY (PROBABLE IMPACT ON END-USERS)	INTERNATIONAL RESEARCH (QUALITY OF THE SCIENCE)
Tenable	The research results are used by organisations for commercial, environmental, community or policy development that maintains, but does not improve, their position relative to peers or competitors.	Not able to set or sustain independent scientific/technical directions – a sense of being continually a follower.
Weak	The research results are not able to be used by organisations to even maintain their position relative to peers or competitors.	Declining quality of scientific/technical output compared with other research groups. Often a short-term reactionary focus.

As demonstrated in Figure 2.12, the aggregate results from the second round of reviews show that the proportion of scientific areas of work within the Divisions were assessed by the panels as having a research impact rated as 'favourable' or better, was 95 per cent. The proportion of research capabilities assessed by the panels as having industry / community impact of 'strong' or better was 68 per cent. The proportion of research capabilities assessed as at an 'acceptable' range in both aspects (that is, a benchmark, strong or favourable assessment for research impact and benchmark or strong in industry / community impact) was 67.4 per cent.

Energy[1]

Analysis of performance

THE CHALLENGES

Powering the future is one of the greatest environmental, economic and social challenges we have to resolve in the early decades of the 21st century. Australia has one of the world's largest carbon footprints per person, with nearly 70 per cent due to energy emissions. There is also heightened community concern about sustainable resource extraction. These concerns need to be balanced against the fact that Australia is a large energy exporter, which contributes significantly to the region's (and Australia's) long-term economic prosperity and energy security.

OUR RESPONSE

CSIRO is tackling these challenges with our energy research portfolio directed at the delivery of secure and affordable low-emissions energy. Our key focus is to help accelerate large-scale emissions cuts, while ensuring a smooth transition to a new energy future. To achieve this, we are working with industry, governments, the community and our research partners to demonstrate new lower emissions energy technologies. Together with our partners, CSIRO is involved in pilot and demonstration-scale activities, both here and overseas, including carbon capture and storage, concentrated solar thermal energy, photovoltaics, geothermal, smart grids, energy storage, biofuels and enhanced coal bed methane.

OUR IMPACT

During the financial year, CSIRO's report on commercial building wireless monitoring and measurement was included in the Council of Australian Governments reference book on wireless metering (associated with the National Strategy on Energy Efficiency and the heating, ventilation, and air conditioning (HVAC) High Efficiency Systems Strategy). This reference book will help the HVAC industry (building owners and service providers) to recognise that wireless metering is a potentially low-cost and effective way of metering energy consumption in buildings. More detailed metering will also help building owners to build the case for energy efficiency upgrades and to manage their energy consumption.

In November 2011, CSIRO, working with the Bureau of Meteorology, the Australian Department of Climate Change and Energy Efficiency, and AusAID, carried out the most comprehensive scientific analysis to date of climate change in the Pacific region. Prior to the release of this research there had only been limited country-specific climate information available. This report addresses a crucial need for reliable information to help Pacific countries effectively plan for climate change.

Additionally, the Energy Group, working with the Western Australian Geothermal Centre of Excellence, a joint venture between CSIRO, the University of Western Australia and Curtin University of Technology, developed a 3D geological model of the Perth Basin, the first of its kind. The model helps to accurately locate geothermal systems which will greatly reduce the cost and risk of exploration. The technique can be applied to other basins around the world to identify and assess resources such as oil, gas, groundwater and carbon capture and storage potential.

This year the Census of Marine Life scientific committee was awarded the International Cosmos Prize from the Expo90 committee for this unprecedented international project. The Census is the world's first comprehensive stocktake of marine life in the global ocean.

1 See Appendix 5, page 180 for the structure of each Research Group.

Research group aim: To develop and apply leading-edge energy research that reduces greenhouse gas emissions; ensures energy supply; maximises Australia's wealth from its energy resources; and derives increased, sustainable benefits from Australia's marine resources while ensuring conservation of our marine biodiversity and coastal habitats and settlements.

The post carbon capture pilot plant at the Tarong Power Plant, Queensland.

Reducing greenhouse emissions

Reducing greenhouse gas emissions from fossil fuels is a key challenge for many nations, including Australia. Over the last decade, carbon dioxide capture and storage (CCS) has emerged as an effective way to reduce emissions from fossil energy power plants. CSIRO has been working closely with industry and government in Australia and overseas, to complete and report on research related to the post-combustion capture and storage of carbon dioxide.

In March 2012, CSIRO released its findings on carbon dioxide capture. The results showed that the technology is viable, applicable and technically available. The research comprised the establishment of post-combustion capture (PCC) pilot plants at two power stations in Australia, extensive laboratory studies on carbon dioxide (CO_2) absorbents and the modelling of a range of processes and designs for PCC plants. The research revealed that more than 85 per cent of carbon dioxide was captured from a power station's flue gases, along with other gases such as sulphur dioxide.

CSIRO scientists working in the Cooperative Research Centre for Greenhouse Gas Technologies (CO2CRC) have shown that the underground storage of CO_2, the final step in the CCS chain, is a technically and environmentally safe way to make deep cuts into Australia's greenhouse gas emissions. The CO2CRC Otway Project demonstrated that depleted gas fields can be used to store significant amounts of carbon dioxide. Since 2008, over 65,000 tonnes of CO_2-rich gas has been injected two kilometres underground in a depleted natural gas reservoir in the Otway Basin located about 200 kilometres west of Melbourne, Victoria.

Environment[1]

Analysis of performance

The Environment Group delivered on its goals in 2011–12 and met its financial targets despite some challenging external influences. Positive relationships with state and federal agencies deepened, as has the Group's role as a Trusted Advisor on water, marine, climate and biodiversity issues. Our international linkages are also growing and strengthening – illustrated by the implementation of a new Memorandum of Understanding with the US National Oceanic and Atmospheric Administration, our participation in the Belmont Forum on Global Change and the Intergovernmental Platform on Biodiversity and Ecosystem Service, as well as growing collaborations in China and India.

DELIVERING CLIMATE INFORMATION

Development of the Australian Community Climate and Earth System Simulator (ACCESS) – the next generation platform for Australia's weather forecasting, climate projection, and earth system simulation capability – continued in collaboration with the Bureau of Meteorology. ACCESS has been delivering Australia's weather forecasts for more than two years and is being adopted by several Australian institutions as the standard platform for earth system simulation and climate change projections. CSIRO has again delivered the most up-to-date assessments for Australian greenhouse gas concentrations in the atmosphere and the analyses of humankind's contribution to them.

INDUSTRY PARTNERSHIP

The Environment Group, as a foundation partner with Australia Pacific LNG, cofounded the Gas Industry Environmental and Social Research Alliance. The Alliance is helping address environmental and social issues that relate to Australian coal seam gas industry developments.

BIODIVERSITY

During the financial year, the Group expanded its biodiversity research through *The Atlas of Living Australia*, which added its 30 millionth species on record. The Group also renewed a joint development agreement around the commercialisation of bee silks with its European partner. Market development around bioremediation enzymes progressed rapidly and a preferred commercial partner was identified in China.

In a global first, CSIRO's Environment Group published guidelines for developing management plans in Indigenous Protected Areas (IPAs). This involved collaboration with managers from 50 declared IPAs across Australia and was delivered through a partnership with the federal government.

NEW RESEARCH VESSEL

This financial year also marks significant milestones in the commissioning of the *RV Investigator* – Australia's purpose built Marine National Facility. When operational, the 96-metre ship will accommodate 40 scientists and cover 10,000 nautical miles in each voyage, significantly boosting science capability in the region.

COMMUNICATION

The CSIRO Environment Communications Strategy continues to be well executed with multiple authoritative publications in climate and water domains made available to the Australian public, including the first two books in the series *Science and Solutions for Australia – Climate Change* and *Water,* as well as the second *State of the Climate* report.

1 See Appendix 5, page 180 for the structure of each Research Group.

Research group aim: A sustainable Australia addressing global challenges, in which CSIRO's Environmental research and development role is pivotal and acclaimed[2].

State of the Climate 2012

In March 2012, CSIRO and the Bureau of Meteorology released the *State of the Climate 2012* report – an updated summary of Australia's long-term climate trends. The report noted that Australia's land and oceans have continued to warm in response to rising carbon dioxide emissions from the burning of fossil fuels.

The latest report, which is updated and released every two years, stated that much of Australia has transitioned from drought to floods since the release of the *State of the Climate 2010* report. This transition has occurred in conjunction with steadily increasing air and ocean temperatures and rising sea levels.

The report demonstrates that global warming continues and that human activity is mainly responsible, noting that the fundamental physical and chemical processes leading to climate change are well understood.

State of the Climate 2012 confirms that, since the 1950s, in Australia, each decade has been warmer than the previous decade, with an increase in the number of warm nights, and an increase in monthly maximum temperatures being broken. In 2011, carbon dioxide concentration in the atmosphere had risen to around 390 parts per million, a level unprecedented in the past 800,000 years. In the past decade it has risen more than three per cent per year, which is projected to contribute significantly to global warming.

CSIRO and the Bureau of Meteorology will continue to provide observations, projections, research, and analysis so that Australia's responses to the challenges of a changing climate are underpinned by robust scientific evidence of the highest quality.

The *State of the Climate 2012* report can be found at: **www.csiro.au/State-of-the-Climate-2012**

A new report released by CSIRO and the Bureau of Meteorology reported that climate change is continuing and that human activities are mainly responsible.

2 The Environment Group aim has been updated to better reflect the Group's objectives under CSIRO's wider strategic plan.

Food, Health and Life Science Industries[1]

Analysis of Performance

In 2011–12, the Food, Health and Life Science Industries (FHLSI) Group continued to deliver world-class expertise to four vital sectors of the Australian economy covering food security, health, biosecurity and new life science industries.

SUSTAINABLE FOOD SECURITY

Increasing agricultural productivity sustainably is a key fundamental need for both Australia and the world as the population expands towards an estimated nine billion by 2050.

In 2012 CSIRO's expertise in agribusiness helped a farmer produce record wheat yields in Queensland, using our innovative crop management system. The new technique combines detailed advice on managing sowing time, seeding rate, variety selection, timing of fertiliser application and control of leaf diseases (more on page 35).

HUMAN DISEASE PREVENTION

In the health sector, CSIRO and its partner, Clinical Genomics, have identified genes that show changes in the blood of people with bowel cancer. A world first blood based test for bowel cancer using these discoveries is under development and currently being trialled with patients from Australia, the US and Europe (more on page 33).

In addition, CSIRO conducted new research showing it is the *type* of dietary fibre, not just the amount, which leads to changes in the bowel which protects against this disease. The study highlighted the beneficial role of resistant starch in reducing the incidence of bowel cancer, which affects more than 14,000 Australians each year.

In May 2012, CSIRO launched the *CSIRO Total Wellbeing Diet Fast and Fresh Recipes* book. The new book provides further meal options for the Total Wellbeing Diet, which has already helped thousands of Australians achieve sustainable weight loss with improved health consequences, particularly in chronic disease prevention.

BIOSECURITY

In November 2011, the world's most advanced bio-secure laboratory was opened at CSIRO's Australian Animal Health Laboratory in Geelong, Victoria. The new $11.5 million laboratory is a maximum 'level 4' biosecurity facility, providing important new research capability to help deal with dangerous pests and pathogens.

A new Biosecurity Flagship within CSIRO commenced operation on 1 July 2012. The Flagship will play a vital role protecting the health of our farming sector, environment and people and boost Australia's long-term biosecurity research capability.

NEW INDUSTRY OPPORTUNITIES

CSIRO is continually, improving the competitiveness of existing industries and developing new life science technologies, sustainable sources of food and new bio-materials. Our expertise in aquafeed technology has seen prawn growth rates increase by 20 per cent in commercial farm trials and our selective breeding programs have seen a 30 per cent increase in the number of aquaculture ponds stocking CSIRO's elite prawns (more on page 26).

The Group's expertise in plant oil research is leading to new opportunities for Australian farmers. A breakthrough development in safflower oil is an important step in providing a viable and renewable resource for the petrochemical industry (more on page 51).

BUILDING SCIENCE CAPABILITY

On 1 July 2012, CSIRO's Divisions of Food and Nutritional Sciences and Livestock Industries amalgamated to become the Division of Animal, Food and Health Sciences and will maintain and develop science excellence in plant, animal and human science capability areas.

The Group is leading the establishment of a precinct which will focus on natural sciences at Black Mountain, Canberra, in line with CSIRO's 2011–15 Strategy. The precinct will be a global leader in plant sciences, focusing on agricultural and environmental genomics, and will attract the world's best researchers and key industry collaborators.

1 See Appendix 5, page 180 for the structure of each Research Group.

Research group aim: To deliver sustainable productivity growth and value to food and fibre production in support of the economy, the environment and the health of Australians. We will do this through scientific excellence in the biological and food sciences and their application to creating profound impact across the agricultural value chain, health, biosecurity and industry[2].

New safflower seed oil for industrial use

Special new safflower plants containing the world's highest levels of valuable oleic acid are closer to becoming a reality for Australian grain growers due to research at CSIRO. Experimental safflower plants have produced safflower seed oil that contains more than 90 per cent of this valuable fatty acid, the highest level of purity of an individual fatty acid present in any currently available plant oils.

Called super-high oleic (SHO) safflower, this new development is the important first step towards providing environmental and economic benefits to Australia. Should the SHO safflower be commercialised, then Australian grain growers will have a unique opportunity to produce and supply renewable, sustainable plant oils for industrial use, and these oils could one day replace petrochemicals in industrial products ranging from fuel and lubricants to specialty chemicals and plastics. Petroleum is a finite resource and the world is searching for replacements. Renewable plant oils will have a huge, positive impact reducing our reliance on petroleum-based products.

The research team used CSIRO's gene silencing technology to boost levels of desirable oleic acid by switching off its conversion to other unwanted fatty acids in the safflower oil.

This breakthrough SHO safflower oil is a versatile and valuable industrial raw material that combines high purity for industrial chemical production with tremendous stability for direct use in industrial lubricants and fluids. Safflower is an ideal crop for Australian biofactories as it is a very hardy crop that does well in warm seasonal conditions and should cope well with the expected stresses of climate change.

SHO safflower was developed by the Crop Biofactories Initiative, a strategic research and product development partnership between CSIRO and the Grains Research and Development Corporation.

Super-high oleic safflower seed, a renewable plant oil, will have a positive impact in reducing our reliance on petrochemicals.

2 The FHLSI Group aim has been updated to better reflect the Group's objectives under CSIRO's wider strategic plan.

Information Sciences Group[1]

Analysis of performance

FASTER BROADBAND

During 2011–12, the Group opened up opportunities for broadband technologies in rural and regional Australia. Wireless backhaul systems typically provide communication links between phone towers, townships and businesses. In February 2012, CSIRO's Ngara technology achieved the world's fastest wireless backhaul data rates over distances up to 50 kilometres, at least 20 times faster than existing technology. The technology could enable people living in remote areas to receive high performance broadband services.

SQUARE KILOMETRE ARRAY

In May 2012, the Square Kilometre Array (SKA) Organisation announced that the $2.5 billion Square Kilometre Array radio telescope would be deployed in Australia, New Zealand and South Africa. The SKA will be the world's largest and most sensitive radio telescope and will help address unanswered questions about our universe, including how the first stars and galaxies were formed and the role of magnetism in the cosmos. The SKA telescope infrastructure will be located 350 kilometres north-east of Geraldton in Western Australia. The site already hosts CSIRO's Australian SKA Pathfinder (ASKAP) radio telescope. Construction of the SKA Phase 1 is expected to start in 2016 and preliminary science operations are to take place by 2020.

NEW NATIONAL RESEARCH FLAGSHIP

The Group is also focusing its research efforts in services-related domains including health, the environment, infrastructure, finance and biotechnology, to identify how smart information can add value to these industries. In July 2012, a new National Research Flagship focusing on services and the digital economy commenced, maximising the opportunities presented by the national broadband infrastructure.

DEMONSTRATING OUR RESEARCH

Our capabilities in mathematics, informatics and statistics continue to be applied to national and global challenges. To help prepare for natural and man-made disasters, our researchers have modelled the effects of a catastrophic failure of the massive Geheyan Dam in China's Hubei province. Scientists have simulated the impact on the surrounding region and its infrastructure if the dam suddenly released its 3.12 billion cubic metres of water. The work is helping authorities prepare for disasters and could also help Australia plan for extreme weather events.

The Group continues to lead development of e-research capabilities, critical for carrying out research requiring extremely large data collections, high-end super computing resources, and global collaborations. The impact of this high-end e-research capability was demonstrated in April 2012, when CSIRO scientists set a new record of more than 1.1 million tasks run at night across 3,000 idle desktops. Using this infrastructure, plant researchers were able to submit 400,000 tasks (4 million crop growth simulations) within two days, equivalent to 16 years work for a single personal computer. Developments such as this help speed up science discovery so that new knowledge can be adopted more quickly and help improve the way we work and live. In addition, in November 2011, CSIRO's general processing unit cluster supercomputer was ranked 212 in the Top500 list of the world's fastest supercomputers and 38th on the Green500 list, making it Australia's greenest supercomputer.

1 See Appendix 5, page 180 for the structure of each Research Group.

Research group aim: To work with partners to solve national challenges, drive the productivity of Australian industries, and deliver public good outcomes through the innovative application of mathematical, statistical, information and communication sciences and technologies, and to build Australia's role in developing the next generation of space sciences.

The freedom of wireless

CSIRO invented and patented its wireless networking technology in the 1990s – a technology that has given us the freedom to work wirelessly in our homes, classrooms and offices, using devices such as laptops and smart phones.

The technology is estimated to be in more than three billion devices worldwide. It is used in offices, public buildings, homes and coffee shops – often called 'Wi-Fi hotspots' – allowing people to move around within the local coverage area and still be connected to the internet.

The invention came out of CSIRO's pioneering work in radioastronomy. That work involved complex mathematics known as 'fast Fourier transforms' as well as detailed knowledge about radio waves and their behaviour in different environments. Indoor environments are particularly difficult for the rapid exchange of large amounts of data using radio waves. CSIRO solved the main problem of wireless networking in a unique way at a time when many of the major communications companies around the world were trying, with less success, to solve the same problem.

CSIRO now has licence agreements with more than 20 companies and has received more than $430 million in revenue from this technology. In April 2012, the Minister for Tertiary Education, Skills, Science and Research, Senator the Hon Chris Evans, announced that a major part of CSIRO's most recent US litigation involving its wireless local area network (WLAN) patent had been settled prior to trial. The WLAN team is credited with creating a technology that will be in more than five billion devices worldwide by the time the patent expires at the end of 2013.

CSIRO inventors Dr John O'Sullivan, Dr Terry Percival, Mr Diet Ostry, Mr Graham Daniels and Mr John Deane won the 2012 European Inventor Awards in the 'non-European countries' category for CSIRO's patented WLAN technology. The awards are presented by the European Patent Office and this is the first time an Australian team has won.

CSIRO's WLAN technology is estimated to be in more than three billion devices worldwide. Image: iStockPhoto

Manufacturing, Materials and Minerals Group[1]

Analysis of performance

The Manufacturing, Materials and Minerals (MMM) Group works in partnership with local and multinational organisations to deliver technologies, products and processes for Australia's sustainable competitive advantage. The Group works closely with companies and agencies in aerospace, automotive, renewable energy, defence, textiles, building infrastructure, health, chemicals, plastics, packaging, mineral exploration, mining, mineral processing and metals production.

In 2011–12, the Group forged new national and international relationships and continues to foster its existing relationships with industry, research providers and governments. In addition, the Group provided expert advice to policy makers and industry groups through forums such as the Prime Minister's Taskforce on Manufacturing and Vision 2040, which provides a vision for Australia's minerals future.

ALLIANCES

In December 2011, the CSIRO-Chile International Centre of Excellence in Mining and Mineral Processing was established. The Centre, with nodes in Santiago and Antofagasta, involves CSIRO working with the Chilean Government, universities and industry on challenges facing the minerals industry in both countries. The overarching aim is to increase the productivity and reduce the environmental impact of the industry by focusing on the issues of processing lower-grade ores, delivering safer and more efficient mining, clean processing and creating value-added mineral products.

The Group continued to develop its alliances with companies such as Boeing, General Electric and Orica, along with assisting more than 700 Australian small-to-medium enterprises (SMEs).

BUILDING AUSTRALIA'S SMEs

In addition to providing a testing and consulting service and delivering research and development projects for many SMEs, the MMM Group works closely with Enterprise Connect, the Australian Government organisation which helps connect businesses with the knowledge, tools and expertise necessary to improve productivity and increase competitiveness. The Group continues to engage with SMEs through the Enterprise Connect 'Researcher-in-Business' program, and provides CSIRO researchers the opportunity to spend time in, and to assist with, internal research and development and provide valuable scientific expertise.

GROWING THROUGH COLLABORATION

Australia has the opportunity to build a number of research precincts of global standing and scale. We are joining with others in a shared vision to build vibrant sites in places where there is already a depth of industry and research infrastructure. We will create centres with critical mass by attracting the world's best minds. The Group is working with partners to develop concepts and plans for the Australian Manufacturing and Materials Innovation Precinct in Clayton, Victoria, the Human Life Sciences Precinct in Parkville, Victoria, and the Mineral Resources Research Precinct, encompassing the Perth suburbs of Kensington and Waterford.

This year has seen the launch of two new clusters. The CSIRO Organic Geochemistry of Mineral Systems Cluster, in Perth, will address future sustainability issues facing the minerals industry in Australia. The Transparent Electrodes for Plastic Electronics Research Cluster, in Brisbane is looking at producing cheap, flexible optoelectronic devices such as displays and lighting based on organic light-emitting diodes, solar cells, plastic electronics and sensors – technologies for use in products ranging from plastic solar cells to flexible televisions.

The Group continues to progress major co-locations with universities and industry, including the New Horizons initiative with Monash University at Clayton. This initiative aims to transform manufacturing in areas such as polymers, biomedicine, transport and aerospace, and the Australian Future Fibre Research and Innovations Centre with Deakin University in Geelong.

1 See Appendix 5, page 180 for the structure of each Research Group.

Research group aim: To help grow Australia's wealth by developing improved commercial products and processes, fostering increased productivity, and supporting business and job creation in an environmentally and socially responsible manner.

First RAFT-based product released

Lubrizol Corporation in the USA has created advanced highly-viscose polymers, known as Asteric™ Viscosity Modifiers, using CSIRO's RAFT (Reversible Addition Fragmentation chain Transfer) technology. This first RAFT-based product was launched in August 2011 at the American Chemical Society Conference and is now commercially available. Lubrizol developed Asteric™ using RAFT to create an innovative star shaped polymer for use in a variety of passenger vehicle transmission and mobile equipment applications worldwide. The star shape dramatically improves the viscosity performance of Asteric™.

RAFT has received significant global interest and, working with our partner DuPont, we are licensing the technology across a number of markets. Other applications will include better drug delivery systems, next generation cosmetics, better performing biomedical materials, new agrochemicals, next generation solar cells and improved industrial chemicals.

The RAFT research was a key achievement that led to the Prime Minister's Science Prize for 2011 being awarded to CSIRO's Dr Ezio Rizzardo and Professor David Solomon from the University of Melbourne (formerly CSIRO). Dr Rizzardo and Professor Solomon were recognised for their long and distinguished research careers that led to a revolution in polymer science, profoundly impacting the level of control we have over polymer structure and function (see page 73 for more information on awards and honours). Dr Rizzardo is the key inventor of the RAFT technology and continues to lead CSIRO's RAFT research.

Prime Minister's Science Prize winners, Professor David Solomon (left) and Dr Ezio Rizzardo (right) with Prime Minister Julia Gillard. Image: Department of Industry, Innovation, Science, Research and Tertiary Education

Program 3 – Science Outreach: Education and Scientific Publishing

Science Outreach – objectives and deliverables

Communicating scientific research helps raise the profile of science and CSIRO within the community. CSIRO conducts a range of science education programs for school students, their teachers and the public. We host the CSIRO Discovery Centre in Canberra and operate major visitor centres at the Parkes Observatory in New South Wales and the Canberra Deep Space Communication Complex.

CSIRO also operates **CSIRO** PUBLISHING as an independent science and technology publisher with a global reputation for quality products and services covering a wide range of scientific disciplines, including agriculture, chemistry, the plant and animal sciences, and environmental management. **CSIRO** PUBLISHING operates within CSIRO on a commercial basis on behalf of authors and customers in Australia and overseas.

CSIRO also runs a postgraduate scholarship program which provides opportunities in science and engineering for outstanding graduates who enrol at Australian tertiary institutions as full-time postgraduate students for research leading to the award of a PhD. PhD students at CSIRO are co-supervised by a university, allowing students to maintain and develop their university connections while being exposed to research in a working environment, see Table 2.10. The number of students fluctuates, with uneven intakes each year, and a reduction in student numbers is often seen when a cohort moves through the program.

Some CSIRO Divisions have collaborative arrangements with universities to foster PhD studies in particular areas – for example, CSIRO Marine and Atmospheric Research and the University of Tasmania run a joint PhD Program.

TABLE 2.10: SCIENCE OUTREACH – CSIRO'S POSTGRADUATE STUDENTS

	2007–08	2008–09	2009–10	2010–11	2011–12
Sponsored postgraduates[a]					
PhD	241	338	375	333	291
Masters	18	9	13	24	20
Honours	13	17	25	19	17
Total	**272**	**364**	**413**	**376**	**328[b]**
Supervised postgraduates[a]					
PhD	523	629	733	655	639
Masters	48	56	47	59	77
Honours	63	58	60	77	64
Total	**634**	**743**	**840**	**791**	**780**
Postdoctoral Fellows	**301**	**304**	**330**	**333**	**326**

(a) As at 31 May each year. A student may be either sponsored, supervised or both. The total number of individual students sponsored and/or supervised as at 31 May 2012 was 806, including more than 45 supervised in collaboration with CRCs and 73 through the Flagship Collaboration Fund. See glossary page 185 for definition of sponsorship and supervision.

(b) Includes 56 students fully sponsored and 272 students partially sponsored by CSIRO.

Science Outreach – Program performance

The performance of CSIRO's Science Outreach Program is assessed through six performance indicators. Table 2.11 provides a summary of progress. More detailed analysis and trend data follows the Table.

TABLE 2.11: PERFORMANCE INDICATORS FOR PROGRAM 3 – SCIENCE OUTREACH

KEY PERFORMANCE INDICATOR	TARGET	PERFORMANCE
Utilisation of science outreach programs.	Increasing	CSIRO's Education Centres experienced a decrease in visitors due to a change in staffing levels at specific locations. Meanwhile, the CSIRO Discovery Centre received 108,060 visitors, 34,288 more than in 2007. Both the Parkes Radio Telescope and Canberra Deep Space Communication Complex attracted higher numbers than the previous year.
Awareness of science by CSIRO stakeholders.	Increasing	In 2011, 40 per cent of Australians questioned were able to name a contribution CSIRO made to their life. This was three per cent less than in 2010.
Success of participants in the Science Outreach Programs.	Evidence of success	Independent evaluations and surveys confirm high levels of success with key CSIRO outreach programs.
International reach and impact of published journals.	Increase	The international reach and impact of 25 peer reviewed research journals published in partnership with the Australian Academy of Science and other societies continues to grow.
New book titles.	50	42 new book titles were published during the year.
Net Profit from **CSIRO** PUBLISHING.	Positive	**CSIRO** PUBLISHING delivered a positive net profit of $620,000.

Utilisation of science outreach programs

CSIRO Education continues to offer a range of valued programs to teachers and students. The Science Education Centres hosted over 374,000 students and teachers in 2011. Table 2.12 on page 58 shows there was a decrease of 14,000 students across the Adelaide and Hobart centres, due to staff changes. While both centres are now operating at full capacity, the change in staff temporarily impacted the programs in those locations.

Membership to the Double Helix Science Club suffered due to the lack of a marketing person for most of 2010 and 2011, consequently promotion fell. This has been rectified with the position being filled in November 2011. The magazines, *the Helix* and *Scientriffic*, also suffered from a general decline of people reading paper based material. Digital options will be considered in the near future.

Science by Email continued to increase its readership to 41,204 subscribers. The Maths by Email program was renamed to Maths and Stats by Email, with subscribers reaching 14,967 at the end of 2011. By December 2011, there were 1,453 Scientists and Mathematicians in Schools partnerships in 1,118 schools. *SCOPE*, the national weekly science TV program, returned to being broadcast on Tuesday afternoons. CarbonKids gained funding from Bayer to expand its activities and had 172 schools registered by December 2011.

CSIRO's Discovery Centre opened two new exhibitions this year – CLIMATE and FUTURE FOOD. The exhibitions communicate complex CSIRO research in visual ways to a range of audiences. Our public programs continue to be extremely popular, attracting positive media attention. The Discovery Centre manages the Inspiring Australia program in the region on behalf of the ACT Government and the Department of Industry, Innovation, Science, Research and Tertiary Education. Our participation in National Science Week in 2011 exceeded previous years, with 20,000 people attending our Experiment-a-thon.

The new climate exhibit at CSIRO's Discovery Centre.

Visitor numbers to the Parkes radio telescope remained high reaching a total of 96,609 in 2011. The telescope's 50th anniversary celebrations generated additional media attention and increased attendance. Education and outreach programs included monthly amateur astronomy meetings, a teacher's astronomy weekend workshop, an open weekend, a community concert and a university level week-long radio astronomy school. Seven high school work experience students and a CSIRO summer vacation student were also hosted at the centre.

The Canberra Deep Space Communication Complex provided education programs to 11,626 students and educators during 2011. Approximately 6,500 students were in years K–6, 4,500 in years 7–12, 600 undertaking tertiary studies and 900 were educators. Subjects ranged from science, technology, engineering and mathematics, and CSIRO's space exploration activities.

TABLE 2.12: SCIENCE OUTREACH

PROGRAM	2007	2008	2009	2010	2011
CSIRO Education Programs					
CSIRO Science Education Centres (visitors)	383,499	390,947	386,500	389,287	374,797
CSIRO Discovery Centre (visitors)	73,772	80,555	94,365	100,920	108,060
Double Helix Science Club (members)	19,545	20,253	19,656	15,821	13,851
Science by Email (subscribers)	28,516	29,560	34,933	38,156	41,204
Maths by Email[1] (subscribers)				9,255	14,967
CREativity in Science and Technology (CREST) (participants)	5,999	8,355	8,801	9,668	8,385
BHP Billiton Science Awards (participants)	4,103	2,568	3,114	3,658	3,770
Other Visitor Centres					
Parkes radio telescope (visitors)	104,783	92,369	112,342	95,104	96,609
Canberra Deep Space Communication Complex (visitors)	62,162	67,538	67,582	70,044	77,350

1 Launched in 2010

Awareness of science by CSIRO stakeholders

In 2011, CSIRO commissioned Ogilvy Illumination to conduct an on-line survey into community attitudes towards CSIRO. Questions from a similar survey undertaken in 2010 were repeated to identify any shifts in community awareness. Results confirmed that when Australians think about science and research in Australia, they overwhelmingly think about CSIRO. As in 2010, awareness of CSIRO is still high amongst our community, however, knowledge of recent stories about CSIRO is comparatively low. Furthermore, awareness of the Organisation's achievements is shallow – particularly among younger Australians.

The 2011 survey found that Australians are more likely to have heard about the Organisation through stories that relate to the environment, whereas in 2010, community awareness was greater when the story was about diet and nutrition. The survey also found that the impression recent CSIRO news stories left on Australians was slightly less positive than in 2010 (more information on page 5).

Evidence of success in the Science Outreach programs

In 2011, an evaluation was completed for Science by Email, where subscribers indicated a high level of satisfaction with the newsletter. Science by Email has been well received at all stages of its history according to in-house surveys completed in 2003, 2007 and 2009. The 2011 evaluation showed that the program is continuing to attract and grow a strong following more than a decade after its formation. The email newsletter is reaching its target audience of 9–13 year olds and their teachers in Australia and overseas. It is also eagerly received by a much broader audience of younger children, young adults and adults who enjoy its currency and immediacy, and want to know more about science.

An external evaluation was also completed for the Scientists in Schools program, where the program was rated as extremely positive in its impact.

BHP Billiton extended the BHP Billiton Science Awards for a further three years and doubled their funding to expand the competition, demonstrating their commitment and how highly they value the awards program.

The Science Education Centres regularly survey teachers who have used our programs. Results from over 6,500 teachers across Australia found that approximately 99 per cent of these teachers found our programs both engaging and educational.

Student at CSIRO New South Wales Education Centre.

Attendance from interstate schools to CSIRO's Discovery Centre continues to increase, with 43,000 students visiting the Centre in 2011–12. Students are taken through a 90-minute minds-on, hands-on program hosted by a team of postdoctoral and PhD students from CSIRO and the Australian National University. The program begins with an overview of CSIRO, its research and achievements. A number of times this year, our high-school age audiences spontaneously burst into applause when told that a CSIRO invention, wireless local area network (WLAN), made wireless hotspots and mobile phone downloads possible. CSIRO Discovery has been working with science units on the Black Mountain site in Canberra, to extend the range of educational experiences on offer, including tours of the High Resolution Plant Phenomics Centre and the CSIRO-hosted national collections.

The Parkes radio telescope visitors centre conducts monthly exit surveys to determine the quality of visitor experience. In 2011, 90 per cent of surveyed visitors rated their experience as 'good' or 'very good', while 65 per cent rated their visit as 'very good'. The centre remains a popular attraction with around 5,000 visitors attending its 50th anniversary celebrations over one weekend during 8–9 October 2011.

The Canberra Deep Space Communication Complex continues to provide a unique science

education and outreach opportunity to the community and students from Kindergarten to Year 12, including tertiary. During 2011–12, a new outreach program was launched utilising social media to encourage conversations about science and planetary exploration. Visitor surveys consistently return positive feedback. Evidence of our education success is seen in the high rate of schools re-booking, with an average of 74 per cent returning each year.

CSIRO PUBLISHING

International reach and impact of published journals

The international reach and impact of 25 peer reviewed research journals published in partnership with the Australian Academy of Science and other societies continues to grow, as measured by downloads, impact factors and subscriptions.

Approximately 50 per cent of the articles in the journals were written by Australian researchers, with the balance by overseas authors.

During 2011, 2.6 million journal articles were downloaded from **CSIRO** PUBLISHING's website, with approximately 40 per cent of these from **CSIRO** PUBLISHING's archive (see Table 2.13).

CSIRO's *ECOS towards a sustainable future* magazine discontinued publishing in print and adopted a digital-only format. This allowed publication to occur weekly rather than bimonthly. *ECOS* downloads increased by 23 per cent due in part to it being published more frequently.

New book titles

During 2011–12, 42 new books were published in print and digital formats. Titles featuring CSIRO authors and their research included *Minerals, Metals and Sustainability: Meeting Future Material Needs* and *Biological Control of Weeds in Australia*. A notable highlight was *Burke and Wills: The Scientific Legacy of the Victorian Exploring Expedition*. The book captured a good deal of media attention as it shed new light on an important event in Australia's history. *Science and Solutions for Australia* series continued with publication of the second book *Water*.

Net Profit from CSIRO PUBLISHING

A positive net profit of $620,000 was delivered. **CSIRO** PUBLISHING's total revenue for 2011–12 was $10.08 million, down slightly on 2010–11 revenue of $10.23 million. The demand for **CSIRO** PUBLISHING's products remains strong, even in an environment dominated by global budgetary restraints and new publishing models.

TABLE 2.13: CSIRO PUBLISHING

	2007	2008	2009	2010	2011
CSIRO PUBLISHING journal (downloads)	1,432,024	1,686,320	2,092,283	2,633,703	2,653,848
ECOS story (downloads)	168,262	204,225	200,740	241,525	296,448

Program 4 – National Research Infrastructure: National Facilities and Collections

National Research Infrastructure – objectives and deliverables

CSIRO manages two types of national research infrastructure on behalf of the nation; National Research Facilities and National Biological Collections. In addition, CSIRO hosts 30 other research facilities and over 30 national reference collections.

National Research Facilities

CSIRO operates a range of specialised laboratories, scientific and testing equipment, and other research facilities which are available for use by both Australian and international researchers. The three major National Research Facilities, classified as landmark facilities, are:

- **The Australian Animal Health Laboratory (AAHL)** – located in Geelong, Victoria, is a national centre of excellence in disease diagnosis, research and policy advice in animal health and human diseases of animal origin (zoonoses). It is Australia's front line defence, helping to protect Australia from the threat of exotic (foreign) and emerging animal diseases.
- **The Australia Telescope National Facility (ATNF)** – operated and managed by CSIRO's Division of Astronomy and Space Science, is made up of radio telescopes at three observatories, near the towns of Parkes, Coonabarabran and Narrabri in New South Wales. A fourth telescope, the next generation Australian Square Kilometre Array Pathfinder (ASKAP) is currently being built at the Murchison Radio-astronomy Observatory in Western Australia and will consist of 36 antennas. The ASKAP will be operational in 2013 as part of the ATNF.
- **The Marine National Facility (MNF)** – is made up of a 66 metre blue-water research vessel, *Southern Surveyor*, a package of unique scientific equipment and instrumentation, and a collection of 27 years of marine data. It has the scientific, technical and administrative expertise required to safely and effectively manage an ocean-going research platform. The *Southern Surveyor* is particularly suited to multidisciplinary research projects in the deep oceans surrounding Australia. CSIRO is managing a major project to design and build a new state-of-the-art research vessel, *Investigator*, to replace the *Southern Surveyor*, scheduled to be operational in 2013.

National Biological Collections

CSIRO is the custodian of four national biological collections:

- Australian National Insect Collection (ANIC), specialising in Australian terrestrial invertebrates
- 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 and weeds

and over 20 smaller collections of interest that contribute to the discovery, inventory, understanding and conservation of Australia's biological diversity.

Together, these collections support an important part of the country's taxonomic, genetic, agricultural and ecological research. These vital resources provide correct identification of species for biosecurity, conservation and the development of sustainable land and marine management systems.

National Research Infrastructure – Program performance

The performance of CSIRO's National Research Infrastructure Program is assessed through six key performance indicators. Table 2.14 on page 62 provides a summary of progress. More detailed analysis and trend data follow the Table.

TABLE 2.14: PERFORMANCE INDICATORS FOR PROGRAM 4 – NATIONAL RESEARCH INFRASTRUCTURE

KEY PERFORMANCE INDICATOR	TARGET	PERFORMANCE
Utilisation of the National Research Infrastructure.	Variable	Availability and use of the National Research Infrastructure by Australia and the international scientific community has been maintained at the target levels for National Research Facilities. The total number of visitors and tours hosted for National Biological Collections decreased between 2010–11 and 2011–12 as outlined in Table 2.15.
Maintenance and operation of National Research Infrastructure.	International Standard	Management arrangements continue to be strengthened to ensure operations are being adequately maintained. Compliance with relevant Australian and international standards is being achieved, including the auditing of facilities by the various regulators.
Proportion of National Biological Collections digitised and available to the public.	Increase	The proportion of specimen material digitised in the four national biological collections increased slightly. Public availability of *The Atlas of Living Australia* (see: **www.ala.org.au**) provides open and free access to biodiversity data held by these collections and others.
Coverage of National Biological Collections.	Increase	The taxonomic coverage of Australian species remained largely unchanged in the year, except for fish species, which increased by three per cent.
Response to national events.	Timely response	AAHL continues to respond to national events in a timely manner. All 48,500 tests on around 31,000 samples sent for diagnostic testing for exotic diseases were completed in 24 hours or less. During the year, a record number of cases of the Hendra virus in horses in New South Wales and Queensland were noted, with more incidents recorded this year than the total for all previous cases combined.
Scientific contributions in support of research.	Demonstrated high-quality contributions	CSIRO's National Research Infrastructure continues to provide significant support and opportunities for collaboration with the Australian and international scientific communities. Achievements this year are described on pages 66–68.

Utilisation of National Research Infrastructure

Statistics relating to the use of the National Research Facilities are provided in Table 2.15.

TABLE 2.15: UTILISATION OF NATIONAL RESEARCH FACILITIES

ACCESS TO NATIONAL RESEARCH INFRASTRUCTURE	2008–09	2009–10	2010–11	2011–12
Australian Animal Health Laboratory				
Hours operating per day	24	24	24	24
Days operating per week	7	7	7	7
Australia Telescope National Facility[1]				
Time allocated to observations (%)	76	75.3	72.4	73.6
Time lost to equipment failure (%)	3	2.9	3.1	2.7
Time allocated to CSIRO staff (%)	20	24	24	22
Time allocated to other Australian researchers (%)	30	23	25	21
Time allocated to international researchers (%)	50	53	51	57
Marine National Facility				
Ship time grants (days)	99	177	169	176

1 More information can be found in the ATNF's Annual Report, see: **www.atnf.csiro.au/AR2011**

In November 2011, the world's most advanced bio-secure laboratory – the **AAHL Collaborative Biosecurity Research Facility** (ACBRF) – was officially opened by the then Minister for Innovation, Industry, Science and Research, Senator the Hon Kim Carr. This specialised biosecurity infrastructure has extended AAHL's ability to deal quickly and effectively with a wide range of emerging diseases that have the potential to harm humans and animals. The Australian Government funded the construction of the ACBRF through the National Collaborative Research Infrastructure Strategy (NCRIS).

Demand by prominent astronomers, from Australia and overseas, for use of the **Australia Telescope National Facility** (ATNF) remains high. This is evident with telescopes over-subscribed by up to a factor of 2.6 at peak observation times. The ATNF exceeded its target of 70 per cent of time allocated for astronomical observations on the Australia Telescope Compact Array and Parkes Telescope. Time lost during scheduled observations due to equipment failure was below five per cent. Performance targets were also met on the Mopra Telescope and Long Baseline Array. Over 100 papers using ATNF data were also published in refereed journals in the reporting year.

The **Marine National Facility** (MNF) provided 176 days of ship time out of 405 days requested by researchers and a possible 180 days at sea. Participants included scientists from 18 Australian institutions including CSIRO, Geoscience Australia, the Bureau of Meteorology, the Australian National University, the University of Wollongong, the Western Australian Department of Fisheries, the Royal Australian Navy and collaborating scientists from institutions in Belgium, France, Israel, the Netherlands, New Zealand and the USA. The MNF fostered the development of next generation marine researchers by enabling 25 students to experience scientific work at sea.

Use of the **National Biological Collections** across a number of metrics decreased in the past year (see Table 2.16). Reduced staffing to support access to the collections has had a major impact on physical use, particularly in the ANIC. However, web portals such as *The Atlas of Living Australia* and *Australia's Virtual Herbarium* provide new avenues for virtual access of collection material. Downloads per record in 2011–12 ranged from 3 to over 20 across the four collections, which demonstrates strong interest in accessing data about the collections. The collections have now been assembled with four others as the Australian National Biological Collections Facility under common leadership to enhance their maintenance, research and access.

TABLE 2.16: COMBINED UTILISATION OF NATIONAL BIOLOGICAL COLLECTIONS

USE OF NATIONAL BIOLOGICAL COLLECTIONS	2008–09	2009–10	2010–11	2011–12
Number of specimens dispatched	7,800	29,300	25,925	15,548
Outward going loans	138	147	193	157
Tissue samples sent	3,300	3,800	4,447	3,819
Tissue sample grants	79	44	40	43
Number of visitors hosted	155	186	336	267
Total visitor research days	**403**	**713**	**551**	**800**
Number of tours hosted	47	57	70	52
Total number of visitors on tours	**535**	**597**	**1,266**	**363**

Maintenance and operation of National Research Infrastructure

The **AAHL** laboratory continues to retain accreditation to ISO/IEC 17025:2005 and certification of its management system to AS/NZS ISO 9001:2008 and environmental management system to AS/NZS ISO 14001:2004. AAHL expanded its function as an international proficiency testing provider for exotic disease agents and has achieved accreditation to ISO/IEC 17043.

Compliance with the Australian Quarantine Inspection Services, the Office of the Gene Technology Regulator and those regulations concerning Security Sensitive Biological Agents has been achieved. Many of these regulations have been enhanced and expanded in response to maximising effective risk management in these areas. Auditing of the new facilities (the PC4 laboratory and the insectary) by the various regulators has been successful with only minor modifications required to ensure full compliance.

The safety of staff is paramount at all times and a rigorous program of microbiological and safety training is provided throughout the year.

The **ATNF** is continuing to maintain and upgrade existing instrumentation and improve the standardisation of equipment across all its observatories. New 16 centimetre receivers were installed on all antennas of the Australia Telescope Compact Array. A significant amount of work has been carried out on the Parkes Telescope in preparation for observations to be conducted remotely from the observatory, while ensuring the telescope and its systems are safely protected.

CSIRO is managing the building of a new state-of-the-art **MNF** research vessel to replace the current vessel *Southern Surveyor,* which is scheduled to be decommissioned in 2013. The 41-year-old *Southern Surveyor* will undertake numerous voyages in its final months, made possible through an enhanced maintenance program of $887,000 in 2011–12. Progress with the new vessel, the *Investigator,* is well underway. A blog on CSIRO's web site has been developed to keep the general public informed about the progress of the project (see: **www.csirofrvblog.com**). The new vessel is larger and capable of supporting more days at sea per annum.

National Biological Collections

During 2011–12, the National Biological Collections developed plans for their future infrastructure needs as a number of the collections are nearing capacity and have ageing facilities. The **ANWC** and the Dadswell Wood Collection need to be relocated to Black Mountain, Canberra in the next few years.

The **ANH** has processed a number of scientifically and historically significant specimen donations, totalling over 2,300 specimens, further reducing the ANH collections backlog and increasing specimens and data available for research. Additional valuable collections have also been accessioned through staff participation in a survey of Christmas Island, and 'Bush Blitz' survey expeditions to the monsoon Northern Territory and the Tasmanian Highlands.

The **ANIC** has prioritised the digitisation of the bee and cicada collections, which will contribute primary biodiversity data and multimedia from these groups to a national initiative in collaboration with *The Atlas of Living Australia* (ALA) (**www.ala.org.au/**). In addition, the ANIC received several important donations of material, including a collection of butterflies that added significant value to the ANIC's collection of Gondwanan Lepidoptera specimens.

The **ANFC** is a purpose-built facility and is maintained and operated to the standards expected for a collection of international standing. All specimens and samples are prepared using standard internationally-recognised museum procedures.

Proportion of collections digitised and available to the public

The proportion of specimen level material digitised in the four collections ranges from 5 to 100 per cent (see Table 2.17).

TABLE 2.17: DIGITISATION OF THE NATIONAL BIOLOGICAL COLLECTIONS

COLLECTION	PROPORTION OF COLLECTION DIGITISED (%)		
	2009–10	2010–11	2011–12
Australian National Insect Collection	2.9	5	5
Australian National Wildlife Collection (excluding sound collection)	86	91	91
Australian National Fish Collection	100	100	100
Australian National Herbarium	76	76	76

Most of these digital records are available to the public and to researchers through the ALA. In this last year, the functionality of the ALA has been extended with the release of the *OzAtlas* mobile application for smart phones and tablet computers. This allows mobile data capture into the ALA and gives access to data and images for Australian species and their distribution, including on-line field guides for species within a given locality.

Digital records of individual insect specimens from the **ANIC** have been supplemented by new digitisation techniques, which allow a whole drawer of insects to be rapidly photographed and analysed. This has enabled faster delivery of specimen data to users. The ANIC is focusing on digitising the most scientifically valuable specimens to be made publicly available on-line, thus increasing digitisation rates across the whole collection.

The **ANWC's** collections of birds, mammals, reptiles and amphibians comprise dried skins, skeletal specimens, whole specimens in alcohol and eggs. They have been almost completely digitised, even as the collection grows, and the records are available on the ALA. The Sound Library and recently collected subfossil material are in the process of being digitised using new databasing methods.

The **ANFC** specimen data (49,158 records) is 100 per cent digitised and approximately 57 per cent is available publicly through the On-line Zoological Collections of Australian Museums (**www.ozcam.org.au/**) and the ALA.

The majority of **ANH** Australian specimen records are digitised and available through *Australia's Virtual Herbarium* (**www.chah.gov.au/avh**) and through the ALA. The remaining undatabased collections (approximately 24 per cent) are primarily of non-Australian origin. Images of Australian plants are also available via the Australian Plant Image Index (**www.cpbr.gov.au/photo/**), a comprehensive collection of over 65,000 images.

Coverage of the National Biological Collections

The National Biological Collections provide a broad coverage of Australian species (see Table 2.18), although in the national context the collections have focused on building strength in particular areas.

TABLE 2.18: COVERAGE OF THE NATIONAL BIOLOGICAL COLLECTIONS

COLLECTION	PROPORTION OF DIVERSITY COVERED (%)		
	2009–10	2010–11	2011–12
Australian National Insect Collection	70	70	70
Australian National Wildlife Collection	Birds – 99 Other vertebrates – 55	Birds – 99 Other vertebrates – 55	Birds – 99 Other vertebrates – 55
Australian National Fish Collection	50	54	57
Australian National Herbarium	70	70	70

Demonstrated response to national events

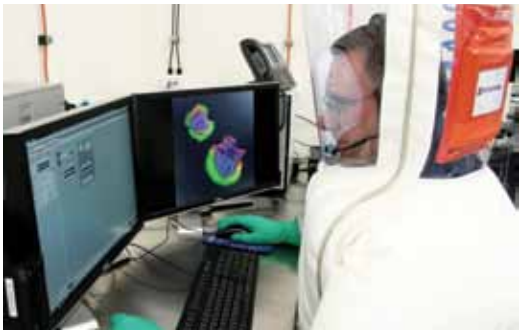
AAHL continued to ensure that all diagnostic testing met nationally agreed turn around and reporting timelines, with those involving exotic agents requiring a 24 hours or less response.

During the reporting year, some 48,500 tests were conducted on around 31,000 samples. There was an unprecedented increase in the number of cases of Hendra virus in horses in New South Wales and Queensland, with more incidents recorded this year than the total of all previous cases combined.

2011–12 also saw the first recorded cases of Pigeon Paramyxovirus in Australia, where AAHL provided rapid diagnostic capabilities.

Scientific contributions in support of research

This section highlights some of the high-quality scientific contributions made by the National Facilities and Collections in 2011–12.



Dr Glenn Marsh working at the highest level of biosecurity at AAHL.

Confetti cannons fire in celebration of the Parkes Observatory 50th Anniversary.

AUSTRALIAN ANIMAL HEALTH LABORATORY

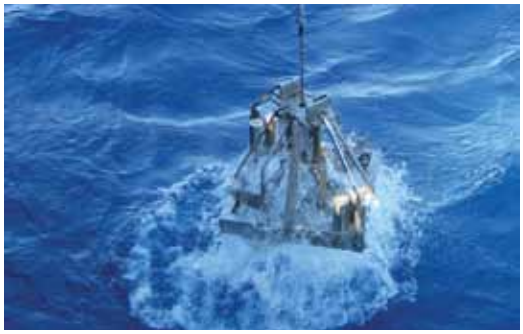
AAHL continues to develop capabilities and partnerships for best managing the risks from infectious agents to livestock, people and our environment. It does this by providing access to its world-class high containment facility to Australian researchers. Currently, infectious disease experts from Deakin University are partnering with AAHL to utilise the unique infrastructure and cutting-edge technology that AAHL offers.

During 2011–12, AAHL scientists produced a new experimental vaccine to protect horses against the deadly Hendra virus. AAHL is now working closely with a commercial manufacturer to prepare for large-scale production of the vaccine for wide spread use. If trials and evaluations are successful, the vaccine could be available for limited field trials by late 2012, with a target of 2013 for final release.

AUSTRALIA TELESCOPE NATIONAL FACILITY

The Parkes Telescope, one of the ATNF's suite of telescopes, celebrated its 50th birthday in October 2011, with the occasion marked by a symposium highlighting five decades of scientific research. The Parkes Observatory also hosted the annual Radio School, with a week of lectures and hands-on observing experience for the next generation of telescope users.

Observations made with the Parkes Telescope were used to infer the existence of a 'diamond planet', a planet almost certainly crystalline in nature, in our galaxy, which attracted considerable media interest.



Sediment grab sampler being retrieved on the *Southern Surveyor*.

The ANIC Collection Manager, Dr Beth Mantle, viewing specimens of the Ulysses butterfly, *Papilio ulysses*.

MARINE NATIONAL FACILITY

The Marine National Facility research vessel, *Southern Surveyor,* deployed deep water moorings off the coast of Brisbane to enable the long-term monitoring of the Eastern Australian Current. The data collected will be crucial for climate model development and understanding Australia's changing marine environment.

Deep water moorings were also deployed off the south coast of Tasmania, to measure carbon dioxide exchange between the air and the ocean and its movement within the Southern Ocean – an ocean that is recognised as an important driver of regional and global climate. This provides essential information to understand past and projected future climate states and inform responses to climate change.

On a voyage off Western Australia, where Australia separated from India during the eastern Gondwana breakup, scientists mapped previously unexplored seafloor to provide insights into its geological history and deep earth resources. Exciting results included the discovery of an underwater micro-continent, a fragment of the breakup process.

AUSTRALIAN NATIONAL INSECT COLLECTION

During 2011–12, the ANIC conducted, in collaboration with researchers from the Barcode of Life, Canada, a 'barcode blitz' on butterflies and moths, where DNA was extracted and analysed from over 28,000 specimens. This represents over 8,000 species. Despite an average age of 30 years, DNA sequences were recovered from more than 95 per cent of specimens, providing the first continent-wide data set for a mega-diverse insect group in Australia. These findings have proved that the existence of natural history collections are valuable for fast-tracking the development of comprehensive DNA barcode libraries.

***Eucalyptus recurva,* an intriguing endangered species from south-eastern New South Wales. Image: Mike Crisp**

AUSTRALIAN NATIONAL HERBARIUM

A major research focus for the Herbarium has been integrating evolutionary and geographic information to improve conservation decision-making.

We have developed methods to identify areas of high biodiversity significance in Australia, focusing on wattles, eucalypts, orchids, ferns and mosses. Working with government agencies, we are assessing how well biodiversity is represented in nature reserves across Australia, and the impacts of intensified cropping on biodiversity patterns in the 'high rainfall zone', from Townsville in Queensland, to Tasmania and south-west Western Australia.

The Tawny-crowned Honeyeater *Glyciphila melanops* was a key species in a recent ANWC study. Image: Lynn Pedler

AUSTRALIAN NATIONAL WILDLIFE COLLECTION

The ANWC continues its innovative analyses of DNA sequences from native birds. These analyses help us to understand how various species have evolved in their particular niches in Australia's harsh environments. They also continue to deepen our understanding of how and when evolutionary connections have been formed and broken between birds in Australia and New Guinea.

Saumarez Gurnard *(Pterygotrigla saumarez),* a new species described in 2012 using ANFC specimens.

AUSTRALIAN NATIONAL FISH COLLECTION

The ANFC contributes significantly to the understanding and management of Australia's marine biodiversity, providing essential expertise to the National Research Flagships Program. As part of *The Atlas of Living Australia* and the Wealth from Oceans Flagship, CSIRO's Photographic Index of Australian Fishes and marine bioregionalisation initiatives, have been used to create an on-line mapping and identification tool for Australian marine fishes (about 4,500 documented species). When released in late 2012, this tool will enable users to create customised, illustrated species lists for any region of Australia's marine jurisdiction.

Program 5 – Science and Industry Endowment Fund

SIEF – objectives and deliverables

The Science and Industry Endowment Fund (SIEF) is a separately constituted trust under the *Science and Industry Endowment Act 1926* and makes strategic investments in scientific research for the purpose of supporting scientific and industrial research for the benefit of Australia and its people.

The SIEF makes strategic investments in scientific research that addresses issues of national priority for Australia. The Fund invests in science that contributes to Australia's sustainable future such as:

- fundamental research for sustainable resource use, environmental protection and community health
- tactical research addressing solutions to national challenges
- collaborative research that brings together organisations capable of working together on solutions to national challenges
- scholarships that create and sustain young researchers capable of addressing national challenges.

Recognising that science has been, and will be, a key driver of the economic, industrial, environmental, and cultural development of Australia, the SIEF invests in research that will contribute to the sustainable growth of Australia.

The Chief Executive of CSIRO, Dr Megan Clark, is the Trustee of the Fund. Dr Clark is assisted by the SIEF Advisory Council, which provides independent advice and recommendations to the Trustee in relation to the making of grants and funding of proposals out of the assets of the SIEF. The Fund is managed by CSIRO on behalf of the Trustee.

Funding is awarded by the Trustee, with advice from Australian and international experts, to proponents from across the National Innovation System. Some of the programs are operated on a competitive basis, and others are operated by invitation on the basis of identified needs of the Australian science community.

The SIEF delivers funding via a number of programs:

- Research Project grants (competitive)
- Research infrastructure grants
- Special research program grant (Synchrotron science)
- Joint chair appointment (CSIRO/Macquarie University)
- Research fellowships/scholarships (competitive).

SIEF – Program performance

The performance of SIEF is assessed through four performance indicators. Table 2.19 provides a summary of progress. More detailed analysis follows the Table.

TABLE 2.19: PERFORMANCE INDICATORS FOR PROGRAM 5 – SIEF[1]

KEY PERFORMANCE INDICATOR	PERFORMANCE
Proportion of projects involving research in National Research Priority areas	100% Research Projects 76% Promotion of Science
Number of publications from SIEF projects	79
Proportion of projects involving more than one organisation	more than 85%
Financial contributions of partners	approximately 57%

1 For all projects awarded as at 30 June 2012.

Key performance indicators for SIEF have been chosen to address the objectives of the early stages of this program. New performance indicators will be added in the future as the programs mature.

Proportion of projects involving research in national research priority areas

A key selection criterion for all funded programs is addressing national challenges. This criterion is given greater emphasis for the more substantial Research Projects grants (resulting in 100 per cent alignment with national research priority areas). Some latitude is applied in relation to the SIEF Promotion of Science programs, which primarily consists of smaller grants for scholarships and fellowships. This program emphasises support of early career researchers in areas of Australian strength, such as astronomy.

Number of publications arising from SIEF-funded projects

Publications are a trailing indicator of progress. As SIEF-funded Research Projects generally have a three to five year lifespan and most have commenced relatively recently (many within the 2011–12 reporting period), this metric is expected to increase in future years as projects mature and outcomes are documented.

Proportion of projects involving more than one organisation

Collaboration is another key (but not mandatory) selection criterion for all funded projects. Ten of the 12 SIEF-funded Research Projects are collaborations, with later selection Rounds (Round 3) all having multiple partners involved. The number of partners for all Research Projects range between one and seven (average three). Strong collaboration can be seen in the scholarships and fellowships programs with 93 per cent of scholars/fellows having co-supervisors from more than one organisation.

Financial contributions of partners

Commitment to SIEF collaborations can be seen by cash and/or in-kind co-contributions by grant recipients. For all awarded Research Projects, the average co-contribution by collaborators is 58 per cent of total expenditure (approximately $11 million average total expenditure per Research Project). The average co-contribution towards consumables, travel expenses, access to facilities for scholarship and fellowship grants is 42 per cent, which is in addition to time commitments by supervisors.

Intellectual property and equity portfolio

Intellectual property management and licensing

CSIRO manages its intellectual property (IP) using the framework provided by the *Statement of IP Principles for Australian Government Agencies*. This ensures effective identification, protection, ongoing management and exploitation of IP.

During 2011–12, the portfolio experienced growth and change across most IP categories (see Table 2.20). In particular, foreign plant breeder's rights increased significantly by 45 per cent. CSIRO remains Australia's largest patent holder and is proactive in seeking partners to commercialise its IP.

CSIRO executes around 80 new commercial licenses every year, many of these licenses are with small-to-medium enterprises (SMEs). Of the total 4,071 IP registrations and applications (including patents, trade marks, designs and plant varieties), 1,815 are either involved in commercial license arrangements or utilised in collaborative activity with third parties.

TABLE 2.20: CSIRO INTELLECTUAL PROPERTY BY TYPE

IP CATEGORY[1]	SUB CATEGORY	2007–08	2008–09	2009–10	2010–11	2011–12
Patents	Current PCT[2] applications	111	97	90	101	98
	Granted	1,933	1,625	1,630	1,631	1,649
	Live cases	3,787	3,710	3,379	3,370	3,582
Inventions	Patent families	741	743	712	709	728
	New	67	80	99	92	95
Trade marks	Australian	291	265	263	259	275
	Foreign	113	130	114	109	81
Plant breeder's rights	Australian	122	122	122	122	83
	Foreign	25	25	21	21	39
Registered designs	Australian	2	2	2	2	3
	Foreign	11	10	10	10	8

1 IP categories are defined in the glossary on page 185.

2 Patent Cooperation Treaty.

In 2011–12 Starpharma (ASX:SPL) reached a milestone of $500 million estimated market value. Starpharma was founded on technology originally discovered at the Biomolecular Research Institute, a joint venture between CSIRO and the Victorian State Government. Starpharma is Australia's third largest publicly listed biotechnology company. Having developed and commercialised dendrimer technology (a type of synthetic nanoscale polymer), Starpharma has grown to become one of Australia's biotechnology success stories. Its lead product, VivaGel, is currently in Phase 3 trials for treatment of bacterial vaginosis, and the company also has dendrimer development programs in both drug delivery and agrochemicals that are producing promising results.

To support the growth of the IP Portfolio, CSIRO places significant focus on strategic engagements and collaboration with industry partners. In 2007, CSIRO established the Australian Growth Partnership (AGP) program to increase engagement with Australian SMEs. The AGP program provides funds to high potential, technology-receptive SMEs so they can access CSIRO research and development capability and IP. It is designed to be mutually beneficial by assisting SMEs to overcome existing technical issues, while contributing to CSIRO's National Research Flagships Program. As at 30 June 2012, six SMEs were engaged in the AGP program.

Equity portfolio

2011–12 was a challenging year for CSIRO's equity portfolio. The total value of CSIRO's equity portfolio at 30 June 2012 was $17.1 million across listed and unlisted companies. Based on our shareholdings, this translates into a market capitalisation of approximately $832 million. Revenues from these companies added approximately $120 million to Australia's gross domestic product and employed 279 people.

CSIRO's overall total equity portfolio decreased significantly from 30 June 2011. Major contributing factors were the decrease in value of listed companies due to ongoing unfavourable market conditions and the declining shareholding value of a number of the unlisted portfolio companies. There have been no new spin-out companies formed during 2011–12, however, as Table 2.21 indicates, some of the portfolio companies have raised funds from the capital markets during the year to help fund ongoing commercialisation activities.

CSIRO directly creates new high technology SMEs through spinning out IP when that is deemed to be the best available pathway to commercialisation. CSIRO currently has interests in 34 companies. The broader impact of CSIRO's recent spin-out companies on the economy has been estimated as nearly $1 billion in market capitalisation.

TABLE 2.21: PORTFOLIO MOVEMENTS AND ACTIVITY DURING 2011–12

ACTIVITY	NUMBER OF COMPANIES	VALUE ($M)
Companies created	0	0
New capital raised[1]	5	60.35
New CSIRO equity contributions	7	2.76
Wound-up	1	0

1 Capital raised from all sources by companies within the portfolio.

Awards and honours

Outstanding performance in research is recognised by various international and national award schemes. Here are just a few examples of awards and honours granted in 2011–12 that demonstrate our effectiveness in research and its application in industry and the community.

Order of Australia

OFFICER (AO)

Dr Tom Denmead (Land and Water Fellow) for distinguished service to environmental research in the fields of crop and soil sciences, physical ecology and micrometeorology, and through the development of improved agricultural practices.

Mr Simon McKeon (CSIRO Board Chairman) for distinguished service to business and commerce through leadership and advisory roles, and to the community as a supporter of national and international charitable, educational and sporting organisations.

Dr Richard Miln Smith (formerly Human Nutrition) for distinguished service to scientific research in the fields of human nutrition, cardiovascular disease and agriculture, to Indigenous communities in rural and remote areas, and to professional organisations.

MEMBER (AM)

Mr Edward (Ted) Edwards (Ecosystem Sciences Fellow) for service to science in the field of entomology, particularly moths and butterflies, as an author and researcher, and as a mentor.

Dr Glen Kile (former Chief of Forestry and Forest Products) for service to forest science, biosecurity and sustainable forestry through research, leadership and management.

Dr Graham Sparrow (Process Science and Engineering Fellow) for service to mineral chemistry and to the mining industry as a research scientist and project manager in the development of metallurgical processes for upgrading Australia's mineral resources.

MEDAL (OAM)

Dr Brian Cooke (formerly Ecosystem Sciences) for service to conservation and the environment through biological management programs for rabbit population control.

PUBLIC SERVICE MEDAL (PSM)

Dr Michelle Storey (Square Kilometre Array) for outstanding service in supporting CSIRO's radio astronomy objectives and working with the Australian, Western Australian and New Zealand Governments in their bid to host the future Square Kilometre Array radio telescope project.

PRIME MINISTER'S SCIENCE PRIZE

Dr Ezio Rizzardo (Materials Science and Engineering) and **Professor David Solomon** (University of Melbourne, formerly CSIRO) were recognised for their long and distinguished research careers that led to a revolution in polymer science, profoundly impacting the level of control we have over polymer structure and function (more on page 55).

AUSTRALIAN MUSEUM EUREKA PRIZES 2011

Dr John Arkwright (Materials Science and Engineering) was awarded the Eureka Prize for Innovative use of technology for the creation of a fibre-optic catheter that is opening up new paths for the advanced treatment of colonic diseases and conditions.

Dr Wojciech (Voytek) Gutowski (Materials Science and Engineering) was awarded the Eureka Prize for Commercialisation of Innovation for developing the first true zero-waste coating technology that completely eliminates solid and liquid waste, volatile organic chemicals and the use of water in a range of industries that led to powder-coat products.

Winners of the Chairman's Medal: the Cotton Breeding and Biotechnology Team (left to right) Mr Simon McKeon AO (Chairman, CSIRO Board), Ms Jackie Oliver, Ms Kellie Cooper, Ms Kay Smith, Mr Chris Tyson, Ms Sandra Magann, Mr Scott McCarron, Ms Judith Gaudron, Mr David Shann, Dr Greg Constable, Dr Warwick Stiller. Absent: Mr Chris Allen, Mr Max Barnes, Mr Deon Cameron, Ms Dee Hamilton, Ms Ammie Kidd, Mr Sam Lee, Dr Shiming Liu, Dr Danny Llewellyn, Mr Tom O'Connor, Ms Judy Radik, Mr Peter Reid, Ms Marilyn Smith, Ms Megan Smith and Ms Rebecca Warnock. Image: Simon Ferrito

CSIRO CHAIRMAN'S MEDAL

The Chairman's Medal honours the most exceptional research in CSIRO and is awarded to the scientist or team whose research is of national or international importance in advancing scientific knowledge, technology application or commercialisation.

The winners of the *2011 Chairman's Medal* were **Dr Greg Constable** (team leader) and the **Cotton Breeding and Biotechnology Team**. The team received the award in recognition of the major impact achieved on Australia's cotton production due to the breeding and deployment of a new cotton variety.

Further information on CSIRO Awards can be found at: **www.csiro.au/CSIROChairmansMedal**

THE CSIRO MEDAL FOR LIFETIME ACHIEVEMENT

The CSIRO Medal for Lifetime Achievement is awarded to individuals who have a record of sustained and meritorious achievement over a prolonged period of CSIRO service.

The 2011 winner was **Dr Trevor Bird** (ICT Centre) for his inspirational leadership and outstanding technical contributions to the international satellite industry and radio astronomy. In particular, for design techniques and innovations for multibeam antennas now employed in both applications world-wide.

Part three
our organisation

Part three: Our organisation

Management and accountability

OPERATING MODEL

CSIRO's Operating Model underpins the governance of the Organisation by defining the roles, relationships and accountabilities of leaders and operating units. It includes our processes for planning, investment, review and reporting, and outlines CSIRO's Policy Framework.

The Model is complemented by the CSIRO Code of Conduct. The Code aligns with our Values Compass and sets the standard for behaviour expected of CSIRO and of everyone working in CSIRO. It forms a key component of our staff induction programs.

Further information on the Operating Model and the Code of Conduct can be found at: **www.csiro.au/governanceoverview**.

LEGISLATION AND GOVERNMENT POLICY

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** are to:

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

Our **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.

Reporting, accountability and other rules for CSIRO's operations are set out in the *Commonwealth Authorities and Companies Act 1997* (CAC Act).

Pursuant to a service agreement, CSIRO provides administrative support services to the Trustee of the Science and Industry Endowment Fund consistent with the *Science and Industry Endowment Fund Act 1926*. The Fund has its own governance structure.

In October 2011, CSIRO submitted an annual Compliance Report to the Australian Government regarding the Organisation's compliance with the CAC Act and its financial sustainability.

General policies of the Australian Government that applied to CSIRO in 2011–12 under Section 28 of the CAC Act are: Commonwealth Fraud Control Policy; Australian Government Foreign Exchange Risk Management Guidelines; and Outsourcing of Information Technology Infrastructure Services. In addition, CSIRO has complied with the Commonwealth Procurement Guidelines as they apply to CSIRO.

RESPONSIBLE MINISTER

In 2011–12, the Ministers responsible for CSIRO were Senator the Hon Kim Carr, Minister for Innovation, Industry, Science and Research till December 2011 followed by Senator the Hon Chris Evans, Minister for Tertiary Education, Skills, Science and Research.

Under the SIR and CAC Acts, the Minister has power to:

- add to the purposes for which CSIRO may carry out scientific research (SIR Act, section 9)
- 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 (SIR Act, section 13).

The Minister's Statement of Expectations and the Board's Statement of Intent can be found at: **www.csiro.au/resources/Statement-of-Expectations.html**.

The Public Research Agency Charter, signed by the Minister and the Board, provides guidance to CSIRO and its researchers on providing scientific advice and engaging in public debate. The Charter can be found at: **www.csiro.au/resources/pf1lc.html**.

The Government has approved CSIRO's funding for the 2011–12 to 2014–15 period and the Quadrennium Funding Agreement confirming the terms of that funding should be signed in the third quarter of 2012.

MINISTERIAL DIRECTIONS AND NOTIFICATIONS

No new directions were received in 2011–12. The CSIRO 2011–14 Enterprise Agreement was developed in accordance with the Minister's direction regarding compliance with the Australian Government Employment Bargaining Framework.

Twenty-one notifications of significant events under Section 15 and 16 of the CAC Act were made to the Minister during 2011–12. These related to participation in research centres and alliances, licence agreements, equity transactions and major research and infrastructure projects.

CSIRO Board

CSIRO is governed by a Board which is responsible to the Australian Government for the overall strategy, governance and performance of the Organisation.

The CSIRO Board comprises nine part-time, non-executive members including the Chairman plus a full-time Chief Executive. All non-executive members are appointed by the Governor-General. The Chief Executive is appointed by the CSIRO Board, in consultation with the Minister.

The CSIRO Board operates partly through three standing committees:

- Board Audit Committee
- Board Commercial Committee
- Board Nominations and Remuneration Committee

In response to a performance review in 2011, the Board implemented a range of improvements and reviewed its charters. It decided to close the Board Endowment Committee in June 2011 and the Board Commercial Committee in June 2012. Their responsibilities will be subsumed by the Board. From July 2012, the importance of overseeing risk and health and safety will be recognised by reconstituting the remaining committees as a Board Audit and Risk Committee and Board People, Health and Safety Committee.

Disclosure of interests by Board members and the Chief Executive are made in accordance with the SIR Act and CAC Act, as appropriate.

Details of the 2011–12 Board members, including qualifications and terms of appointment are on page 82. Details of remuneration, membership of Board Committees and attendance at meetings are shown on pages 147–148 in the Financial Statements. The Board Charter and membership profiles are available at: **www.csiro.au/boardoverview**.

Newly appointed Board members are informed of their responsibilities and rights through a formal induction process. 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.

CSIRO Executive Management

The Chief Executive conducts the affairs of the Organisation in accordance with the strategy, plans and policies approved by the Board and the Board Directions to the Chief Executive.

The Chief Executive is supported by the Executive Team. As a team and through their individual roles, the members lead, direct, coordinate and control CSIRO's operations and performance. Details of the members are on page 83.

The Executive Team is assisted by the Science Sub-committee, Flagship Oversight Committee and Commercial Executive Committee. The CSIRO Health, Safety and Environment Committee is accountable to the Chief Executive. In 2011 a Precinct Oversight Committee was also formed to steer the implementation of that key element of the CSIRO strategy.

The Executive Management Council of senior managers provides a forum for sharing and discussing issues relating to the management and future strategy for CSIRO.

POLICIES, STANDARDS AND PROCEDURES

The CSIRO Policy Framework comprises policies, standards and procedures. It is supported by the CSIRO Delegations and Authorities Framework.

The policy statements, approved by the Board, cover the Organisation's commitment in relation to:

- Science and Delivery
- People
- Governance
- Risk
- Health, Safety, Environmental Sustainability and the Community.

The statements are available at: **www.csiro.au/org/Key-policy-statements.html**.

In 2011–12 there was a comprehensive review of all human resources procedures; finance; procurement and property procedures; and intellectual property (IP) and commercial procedures.

Other standards and procedures introduced or amended this year include:

Standards

- Major projects
- IP and licensing

Procedures

- Advisory committees
- Australian Growth Partnerships
- Aviation safety and small boats safety
- Individual flexibility arrangements
- Mobile devices
- Major projects
- Platform IP management

In June 2012, the Delegations and Authorities Framework was amended to further support CSIRO's Operating Model. The framework aligns delegations more closely with roles and responsibilities, provides more flexibility, streamlines and improves the clarity of the delegation schedules, tightens some controls and reduces administration.

PLANNING AND MONITORING PERFORMANCE

The implementation of a new Strategic Plan for the period 2011–15 was a major focus for the Organisation in 2011–12. (see: **www.csiro.au/resources/CSIRO-Strategy-2011-2015.html**)

The plan conveys the broad objectives for the Organisation, and sets out the broad policies and strategies to be pursued to achieve those objectives. In brief, the strategy emphasises CSIRO's intent to maintain its focus on addressing national challenges and opportunities through an enhanced program of National Research Flagships, and to continue developing Australia's scientific capability and preparedness by investing in the people and infrastructure required to meet current and future challenges.

Within the context provided by the Strategic Plan, CSIRO's portfolio of research is decided through a science investment process that is guided by the twin imperatives of seeking relevance and impact for Australia.

The actions to achieve the strategic objectives and investment priorities are described in the annual CSIRO Operational Plan (see: **www.csiro.au/operational-plan**).

Performance is reported against annual key executive actions, the Strategic Plan Enterprise Strategy Measures, CSIRO's Portfolio Budget Statements and other internal performance indicators.

In addition, our Divisions and Flagships are subject to regular review by panels chaired by independent experts who assess the strength of our capability, as well as the relevance and impact of our research. The quality of our research is subject to scientific peer review mechanisms and the Chief Executive conducts an annual review of all research portfolios, Divisions and functional areas.

ADVISORY MECHANISMS

CSIRO's Strategic Advisory Committees provide advice on CSIRO's longer-term strategic directions and research and development priorities and on how CSIRO can meet the research, technical and business needs of customers or communities. Whilst the Flagship Advisory Committees, established for each Flagship, focus on how to maximise the effectiveness of the Flagship portfolio to achieve its goals. The Committees comprise representatives from industry, government, non-government organisations and other stakeholders.

Committee details can be found at: **www.csiro.au/SAC** and **www.csiro.au/FAC**.

RISK MANAGEMENT

CSIRO's Risk Policy recognises that the identification and management of risk is central to delivering the functions of CSIRO and delivering benefits to Australia.

CSIRO's risk management framework provides the methodology by which CSIRO's risk profile is articulated and regularly updated. It also sets out the responsibilities of all individuals across CSIRO, including the Board and management for identifying and managing risk.

Risks are managed on an enterprise basis through mitigation strategies that include, in appropriate circumstances, insurance to transfer the financial impact of risk.

General insurance including General Liability and Professional Indemnity insurance and Directors and Officers Liability insurance is through Comcover. CSIRO's workers' compensation liability is covered by a premium paid to Comcare.

EXTERNAL AUDIT AND INTERNAL CONTROLS

Assurances about the Organisation's financial state of affairs, compliance issues and control environment are provided through a range of processes including internal Audit and Security functions, compliance reporting by senior managers and the operation of a Whistleblower Scheme. External audit is provided by the Australian National Audit Office.

CSIRO complies with Commonwealth Fraud Control Guidelines (revised 2011). A Fraud Risk Assessment was completed in February 2010 and an updated Fraud Control Plan incorporating guideline amendments was released in September 2011.

The CSIRO Strategic Protective Security Risk Assessment was updated in February 2009 and is currently under review. As a result of the release of the Commonwealth Protective Security Policy Framework in June 2010, a CSIRO wide Security Committee has been established chaired by General Counsel. This Committee will oversee and endorse all changes to security policies and procedures with CSIRO. A review of security within CSIRO is currently underway and is expected to be completed by October 2012.

Board membership 2011–12 *(From L to R)*

CHIEF EXECUTIVE
Dr Megan Clark
BSc (Hons) PhD Hon DSc Hon DApSc FTSE GAICD
1 January 2009 – 31 December 2013

MEMBER
Professor Peter Høj
MSc PhD DUniv (honoris causa) FTSE
Vice Chancellor and President
University of South Australia
7 December 2011 – 6 December 2014

MEMBER
Dr Eileen Doyle
BMath (Hons) MMath PhD FAICD
Company Director
15 February 2006 – 14 February 2016

MEMBER
Dr Don Russell
BEc (Hons) MEc PhD CFA
Secretary, Department of Industry, Innovation, Science, Research and Tertiary Education
19 October 2011 – 8 February 2016

MEMBER
Ms Mary Boydell
BCom FCA
Company Director
26 June 2009 – 25 June 2014

CHAIRMAN
Mr Simon McKeon AO
BCom LLB FAICD
Company Director
28 June 2010 – 27 June 2015

MEMBER
Mr Hutch Ranck
BSc Economics FAICD
Company Director
1 May 2011 – 30 April 2016

MEMBER
Ms Shirley In't Veld
BCom LLB
Company Director
28 June 2012 – 27 June 2015

MEMBER
Professor Tom Spurling AM
BSc (Hons) PhD FRACI FTSE
Research Professor
Swinburne University of Technology
1 May 2008 – 30 April 2012
Reappointed 28 June 2012 – 27 June 2015

DEPUTY CHAIRMAN *ABSENT*
Dr Terry Cutler
BA (Hons) PhD Hon DUniv FAHA FIPA
Principal
Cutler and Company Pty Ltd
25 July 2002 – 24 July 2012

MEMBERS *ABSENT*
Professor Ian Chubb AC
MSc DPhil Oxon Hon DSc
Chief Scientist of Australia
7 August 2008 – Resigned 8 December 2011

The Hon John Kerin AM
BA BEc Hon DScAgr Hon DSc Hon DLitt FTSE FAIAST
Company Director
3 October 2008 – 2 October 2011

Executive Team membership 2011–12 *(From L to R)*

Mr Craig Roy
BSc MSc MBA FAICD
Deputy Chief Executive, Science Strategy and People

Dr Calum Drummond
BSc (Ed) BSc (Hons) PhD
Group Executive, Manufacturing, Materials and Minerals

Ms Hazel Bennett
BSc (Hons) ACA FAIM
Chief Finance Officer

Dr Andrew Johnson
BAgrSc (Hons) PhD MPA
Group Executive, Environment

Dr Tom Hatton PSM
BSc MSc PhD
Group Executive, Energy (from April 2012)

Dr Alastair Robertson
BSc (Hons) PhD FRSC CChem FIFST
Group Executive, Food, Health and Life Science Industries

Dr Megan Clark
BSc (Hons) PhD Hon DSc Hon DApSc FTSE GAICD
Chief Executive

ABSENT
Mr Rod Bloom
BA
Acting Executive Director, Development (from March 2012)

Mr Nigel Poole
LLB BCom FAICD
Acting Group Executive, Information Sciences (from March 2012)

Mr Mike Whelan
BEc
Deputy Chief Executive, Operations

Dr James Bradfield Moody
BInfoTech (Hons) BEng (Elec) PhD
Executive Director, Development (to March 2012)

Dr Beverley Ronalds
BE (Civil)(Hons) MSc PhD FIEAust FICE FTSE FAICD
Group Executive, Energy (to March 2012)

Dr Alex Zelinsky
BMaths (Hons) PhD FTSE FIEEE FAICD FIEAust
Group Executive, Information Sciences (to March 2012)

Executive Team profiles are available at:
www.csiro.au/executiveteam

Health and safety

CSIRO is committed to the health and safety of its staff and recognises the importance of positive interventions aimed at improving staff health and safety. CSIRO acknowledges its responsibilities under Section 74 of the *Occupational Health and Safety Act 1991* and the *Work Health and Safety Act 2011*.

HEALTH, SAFETY, ENVIRONMENTAL SUSTAINABILITY AND COMMUNITY POLICY

CSIRO's Health, Safety, Environmental Sustainability and Community Policy reflects our commitment to ensuring the safety and wellbeing of our staff, visitors and the communities in which we work. It reinforces our Health, Safety and Environmental (HSE) strategic goal of '*Striving for Zero Harm*' to our people, the environment and the communities in which we operate.

The *Occupational Health and Safety Act 1991* was rescinded on 31 December 2011 and replaced by the *Work Health and Safety Act (Commonwealth) 2011* which became effective on 1 January 2012. A summary of CSIRO's performance and its compliance with these Acts is provided below.

HEALTH AND SAFETY MANAGEMENT ARRANGEMENTS

Health and safety management arrangements are documents concerning the management of health and safety in CSIRO, and are one of the mechanisms by which CSIRO demonstrates commitment to meeting its duty of care.

In recognition of this duty, CSIRO developed these health and safety management arrangements in consultation with staff and their representatives. The Act emphasises consultation and cooperation between employers and employees in regard to occupational health and safety issues by requiring the establishment of a framework incorporating:

- health and safety management arrangements (HSMAs)
- designated work groups
- health and safety representatives
- health and safety committees
- dispute resolution processes.

These structures and arrangements are in place and effective within CSIRO. A review of the HSMAs in line with the expected changes to Workplace Health and Safety laws commenced in June 2011 and was completed in September 2011.

INITIATIVES UNDERTAKEN DURING THE YEAR TO ENSURE THE HEALTH, SAFETY AND WELFARE AT WORK OF STAFF MEMBERS AND AFFILIATES

- An HSE supervisors training program was introduced.
- A safety leadership training program for CSIRO's top 250 leaders was implemented.
- Contractor training, electrical safety training, and incident and investigation programs were deployed.
- A gas safety review was finalised.
- A freezer safety review was finalised.
- A hazardous substances gap analysis was carried out.
- A quad bike safety survey was conducted.
- New work health and safety laws were incorporated into internal procedures.
- An aviation safety procedure was developed.
- A small boat safety procedure was developed.
- Safe travel and work overseas guidelines were deployed.
- Safe overseas travel by staff was enhanced through a staff international travel system upgrade.
- Divisional HSE risk profiles were updated.
- An on-line health and wellness program was piloted.

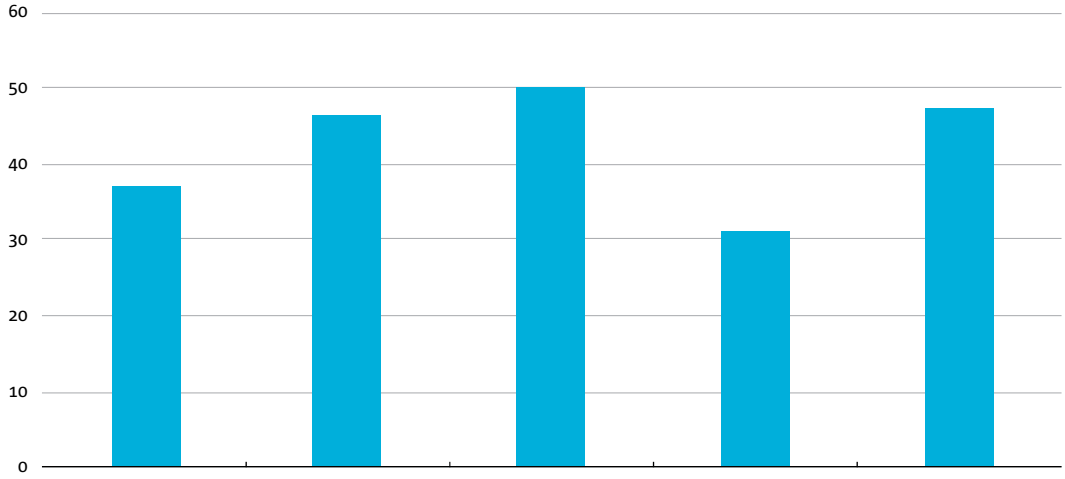
STATISTICS OF ANY ACCIDENTS OR DANGEROUS OCCURRENCES DURING THE YEAR THAT AROSE OUT OF THE CONDUCT OF UNDERTAKINGS BY CSIRO THAT REQUIRED THE GIVING OF NOTICE UNDER SECTION 68 (SEE FIGURE 3.1)

- A significant change in the method for classifying lost time injuries (LTIs) and medical treatment injuries (MTIs) commenced in 2010–11 to ensure reliable, accurate, standardised injury classification. CSIRO is now in the process of re-establishing its injury performance baseline, hence LTI and MTI comparisons with data prior to 2010–11 are not considered meaningful (for more information see page 6).
- Fifty-three LTIs were reported during the year, resulting in an LTI frequency rate of 4.8.
- Eighty MTIs were reported during the year, resulting in an MTI frequency rate of 7.2.
- There were 47 Comcare Notifiable Incidents reported during the year. Comcare changed the definitions and requirements for Notifiable Incidents on 1 January 2012. Of the 47 incidents reported during the year, 28 were under the old definitions (pre 1 January 2012) and 19 came under the new requirements (post 1 January 2012).
- The number of workers' compensation claims with injury dates in the reporting period increased from 56 in 2010–11 to 60 in 2011–12.
- CSIRO's premium for 2011–12 was 0.47 per cent of payroll compared to the Commonwealth agency rate of 1.41 per cent.

DETAILS OF ANY INVESTIGATIONS CONDUCTED DURING THE YEAR THAT RELATE TO UNDERTAKINGS CARRIED ON BY THE EMPLOYER, INCLUDING DETAILS OF ALL NOTICES GIVEN TO THE EMPLOYEE UNDER SECTIONS 29, 46 OR 47 DURING THE YEAR

- There were no Prohibition Notices or Provisional Improvement Notices issued in 2011–12.
- There was one Improvement Notice issued by Comcare at the end of the 2011–12 reporting period. CSIRO is working with Comcare regarding the required improvements.
- There were 11 compliance monitoring interventions and one investigation of Notifiable Incidents conducted by Comcare in 2011–12. All were completed to Comcare's satisfaction.
- There were no notifiable environmental incidents in the reporting period.

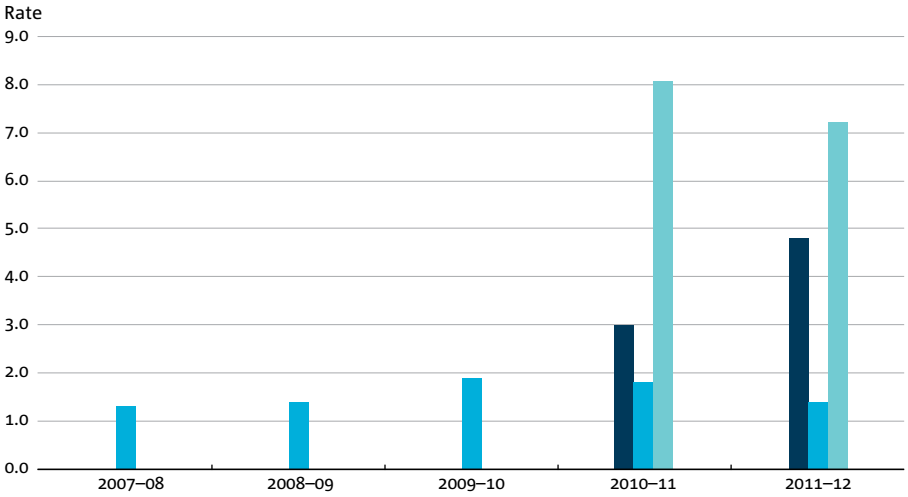
FIGURE 3.1: NUMBER OF NOTIFIABLE INCIDENTS



	2007–08	2008–09	2009–10	2010–11	2011–12
NI	37	46	50	31	47

During 2010–11, CSIRO re-established its injury performance baseline to ensure all injuries resulting in time lost from work, or where medical treatment has been necessary, are identified and correctly classified using international best practice criteria. The Comcare derived LTIFR in Figure 3.2 shows what CSIRO's lost time performance would have been if Comcare workers' compensation data was still used as the basis for measuring CSIRO's performance. We are seeing a decreasing LTIFR trend using historic Comcare derived data.

FIGURE 3.2: CSIRO LTIFR AND MTIFR AND COMCARE DERIVED LTIFR ANNUAL TRENDS



	2007–08	2008–09	2009–10	2010–11	2011–12
CSIRO LTIFR				3.0	4.8
COMCARE LTIFR	1.3	1.4	1.9	1.8	1.4
CSIRO MTIFR				8.1	7.2

Environmental performance

CONTRIBUTION TO ECOLOGICALLY SUSTAINABLE DEVELOPMENT

CSIRO upholds the principles of ecologically sustainable development (ESD) outlined in the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) through both its operations and research activities.

To achieve its research goals, CSIRO operates numerous types of infrastructure, such as laboratories, glasshouses, farm properties and telescope facilities, as well as managing plants and livestock. These activities require significant quantities of energy and water and produce waste. Examples of the work undertaken to support our ESD principles are set out in Table 3.1.

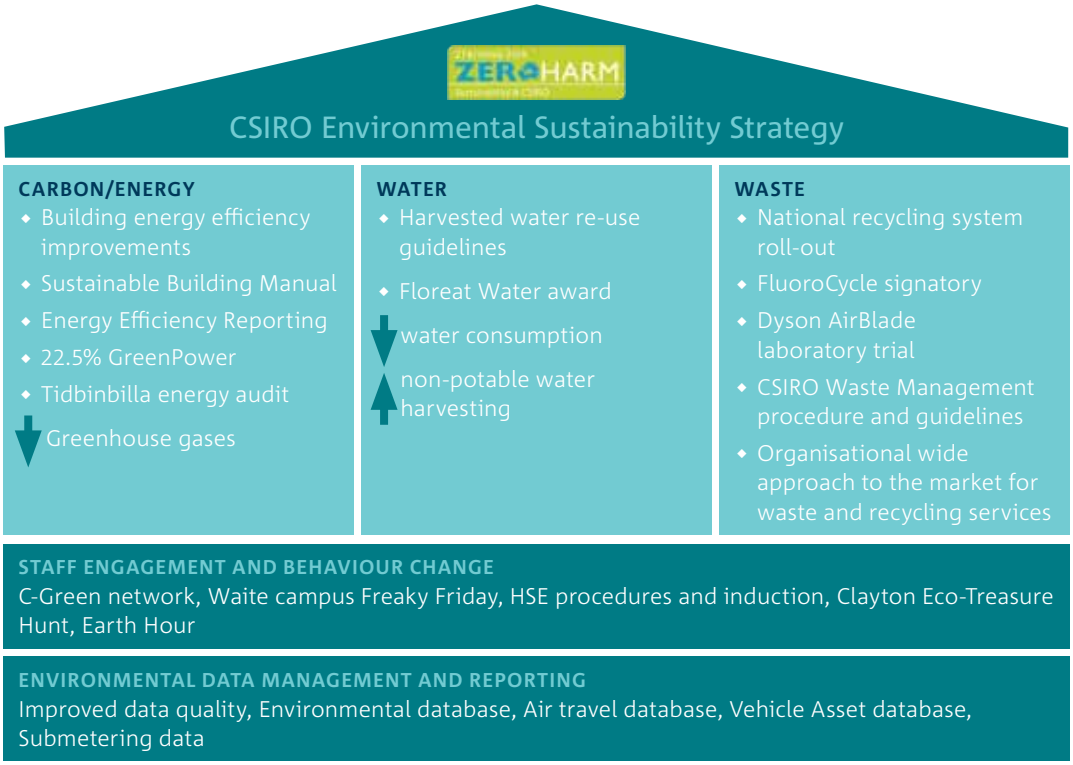
TABLE 3.1: EXAMPLES OF CSIRO'S CONTRIBUTION TO ESD PRINCIPLES

PRINCIPLES	EXAMPLES OF RELEVANT CSIRO WORK
Decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations.	CSIRO's Values Compass identifies health, safety and sustainability as key values that guide the way CSIRO undertakes its business activities. To reinforce these values, CSIRO introduced an updated Health, Safety and Environmental course for Leaders in 2011–12. The course assists managers understand the expectations that CSIRO places on its managers with respect to Health, Safety and Environmental leadership.
If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.	CSIRO published the first (Australian and global) guidelines for developing management plans in Indigenous Protected Areas (IPAs). An IPA is an area of Indigenous-owned land or sea where traditional owners have entered into an agreement with the Australian Government to promote biodiversity and cultural resource conservation. IPAs make a significant contribution to Australian biodiversity conservation and help Indigenous communities protect their cultural values for future generations and receive spin-off health, education, economic and social benefits. The research has been translated into a resource as part of the IPA Manager's toolkit on the Department of Sustainability, Environment, Water, Population and Communities website. *Our Country Our Way* is an illustrated guide that can be used by anyone interested in developing a management plan for an IPA.
The principle of inter-generational equity – that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations.	Our Healthy Water Ecosystems Theme, conducts research to inform the sustainable protection and rehabilitation of Australia's creeks, rivers, wetlands, floodplains and estuaries.
The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making.	In planning for the divesting of CSIRO's Highett site in Victoria, CSIRO is working with the Bayside City Council for the preservation and on-going maintenance of the Remnant Woodlands on the Highett site.
Improved valuation, pricing and incentive mechanisms should be promoted.	In 2011, CSIRO in collaboration with Aecom, investigated the impact of the Government's carbon price on the cost of living for Australian households. They found that the projected impact of the carbon price is within the range of changes in consumer prices and household cost of living, and that most households would receive assistance that offset all or a significant portion of the carbon price impact. More information about the findings of the report can be found at: **www.csiro.au/CarbonPriceCostOfLiving**

EFFECTS OF CSIRO'S ACTIVITIES ON THE ENVIRONMENT

During 2011–12, CSIRO continued towards achieving its Environmental Sustainability Strategy (ESS) goals, focusing on reductions in carbon emissions, mains water consumption and waste to landfill, as represented in Figure 3.3. The programs and initiatives also serve to increase alignment between CSIRO's sustainability-focused research and innovation, and how we operate in our daily work practices.

FIGURE 3.3: KEY ENVIRONMENTAL SUSTAINABILITY INITIATIVES IMPLEMENTED DURING 2011–12



CARBON/ENERGY

CSIRO continued to improve its energy-efficiency at its sites and to reduce its greenhouse gas emissions. In 2011–12, CSIRO undertook studies to identify options to reduce energy consumption, manage demand and reduce associated costs. CSIRO improved the energy-efficiency of its printers through a printer refresh and improved its understanding of energy consumption of selected data centres.

In November 2011, CSIRO conducted an Eco Treasure Hunt at our Clayton site, Victoria, to identify energy and water saving opportunities. The event resulted in positive engagement between a number of business units and their staff, service suppliers and General Electric as a strategic partner. The recommendations will contribute to the generation of national programs engaging staff in our carbon and water reduction targets, while also creating cost savings.

WATER

Reducing mains water consumption continues to be a focus, with on-going roll out and upgrades of bore and mains water sub-meters and leak detection programs. Opportunities to capture and reuse rainwater, reverse osmosis reject water and other non-potable water sources will be expanded in future years with the development of a water reuse guide that was commissioned in 2011–12.

STAFF ENGAGEMENT AND BEHAVIOUR CHANGE

During 2011–12, engaging staff in the Organisation's ESS was a major focus for CSIRO. A 'green' ambassador network, called C-Greens was developed to assist with the implementation of current and future ESS projects. The C-Green network consists of site-based CSIRO volunteers drawn from all staff levels and roles, representing geographical locations and business units.

WASTE

The C-Green network introduced green workplace recycling stations on most sites and has begun to engage staff at specific CSIRO sites in a sustainable laboratory program. Part of the program focuses on ovens, fridges and freezers to reduce our energy consumption.

To reduce our waste to landfill, CSIRO will source an organisation-wide solution for waste and recycling services, including hazardous waste in early 2012–13. This will assist the Organisation to reach its target of a 50 per cent reduction of waste to landfill.

A CSIRO Get Wasted Workshop was held in November 2011, to connect expertise and build networks across CSIRO. The workshop focused on research related to avoidance, minimisation and utilisation of waste in industrial and manufacturing processes, plus improved understanding of initiatives to achieve CSIRO's waste-related goal.

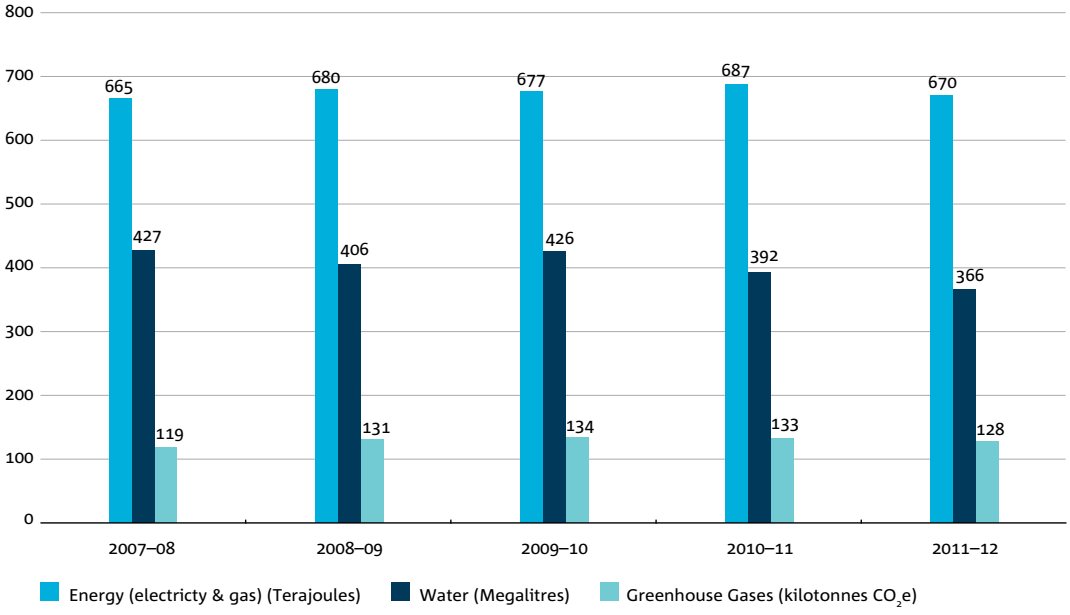
ENVIRONMENTAL REPORTING

CSIRO implemented an integrated environmental data management system to support ESS projects and to meet its external environmental reporting obligations, including submissions to the following programs: National Greenhouse and Energy Reporting Scheme; Government Greenhouse and Energy Reporting, Energy-Efficiency Opportunities program, the National Pollution Inventory and relevant National Environmental Protection Measures.

CSIRO ENVIRONMENTAL PERFORMANCE INDICATORS

CSIRO's electricity and gas consumption has remained relatively stable over the last five years (see Figure 3.4). Changes to CSIRO's property portfolio and implementation of energy-efficiency measures in the design or retrofit of infrastructure has enabled the Organisation to stabilise its energy consumption over that period. For example, on-going plant upgrades at sites such as the Australian Animal Health Laboratory, have resulted in a 20 per cent reduction at that site in the past five years.

FIGURE 3.4: CSIRO'S ENVIRONMENTAL PERFORMANCE



The slight reductions in electricity and gas consumption during 2011–12 resulted in a slight decrease in greenhouse gas emissions (four per cent) attributed to energy sources. CSIRO's net emissions decreased due to increased procurement of certified GreenPower purchased under its major electricity contracts.

CSIRO's air travel reduced slightly during 2011–12 compared to 2010–11, noting the large reduction in air travel that occurred in 2009–10. CSIRO remains committed to minimising the need for air travel through the on-going use of video-conferencing and webcam facilities.

Mains water consumption has trended down over the past five years, reducing by approximately seven per cent per annum. Over the past five years, CSIRO has achieved significant water reductions at specific sites, and was recognised by the Western Australian Water Corporation with a Bronze Certificate of Recognition for a sustained water reduction of 4,000 kilolitres (kL) over the past five years.

Additional Information on CSIRO's performance is shown in Table 3.2.

TABLE 3.2: CSIRO'S ENERGY, AIR TRAVEL AND WATER INTENSITIES

THEME	PERFORMANCE MEASURE	INDICATOR(S)	2007–08	2008–09	2009–10	2010–11	2011–12[1]
Energy	Consumption of green energy	Green energy purchased (TJ)	43	56	74	77	84
	Relative energy uses	Green energy purchased divided by the amount of electricity purchased	10%	13%	17%	18%	19%
		Amount of energy (electricity and gas) consumed per employee (gigajoule (GJ)/ FTE[2])	115	116	114	119	117
Air travel	Air travel	Air travel (million kilometres (km))	Not available		82	116	114
		Air travel per employee (km/FTE)	Not available		13,768	20,069	19,930
Water	Relative mains water use	Amount of total water use per employee (kL/FTE)	74	69	72	68	64

1 Data as at 10 August 2012.

2 FTE – Full time equivalent

Our people

CSIRO looks to its staff to support its values and to work in a collaborative and positive way to achieve the Organisation's mission and purpose. CSIRO seeks to attract the best minds and to be a place where creativity and innovation can flourish. We provide the environment, facilities and opportunities people need to respond to national challenges.

CSIRO's People Policy confirms our commitment to developing and supporting our staff, and CSIRO's Human Resources function provides support and leadership on people issues to leaders and staff across CSIRO. The goal is to develop high-performing teams working across the Organisation's boundaries. Two key themes are:

- nurturing CSIRO's innovative culture by fostering a safe environment where innovation, collaboration, flexibility and performance flourish
- working effectively and efficiently by using common systems, structures and improved processes to support CSIRO's operations.

ENTERPRISE AGREEMENTS

Enterprise Agreements set the terms and conditions of employment for CSIRO staff. Two Enterprise Agreements are in operation at CSIRO – CSIRO Enterprise Agreement 2011–14 (CSIRO EA) and the Canberra Deep Space Communication Complex (CDSCC) / Combined Unions Enterprise Agreement 2011 (CDSCC EA). The CSIRO EA was negotiated with relevant unions and staff bargaining agents. It came into operation on 7 July 2011 following formal approval processes and a staff vote. This Agreement will reach its nominal expiry date in August 2014. The CDSCC EA covers non-managerial CSIRO staff employed at CDSCC, Tidbinbilla, Canberra, and was negotiated with relevant unions. It came into operation on 8 July 2011 and will reach its nominal expiry date in July 2013.

Throughout 2011–12, CSIRO has used focus groups, reference groups and other qualitative methodologies to engage with staff in a focused, topic specific way. These activities provided valuable insights to support the development of CSIRO's 2011–15 Strategy.

LEARNING AND DEVELOPMENT

CSIRO's Enterprise Agreement provides all staff the opportunity to participate in at least five development days each year. This learning can be accessed through work experience, networking, coaching, mentoring, or through participation in formal programs.

CSIRO's Learning and Development formal programs are offered in three broad areas:

- Working in CSIRO
- Science in CSIRO
- Leading in CSIRO

Working in CSIRO helps individual staff members learn about CSIRO's processes and develops an individual's team skills. This year 164 programs were facilitated, for 1,778 participants, with an average participation rate of 70 per cent.

Science in CSIRO provides a range of programs from proposal writing, to data analysis through to project management, paper writing and presentation skills for scientists. This year 53 programs were facilitated for 821 participants, with a participation rate of 85 per cent.

Leading in CSIRO provides programs for new, experienced and high potential leaders. This year 24 high-potential leaders participated in the Leading the Research Enterprise program, 49 in the New Experienced Leader Program and 94 in the New People Leader Program. In total, CSIRO offered seven modularised leadership programs with a participation rate of 100 per cent. In addition, 145 new leaders accessed the Guidance for New Leaders eLearning suite available to support their transition to leadership at CSIRO.

DIVERSITY AND INCLUSION

During 2011–12, CSIRO developed a renewed Diversity and Inclusion Plan for implementation over the 2012–15 strategy period. The Plan builds on the foundations of past Plans and seeks to produce a step-change in our diversity and inclusion performance through enhanced leader responsibility, visibility and engagement.

CSIRO's Indigenous Engagement Strategy, which aims to increase Indigenous participation in CSIRO's research and development agenda and activities, continues to be progressed (see page 14–15). The Indigenous Employment Strategy aims to increase the employment of Indigenous peoples through the implementation of several new employment programs and targeted approaches. CSIRO's commitment is reflected in the CSIRO Enterprise Agreement.

STAFF DEMOGRAPHICS

CSIRO staff are employed under section 32 of the *Science and Industry Research Act 1949*. At 30 June 2012, CSIRO had a total of 6,492 staff, which has a full-time equivalent (FTE) of 5,720.

Table 3.3 shows the number of staff employed in different functional areas and Table 3.4 shows staff by state. Overall, the total number of staff decreased by 0.3 per cent (22) over the last 12 months. Research Science staff increased by 4.5 per cent (83). Voluntary staff turnover was at a record low of 4.24 per cent. The proportion of female staff in CSIRO increased from 39 to 40 per cent as did the proportion of female Research Science staff, increasing from 24 to 25 per cent (up from 21 per cent in 2007–08).

TABLE 3.3: STAFF NUMBERS (HEADCOUNT) AS AT 30 JUNE

FUNCTIONAL AREA	2007–08	2008–09	2009–10	2010–11	2011–12	% FEMALE FOR 2011–12
Research Scientists	1,727	1,837	1,907	1,865	1,948	25
Research Project Staff	2,246	2,215	2,241	2,166	2,094	43
Senior Specialists	13	13	15	12	11	27
Research Management	194	176	161	165	166	11
Research Consulting	29	26	34	40	42	14
Technical Services	542	545	630	643	613	12
Communication and Information Services	402	407	429	375	391	64
General Services	66	51	48	56	40	60
Administrative Support[1]	1,082	1,112	1,075	1,048	1,057	75
General Management	122	128	140	144	130	28
Total headcount	**6,423**	**6,510**	**6,680**	**6,514**	**6,492**	**40**
FTE	5,768	5,866	5,956	5,780	5,720	37

1 Administrative Support includes: Staff who provide science-based administrative and management services and systems.

TABLE 3.4: STAFF NUMBERS BY STATE AS AT 30 JUNE 2012

STATE	METROPOLITAN	REGIONAL	TOTAL
ACT	1,394		1,394
NSW	802	320	1,122
NT	29	10	39
QLD	735	128	863
SA	397		397
TAS	383		383
VIC	1,446	343	1,789
WA	498	7	505
Grand Total	**5,684**	**808**	**6,492**

STAFF SURVEY

In March 2012, an all Staff Survey was conducted by independent survey partners Towers Watson. The purpose of the survey was to collect feedback from staff on their experiences of working in CSIRO. The survey also gauged cultural aspects of the Organisation's performance in terms of supportive conditions and barriers to the implementation of the 2011–15 CSIRO Strategy.

A response rate of 68 per cent was achieved. CSIRO's performance was favourable in the engagement, values and diversity categories (see Figure 3.5 for a snapshot of the key survey results). Relative to other global research organisations, CSIRO's staff satisfaction rated highly in relation to:

- engagement with and pride in CSIRO
- a strong belief in the Organisation's goals and values
- support by immediate managers that help staff achieve work-life balance
- continued development of skills and abilities
- involving team members in decisions that affect their work.

CSIRO is committed to continuously improving its position as an employer of choice through better understanding and responding to the challenges staff face in their roles. The survey identified some key areas for improvement, such as increasing our internal collaboration and knowledge transfer across teams; consulting more widely about change management and its implementation; and our processes in relation to resource allocation and client engagement.

We will be addressing these challenges over the next 12 months, working with staff to improve our performance in these areas. In summary, there has been considerable support for our strategic direction, our goals and values, and the pride we share in our Organisation.

FIGURE 3.5: SNAPSHOT OF KEY SURVEY RESULTS

83% Overall Employee Engagement[1]

81% Awareness of CSIRO Values (up from 73% in 2010)

68% Overall Diversity[1] score

1 Scale performance reflects the average percentage respondents responded as favourable across multiple questions.

Part four
financial statements

Australian National
Audit Office

INDEPENDENT AUDITOR'S REPORT

To the Minister for Tertiary Education, Skills, Science and Research

Report on the Financial Statements

I have audited the accompanying financial statements of the Commonwealth Scientific and Industrial Research Organisation and the consolidated entity for the year ended 30 June 2012, which comprise: a Statement by the Chairman of the Board, Chief Executive and Chief Finance Officer; the Statement of Comprehensive Income; Balance Sheet; Statement of Changes in Equity; Cash Flow Statement; Schedule of Commitments; Schedule of Contingencies; and Notes to and Forming Part of the Financial Statements, including a Summary of Significant Accounting Policies and other explanatory information. The consolidated entity comprises the Commonwealth Scientific and Industrial Research Organisation and the entities it controlled at the year's end, or from time to time during the financial year.

Directors' Responsibility for the Financial Statements

The directors of the Commonwealth Scientific and Industrial Research Organisation are responsible for the preparation of the financial statements that give a true and fair view in accordance with the Finance Minister's Orders made under the *Commonwealth Authorities and Companies Act 1997*, including the Australian Accounting Standards, and for such internal control as is necessary to enable the preparation of the financial statements that give a true and fair view and are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

My responsibility is to express an opinion on the financial statements based on my audit. I have conducted my audit in accordance with the Australian National Audit Office Auditing Standards, which incorporate 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 about whether the financial statements are free from material misstatement.

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

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Research Organisation's preparation of the financial statements that give a true and fair view 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 the accounting policies used and the reasonableness of accounting estimates made by the directors, as well as evaluating the overall presentation of the financial statements.

I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my audit opinion.

Independence

In conducting my audit, I have followed the independence requirements of the Australian National Audit Office, which incorporate the requirements of the Australian accounting profession.

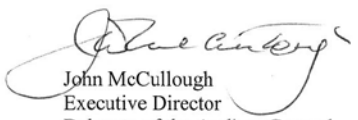
Opinion

In my opinion, the financial statements of the Commonwealth Scientific and Industrial Research Organisation and the consolidated entity:

(a) have been prepared in accordance with the Finance Minister's Orders made under the *Commonwealth Authorities and Companies Act 1997,* including the Australian Accounting Standards; 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 and the consolidated entity's financial positions as at 30 June 2012 and of their financial performance and cash flows for the year then ended.

Australian National Audit Office



John McCullough
Executive Director
Delegate of the Auditor-General

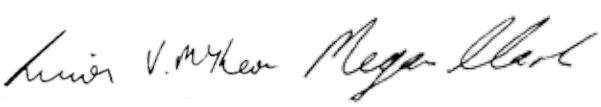
Canberra
23 August 2012

COMMONWEALTH SCIENTIFIC AND INDUSTRIAL RESEARCH ORGANISATION
STATEMENT BY THE CHAIRMAN OF THE BOARD, CHIEF EXECUTIVE AND CHIEF FINANCE OFFICER

In our opinion, the attached financial statements for the year ended 30 June 2012 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, as* amended.

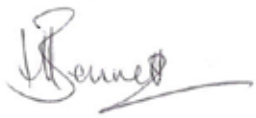
In our opinion, at the date of this statement, there are reasonable grounds to believe that the Group will be able to pay its debts as and when they become due and payable.

This Statement is made in accordance with a resolution of the Board Members.



Simon McKeon AO
Chairman of the Board
23 August 2012

Megan Clark
Chief Executive and Board Member
23 August 2012



Hazel Bennett
Chief Finance Officer
23 August 2012

CONSOLIDATED FINANCIAL STATEMENTS
STATEMENT OF COMPREHENSIVE INCOME
For the period ended 30 June 2012

	Notes	Consolidated		CSIRO	
		2012 $'000	2011 $'000	2012 $'000	2011 $'000
EXPENSES					
Employee benefits	3.1	739,908	718,251	738,477	718,047
Supplier expenses	3.2	397,358	380,382	395,722	380,026
Depreciation and amortisation	3.3	118,684	101,728	118,684	101,728
Finance costs	3.4	3,271	3,266	3,271	3,266
Write-down and impairment of assets	3.5	19,357	25,601	19,357	25,601
Net foreign exchange losses	3.6	-	2,448	-	2,448
Total expenses		**1,278,578**	**1,231,676**	**1,275,511**	**1,231,116**
LESS:					
OWN-SOURCE INCOME					
Own source revenue					
Sale of goods and rendering of services	4.1	398,784	409,676	410,818	418,077
Interest	4.2	17,890	15,174	9,195	8,729
Rental income		8,253	7,826	8,253	7,826
Royalties and licence fees	4.3	278,516	29,237	278,516	29,237
Other revenues	4.4	38,215	30,766	38,714	31,457
Total own source revenues		**741,658**	**492,679**	**745,496**	**495,326**
Gains					
Net gain from sale of assets	4.5	409	4,940	409	4,940
Net foreign exchange gains	4.6	5,127	-	5,127	-
Realisation of fair value gain reserve	4.7	-	140	-	140
Total gains		**5,536**	**5,080**	**5,536**	**5,080**
Total own-source income		**747,194**	**497,759**	**751,032**	**500,406**
Net cost of service		**(531,384)**	**(733,917)**	**(524,479)**	**(730,710)**
Revenues from Government	4.8	724,939	720,415	724,939	720,415
Share of net operating surplus/(deficit) of joint venture accounted for using the equity method	8	10	(184)	10	(184)
Surplus on continuing operation		**724,949**	**720,231**	**724,949**	**720,231**
Surplus/(Deficit) attributable to the Australian Government		**193,565**	**(13,686)**	**200,470**	**(10,479)**
OTHER COMPREHENSIVE INCOME					
Increase/(decrease) in asset revaluation reserves	5.1	1,414	227,503	1,414	227,503
Increase/(decrease) in other reserves	5.2	(140)	14,352	(140)	14,352
Total other comprehensive income		**1,274**	**241,855**	**1,274**	**241,855**
Total comprehensive income/(loss) attributable to the Australian Government		**194,839**	**228,169**	**201,744**	**231,376**

The above Statement should be read in conjunction with the accompanying notes.

CONSOLIDATED FINANCIAL STATEMENTS
BALANCE SHEET
As at 30 June 2012

	Notes	Consolidated		CSIRO	
		2012 $'000	2011 $'000	2012 $'000	2011 $'000
ASSETS					
Financial Assets					
Cash and cash equivalents	6	381,687	308,478	240,976	161,490
Trade and other receivables	7	247,884	88,988	247,692	88,488
Investments accounted for using the equity method	8	399	389	399	389
Other investments	9	17,142	31,969	17,142	31,969
Total financial assets		**647,112**	**429,824**	**506,209**	**282,336**
Non-Financial Assets					
Land and buildings	10	1,581,745	1,598,603	1,581,745	1,598,603
Plant and equipment	11	446,851	381,145	446,851	381,145
Investment properties	12	52,000	50,950	52,000	50,950
Intangibles	13	28,711	28,346	28,711	28,346
Inventories	14	1,163	1,010	1,163	1,010
Other non-financial assets	15	42,096	40,862	42,094	40,862
Total non-financial assets		**2,152,566**	**2,100,916**	**2,152,564**	**2,100,916**
Properties held for sale	16	14,319	11,865	14,319	11,865
TOTAL ASSETS		**2,813,997**	**2,542,605**	**2,673,092**	**2,395,117**
LIABILITIES					
Payables					
Suppliers	17	72,152	84,195	70,438	83,750
Other payables	18	171,065	153,148	172,395	153,531
Total payables		**243,217**	**237,343**	**242,833**	**237,281**
Interest Bearing Liabilities					
Leases	19	61,033	65,200	61,033	65,200
Deposits	20	7,130	6,472	7,130	6,472
Total interest bearing liabilities		**68,163**	**71,672**	**68,163**	**71,672**
Provisions					
Employee provisions	21	246,854	205,564	246,854	205,564
Total provisions		**246,854**	**205,564**	**246,854**	**205,564**
TOTAL LIABILITIES		558,234	514,579	557,850	514,517
NET ASSETS		**2,255,763**	**2,028,026**	**2,115,242**	**1,880,600**
EQUITY					
Contributed equity		149,588	116,690	149,388	116,490
Assets revaluation reserves		1,322,629	1,321,215	1,322,629	1,321,215
Other reserves		635	775	635	775
Retained surplus		782,911	589,346	642,590	442,120
TOTAL EQUITY		**2,255,763**	**2,028,026**	**2,115,242**	**1,880,600**

The above Balance Sheet should be read in conjunction with the accompanying notes.

CONSOLIDATED FINANCIAL STATEMENTS

STATEMENT OF CHANGES IN EQUITY – CONSOLIDATED

For the period ended 30 June 2012

	Retained Surplus		Asset Revaluation Reserves		Other Reserves		Contributed Equity/Capital		Total Equity	
	2012 $'000	2011 $'000	2012 $'000	2011 $'000	2012 $'000	2011 $'000	2012 $'000	2011 $'000	2012 $'000	2011 $'000
Opening balance	**589,346**	**603,032**	**1,321,215**	**1,093,712**	**775**	**(13,577)**	**116,690**	**36,790**	**2,028,026**	**1,719,957**
Comprehensive income										
Other comprehensive income	-	-	1,414	227,503	(140)	14,352	-	-	1,274	241,855
Surplus/(deficit) for the period	193,565	(13,686)	-	-	-	-	-	-	193,565	(13,686)
Total comprehensive income	**193,565**	**(13,686)**	**1,414**	**227,503**	**(140)**	**14,352**	**-**	**-**	**194,839**	**228,169**
Transactions with owners										
Contributions by owners										
Equity injection	-	-	-	-	-	-	32,898	79,900	32,898	79,900
Closing balance	**782,911**	**589,346**	**1,322,629**	**1,321,215**	**635**	**775**	**149,588**	**116,690**	**2,255,763**	**2,028,026**

The above Statement should be read in conjunction with the accompanying notes.

CONSOLIDATED FINANCIAL STATEMENTS

STATEMENT OF CHANGES IN EQUITY – CSIRO

For the period ended 30 June 2012

	Retained Surplus		Asset Revaluation Reserves		Other Reserves		Contributed Equity/Capital		Total Equity	
	2012 $'000	2011 $'000	2012 $'000	2011 $'000	2012 $'000	2011 $'000	2012 $'000	2011 $'000	2012 $'000	2011 $'000
Opening balance	442,120	452,599	1,321,215	1,093,712	775	(13,577)	116,490	36,590	1,880,600	1,569,324
Comprehensive income										
Other comprehensive income	-	-	1,414	227,503	(140)	14,352	-	-	1,274	241,855
Surplus/(deficit) for the period	200,470	(10,479)	-	-	-	-	-	-	200,470	(10,479)
Total comprehensive income	200,470	(10,479)	1,414	227,503	(140)	14,352	-	-	201,744	231,376
Transactions with owners										
Contributions by owners										
Equity injection	-	-	-	-	-	-	32,898	79,900	32,898	79,900
Closing balance	642,590	442,120	1,322,629	1,321,215	635	775	149,388	116,490	2,115,242	1,880,600

The above Statement should be read in conjunction with the accompanying notes.

CONSOLIDATED FINANCIAL STATEMENTS
CASH FLOW STATEMENT
For the period ended 30 June 2012

	Notes	Consolidated		CSIRO	
		2012 $'000	2011 $'000	2012 $'000	2011 $'000
OPERATING ACTIVITIES					
Cash received					
Receipts from Government		724,939	720,415	724,939	720,415
Goods and services		617,498	568,704	627,151	527,574
Interest		15,865	16,463	7,965	8,946
Net GST received		1,659	10,579	810	9,802
Deposits		9,104	3,794	9,104	3,794
Total cash received		**1,369,065**	**1,319,955**	**1,369,969**	**1,270,531**
Cash used					
Employees		692,436	698,595	692,203	698,193
Suppliers		454,800	488,926	449,660	488,322
Finance costs		3,093	3,094	3,093	3,093
Total cash used		**1,150,329**	**1,190,615**	**1,144,956**	**1,189,608**
Net cash from operating activities	22	**218,736**	**129,340**	**225,013**	**80,923**
INVESTING ACTIVITIES					
Cash received					
Proceeds from sale of property, plant and equipment		12,543	46,407	12,543	46,407
Proceeds from sale of equity investments and intellectual property		30	6,690	30	6,690
Total cash received		**12,573**	**53,097**	**12,573**	**53,097**
Cash used					
Purchase of property, plant and equipment		183,465	168,477	183,465	168,477
Purchase of equity investments		3,264	7,745	3,264	7,745
Other selling costs		102	4,874	102	4,874
Total cash used		**186,831**	**181,096**	**186,831**	**181,096**
Net cash used by investing activities		**(174,258)**	**(127,999)**	**(174,258)**	**(127,999)**
FINANCING ACTIVITIES					
Cash received					
Contributed equity		32,898	79,900	32,898	79,900
Total cash received		**32,898**	**79,900**	**32,898**	**79,900**
Cash used					
Other cash used		4,167	4,056	4,167	4,056
Total cash used		**4,167**	**4,056**	**4,167**	**4,056**
Net cash from financing activities		**28,731**	**75,844**	**28,731**	**75,844**
Net increase/(decrease) in cash held		**73,209**	**77,185**	**79,486**	**28,768**
Cash and cash equivalents at the beginning of the reporting period		308,478	231,293	161,490	132,722
Cash and cash equivalents at end of the reporting period	6	**381,687**	**308,478**	**240,976**	**161,490**

The above Statement should be read in conjunction with the accompanying notes.

CONSOLIDATED FINANCIAL STATEMENTS
SCHEDULE OF COMMITMENTS
As at 30 June 2012

	Consolidated		CSIRO	
	2012 $'000	2011 $'000	2012 $'000	2011 $'000
BY TYPE				
Capital commitments payable				
Land and buildings[1]	13,970	12,010	13,970	12,010
Plant and equipment[2]	65,433	108,560	65,433	108,560
Investments[3]	2,834	5,471	2,834	5,471
Total capital commitments payable	**82,237**	**126,041**	**82,237**	**126,041**
Other commitments payable				
Operating leases[4]	268,367	277,994	268,367	277,994
Research and development commitments[5]	668,694	663,405	656,581	663,405
Other commitments[6]	27,560	38,597	27,560	38,597
Total other commitments payable	**964,621**	**979,996**	**952,508**	**979,996**
Commitments receivable				
Research and development commitments[5]	(397,541)	(411,454)	(397,541)	(411,454)
Other receivables[6]	(16,098)	(15,823)	(16,098)	(15,823)
Total commitments receivable	**(413,639)**	**(427,277)**	**(413,639)**	**(427,277)**
Net commitments by type	**633,219**	**678,760**	**621,106**	**678,760**
BY MATURITY				
Capital commitments payable				
One year or less	80,594	64,254	80,594	64,254
From one to five years	1,643	61,787	1,643	61,787
Total capital commitments payable	**82,237**	**126,041**	**82,237**	**126,041**
Operating lease commitments payable				
One year or less	33,981	32,655	33,981	32,655
From one to five years	131,641	123,309	131,641	123,309
Over five years	102,745	122,030	102,745	122,030
Total operating lease commitments payable	**268,367**	**277,994**	**268,367**	**277,994**
Other commitments payable				
One year or less	464,393	397,739	460,315	397,739
From one to five years	229,485	304,263	221,450	304,263
Over five years	2,376	-	2,376	-
Total other commitments payable	**696,254**	**702,002**	**684,141**	**702,002**
Commitments receivable				
One year or less	(272,890)	(267,087)	(272,890)	(267,087)
From one to five years	(139,308)	(159,224)	(139,308)	(159,224)
Over five years	(1,441)	(966)	(1,441)	(966)
Total commitments receivable	**(413,639)**	**(427,277)**	**(413,639)**	**(427,277)**
Net commitments by maturity	**633,219**	**678,760**	**621,106**	**678,760**

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 for additional contributions to equity investments.

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 an annual increase in accordance with the terms of agreement, e.g. upward movements in the Consumer Price Index. The accommodation leases are still current and each may be renewed at the Group's option, following a once-off adjustment of rentals to current market levels.
Leases for motor vehicles	No contingent rentals exist. There are no purchase options available to the Group.
Leases for computer equipment	The lessor provides computer equipment designated as necessary in the supply contract for a general period of 2–3 years.

5. Research and development commitments payable and receivable are Agreements Equally Proportionately Unperformed for research and development contracts.

6. Other commitments payable and receivable are for services and property leases respectively.

7. Commitments are GST inclusive where relevant.

SCHEDULE OF CONTINGENCIES
As at 30 June 2012

	Consolidated		CSIRO	
	2012	2011	2012	2011
	$'000	$'000	$'000	$'000
Contingent assets				
Claims for damages or costs and bank guarantees	7,660	-	7,660	-
Total contingent assets	7,660	-	7,660	-
Contingent liabilities				
Claims for damages or costs	300	300	300	300
Financial guarantees	45	17	45	17
Total contingent liabilities	**345**	**317**	**345**	**317**
Net contingent assets/(liabilities)	**7,315**	**(317)**	**7,315**	**(317)**

Details of each class of contingent liabilities and contingent assets listed above are disclosed in Note 23: Contingent Liabilities and Assets, along with information on contingencies that cannot be quantified.

No contingent liabilities were reported by the CRCs in which the Group is a participant.

The above Schedule should be read in conjunction with the accompanying notes.

CONSOLIDATED FINANCIAL STATEMENTS
NOTES TO AND FORMING PART OF THE FINANCIAL STATEMENTS
For the period ended 30 June 2012

Note 1 Summary of significant accounting policies

1.1 Objective of the Organisation and its Subsidiaries (the Group)

CSIRO is an Australian Government controlled not-for-profit entity. It is a research enterprise that aims to deliver great science and innovative solutions for industry, society and the environment.

CSIRO is structured to meet the following outcome:

Outcome: Innovative scientific and technology solutions to national challenges and opportunities to benefit industry, the environment and the community, through scientific research and capability development, services and advice.

The continued existence of CSIRO in its present form and with its present programs is dependent on Government policy and on continuing funding by Parliament for CSIRO's administration and programs.

For the purposes of AASB 127 *Consolidated and Separate Financial Statements*, consolidated accounts are prepared to include subsidiaries (refer Note 1.5).

1.2 Basis of Preparation of the Financial Statements

The financial statements are required by Clause 1(b) of Schedule 1 to the *Commonwealth Authorities and Companies Act 1997* and are general purpose financial statements.

The Commonwealth Scientific and Industrial Research Organisation and the Group's Consolidated Financial Statements have been prepared in accordance with:

- Finance Minister's Orders (FMOs) for reporting periods ending on or after 1 July 2011;
- Australian Accounting Standards and Interpretations issued by the Australian Accounting Standards Board (AASB) that apply for the reporting period.

The financial statements have been prepared on an accrual basis and in accordance with the historical cost convention, except for certain assets and liabilities 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 statements are 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 be required 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 or the Schedule of Contingencies.

Unless alternative treatment is specifically required by an Accounting Standard, income and expenses are recognised in the Statement of Comprehensive Income when, and only when, the flow, consumption or loss of economic benefits has occurred and can be reliably measured.

1.3 Significant Accounting Judgements and Estimates

In the process of applying the accounting policies listed in this note, CSIRO has made the following judgements that have the most significant impact on the amounts recorded in the financial statements:

- The fair value of properties classified as 'properties held for sale' and 'investment properties' has been taken to be the market value of similar properties as determined by an independent valuer.
- The fair value of land which will continue to be used for research activities, and buildings held for specialised purposes and where there is no readily available market price, fair value has

been taken to be 'existing use value' and 'depreciated replacement cost' respectively, as determined by an independent valuer and CSIRO's registered valuer.

- The fair value of plant and equipment has been taken to be the 'depreciated replacement cost' as determined by an independent valuer.
- The fair value of investments in unlisted companies is based on the generally accepted valuation guidelines 'International Private Equity and Venture Capital Valuation Guidelines'.
- Gains or losses arising from changes in fair value are recognised in reserves or equity with the exception of impairment. Investments in listed companies have been assessed for impairment and the decline in fair value does not represent impairment. Hence, the total decline in fair value is recognised directly in reserves or equity.

1.4 New Australian Accounting Standards

Adoption of new Australian Accounting Standard requirements
No Accounting Standard has been adopted earlier than the application date as stated in the standard.

CSIRO has reviewed new standards, revised standards and interpretations/amending standards issued prior to the signing of the financial statements and considers that none of these have had a financial impact.

Future Australian Accounting Standard requirements
No new or revised pronouncements were issued by the Australian Accounting Standards Board prior to the finalisation of the financial statements which are expected to have a material financial impact on the entity in future reporting periods.

1.5 Consolidation

AASB 127 *(Consolidated and Separate Financial Statements)* requires a parent entity that is in a group to present consolidated financial statements that consolidate its investments in controlled entities in accordance with AASB 127. The parent and controlled entities apply consistent accounting policies and the effects of all transactions and balances between the entities are eliminated in full. The financial statements of the controlled entities are prepared for the same reporting period as the parent entity.

The consolidated financial statements incorporate the assets and liabilities of all entities controlled by CSIRO as at 30 June 2012 and the results of the controlled entities for the year then ended.

1.6 Revenue

Revenue from sale of goods is recognised when:

- the risks and rewards of ownership have been transferred to the buyer
- the entity retains no managerial involvement or effective control over the goods
- 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 entity.

Revenue from rendering of services is recognised by reference to the stage of completion of contracts at the reporting date. The revenue is recognised when:

- the amount of revenue, stage of completion and transaction costs incurred can be reliably measured
- it is probable that the economic benefits associated with the transaction will flow to the entity.

The stage of completion of contracts at the reporting date is determined by reference to the proportion that costs incurred to date bear to the total costs of the transaction. The balances of contract research and development activities in progress are accounted as either contract research work in progress (Note 15), being the gross unbilled amount expected to be collected from clients for contract research and services performed as at 30 June 2012, or contract research revenue received in advance (Note 18), where revenue for contract research and services received and/or billed exceeded revenue earned.

Receivables for goods and services, which have 30 day terms, are recognised at the nominal amounts due less any impairment allowance. Collectability of debts is reviewed as at the end of reporting period. Allowances 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.*

Resources received free of charge are recognised as revenue 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. Resources received free of charge are recorded as either revenue or gains depending on their nature.

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 agency or authority as a consequence of a restructuring of administrative arrangements.

Royalties and licence revenue are recognised on an accrual basis in accordance with the substance of the relevant royalty agreements.

Revenue from legal settlements related to intellectual property is recognised on an accrual basis in accordance with the substance of the relevant licensing agreements.

Revenues from Government
Funding received from the Australian Government Department of Industry, Innovation, Science, Research and Tertiary Education (appropriated to CSIRO as a CAC Act body payment item) is recognised as Revenue from Government unless they are in the nature of an equity injection or a loan.

1.7 Gains

Resources Received Free of Charge
Resources 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.

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 agency 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.

1.8 Transactions with the Government as Owners

Equity Injections
Amounts that are designated as equity injections for a year are recognised directly in contributed equity in that year.

1.9 Research and Development Expenditure and Intellectual Property

All research and development costs, including costs associated with protecting intellectual property (e.g. patents and trademarks), are expensed as incurred.

1.10 Employee Benefits

Liabilities for short-term employee benefits (as defined in AASB 119) and termination benefits due within twelve months of the end of the reporting period are measured at their nominal amounts. The nominal amount is calculated with regard to the rate expected to be paid on settlement of the liability.

Other long-term 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 at the estimated salary rates that will apply at the time the leave is taken, including the 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 at 30 June 2012 for long service leave has been determined by the short hand method and reference to the work of the Australian Government Actuary (AGA). 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. CSIRO recognises a provision for termination when it has developed a detailed formal plan for the terminations and has informed those employees affected that it will carry out the terminations.

Superannuation
Employees of CSIRO 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. This liability is reported by the Department of Finance and Deregulation as an administered item.

CSIRO makes employer contributions to the employee superannuation schemes at rates determined by an actuary to be sufficient to meet the cost to the Government of the superannuation entitlements of the Group's employees. CSIRO accounts for the contributions as if they were contributions to defined contribution plans.

The liability for superannuation recognised as at 30 June 2012 represents outstanding contributions for the final fortnight of the year.

1.11 Workers' Compensation

CSIRO'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.

1.12 Insurance

As part of its risk management strategy, CSIRO has insured for risks through the Australian Government's insurable risk managed fund 'Comcover'.

1.13 Cash

Cash and cash equivalents includes cash on hand and demand deposits in bank accounts with an original maturity of six months or less that are readily convertible to known amounts of cash and subject to insignificant risk of change in value. Cash is recognised at its nominal amount.

1.14 Financial Assets

CSIRO classifies its financial assets in the following categories:

- available for sale financial assets
- loans and receivables.

The classification depends on the nature and the purpose of financial assets and is determined at the time of initial recognition.

Financial assets are recognised and derecognised upon trade date.

Effective Interest Method
The effective interest method is a method of calculating the amortised cost of a financial asset and of allocating interest income over the relevant period. The effective interest rate is the rate that exactly discounts estimated future cash receipts through the expected life of the financial asset or, where appropriate, a shorter period.

Income is recognised on an effective interest rate basis.

Available-for-Sale Financial Assets
Available-for-sale financial assets are non-derivatives that are either designated in this category or not classified in any of the other categories.

Available-for-sale financial assets are recorded at fair value. Gains and losses arising from changes in fair value are recognised directly in the reserves (equity) with the exception of impairment losses. Interest is calculated using the effective interest method and foreign exchange gains and losses on monetary assets are recognised directly in profit or loss. Where the asset is disposed of or is determined to be impaired, part (or all) of the cumulative gain or loss previously recognised in the reserve is included in the operating result for the period.

CSIRO has investments in a number of unlisted start-up companies over which it has significant influence or control. These companies have been established for the purpose of commercialisation of CSIRO's intellectual property.

CSIRO also has some investments in companies which have, since initial start-up, been sold to third parties and subsequently listed on the Australian Stock Exchange.

CSIRO's investments in listed and unlisted companies are accounted for in accordance with AASB 139 *Financial Instruments: Recognition and Measurement*, and have been designated as 'available-for-sale' financial assets.

Fair value of Investments in Listed Companies
The fair value of investments in listed companies has been determined by reference to their closing bid price at the reporting date.

Fair value of Investments in Unlisted Companies
For investments in unlisted companies where there is no readily available market pricing for the equity instruments, the fair value has been determined by applying valuation techniques in line with the generally accepted valuation guidelines 'International Private Equity and Venture Capital Valuation Guidelines (AVCAL)'.

Where recent transactions for the unlisted companies' equity have taken place, these equity transaction prices are used to value CSIRO's investment.

For unlisted companies that have not had any recent equity transactions, other AVCAL valuation techniques are used such as discounted cash flows and share of net assets.

In addition, independent valuations are performed as at reporting date for unlisted companies that are considered to have a material impact on CSIRO's investment portfolio.

Investments in special purpose entities are either valued at cost or share of net realisable assets since a reliable estimate of fair value cannot be established. These entities have been set up primarily to gain access to research facilities/networks, or to provide services to owners. Hence, there is no 'active

market' for these equity investments. CSIRO is a long-term shareholder and is unlikely to dispose of its interest in these investments.

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

Impairment of Financial Assets
Financial assets are assessed for impairment at each balance sheet date.

Financial assets held at amortised cost – if there is objective evidence that an impairment loss has been incurred for loans and receivables, the amount of the loss is measured as the difference between the asset's carrying amount and the present value of estimated future cash flows discounted at the asset's original effective interest rate. The carrying amount is reduced by way of an allowance account. The loss is recognised in the Statement of Comprehensive Income.

Available-for-sale financial assets – if there is objective evidence that an impairment loss on an available-for-sale financial asset has been incurred, the amount of the difference between its cost, less principal repayments and amortisation, and its current fair value, less any impairment loss previously recognised in expenses, is transferred from equity to the Statement of Comprehensive Income.

Available-for-sale financial assets (held at cost) – if there is objective evidence that an impairment loss has been incurred, the amount of the impairment loss is the difference between the carrying amount of the asset and the present value of the estimated future cash flows discounted at the current market rate for similar assets.

1.15 Financial liabilities

Financial liabilities are recognised and derecognised upon trade date.

Supplier and other payables are recognised at amortised cost. Liabilities are recognised to the extent that the goods or services have been received (and irrespective of having been invoiced).

1.16 Acquisition of Assets

Assets are recorded at cost on acquisition except as stated below. The cost of acquisition includes the fair value of assets transferred in exchange and liabilities undertaken. Financial assets are initially measured at their fair value plus transaction costs where appropriate.

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.

1.17 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).

The initial cost of an asset includes an estimate of the cost of dismantling and removing the item and restoring the site on which it is located.

Revaluations
Following initial recognition at cost, 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 valuation depends upon the volatility of movements in the market values for the relevant assets.

Revaluation adjustments are made on a class basis. Any revaluation increment is credited to equity under asset revaluation reserve, except to the extent that it reverses a previous revaluation decrement of the same asset class that was previously recognised in the surplus/deficit. Revaluation decrements

for a class of assets are recognised directly through surplus/deficit except to the extent that they reverse a previous revaluation increment for that class.

Any accumulated depreciation as at the revaluation date is restated proportionately with the change in the gross carrying amount of the asset so that the carrying amount of the asset after revaluation equals its revalued amount.

Fair value for each class of asset is determined as follows:

- Land, which will continue to be used for research activity, is valued by independent valuers at 'existing use value'. Existing use contemplates the continued use of the asset for the same application as at the date of valuation.

- Buildings and leasehold improvements, which will continue to be used for research activities, are valued by CSIRO's registered valuer at their 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 buildings.

- Plant and equipment which will continue to be used for research activities are valued by independent valuers, at fair value being the lesser of the depreciated replacement or reproduction cost.

- Properties held or identified for sale and investment properties are valued by independent valuers as at reporting date.

- 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 25.

Depreciation and Amortisation
Depreciable property, plant and equipment assets are written-off to their estimated residual values over their estimated useful lives 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. Land is not depreciated.

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:

	2012	2011
Buildings on freehold land	30 to 50 years	30 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 vessel	25 years	25 years
Australia Telescope	15 to 58 years	15 to 58 years

Impairment
All assets were assessed for impairment at 30 June 2012. 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 entity were deprived of the asset, its value in use is taken to be its depreciated replacement cost.

Derecognition
An item of property, plant and equipment is derecognised upon disposal or when no further future economic benefits are expected from its use or disposal.

1.18 Investment Properties

Investment properties are measured initially at cost, including transaction costs. Subsequent to initial recognition, investment properties are stated at fair value, which is based on active market price, adjusted if necessary, for any difference in nature, location or condition of the specific asset at the balance sheet date. Gains or losses arising from changes in the fair values of investment properties are recognised in the profit or loss in the year in which they arise.

Investment properties are derecognised either when they have been disposed or when the investment property is permanently withdrawn from use and no future economic benefit is expected from its disposal. Any gains or losses on disposal of an investment property are recognised in profit or loss in the year of disposal.

1.19 Intangibles

Intangibles comprise internally developed and acquired software for internal use. These assets are carried at cost, less accumulated amortisation and impairment losses, except where the estimated cost of software is less than the $250,000 threshold and expensed in the year of acquisition.

Software is amortised on a straight-line basis over its anticipated useful life. The useful lives of software are 2 to 10 years (2010–11 2 to 10 years).

All software assets were assessed for indications of impairment as at 30 June 2012.

1.20 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.

1.21 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 expenditures or total assets.

1.22 Leases

A distinction is made between finance leases and operating leases. Finance leases effectively transfer from the lessor to the lessee substantially all the risks and rewards incidental to ownership of leased 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 an 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.

1.23 Foreign Currency Transactions

Transactions denominated in a foreign currency are translated at the exchange rate prevailing at the date of the transaction. Foreign currency receivables and payables are translated at the exchange rates prevailing at reporting date. Foreign currency translation gains and losses are recognised in the operating result. The Group has not entered into specific forward exchange contracts during the reporting period.

1.24 Taxation/Competitive Neutrality

Taxation
In accordance with Section 53 of the *Science and Industry Research Act 1949*, CSIRO 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
- for receivables and payables.

The Science Industry Endowment Fund is exempt from income tax in Australia. WLAN Services Pty Ltd is subject to all applicable taxes in Australia.

Competitive Neutrality
The Australian Government *Competitive Neutrality Guidelines for Managers* require government bodies to operate with no net competitive advantages over private sector competitors. CSIRO's 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.

1.25 Joint Ventures

Joint Venture Operations – Cooperative Research Centres (CRCs)
The proportionate interests 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, including CSIRO and universities, for research and development purposes. CSIRO'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 Statement of Comprehensive Income. CSIRO is a participant in 24 CRCs and the names of these CRCs are disclosed in Note 24.

Joint Venture Entities – Unincorporated (Refer Note 8)
Murray-Darling Freshwater Research Centre (MDFRC) – CSIRO's 33.3% interest in the MDFRC is accounted for using the equity method.

1.26 Borrowing Costs

All borrowing costs are expensed as incurred.

1.27 Contingent Liabilities and Contingent Assets

Contingent liabilities and contingent 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 a liability or asset in respect of which the amount cannot be reliably measured. Contingent assets are disclosed when settlement is probable but not virtually certain and contingent liabilities are disclosed when settlement is greater than remote.

1.28 Properties Held for Sale

Properties which are expected to be recovered primarily through sale rather than through continuing use are classified as 'properties held for sale'. Immediately before classification, the properties are remeasured in accordance with the Group's accounting policies. Thereafter, at reporting date the properties are measured at the lower of their carrying amount and fair value less cost to sell.

Impairment losses on initial classification as held for sale and subsequent gains or losses on re-measurement are recognised in the Statement of Comprehensive Income.

1.29 Presentation of Financial Statements

CSIRO presents in the consolidated Statement of Changes in Equity all owner changes in equity, whereas all non-owner changes in equity are presented in the consolidated Statement of Comprehensive Income.

1.30 Related Party Disclosure

Related entity values disclosed in Notes 4.1 – Sale of goods and rendering of services; Note 7 – Trade and other receivables, Note 17 – Trade creditors and accruals; and Note 35 – Reporting of outcome, reflect business transactions between CSIRO and other FMA and CAC Act agencies.

Note 2 Events after the Balance Sheet Date

At the time of completion of this note, the Group is not aware of any significant events occurring after the reporting date.

Note 3 Expenses	Notes	Consolidated 2012 $'000	Consolidated 2011 $'000	CSIRO 2012 $'000	CSIRO 2011 $'000
3.1 Employee benefits					
Wages and salaries		538,705	534,725	537,285	534,534
Superannuation – defined contribution plans		83,940	82,559	83,929	82,546
Leave and other entitlements		118,047	97,827	118,047	97,827
Separation and redundancies		9,418	13,763	9,418	13,763
Gross employee benefits		**750,110**	**728,874**	**748,679**	**728,670**
Less					
Capitalised labour		(9,976)	(10,623)	(9,976)	(10,623)
Employee cost recovery from subsidiary companies		(226)	-	(226)	-
Total employee benefits		**739,908**	**718,251**	**738,477**	**718,047**
3.2 Suppliers					
Goods and services					
Goods		135,283	118,737	135,283	118,737
Services		247,741	245,612	246,105	245,258
Total goods and services		**383,024**	**364,349**	**381,388**	**363,995**
Goods and services are made up of:					
Provision of goods – related entities		-	-	-	-
Provision of goods – external entities		135,283	129,360	135,283	129,360
Rendering of services – related entities		31,197	24,488	31,197	24,488
Rendering of services – external entities		216,544	210,501	214,908	210,147
Total goods and services		**383,024**	**364,349**	**381,388**	**363,995**
Other supplier expenses					
Operating lease rentals:					
Minimum lease payments		12,302	14,264	12,302	14,264
Workers compensation expenses		2,032	1,769	2,032	1,767
Total other supplier expenses		**14,334**	**16,033**	**14,334**	**16,031**
Total supplier expenses		**397,358**	**380,382**	**395,722**	**380,026**
3.3 Depreciation and amortisation					
Depreciation					
Plant and equipment		45,029	41,706	45,029	41,706
Buildings and leasehold improvements		69,413	56,588	69,413	56,588
Total depreciation		**114,442**	**98,294**	**114,442**	**98,294**
Amortisation					
Intangibles – computer software		4,242	3,434	4,242	3,434
Total depreciation and amortisation		**118,684**	**101,728**	**118,684**	**101,728**
3.4 Finance costs					
Finance leases		**3,271**	**3,266**	**3,271**	**3,266**

Note 3 Expenses (cont)	Notes	Consolidated		CSIRO	
		2012	2011	2012	2011
		$'000	$'000	$'000	$'000
3.5 Write-down and impairment of assets					
Assets write downs and impairments from:					
Bad debts		279	87	279	87
Increase/(decrease) in allowance for impairment of receivable		540	(34)	540	(34)
Impairment of available for sale investments		17,699	7,825	17,699	7,825
Net impairment loss on revaluation of properties held for sale and investment properties		578	4,683	578	4,683
Net realisation of fair value loss reserve on available for sale investments		261	13,040	261	13,040
Total write-down and impairment of assets		**19,357**	**25,601**	**19,357**	**25,601**
3.6 Net foreign exchange losses					
Non-speculative		-	2,448	-	2,448

	Notes	Consolidated		CSIRO	
		2012	2011	2012	2011
		$'000	$'000	$'000	$'000
Note 4 Income					
4.1 Sale of goods and rendering of services					
Provision of goods – related entities		-	-	-	-
Provision of goods – external entities		13,165	13,379	13,165	13,379
Total sale of goods		**13,165**	**13,379**	**13,165**	**13,379**
Rendering of services – related entities		145,840	141,221	145,840	141,221
Rendering of services – external entities		239,779	255,076	251,813	263,477
Total rendering of services		**385,619**	**396,297**	**397,653**	**404,698**
Total sale of goods and rendering of services		**398,784**	**409,676**	**410,818**	**418,077**
4.2 Interest					
Bank and term deposits		**17,890**	**15,174**	**9,195**	**8,729**
4.3 Royalties and licence fees					
Royalties and licence fees[1]		**278,516**	**29,237**	**278,516**	**29,237**
4.4 Other revenues					
Sale of primary produce		1,404	1,333	1,404	1,333
Donation		29	524	29	524
Capital contributions		14,301	2,149	14,301	2,149
Education programs and subscriptions		3,471	3,400	3,471	3,400
Other		19,010	23,360	19,509	24,051
Total other revenues		**38,215**	**30,766**	**38,714**	**31,457**

[1]In April 2012, CSIRO concluded a number of licence agreements related to the wireless networking technology patent with licensing proceeds to be received by CSIRO across the 2011-12 to 2013-14 financial years. CSIRO and the Commonwealth Government are discussing how to share the cash proceeds as they are received which may result in a reduction of Net Assets of up to $80 million over 2012-13 and 2013-14.

Note 4 Income (cont)	Notes	Consolidated		CSIRO	
		2012 $'000	2011 $'000	2012 $'000	2011 $'000
4.5 Net gain/(loss) from sale of assets					
Equity investment and intellectual property					
Proceeds from sale of equity investments		-	3,775	-	3,775
Proceeds from sale of intellectual property		30	2,915	30	2,915
Total proceeds		30	6,690	30	6,690
Carrying value of assets sold		-	(1,860)	-	(1,860)
Selling expenses		-	(8)	-	(8)
Net gain/(loss) from equity investment and intellectual property		**30**	**4,822**	**30**	**4,822**
Land and buildings					
Proceeds from sale		11,102	40,204	11,102	40,204
Carrying value of assets sold		(9,751)	(34,140)	(9,751)	(34,140)
Selling expenses		(89)	(4,854)	(89)	(4,854)
Net gain/(loss) from sale of land and buildings		**1,262**	**1,210**	**1,262**	**1,210**
Plant and equipment					
Proceeds from sale		594	692	594	692
Carrying value of assets sold		(1,463)	(1,772)	(1,463)	(1,772)
Selling expenses		(14)	(12)	(14)	(12)
Net gain/(loss) from sale of plant and equipment		**(883)**	**(1,092)**	**(883)**	**(1,092)**
Total net gain/(loss) from sale of assets		**409**	**4,940**	**409**	**4,940**
4.6 Net foreign exchange gains					
Non-speculative		**5,127**	**-**	**5,127**	**-**
4.7 Other gains					
Net realisation of fair value gain reserve on available for sale investments		**-**	**140**	**-**	**140**
4.8 Revenue from Government					
Department of Industry, Innovation, Science, Research and Tertiary Education CAC Act body payment item		**724,939**	**720,415**	**724,939**	**720,415**

	Notes	Consolidated		CSIRO	
		2012	2011	2012	2011
		$'000	$'000	$'000	$'000
Note 5 Other comprehensive income					
5.1 Changes in asset revaluation reserves					
Revaluation of plant and equipment		695	-	695	-
Revaluation of land and buildings		719	227,503	719	227,503
Net decrease in asset revaluation reserves		**1,414**	**227,503**	**1,414**	**227,503**
5.2 Change in other reserve					
Net change in fair value gain/(loss) of available for sale investments		(401)	1,452	(401)	1,452
Realisation of fair value loss on sale and impairment of available for sale investment		261	12,900	261	12,900
Net increase/(decrease) in other reserve		**(140)**	**14,352**	**(140)**	**14,352**
Note 6 Cash and cash equivalents					
Cash at bank and on hand		35,755	36,874	35,713	36,490
Term deposits		345,932	271,604	205,263	125,000
Total cash and cash equivalents		**381,687**	**308,478**	**240,976**	**161,490**
Total cash includes deposits held on behalf of third parties totalling $7.1 million (2011 $6.5 million).	20				
Note 7 Trade and other receivables					
Goods and services:					
Goods and services – related entities		13,232	17,504	13,232	23,017
Goods and services – external entities		62,915	63,287	62,915	57,774
Total receivable for goods and services		**76,147**	**80,791**	**76,147**	**80,791**
Other receivables:					
GST receivable from the ATO		1,103	-	771	-
Interest		3,376	1,351	1,799	569
Other receivables		168,785	7,833	170,502	8,115
Total other receivables (gross)		**173,264**	**9,184**	**173,072**	**8,684**
Total trade and other receivables (gross)		**249,411**	**89,975**	**249,219**	**89,475**
Less impairment allowance:					
Goods and services		(1,527)	(987)	(1,527)	(987)
Total trade and other receivables (net)		**247,884**	**88,988**	**247,692**	**88,488**
Receivables are expected to be recovered in:					
No more than 12 months		178,546	88,988	178,354	88,488
More than 12 months		69,338	-	69,338	-
Total trade and other receivables (net)		**247,884**	**88,988**	**247,692**	**88,488**

	Notes	Consolidated		CSIRO	
		2012	2011	2012	2011
		$'000	$'000	$'000	$'000
Note 7 Trade and other receivables (cont)					
Receivables are aged as follows:					
Not overdue		238,224	77,029	238,032	76,529
Overdue by:					
0 to 30 days		7,736	10,435	7,736	10,435
31 to 60 days		1,647	901	1,647	901
61 to 90 days		311	553	311	553
More than 90 days		1,493	1,057	1,493	1,057
Total receivables (gross)		**249,411**	**89,975**	**249,219**	**89,475**
The impairment allowance is aged as follows:					
Not overdue		68	-	68	-
Overdue by:					
0 to 30 days		27	-	27	-
31 to 60 days		27	-	27	-
61 to 90 days		29	-	29	-
More than 90 days		1,376	987	1,376	987
Total impairment allowance		**1,527**	**987**	**1,527**	**987**

Reconciliation of impairment allowance:	Consolidated	CSIRO
Movements in relation to 2012	Goods and services	Goods and services
	$'000	$'000
Opening balance	987	987
Increase recognised in net surplus	540	540
Closing balance	**1,527**	**1,527**
Movements in relation to 2011		
Opening balance	1,021	1,021
Decrease recognised in net deficit	(34)	(34)
Closing balance	**987**	**987**

	Consolidated		CSIRO	
	2012	2011	2012	2011
	$'000	$'000	$'000	$'000
Note 8 Investments accounted for using the equity method				
Murray-Darling Fresh Water Research Centre	399	389	399	389

Movements of the carrying amount of investment in the MDFRC joint venture entity are as follows:

Carrying amount at beginning of the financial year	389	573	389	573
Share of MDFRC's net operating surplus/(deficit) for the year	3	(85)	3	(85)
Adjustment based on audited accounts	7	(99)	7	(99)
Adjusted share of MDFRC's net operating surplus/(deficit) for the year	10	(184)	10	(184)
Carrying amount of investment in MDFRC as at 30 June	**399**	**389**	**399**	**389**

Murray-Darling Fresh Water Research Centre (MDFRC)

The Murray-Darling Fresh Water Research Centre is a collaborative joint venture for the purpose of Murray-Darling Basin Freshwater Research to support the generation of knowledge required to ensure the sustainable management of water and associated environmental resources of the Murray-Darling Basin.

CSIRO's 33.3% (2011 33.3%) investment in MDFRC is accounted for using the equity method. In accordance with the joint venture agreement, the operating surplus/(deficit) was shared by participants in the joint venture. CSIRO's share of MDFRC's operating surplus was $2,300 (2011 $77,300 deficit).

Note 8 Investments accounted for using the equity method (cont)

The following is a summary of the financial performance and position of MDFRC:

	Total Revenues	Net Operating deficit	Total Assets	Total Liabilities	Net Assets
	$'000	$'000	$'000	$'000	$'000
2012					
MDFRC (unaudited)	5,347	7	3,151	1,967	1,184
2011					
MDFRC (audited)	6,270	(232)	3,374	2,183	1,191

No indicators of impairment were found for investments accounted for using the equity method.
No investments accounted for using the equity method are expected to be sold within the next 12 months.

	Notes	Consolidated		CSIRO	
		2012	2011	2012	2011
		$'000	$'000	$'000	$'000
Note 9 Other investments					
At fair value classified as available for sale investments.	1.14				
Shares (or equity investments)					
Listed companies		5,166	10,461	5,166	10,461
Unlisted companies		11,676	21,508	11,676	21,508
Other investment		300	-	300	-
Total investments		**17,142**	**31,969**	**17,142**	**31,969**

All other investments are expected to be recovered in more than 12 months.

	Notes	Consolidated		CSIRO	
		2012	2011	2012	2011
		$'000	$'000	$'000	$'000
Note 10 Land and buildings					
Freehold land – fair value		**378,593**	**386,572**	**378,593**	**386,572**
Buildings on freehold land					
– fair value		1,683,384	1,666,384	1,683,384	1,666,384
– accumulated depreciation		(934,376)	(887,366)	(934,376)	(887,366)
		749,008	779,018	749,008	779,018
– work in progress		25,396	14,336	25,396	14,336
Total buildings on freehold land		**774,404**	**793,354**	**774,404**	**793,354**
Leasehold improvements					
– fair value		354,515	351,503	354,515	351,503
– accumulated depreciation		(107,348)	(93,638)	(107,348)	(93,638)
		247,167	257,865	247,167	257,865
– work in progress		56,420	28,789	56,420	28,789
Total leasehold improvements		**303,587**	**286,654**	**303,587**	**286,654**
Buildings under finance lease					
– fair value		188,689	188,890	188,689	188,890
– accumulated depreciation		(63,528)	(56,867)	(63,528)	(56,867)
Total buildings under finance lease		**125,161**	**132,023**	**125,161**	**132,023**
Total land and buildings		**1,581,745**	**1,598,603**	**1,581,745**	**1,598,603**

All revaluations are conducted in accordance with the revaluation policy stated in Note 1.17. Land and buildings were revalued as at 30 June 2011 by a panel of independent valuers. The primary valuer was CB Richard Ellis. No indicators of impairment were identified for land and buildings.

No land or buildings are expected to be sold or disposed of within the next 12 months.

	Notes	Consolidated		CSIRO	
		2012 $'000	2011 $'000	2012 $'000	2011 $'000
Note 11 Plant and equipment					
Plant and equipment					
– fair value		760,519	766,377	760,519	766,377
– accumulated depreciation		(463,677)	(463,739)	(463,677)	(463,739)
		296,842	302,638	296,842	302,638
– work in progress		102,310	61,263	102,310	61,263
Total plant and equipment		**399,152**	**363,901**	**399,152**	**363,901**
Research vessel					
– fair value		80,453	15,178	80,453	15,178
– accumulated depreciation		(75,012)	(11,458)	(75,012)	(11,458)
		5,441	3,720	5,441	3,720
– work in progress		42,233	13,320	42,233	13,320
Total research vessel		**47,674**	**17,040**	**47,674**	**17,040**
Plant and equipment under finance lease					
– fair value		90	1,890	90	1,890
– accumulated depreciation		(65)	(1,686)	(65)	(1,686)
Total plant and equipment under finance lease		**25**	**204**	**25**	**204**
Total plant and equipment		**446,851**	**381,145**	**446,851**	**381,145**

All revaluations are conducted in accordance with the revaluation policy stated in Note 1.17. Plant and equipment were revalued as at 30 June 2012 by the Australian Valuation Office.

No indicators of impairment were identified for plant and equipment.

Notes 10 – 11 Land and buildings and plant and equipment (cont)

(a) Reconciliation of the opening and closing balances of Land and Buildings, Plant and Equipment (2011–12) – Consolidated

	Land	Buildings	Total Land and Buildings	Plant and Equipment	Total
	$'000	$'000	$'000	$'000	$'000
As at 1 July 2011					
Gross book value	386,572	2,249,902	2,636,474	858,028	3,494,502
Accumulated depreciation and impairment	-	(1,037,871)	(1,037,871)	(476,883)	(1,514,754)
Net book value as at 1 July 2011	**386,572**	**1,212,031**	**1,598,603**	**381,145**	**1,979,748**
Additions:					
By purchase	-	65,669	65,669	111,503	177,172
Reclassification	(8,177)	(5,654)	(13,831)	-	(13,831)
Revaluation and impairments	200	519	719	695	1,414
Depreciation expense	-	(69,413)	(69,413)	(45,029)	(114,442)
Disposals	(2)	-	(2)	(1,463)	(1,465)
Net book value as at 30 June 2012	**378,593**	**1,203,152**	**1,581,745**	**446,851**	**2,028,596**
Net book value as at 30 June 2012 represented by:					
Gross book value	378,593	2,308,404	2,686,997	985,605	3,672,602
Accumulated depreciation and impairment	-	(1,105,252)	(1,105,252)	(538,754)	(1,644,006)
Net book value as at 30 June 2012	**378,593**	**1,203,152**	**1,581,745**	**446,851**	**2,028,596**

Notes 10 – 11 Land and buildings and plant and equipment (cont)

(a) Reconciliation of the opening and closing balances of Land and Buildings, Plant and Equipment (2010–11) – Consolidated

	Land	Buildings	Total Land and Buildings	Plant and Equipment	Total
	$'000	$'000	$'000	$'000	$'000
As at 1 July 2010					
Gross book value	369,587	2,253,523	2,623,110	791,947	3,415,057
Accumulated depreciation and impairment	-	(1,256,363)	(1,256,363)	(461,630)	(1,717,993)
Net book value as at 1 July 2010	**369,587**	**997,160**	**1,366,747**	**330,317**	**1,697,064**
Additions:					
By purchase	-	64,001	64,001	94,622	158,623
Reclassification	-	-	-	(318)	(318)
Revaluation and impairments	18,085	209,418	227,503	-	227,503
Depreciation expense	-	(56,588)	(56,588)	(41,706)	(98,294)
Disposals	(1,100)	(1,960)	(3,060)	(1,770)	(4,830)
Net book value as at 30 June 2011	**386,572**	**1,212,031**	**1,598,603**	**381,145**	**1,979,748**
Net book value as at 30 June 2011 represented by:					
Gross book value	386,572	2,249,902	2,636,474	858,028	3,494,502
Accumulated depreciation and impairment	-	(1,037,871)	(1,037,871)	(476,883)	(1,514,754)
Net book value as at 30 June 2011	**386,572**	**1,212,031**	**1,598,603**	**381,145**	**1,979,748**

	Notes	Consolidated		CSIRO	
		2012	2011	2012	2011
		$'000	$'000	$'000	$'000
Note 12 Investment properties					
Investment properties – fair value	1.18	**52,000**	**50,950**	**52,000**	**50,950**
Reconciliation of the opening and closing balances of investment properties					
As at 1 July		50,950	50,665	50,950	50,665
Net gain from fair value adjustments		1,050	285	1,050	285
Net book value as at 30 June		**52,000**	**50,950**	**52,000**	**50,950**

As at 30 June 2012 investment properties comprise properties that are leased to third parties. The lease contains an initial non-cancellable period of ten years. No contingent rents are charged. Rental income from investment properties was $2.8 million (2011 $2.1 million). No separate record was maintained on direct operating expenses including repairs and maintenance for those investment properties. Fair value gain on investment properties for the year was $1.1 million (2011 $285,000).

No indicators of impairment were identified for investment properties.

Note 13 Intangibles

Computer software	1.19				
Internally developed – in use		40,410	35,337	40,410	35,337
Internally developed – in progress		2,549	3,015	2,549	3,015
		42,959	38,352	42,959	38,352
Accumulated amortisation		(14,248)	(10,006)	(14,248)	(10,006)
Total intangibles		**28,711**	**28,346**	**28,711**	**28,346**

No indicators of impairment were identified for intangible assets.

No intangibles are expected to be sold or disposed of within the next 12 months.

Note 13 Intangibles (cont)

(a) Reconciliation of opening and closing balances of Intangibles (2011–12) – Consolidated

	Internally developed software $'000	Total $'000
As at 1 July 2011		
Gross book value	38,352	38,352
Accumulated amortisation and impairment	(10,006)	(10,006)
Net book value as at 1 July 2011	**28,346**	**28,346**
Additions by purchase or internally developed	4,607	4,607
Amortisation	(4,242)	(4,242)
Net book value as at 30 June 2012	**28,711**	**28,711**
Net book value as at 30 June 2012 represented by:		
Gross book value	42,959	42,959
Accumulated amortisation and impairment	(14,248)	(14,248)
Net book value as at 30 June 2012	**28,711**	**28,711**

(b) Reconciliation of opening and closing balances of Intangibles (2010–11) – Consolidated

	Internally developed software $'000	Total $'000
As at 1 July 2010		
Gross book value	33,481	33,481
Accumulated amortisation and impairment	(6,675)	(6,675)
Net book value as at 1 July 2010	**26,806**	**26,806**
Additions by purchase or internally developed	4,656	4,656
Reclassification	318	318
Amortisation	(3,434)	(3,434)
Net book value as at 30 June 2011	**28,346**	**28,346**
Net book value as at 30 June 2011 represented by:		
Gross book value	38,352	38,352
Accumulated amortisation and impairment	(10,006)	(10,006)
Net book value as at 30 June 2011	**28,346**	**28,346**

	Notes	Consolidated		CSIRO	
		2012	2011	2012	2011
		$'000	$'000	$'000	$'000
Note 14 Inventories held for sale					
Books and media products – at lower of cost and net realisable value	1.20	**1,163**	**1,010**	**1,163**	**1,010**

No items of inventory were recognised at fair value less cost to sell.

All inventory is expected to be sold in the next 12 months.

Note 15 Other non-financial assets

Contract research work in progress – at cost	1.6	34,199	32,272	34,199	32,272
Other prepayments		7,897	8,590	7,895	8,590
Total other non-financial assets		**42,096**	**40,862**	**42,094**	**40,862**

No indicators of impairment were identified for other non–financial assets.

All other non-financial assets are expected to be recovered in no more than 12 months.

Note 16 Properties held for sale

Properties held for sale	1.28	**14,319**	**11,865**	**14,319**	**11,865**
Reconciliation of the opening and closing balances of properties held for sale					
As at 1 July		11,865	47,913	11,865	47,913
Additions		-	-	-	-
Reclassification		13,831	-	13,831	-
Disposals		(9,749)	(31,080)	(9,749)	(31,080)
Impairment loss on revaluation		(1,628)	(4,968)	(1,628)	(4,968)
Net book value as at 30 June		**14,319**	**11,865**	**14,319**	**11,865**

Balance as at 30 June 2012 represents properties identified as surplus to CSIRO and classified as 'held for sale'. These properties have been valued by independent valuers. They are expected to be sold in the market and settled within the next 12 months. An impairment loss of $1.6 million on the re-measurement of properties held for sale to the lower of their carrying amount and fair value cost to sell, has been recognised in the Statement of Comprehensive Income (2011 impairment loss $4.9 million).

	Notes	Consolidated		CSIRO	
		2012	2011	2012	2011
		$'000	$'000	$'000	$'000
Note 17 Suppliers					
Trade creditors and accruals		72,152	84,195	70,438	83,750
Supplier payable expected to be settled within 12 months.					
Related entities		1,241	1,170	1,241	1,170
External entities		70,911	83,025	69,197	82,580
		72,152	84,195	70,438	83,750
Settlement is usually made within 30 days.					
Note 18 Other payables					
Accrued salaries and wages		23,749	20,273	22,310	20,032
Redundancies		5,836	3,349	5,836	3,349
Contract research revenue received in advance	1.6	106,370	96,648	106,370	96,648
Other revenue received in advance		19,869	26,105	19,869	26,105
Other creditors and accrued expenses		15,241	5,574	18,010	5,828
GST payable to ATO		-	1,199	-	1,569
Total other payables		171,065	153,148	172,395	153,531
All other payables are expected to be settled within 12 months.					
Note 19 Leases					
Finance leases		61,033	65,200	61,033	65,200
Total finance leases		61,033	65,200	61,033	65,200
Payable:					
Within one year					
Minimum lease payments		7,034	7,082	7,034	7,082
Deduct: future finance charges		(2,756)	(2,915)	(2,756)	(2,915)
Total payable within one year (current)		4,278	4,167	4,278	4,167
In one to five years					
Minimum lease payments		28,062	28,449	28,062	28,449
Deduct: future finance charges		(9,195)	(9,961)	(9,195)	(9,961)
Total payable in one to five years		18,867	18,488	18,867	18,488
In more than five years					
Minimum lease payments		45,089	51,737	45,089	51,737
Deduct: future finance charges		(7,201)	(9,192)	(7,201)	(9,192)
Total payable in more than five years		37,888	42,545	37,888	42,545
Total finance leases recognised on the Balance Sheet		61,033	65,200	61,033	65,200

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. CSIRO guarantees the residual values of all assets leased. There are no contingent rentals. The interest rate implicit in the leases averaged 5% per annum (2011 5% per annum). The lease liabilities are secured by the lease assets.

	Notes	Consolidated		CSIRO	
		2012	2011	2012	2011
		$'000	$'000	$'000	$'000
Note 20 Deposits					
Deposits		7,130	6,472	7,130	6,472
Deposits represent monies held on behalf of the following third parties:					
Cooperative Research Centres		-	250	-	250
Goyder Trust		5,566	4,820	5,566	4,820
Others		1,564	1,402	1,564	1,402
Total deposits		7,130	6,472	7,130	6,472
All deposits are expected to be settled within the next 12 months.					
Note 21 Employee provisions					
Annual leave		63,816	59,922	63,816	59,922
Long service leave		176,532	139,494	176,532	139,494
Severance pay		6,506	6,148	6,506	6,148
Total employee provisions		246,854	205,564	246,854	205,564
Employee provisions are expected to be settled in:					
No more than 12 months		223,391	187,635	223,391	187,635
More than 12 months		23,463	17,929	23,463	17,929
Total employee provisions		246,854	205,564	246,854	205,564

	Notes	Consolidated		CSIRO	
		2012	2011	2012	2011
		$'000	$'000	$'000	$'000
Note 22 Cash flow reconciliation					
Reconciliation of cash and cash equivalents as per Balance Sheet to Cash Flow Statement					
Cash and cash equivalents as per:					
Cash Flow Statement		381,687	308,478	240,976	161,490
Balance Sheet	6	381,687	308,478	240,976	161,490
Difference		-	-	-	-
Reconciliation of net cost of services to net cash from operating activities:					
Net cost of service		(531,384)	(733,917)	(524,479)	(730,710)
Add revenue from Government		724,939	720,415	724,939	720,415
Share of net operating surplus/(deficit) of joint venture accounted for using the equity method		10	(184)	10	(184)
Adjustments for non-cash items					
Depreciation and amortisation		118,684	101,728	118,684	101,728
Net write-down and impairment of assets		19,357	25,601	19,357	25,601
(Gains)/loss from sale of property, plant and equipment		(379)	(118)	(379)	(118)
(Gains)/loss from sale of equity investments and intellectual property		(30)	(4,822)	(30)	(4,822)
Realisation of fair value gain reserve on available for sale investments		-	(140)	-	(140)
Changes in assets/liabilities					
(Increase)/decrease in trade and other receivables		(157,793)	12,424	(158,433)	11,629
(Increase)/decrease in inventories		(153)	143	(153)	143
(Increase)/decrease in other non–financial assets		(1,234)	1,175	(1,232)	1,175
(Increase)/decrease in GST receivable		(1,103)	726	(771)	429
Increase/(decrease) in GST payable		(1,199)	1,199	(1,569)	1,569
Increase/(decrease) in employee liabilities		41,290	16,453	41,290	16,453
Increase/(decrease) in supplier payables		(12,043)	(10,746)	(13,312)	(11,561)
Increase/(decrease) in other payables		19,116	(4,607)	20,433	(54,694)
Increase/(decrease) in deposits–liabilities		658	4,010	658	4,010
Net cash from operating activities		**218,736**	**129,340**	**225,013**	**80,923**

	Notes	Consolidated		CSIRO	
		2012	2011	2012	2011
		$'000	$'000	$'000	$'000
Note 23 Contingent liabilities and assets					
Quantifiable Contingencies					
Contingent assets					
Under a number of commercial agreements, the Group has receivable assets, to be received at a future date upon the conditions of the agreements being met. At this stage, it is too early to determine whether the conditions of the agreements will be met and predict when the amounts will be received.					
Bank guarantees received from suppliers.		4,597	-	4,597	-
Bank guarantees received against a convertible note.		1,200	-	1,200	-
Anticipated net insurance claims.		1,863	-	1,863	-
Total contigent assets		**7,660**	**-**	**7,660**	**-**
Contingent liabilities					
Estimated legal claims arising from employment, motor vehicle accidents, commercial and patent disputes. The Group has denied liability and is defending the claims. The estimate is based on precedent in such cases.		(300)	(300)	(300)	(300)
Financial guarantee for a bank loan.		-	(17)	-	(17)
Financial guarantee for an export agreement.		(45)	-	(45)	-
Total contigent liabilities		**(345)**	**(317)**	**(345)**	**(317)**
Total net contingent asset/(liability)		**7,315**	**(317)**	**7,315**	**(317)**

Unquantifiable contingencies

CSIRO is currently involved in a legal proceeding in the USA related to a wireless local area network (WLAN) patent which it owns and has licensed broadly. The proceeding is additional to proceedings settled by CSIRO in 2009 and in March/April 2012. It involves claims and counterclaims related to patent infringement, patent validity and related matters. Trial is set for January 2014. If successful, CSIRO expects to receive significant revenue which would exceed the associated legal cost. At this stage, the revenue and costs are considered unquantifiable.

24 Joint ventures – Cooperative Research Centres (CRCs)

CSIRO was a party to 24 CRCs during 2011–12.

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 the CSIRO's share of the new entity is treated either as subsidiary, joint venture or associate in the Balance Sheet as appropriate.

CSIRO's total cash and in-kind contribution (e.g. staff and use of assets) to CRCs from its own resources was $26.8 million for the year (2011 $33.8 million). Contributions made by CSIRO are expensed as incurred and these are included in the Statement of Comprehensive Income.

No contingent liabilities were reported by the CRCs in which CSIRO is a participant.

CSIRO is a participant in the following CRCs as at 30 June 2012

Name of CRC	Expected Termination date
Advanced Automotive Technology CRC	30/06/12
Advanced Manufacturing CRC	30/06/14
Antarctic Climate and Ecosystems CRC	30/06/17
Australasian Invasive Animals CRC	30/06/12
Australian Poultry CRC	30/06/17
Australian Seafood CRC	30/06/14
Beef Genetic Technologies CRC	30/06/12
Bushfire CRC	30/06/13
CRC for Cancer Therapeutics	30/06/14
CAST CRC	30/06/12
Cotton Catchment Communities CRC	30/06/12
CRC for Contaminated Assessment and Remediation of the Environment (CRC for CARE)	30/06/20
CRC for Forestry	30/06/12
CRC for Mental Health	30/06/18
Deep Exploration Technologies CRC	30/06/16
e-Water CRC	30/06/12
Future Farm Industries CRC	30/06/14
Greenhouse Gas Technologies CRC	30/06/15
National Plant Biosecurity CRC	30/06/12
Parker CRC for Integrated Hydrometallurgy Solutions	30/06/12
Polymers CRC	30/06/12
Remote Economic Participation CRC	30/06/17
Sheep Industry Innovation CRC	30/06/14
Vision CRC	30/06/17

Note 25 Resources made available to the Group and not included in the Balance Sheet

	Land	Buildings	Plant and Equipment	Total
	$'000	$'000	$'000	$'000
At cost or fair value	4,615	153	38,497	43,265
Accumulated depreciation	-	-	(27,230)	(27,230)
Net value as at 30 June 2012	**4,615**	**153**	**11,267**	**16,035**
Net value as at 30 June 2011	**4,615**	**159**	**9,227**	**14,001**

The above assets are made available to CSIRO 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 1.7, or made available to CSIRO 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. There are some restrictions on how these assets are operated. The fair value of the continuing use of these assets could not be reliably determined and therefore are not brought to account in the Statement of Comprehensive Income.

Note 26 Monies held in trust

	2012 $'000	2011 $'000
Monies held in trust represented by cash, deposits and investments for the benefit of the Group which are not included in the Balance Sheet are:		
The Sir Ian McLennan Achievement for Industry Award – established to award outstanding contributions by the Group's scientists and engineers to national development.	264	265
The Elwood and Hannah Zimmerman Trust Fund – established to fund weevil research and the curation of the Australian National Insect Collection (ANIC) weevil collection.	4,729	4,574
The Schlinger Trust – established to research the taxonomy, biosystematics, general biology and biogeography of Australasian Diptera conducted by the Australian National Insect Collection.	2,421	2,285
Total monies held in trust as at 30 June	**7,414**	**7,124**

Movement summary of monies held in trust:

	McLennan	Zimmerman	Schlinger	Total
	$'000	$'000	$'000	$'000
Balance as at 1 July 2011	265	4,574	2,285	7,124
Receipts during the year	-	74	-	74
Interest and distribution	14	138	136	288
Expenditure	(15)	(57)		(72)
Balance as at 30 June 2012	**264**	**4,729**	**2,421**	**7,414**

Note 27 Collections

CSIRO has a number of collections used for scientific research. These 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, CSIRO has not recognised them as an asset in its financial statements.

The main collections held by CSIRO 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) – The 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 include, but are not limited to, the Australian Tree Seed Collection, the Dadswell Memorial Wood Collection, CSIRO collection of living microalgae and the Wood-Inhabiting fungi collection.

	Notes	Consolidated		CSIRO	
		2012	2011	2012	2011
Note 28 Remuneration of auditors		$	$	$	$
Financial statement audit services are provided to the Group by the Auditor-General					
The fee for auditing services provided was:		**221,900**	**222,000**	**210,000**	**210,000**
No other services were provided by the Auditor-General.					
Note 29 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		411,527	470,775	411,527	470,775
Payments to superannuation funds for Board Members		35,763	54,455	35,763	54,455
Total remuneration		**447,290**	**525,230**	**447,290**	**525,230**
The remuneration of the Chief Executive Officer, who is also a Board Member of the Group is reported under Note 30 Senior Executives Remuneration.					
The number of Board Members whose total remuneration fell within the following bands were:					
$		**Number**	**Number**	**Number**	**Number**
0 – 29,999		4	3	4	3
30,000 – 59,999		4	5	4	5
60,000 – 89,999		2	2	2	2
90,000 – 119,999		1	1	1	1
Total		**11**	**11**	**11**	**11**

	Notes	Consolidated		CSIRO	
		2012	2011	2012	2011
		$	$	$	$
Note 30 Senior Executive Remuneration					
(a) Senior Executive remuneration expense for the reporting period[1&2]					
Short-term employee benefits:					
Salary		6,861,967	7,320,423	6,861,967	7,320,423
Annual leave accrued		614,281	679,565	614,281	679,565
Performance bonuses		1,703,006	1,687,027	1,703,006	1,687,027
Additonal Allowances		486,559	497,045	486,559	497,045
Total short-term employee benefits		**9,665,813**	**10,184,060**	**9,665,813**	**10,184,060**
Post-employment benefits:					
Superannuation		1,000,704	1,011,139	1,000,704	1,011,139
Total post-employment benefits		**1,000,704**	**1,011,139**	**1,000,704**	**1,011,139**
Other long-term benefits:					
Long-service leave[3]		795,515	423,594	795,515	423,594
Total other long-term benefits		**795,515**	**423,594**	**795,515**	**423,594**
Termination benefits		41,878	58,316	41,878	58,316
Total termination benefits		**41,878**	**58,316**	**41,878**	**58,316**
Total		**11,503,910**	**11,677,109**	**11,503,910**	**11,677,109**

Notes:

2011 comparatives have been updated to represent the changes in 2012 FMOs.

[1] Note 30 (a) is prepared on an accrual basis (therefore the performance bonus expenses disclosed above may differ from the cash 'bonus paid' in Note 30 (b)).

[2] Note 30 (a) excludes acting arrangements and part-year service where total remuneration expensed for a senior executive was less than $150,000.

[3] The movement in long service leave includes the impact of the increased discounting factor for employee provisions as at 30 June 2012.

Note 30 Senior Executive Remuneration (cont)

Note 30 (b) Average annual reportable remuneration paid to substantive senior executives during the reporting period

	2012					
Average annual reportable remuneration[1]	**Senior executives number**	**Reportable salary[2&6]**	**Contributed superannuation[3&6]**	**Reportable allowances[4]**	**Bonus paid[5]**	**Total**
		$	$	$	$	$
Total remuneration (including part-time arrangements):						
$150,000 to $179,999	1	144,390	20,218	-	-	164,608
$240,000 to $269,999	3	204,425	24,798	-	29,609	258,832
$270,000 to $299,999	8	199,589	36,467	-	48,550	284,606
$300,000 to $329,999	6	211,270	49,316	-	54,073	314,659
$330,000 to $359,999	5	212,578	51,746	-	80,331	344,655
$360,000 to $389,999	3	266,449	50,412	-	59,607	376,468
$390,000 to $419,999	2	265,038	68,254	-	70,060	403,352
$420,000 to $449,999	1	313,118	39,639	-	75,495	428,252
$450,000 to $479,999	1	339,679	40,890	-	82,457	463,026
$480,000 to $509,999	1	342,538	59,063	-	88,040	489,641
$720,000 to $749,999	1	523,520	64,478	-	149,523	737,521
Total	**32**					

Note 30 Senior Executive Remuneration (cont)

Note 30 (b) Average annual reportable remuneration paid to substantive senior executives during the reporting period

		2011				
Average annual reportable remuneration[1]	**Senior executives number**	**Reportable salary[2]**	**Contributed superannuation[3&6]**	**Reportable allowances[4]**	**Bonus paid[5]**	**Total**
		$	$	$	$	$
Total remuneration (including part-time arrangements):						
less than $150,000	3	40,385	6,895	-	11,093	58,373
$180,000 to $209,999	2	170,238	22,346	-	-	192,584
$210,000 to $239,999	2	193,689	25,167	-	12,744	231,600
$240,000 to $269,999	3	176,952	28,587	-	47,515	253,054
$270,000 to $299,999	6	208,959	35,423	-	44,067	288,449
$300,000 to $329,999	8	216,376	42,996	-	53,551	312,923
$330,000 to $359,999	7	241,858	45,448	-	54,361	341,667
$360,000 to $389,999	2	241,858	32,959	-	64,122	338,939
$390,000 to $419,999	1	248,373	86,895	-	65,543	400,811
$420,000 to $449,999	1	330,992	37,613	-	66,655	435,260
$450,000 to $479,999	1	335,434	56,356	-	81,733	473,523
$690,000 to $719,999	1	510,207	62,600	-	141,831	714,638
Total	37					

Note 30 Senior Executive Remuneration (cont)

Note 30 (b) Average annual reportable remuneration paid to substantive senior executives during the reporting period (cont)

Notes:

1 This table reports substantive senior executives who received remuneration during the reporting period. Each row is an averaged figure based on headcount for individuals in the band.

2 Reportable salary[2] includes the following:

(a) gross payments (less any bonuses paid, which are separated out and disclosed in the 'bonus paid' column)

(b) reportable fringe benefits (at the net amount prior to 'grossing up' to account for tax benefits)

(c) exempt foreign employment income.

3 The 'contributed superannuation' amount is the average actual superannuation contributions paid to senior executives in that reportable remuneration band during the reporting period, including any salary sacrificed amounts, as per e.g. the individuals' payslips.

4 'Reportable allowances' are the average actual allowances paid as per the 'total allowances' line on individuals' payment summaries.

5 'Bonus paid' represents average actual bonuses paid during the reporting period in that reportable remuneration band. The 'bonus paid' within a particular band may vary between financial years due to various factors such as individuals commencing with or leaving the entity during the financial year.

6 Various salary sacrifice arrangements were available to senior executives including superannuation, motor vehicle and expense payment fringe benefits. Salary sacrifice benefits are reported in the 'reportable salary' column, excluding salary sacrificed superannuation, which is reported in the 'contributed superannuation' column.

Note 30 Senior Executive Remuneration (cont)

Note 30 (c) Other highly paid staff – Consolidated

	2012					
Average annual reportable remuneration[1]	**Staff number**	**Reportable salary[2]**	**Contributed superannuation[3&6]**	**Reportable allowances[4]**	**Bonus paid[5]**	**Total**
		$	$	$	$	$
Total remuneration (including part-time arrangements):						
$150,000 to $179,999	465	132,300	28,006	-	1,784	162,090
$180,000 to $209,999	164	154,280	35,032	-	4,129	193,441
$210,000 to $239,999	74	173,531	38,255	-	12,217	224,003
$240,000 to $269,999	19	191,200	37,318	-	19,941	248,459
$270,000 to $299,999	4	179,738	52,577	-	50,258	282,573
$300,000 to $329,999	7	215,270	51,652	-	43,800	310,722
$330,000 to $359,999	3	231,622	64,308	-	48,549	344,479
$360,000 to $389,999	1	281,013	15,775	-	65,485	362,273
$420,000 to $449,999	1	307,133	47,550	-	74,240	428,923
Total	**738**					

Note 30 Senior Executive Remuneration (cont)

Note 30 (c) Other highly paid staff – Consolidated

		2011				
Average annual reportable remuneration[1]	**Staff number**	**Reportable salary[2&6]**	**Contributed superannuation[3&6]**	**Reportable allowances[4]**	**Bonus paid[5]**	**Total**
		$	$	$	$	$
Total remuneration (including part-time arrangements):						
$150,000 to $179,999	338	131,393	28,751	-	3,111	163,255
$180,000 to $209,999	156	152,096	34,784	-	6,271	193,151
$210,000 to $239,999	71	169,459	39,813	-	13,882	223,154
$240,000 to $269,999	8	183,355	31,954	-	31,736	247,045
$270,000 to $299,999	5	199,258	46,317	-	40,113	285,688
$300,000 to $329,999	2	227,048	40,450	-	35,338	302,836
$330,000 to $359,999	3	174,262	70,239	-	98,975	343,476
$360,000 to $389,999	2	219,821	82,994	-	59,798	362,613
$390,000 to $419,999	1	292,352	48,486	-	68,109	408,947
Total	**586**					

Note 30 Senior Executive Remuneration (cont)

Note 30 (c) Other highly paid staff (cont)

Notes:

1 This table reports staff:
   (a) who were employed by the Group during the reporting period
   (b) whose reportable remuneration was $150,000 or more for the financial period
   (c) were not required to be disclosed in Tables A, B or Director disclosures.
   Each row is an averaged figure based on headcount for individuals in the band.
2 'Reportable salary' includes the following:
   (a) gross payments (less any bonuses paid, which are separated out and disclosed in the 'bonus paid' column)
   (b) reportable fringe benefits (at the net amount prior to 'grossing-up' to account for tax benefits);
   (c) exempt foreign employment income.
3 The 'contributed superannuation' amount is the average actual superannuation contributions paid to staff in that reportable remuneration band during the reporting period, including any salary sacrificed amounts, as per e.g. the individuals' payslips.
4 Reportable allowances' are the average actual allowances paid as per the 'total allowances' line on individuals' payment summaries.
5 'Bonus paid' represents average actual bonuses paid during the reporting period in that reportable remuneration band. The 'bonus paid' within a particular band may vary between financial years due to various factors such as individuals commencing with or leaving the entity during the financial year.
6 Various salary sacrifice arrangements were available to other highly paid staff including superannuation, motor vehicle and expense payment fringe benefits. Salary sacrifice benefits are reported in the 'reportable salary' column, excluding salary sacrificed superannuation, which is reported in the 'contributed superannuation' column.
   Note - Consolidated table includes one WLAN employee disclosed in 2011–12 in the salary band $210,000 to $239,999 (2010 –11 $330,000 to $359,999).

Note 31 Meetings of the Board and Board Committees – CSIRO

During the 2011–12 financial year seven Board meetings, five Board Audit Committee meetings, five Board Nominations and Remuneration Committee meetings and five Board Commercial Committee meetings were held. The number of meetings attended by each of the eligible Board members was as follows:

Board Member	CSIRO Board		CSIRO Board Audit Committee		CSIRO Board Commercial Committee		CSIRO Board Nominations and Remuneration Committee	
	Number eligible to attend as a member	Number attended	Number eligible to attend as a member	Number attended	Number eligible to attend as a member	Number attended	Number eligible to attend as a member	Number attended
M S Boydell	7	6	5	5	-	4	-	1
I Chubb	3	2	-	-	-	-	2	1
M Clark	7	7	-	4	-	5	-	4
T A Cutler	7	5	5	4	5	4	-	1
E J Doyle	7	6	3	3	2	4	5	5
P Høj	4	2	1	1	-	-	-	1
S In't Veld	-	-	-	-	-	-	-	-
J Kerin	1	1	2	2	-	1	-	1
S McKeon	7	7	-	1	5	4	5	3
J H Ranck	7	7	-	3	5	5	5	5
D Russell*	5	6	-	-	-	1	-	-
T H Spurling*	5	7	-	-	4	5	4	5

Notes:
*Professor Spurling's term expired on 30 April 2012. He was reappointed on 28 June 2012. He attended two Board meetings, one Board Commercial Committee Meeting and one Board Nominations and Remuneration Committee as an observer.

*Dr Russell was appointed on 19 October 2011. He attended one Board Meeting as an observer.

Note 31 Meetings of the Board and Board Committees – Consolidated

During the 2010–11 financial year, eight Board meetings, six Board Audit Committee meetings, twelve Board Remuneration Committee meetings, three Board Endowment Committee meetings and nine Board Commercial Committee meetings were held. The number of meetings attended by each of the eligible Board members was as follows:

Board Member	CSIRO Board		CSIRO Board Audit Committee		CSIRO Board Nominations and Remuneration Committee		CSIRO Board Commercial Committee		SIEF Board Endowment Committee	
	Number eligible to attend as a member	Number attended	Number eligible to attend as a member	Number attended	Number eligible to attend as a member	Number attended	Number eligible to attend as a member	Number attended	Number eligible to attend as a member	Number attended
M S Boydell	8	8	6	6	-	-	-	-	2	3
I Chubb	8	5	-	-	12	7	-	-	-	-
M Clark*	8	8	-	-	-	-	-	-	-	-
T A Cutler	8	8	6	5	-	-	9	9	3	3
E J Doyle	8	7	-	-	12	12	9	9	-	-
J Kerin	8	8	6	5	-	-	-	-	-	-
S McKeon	8	8	-	-	12	12	8	8	3	3
D M O'Toole	7	4	5	4	-	-	-	-	1	-
M Paterson	1	1	-	-	-	-	-	-	-	-
J H Ranck	1	1	-	-	1	1	1	1	-	-
D J Rathbone	1	1	3	-	-	-	-	-	-	-
T H Spurling	8	8	-	-	12	11	9	8	-	-

*CEO attended as an observer – 4 Board Audit Committee meetings, 12 Board Nominations and Remuneration Committee meetings, 9 Board Commercial Committee meetings and 3 SIEF Board Endowment Committee meetings.

Note 32 Related party disclosures

(a) Controlled Entities

Science and Industry Endowment Fund was established under the *Science and Industry Endowment Act 1926*. The Fund is deemed to be a CSIRO controlled entity in accordance with AASB 127 *Consolidated and Separate Financial Statements* and UIG 112. The Science and Industry Endowment Fund's separate financial statements are reported in the CSIRO Annual Report.

The principal activity of the Science and Industry Endowment Fund is to provide assistance to persons engaged in scientific research and in training of students in scientific research.

WLAN Services Pty Ltd was established in 2005. The company is a CSIRO controlled entity in accordance with AASB 127 Consolidated and Separate Financial Statements and UIG 112. The principal activity is to provide services to CSIRO.

Hydropem Pty Ltd was wound up in 2011–12 and has not been included in the consolidated financial statements.

Names	CSIRO Investment Amount		% Equity Interest Held	
	2012 $	2011 $	2012 $	2011 $
Science and Industry Endowment Fund (SIEF)	-	-	100%	100%
WLAN Services Pty Ltd	1	1	100%	100%
Hydropem Pty Ltd	-	1	-	100%
Total	**1**	**2**		

(b) Board Members

The Board Members of the Group during the financial year were:

S McKeon AO (Chairman)
T A Cutler (Deputy Chairman)
M E Clark (Chief Executive)
M S Boydell
I Chubb (resigned 8 December 2011)
E J Doyle
P Høj (commenced 7 December 2011)
S In't Veld (commenced 28 June 2012)
The Honourable J Kerin AM (term completed 2 October 2011)
J H Ranck
D Russell (commenced 19 October 2011)
T H Spurling AM

Remuneration – the aggregate remuneration of Board Members is disclosed in Note 29.

(c) Board Members' interest in contracts

Since 1 July 2011 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 29 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.

This information relates to the period 1 July 2011 to 30 June 2012.

Note 32 Related party disclosures (cont)

(d) Other transactions of Board Members – related entities

Mr S McKeon is the Executive Chairman of Macquarie Group's Melbourne Office, Chairman of Business for Millennium Development and Global Poverty Project Australia and is a member of the AusAid Business Engagement Steering Committee. He is a Director of Global Poverty Project, the Red Dust Role Models and Vision Fund International. He is also a member of the Federal Government's Human Rights Grants Scheme Advisory Panel, the Victorian Government's National Disability Insurance Scheme Implementation Taskforce and Chair of the 2012 Federal Government Review into Medical and Health Research. 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 technology and strategy consultancy. He is also a Director of The Conversation Ltd and MHM Higher Education Pty Ltd. He is Chairman of the Advisory Board of the Centre of Excellence for Creative Industries and Innovation and is a member of the Design Research Institute Advisory Board RMIT and RMIT College of Business Industry Advisory Board. Dr Cutler is Chair of the Open Technology Foundation and Chairman of The Centre for the Study of Choice Advisory Board, UTS. In May 2012 CSIRO appointed Dr Cutler as Chair and Director of the Chilean Centre of Excellence in Mining and Mineral Processing and nominated Dr Cutler as Chairman and Director of the legal entity to be established to govern the Centre. During 2011-12 Dr Cutler ceased as Director of the Multimedia University (Malaysia) and The National Health Call Centre Network 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.

Dr M Clark is a member of the Prime Minister's Science, Engineering and Innovation Council. Dr Clark became a member of the World Economic Forum, Global Advisory Council for Measuring Sustainability in July 2012. Dr Clark is also a Director of a family company, registered 27 June 2011: Cradle Mountain Carbon Pty Ltd. ACN 151 512 220, the business purpose of which is as a vehicle to hold land for conservation. Dr Clark is a Director of a family company, registered 27 February 2007: Ballantyne Holdings Pty Ltd. ACN 008 729 002 the business purpose of which is commercial property. She is also trustee of the Science and Industry Endowment Fund, a member of the Australia Advisory Board of Bank of America Merrill Lynch and a member of the Chairman's panel of the Great Barrier Reef Foundation. Dr Clark is also Commissioner of The Commission on Sustainable Agriculture and Climate Change and Chair of the Mining for Development Advisory Board for AusAID. Dr Clark ceased ~~as~~ to be a member of the Automotive Industry Innovation Council in 2012. The National Research Infrastructure Council and Prime Minister's Taskforce on Manufacturing concluded in 2012. 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 M S Boydell is the Chairperson of the Gladstone Area Water Board and Acting Commissioner of the Queensland Water Commission. Ms Boydell is a Director of Uniquest Pty Limited and UATC Pty Ltd. During 2011-12 Ms Boydell resigned as a Director of Energex Limited and ceased to be a Member of the Surat Basin Coal Seam Gas Engagement Group. 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.

Professor I Chubb was appointed Chief Scientist for Australia on 23 May 2011. Professor Chubb was Vice-Chancellor of the Australian National University till March 2011. 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 the Hunter Valley Research Foundation. She is also Chair of the Hunter Founders Forum and a Director of GPT Ltd and Boral Ltd. Dr Doyle is also a non-Executive Director of Bradken Limited, a member of the Enterprise Connect Advisory Council and 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.

Note 32 Related party disclosures (cont)

(d) Other transactions of Board Members – related entities (cont)

Professor P Høj is Vice Chancellor and President of the University of South Australia until 7 September 2012. In April 2012 he was appointed Vice Chancellor and President of the University of Queensland and will take up that role on 8 October 2012. He is also Deputy Chair of Universities Australia, and a member of the Australian Qualifications Framework Council. He is a Fellow of the Australian Academy of Technological Sciences and Engineering, a Director of the South Australian Health and Medical Research Institute (SAHMRI) and a foreign member of the Danish Academy of Sciences and Letters. During 2011-12 Professor Høj ceased as a Member of the Higher Education Research Reference Group and Board Member of Business South Australia. He also ceased as a Member of the National Research Infrastructure Council upon its conclusion on 30 June 2012. 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 S In't Veld is a Director of Asciano Limited. She is also an Advisory Council Member of SMART Infrastructure and a council member of AICD (WA). 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.

The Honourable Mr J Kerin is Chair of the Poultry CRC, the National Weeds and Productivity Research Program Advisory R&D Committee and the Board of Governors of The Crawford Fund. He is a member of the Board of the Clunies Ross Foundation and Governor of the World Wildlife Fund. 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 J H Ranck is a Director of Elders and Innotegic Pty Ltd and a member of the Board of the Bush Heritage Foundation. 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 D Russell is Secretary of the Commonwealth Department of Industry, Innovation, Science, Research and Tertiary Education. He is also a Member of the Australian National Institute of Public Policy - ANU Board, Education Investment Fund (EIF) Advisory Board, Melbourne Institute Advisory Board - Melbourne University and Standard Business Reporting Board (SBR) - Treasury. 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.

Professor T H Spurling is a Research Professor in the Faculty of Life and Social Sciences, Swinburne University of Technology, Victoria. He is also a member of the Board of the International Centre for Radio Astronomy Research; and Chairman of the Board of Advanced Molecular Technologies 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.

	Notes	Consolidated		CSIRO	
		2012	2011	2012	2011
Note 33 Financial instruments		$'000	$'000	$'000	$'000
(a) Categories of financial instruments					
Financial assets					
Available for sale financial assets					
Investments	9	17,142	31,969	17,142	31,969
Loans and receivables					
Cash at bank	6	35,755	36,874	35,713	36,490
Term deposits	6	345,932	271,604	205,263	125,000
Receivables for goods and services	7	76,147	80,791	76,147	80,791
Other receivables	7	172,161	9,184	172,301	8,684
Carrying amount of financial assets		**647,137**	**430,422**	**506,566**	**282,934**
Financial liabilities					
Finance lease liabilities	19	61,033	65,200	61,033	65,200
Trade creditors	17	72,152	84,195	70,438	83,750
Research revenue received in advance	18	106,370	96,648	106,370	96,648
Deposits	20	7,130	6,472	7,130	6,472
Other creditors	18	64,695	55,301	66,025	55,314
Carrying amount of financial liabilities		**311,380**	**307,816**	**310,996**	**307,384**
(b) Net income and expense from financial assets					
Cash at bank and term deposits					
Interest revenue	4.2	17,890	15,174	9,195	8,729
Net gain from financial assets		**17,890**	**15,174**	**9,195**	**8,729**
(c) Net income and expense from financial liabilities					
Finance Leases					
Interest expense	3.4	3,271	3,266	3,271	3,266
Net loss from financial liabilities		**3,271**	**3,266**	**3,271**	**3,266**

(d) Fair value of financial instruments

A comparison between the fair value and carrying amount of the Group's financial assets and liabilities is not disclosed because the Group considers that the carrying amounts reported in the balance sheet are a reasonable approximation of the fair value of these financial assets and liabilities.

(e) Fair value hierarchy

The table below analyses financial instruments carried at fair value, by valuation method. The different levels have been defined as follows:

Level 1: quoted prices (unadjusted) in active markets for identical assets or liabilities.

Level 2: inputs other than quoted prices included within Level 1 that are observable for the asset or liability, either directly (i.e. as prices) or indirectly (i.e. derived from prices).

Level 3: inputs for the asset or liability that are not based on observable market data (unobservable inputs).

There have been no transfers to or from Level 1 and Level 3 during the year ended 30 June 2012 (2011 no transfers in either direction).

Note 33 Financial instruments (cont)	Notes	Consolidated		CSIRO	
		2012 $'000	2011 $'000	2012 $'000	2011 $'000
(e) Fair value hierarchy (cont)					
Fair value measurements categorised by fair value hierarchy					
Level 1	9	5,166	10,461	5,166	10,461
Level 2		-	-	-	-
Level 3	9	11,976	21,508	11,976	21,508
Total		**17,142**	**31,969**	**17,142**	**31,969**
Reconciliation of Level 3 fair value hierarchy					
As at 1 July		21,508	19,706	21,508	19,706
Total losses for the period recognised in statement of comprehensive income[1]	3.5	(12,832)	(4,140)	(12,832)	(4,140)
Total gains recognised in other comprehensive income[2]	5.2	26	190	26	190
Purchases		1,668	4,194	1,668	4,194
Sales		-	(194)	-	(194)
Issues		1,606	1,752	1,606	1,752
Closing balance		**11,976**	**21,508**	**11,976**	**21,508**

[1] These losses are presented in the Statement of Comprehensive Income Note 3.5.

[2] Gains for the period included in other comprehensive income that are attributable to gains relating to those assets held at the end of the reporting period is $26,000. Those gains are presented in the Statement of Comprehensive Income in Note 5.2.

Fair value of investments in unlisted companies

For investments in unlisted companies where there is no readily available market pricing for the equity instruments, the fair value has been determined by applying valuation techniques in line with the generally accepted valuation guidelines 'International Private Equity and Venture Capital Valuation Guidelines (AVCAL)'.

Where recent transactions for the unlisted companies' equity have taken place, these equity transaction prices are used to value CSIRO's investment.

For unlisted companies that have not had any recent equity transactions, other AVCAL valuation techniques are used such as discounted cash flows and share of net assets.

In addition, independent valuations are performed as at reporting date for unlisted companies that are considered to have a material impact on CSIRO's investment portfolio.

Investments in special purpose entities are either valued at cost or share of net realisable assets since a reliable estimate of fair value cannot be established. These entities have been set up primarily to gain access to research facilities/networks, or to provide services to owners. Hence, there is no 'active market' for these equity investments. CSIRO is a long-term shareholder and is unlikely to dispose of its interest in these investments.

Note 33 Financial instruments (cont)

(f) Credit risk

The maximum exposure to credit risk is the risk that arises from potential default of a debtor. This amount is equal to the total amount of trade and other receivables of $249.2 million (2011 $88.5 million). The Group has assessed the risk of the default on payment and has allocated $1.5 million (2011 $0.9 million) to an allowance for impairment account.

The Group manages its credit risk by undertaking background and credit checks prior to allowing a debtor relationship. In addition, the Group has policies and procedures that guide employees to apply debt recovery techniques. The Group holds no collateral to mitigate against credit risk.

Credit risk of financial instruments not past due or individually determined as impaired – Consolidated

	Notes	Not past due nor impaired 2012 $'000	Not past due nor impaired 2011 $'000	Past due or impaired 2012 $'000	Past due or impaired 2011 $'000
Cash at bank	6	35,755	36,874	-	-
Term deposits	6	345,932	271,604	-	-
Receivables for goods and services	7	64,960	67,845	11,187	12,946
Other receivables	7	172,161	9,184	-	-
Investments	9	17,142	31,969	-	-
Total		**635,950**	**417,476**	**11,187**	**12,946**

Credit risk of financial instruments not past due or individually determined as impaired – CSIRO

	Notes	Not past due nor impaired 2012 $'000	Not past due nor impaired 2011 $'000	Past due or impaired 2012 $'000	Past due or impaired 2011 $'000
Cash at bank	6	35,713	36,490	-	-
Term deposits	6	205,263	125,000	-	-
Receivables for goods and services	7	64,960	67,845	11,187	12,946
Other receivables	7	172,301	8,684	-	-
Investments	9	17,142	31,969	-	-
Total		**495,379**	**269,988**	**11,187**	**12,946**

Note 33 Financial instruments (cont)

(f) Credit risk (cont)

Ageing of financial assets that are past due but not impaired for 2012 – Consolidated

	0 to 30 days $'000	31 to 60 days $'000	61 to 90 days $'000	90+ days $'000	Total $'000
Receivables for goods and services	7,736	1,647	311	1,493	11,187
Total	**7,736**	**1,647**	**311**	**1,493**	**11,187**

Ageing of financial assets that are past due but not impaired for 2011 – Consolidated

	0 to 30 days $'000	31 to 60 days $'000	61 to 90 days $'000	90+ days $'000	Total $'000
Receivables for goods and services	10,435	901	553	1,057	12,946
Total	**10,435**	**901**	**553**	**1,057**	**12,946**

Ageing of financial assets that are past due but not impaired for 2012 – CSIRO

	0 to 30 days $'000	31 to 60 days $'000	61 to 90 days $'000	90+ days $'000	Total $'000
Receivables for goods and services	7,736	1,647	311	1,493	11,187
Total	**7,736**	**1,647**	**311**	**1,493**	**11,187**

Ageing of financial assets that are past due but not impaired for 2011 – CSIRO

	0 to 30 days $'000	31 to 60 days $'000	61 to 90 days $'000	90+ days $'000	Total $'000
Receivables for goods and services	10,435	901	553	1,057	12,946
Total	**10,435**	**901**	**553**	**1,057**	**12,946**

(g) Liquidity risk

The Group's financial liabilities are payables, finance leases and other interest bearing liabilities. The exposure to liquidity risk is based on the notion that the Group will encounter difficulty in meeting its obligations associated with financial liabilities. This is highly unlikely due to Australian Government funding and internal policies and procedures put in place to ensure there are appropriate resources to meet its financial obligations.

The Group manages its budgeted funds to ensure it has adequate funds to meet payments as they fall due. In addition, the Group has policies in place to ensure timely payments are made when due and has no past experience of defaults.

Note 33 Financial instruments (cont)

(g) Liquidity risk (cont)

The following table illustrates the maturities for financial liabilities for 2012 – Consolidated

	On demand $'000	Within 1 year $'000	1 to 5 years $'000	> 5 years $'000	Total $'000
Finance lease liabilities	-	7,034	28,062	45,089	80,185
Trade creditors	-	72,152	-	-	72,152
Research revenue received in advance	-	106,370	-	-	106,370
Deposits	7,130	-	-	-	7,130
Other creditors	-	64,695	-	-	64,695
Total	**7,130**	**250,251**	**28,062**	**45,089**	**330,532**

The following table illustrates the maturities for financial liabilities for 2011 – Consolidated

	On demand $'000	Within 1 year $'000	1 to 5 years $'000	> 5 years $'000	Total $'000
Finance lease liabilities	-	7,082	28,449	51,737	87,268
Trade creditors	-	84,195	-	-	84,195
Research revenue received in advance	-	96,648	-	-	96,648
Deposits	6,472	-	-	-	6,472
Other creditors	-	55,301	-	-	55,301
Total	**6,472**	**243,226**	**28,449**	**51,737**	**329,884**

The Group has no derivative financial liabilities in both the current and prior years.

Note 33 Financial instruments (cont)

(g) Liquidity risk (cont)

The following table illustrates the maturities for financial liabilities for 2012 – CSIRO

	On demand $'000	Within 1 year $'000	1 to 5 years $'000	> 5 years $'000	Total $'000
Finance lease liabilities	-	7,034	28,062	45,089	80,185
Trade creditors	-	70,438	-	-	70,438
Research revenue received in advance	-	106,370	-	-	106,370
Deposits	7,130	-	-	-	7,130
Other creditors	-	66,025	-	-	66,025
Total	**7,130**	**249,867**	**28,062**	**45,089**	**330,148**

The following table illustrates the maturities for financial liabilities for 2011 – CSIRO

	On demand $'000	Within 1 year $'000	1 to 5 years $'000	> 5 years $'000	Total $'000
Finance lease liabilities	-	7,082	28,449	51,737	87,268
Trade creditors	-	83,750	-	-	83,750
Research revenue received in advance	-	96,648	-	-	96,648
Deposits	6,472	-	-	-	6,472
Other creditors	-	55,314	-	-	55,314
Total	**6,472**	**242,794**	**28,449**	**51,737**	**329,452**

(h) Market risk

The Group holds basic financial instruments that do not expose the Group to certain market risks except for equity price risk for its 'available for sale' equity investments. See Note 9.

Interest rate risk

The only interest–bearing items on the balance sheet are finance leases. They all bear interest at a fixed interest rate and will not fluctuate due to changes in the market interest rate.

Equity price risk

Equity price risk arises from changes in market prices of listed equity investments that the Group has designated as 'available for sale' financial instruments. See Note 9.

Sensitivity analysis

The Group's listed equity investments are listed on the Australian Securities Exchange (ASX). For such instruments classified as 'available for sale', a 10% increase in the ASX All Ordinary Index at the reporting date would have increased equity by $0.5 million (2011 an increase of $1.1 million). An equal change in the opposite direction would have decreased equity by $0.5 million (2011 a decrease of $1.1 million). The analysis is performed on the same basis for 2011.

Note 33 Financial instruments (cont)

(h) Market risk (cont)

Currency risk

In accordance with Australian Government policy, the Group is prohibited from entering into foreign currency hedges.

The Group's exposure to foreign exchange risk on sales and purchases that are denominated in currencies other than the Australian dollar is not considered material. At any point in time the Group's foreign currency risk exposure is not material.

	Notes	Consolidated		CSIRO	
		2012	2011	2012	2011
		$'000	$'000	$'000	$'000
Note 34 Financial assets and liabilities reconciliation					
(a) Financial assets					
Total financial assets as per Balance Sheet		647,112	429,824	506,209	282,336
Add: non-financial instrument components					
Impairment allowanc for goods and services	7	1,527	987	1,527	987
Less: non-financial instrument components					
GST receivable from the ATO		1,103	-	771	-
Investments accounted for using the equity method	8	399	389	399	389
Total financial instrument components		**25**	**598**	**357**	**598**
Total financial assets as per financial instruments note	33 (a)	**647,137**	**430,422**	**506,566**	**282,934**
(b) Financial liabilities					
Total financial liabilities as per Balance Sheet		558,234	514,579	557,850	514,517
Less: non-financial instrument components					
GST payable to the ATO	18	-	1,199	-	1,569
Employee provisions	21	246,854	205,564	246,854	205,564
Total non-financial instrument components		**246,854**	**206,763**	**246,854**	**207,133**
Total financial liabilities as per financial instruments note	33 (a)	**311,380**	**307,816**	**310,996**	**307,384**

Note 35 Reporting of Outcome

(a) Reporting of outcome

The Organisation's outputs contribute to a single outcome:
Innovative scientific and technology solutions to national challenges and opportunities to benefit industry, the environment and the community, through scientific research and capability development, services and advice.

(b) Net cost of outcome delivery

	Consolidated		CSIRO	
	2012 $'000	2011 $'000	2012 $'000	2011 $'000
Total expenses[1]	**1,278,568**	**1,231,860**	**1,275,501**	**1,231,300**
Income from non-government sector				
Other external revenues:				
Sale of goods and rendering of services – to related entities	145,840	141,221	145,840	141,221
Sale of goods and rendering of services – to external entities	252,944	268,455	264,978	276,856
Interest	17,890	15,174	9,195	8,729
Net gains from sale of assets	379	118	379	118
Net foreign exchange gains	5,127	-	5,127	-
Donations	29	524	29	524
Rents	8,253	7,826	8,253	7,826
Royalties	278,516	29,237	278,516	29,237
Net gains from sale of investments	30	4,822	30	4,822
Realisation of fair value gain reserve	-	140	-	140
Sale of primary produce	1,404	1,333	1,404	1,333
Other	36,782	28,909	37,281	29,600
Total other own-source income	747,194	497,759	751,032	500,406
Net cost of outcome delivery	**531,374**	**734,101**	**524,469**	**730,894**

[1]Total expenses adjusted for movement in equity investment.

Part five
appendices

Appendix 1: 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
Private Bag 10, Clayton South, VIC 3169

t 1300 363 400
f +61 3 9545 2175
e enquiries@csiro.au

Appendix 2: 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.

In the reporting year to 30 June 2012, CSIRO received 46 requests for information under the FOI Act.

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 78.
- information about CSIRO's procedures for external consultation can be found at **www.csiro.au/SAC** and **www.csiro.au/FAC**
- 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**) and the ePublish repository (**https://publications.csiro.au**). CSIRO administrative manuals are available from the FOI Officer.

Part V of the FOI Act confers a right to request CSIRO to amend 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 reporting year to 30 June 2012, CSIRO received no requests for amendments of personal information under the FOI Act.

INFORMATION PUBLICATION SCHEME

CSIRO is required to publish information to the public as part of the Information Publication Scheme (IPS). This requirement is in Part II of the FOI Act and has replaced the former requirement to publish a section 8 statement in an annual report. CSIRO displays on its website a plan showing what information it publishes in accordance with the IPS requirements.

ARCHIVES, PRIVACY, ADMINISTRATIVE DECISIONS

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 20 years old is provided in accordance with that Act.

The *Privacy Act 1988* provides for Information Privacy Principles and National Privacy Principles. During 2011–12, the Office of the Australian Information Commissioner did not undertake any investigations under section 36 of the *Privacy Act 1988* in relation to CSIRO.

The *Administrative Decisions (Judicial Review) Act 1977* (ADJR Act) enables a person aggrieved by certain classes of administrative decisions made by Australian Government agencies, including CSIRO, to obtain reasons for or to challenge those decisions. During 2011–12, CSIRO received no challenges or requests for statements of reasons under the ADJR Act.

JUDICIAL DECISIONS

During 2011–12, there were no judicial decisions or decisions of administrative tribunals that have had, or may have, a significant impact on the operations of CSIRO.

REVIEWS BY OUTSIDE BODIES

During 2011–12, there were no reports on the operations of CSIRO by the Auditor-General (other than the report on the financial statements), a Parliamentary Committee or the Commonwealth Ombudsman.

CONTACT

All enquiries under the above legislation (including FOI requests) should be directed to:

FOI and Privacy Officer
CSIRO, PO Box 225, Campbell ACT 2602
t 02 6276 6123
f 02 6276 6437
e rosemary.caldwell@csiro.au

Appendix 3: Consultancy services

The CSIRO engages consultants where it lacks specialist expertise or when independent research, review or assessment is required. Consultants are typically engaged to investigate or diagnose a defined issue or problem; carry out defined reviews or evaluations; or provide independent advice, information or creative solutions to assist in the CSIRO's decision-making.

Prior to engaging consultants, the CSIRO takes into account the skills and resources required for the task, the skills available internally, and the cost-effectiveness of engaging external expertise. The decision to engage a consultant is made in accordance with the Commonwealth Procurement Guidelines (CPGs), CSIRO's procurement policy and other relevant internal policies.

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.

Tables 5.1, 5.2 and 5.3 summarise the consultancies let and the annual spend, the reason for the consultancy and the procurement method. All values include goods and services tax.

TABLE 5.1: ANNUAL SPEND ON CONSULTANCIES

YEAR	SPENT $	LET $ (ESTIMATED WHOLE OF LIFE)
2011–12	1,621,697	1,096,277
2010–11	1,845,670	1,917,497
2009–10	1,249,355	2,282,903

TABLE 5.2: CONSULTANCIES 2011–12 – SUMMARY BY REASON CODE

		2011–12 (TO 30 JUNE 2012)	
CATEGORY CODE	REASON FOR CONSULTANCY	NUMBER OF CONSULTANCIES	VALUE $
IS	Need for independent study/evaluation	9	378,818
PA	Need for professional assistance to manage and facilitate change and its consequence	1	75,450
SS	Specialist skills were not otherwise available	5	642,009
Total		**15**	**1,096,277**

TABLE 5.3: SUMMARY BY PROCUREMENT METHOD CODE

CATEGORY CODE	PROCUREMENT METHOD	2011–12 (TO 30 JUNE 2012) NUMBER OF CONSULTANCIES	VALUE $
OT	Tenders sought from the market place (Request for Proposal, Request for Tender, Expressions of Interest).	0	-
PM	An existing panel member – this category includes standing offers, common use arrangements and approved supplier panels.	4	151,800
ST	Tenders being sought from suppliers who have pre-qualified through some form of previous competitive process.	0	-
RQ	Purchasing thresholds consistent with CSIRO's minimal standards.	2	47,366
EX	Exemption arrangement such as sole supplier, pre-eminent expertise or urgency and/or practicality.	9	897,111
Total		**15**	**1,096,277**

Appendix 4: Science and Industry Endowment Fund Annual Report 2011–12

As the recipient of funds from CSIRO's successful wireless local area network (WLAN) technology, the Science and Industry Endowment Fund (SIEF) has taken seriously its responsibility to grow and leverage those funds, to ensure that the benefits to Australian science and the Australian community are maximised. In times of economic downturn, the wisdom of setting aside funds to ensure that national challenges can be addressed by the best science teams in Australia becomes even more apparent. As most sectors of the Australian community, public and private, come under increasing financial pressures, SIEF has been successful in continuing to implement its strategic goals and expand its programs through the financial stewardship of the Fund.

In reflecting on the Fund's activities over the past twelve months, I have been reminded of the faith invested in the Fund by Australians since its establishment in 1926. The government of the day expressed that faith as follows:

'[Scientists] with reputations to uphold can generally be trusted to rise above the petty considerations which so often influence other people. I am prepared to trust them with sums of money, believing that they will use it in the best interests of humanity.'

It has been my endeavour, in partnership with the esteemed members of the Fund's Advisory Council and Expert Panel, to uphold that historic ideal, and it is my pleasure to report on how this has been achieved in the foregoing year.

USE OF INVESTMENT PROCEEDS

The availability of $10 million of investment proceeds derived from the Fund's capital has enabled me to create an entirely new program responding to a need to invest in Australian Synchrotron Science. The program fills a gap in the National Innovation System by providing access for Australian Publicly Funded Research Agencies to the Australian Synchrotron and forms part of a co-ordinated funding effort that includes the government and university sectors.

Round 4 of SIEF's Research Projects program, currently in the process of selection, has been supplemented by $4 million of investment proceeds to ensure that sufficient funds are available to appropriately support all meritorious proposals. The Australian Synchrotron Science program and extension of the Research Projects program are examples of the tangible benefits for Australian science that have arisen by virtue of prudent investment of SIEF's capital.

The Fund also continues its support of the CREativity in Science and Technology (CREST) program out of the investment proceeds derived from the original 1926 appropriation of 100,000 pounds.

LEVERAGED FUNDS

Equally important as prudent financial investment has been my determination to ensure that SIEF funds are used to attract additional funding for science from other sources.

For example, SIEF pledged $4 million of cash funding for the eReefs project, designed to provide tools for scientists and policy-makers with respect to our unique national resource, the Great Barrier Reef. This pledge was made conditional on the project securing additional support from other sources, and this approach resulted in the project attracting an additional $3.5 million.[1]

Another SIEF-funded project, investigating stem cells in relation to human blood, has enabled two of the collaborators, CSIRO and the Walter and Eliza Hall Institute, to direct resources to a further project investigating breast tissue stem cells. This is another example of the many ways in which SIEF funding has had a multiplying effect on Australian science.

1 The eReefs Project is a collaboration between the Great Barrier Reef Foundation, the Bureau of Meteorology, CSIRO, the Australian Institute of Marine Science and the Queensland Government, supported by funding from the Australian Government's Caring for our Country, the Queensland Government, the BHP Billiton Mitsubishi Alliance, and the Science and Industry Endowment Fund.

Speakers at the CSIRO, AIBL and Alzheimer's Australia public lecture, Professor David Ames, Dr Maria Carrillo and Ms Ita Buttrose, President, Alzheimer's Australia, with Dr Richard Head, Flagship Director, CSIRO Preventative Health Flagship.

It is gratifying that SIEF-funded projects, such as the Australian Imaging, Biomarkers and Lifestyle (AIBL) study, have used access to the SIEF funding to catalyse additional investment, including $8 million of industry funds from global healthcare and pharmaceutical companies; and $4 million in grants from federal, state and international funding agencies.

INVESTING IN AUSTRALIA'S SCIENCE FUTURE

In addition to addressing a range of national challenges through targeted research projects, SIEF has continued to invest in Australia's science future through a variety of scholarships and fellowships. At Parliament House, Canberra, in August 2011, recipients of those inaugural scholarships and fellowships, and the new SIEF-funded CSIRO Macquarie University Chair in Wireless Communications, Professor Stephen Hanley, were honoured. At that event, Senator the Hon Kim Carr, then Minister for Innovation, Industry, Science and Research, noted the current challenges to the Australian economy afforded by the strong Australian dollar, and highlighted our nation's history of thriving on ideas. The ability to harness this quality and to work with the best and the brightest around the world has been a unifying theme for the history of SIEF since 1926, and today's economic conditions make this enterprise more relevant than ever.

Another means by which SIEF intends to invest in Australia's science future is through its research infrastructure program. The Fund is actively investigating a number of Australian research infrastructure investments to shore up the future of Australian science. In this endeavour, we are honouring the conviction of the Australian parliament at the establishment of the Fund in 1926:

'Money expended in fostering scientific research, and in the accumulation of scientific information, is well spent'.

ADVISORY COUNCIL, EXPERT PANEL AND UNDERGRADUATE DEGREE PANEL

SIEF is guided by an Advisory Council, Expert Panel and Undergraduate Degree Panel of eminent persons, all offering their expertise and judgment to SIEF *pro bono,* see page 168. I thank the members of these bodies for their guidance and support throughout the year, and their embodiment of the finest ideals to which the founders of SIEF aspired.

ADVISORY COUNCIL	EXPERT PANEL	UNDERGRADUATE DEGREE PANEL
Prof Alan Robson (Chair)	Prof Tom Spurling	Prof Margaret Sheil (Chair)
Prof Tom Spurling	Dr Ezio Rizzardo	Prof David Symington
Dr Ezio Rizzardo	Prof Oliver Mayo	Dr Terry Lyons
Prof Margaret Sheil	Emeritus Prof John McKenzie	
Mr Nigel Poole	Prof Elaine Sadler	
	Dr Trevor Powell	

IN CONCLUSION

It is a source of pride that in 2011–12, SIEF has continued to fulfil the aspirations of its forebears, by demonstrating that funds invested in science is indeed money well spent. Whether the value is judged by the outcomes of the science itself, or the inspiration it provides to others to join with SIEF in investing in science, as Trustee of SIEF I look forward to a continuation of achieving great outcomes for Australian science, and the community it serves, in the year ahead.

Dr Megan Clark
Trustee SIEF

Australian National
Audit Office

INDEPENDENT AUDITOR'S REPORT

To the Trustee of the Science and Industry Endowment Fund

I have audited the accompanying financial statements of the Science and Industry Endowment Fund for the year ended 30 June 2012, which comprise: a Statement by the Trustee and Chief Financial Officer for the Commonwealth Scientific and Industrial Research Organisation; Statement of Comprehensive Income; Balance Sheet; Statement of Changes in Equity; Cash Flow Statement; and Notes to and Forming Part of the Financial Statements including a Summary of Significant Accounting Policies.

Trustee's Responsibility for the Financial Statements

The Trustee of the Science and Industry Endowment Fund is responsible for the preparation of the financial statements that give a true and fair view in accordance with Australian Accounting Standards (including Australian Accounting Interpretations), and for such internal control as is necessary to enable the preparation of the financial statements that give a true and fair view and are free from material misstatement, whether due to fraud or error.

Auditor's Responsibility

My responsibility is to express an opinion on the financial statements based on my audit. I have conducted my audit 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 about whether the financial statements are free from material misstatement.

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 Fund's preparation of the financial statements that give a true and fair view 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 Fund's internal control. An audit also includes evaluating the appropriateness of the accounting policies used and the reasonableness of accounting estimates made by the Trustee as well as evaluating the overall presentation of the financial statements.

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Phone (02) 6203 7300 Fax (02) 6203 7777

I believe that the audit evidence I have obtained is sufficient and appropriate to provide a basis for my audit opinion.

Independence

In conducting my audit, I have followed the independence requirements of the Australian National Audit Office, which incorporate the requirements of the Australian accounting profession.

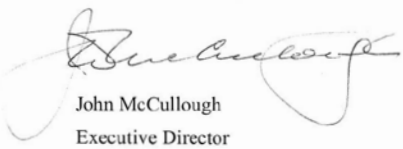
Opinion

In my opinion, the financial statements of the Science and Industry Endowment Fund:

(a) have been prepared in accordance with Australian Accounting Standards (including Australian Accounting Interpretations); and

(b) give a true and fair view of the Science and Industry Endowment Fund's financial position as at 30 June 2012 and of its financial performance and cash flows for the year then ended.

Australian National Audit Office



John McCullough
Executive Director
Delegate of the Auditor-General
Canberra
20 August 2012

SCIENCE AND INDUSTRY ENDOWMENT FUND

STATEMENT BY TRUSTEE AND CHIEF FINANCE OFFICER OF CSIRO AS SERVICE PROVIDER TO THE SCIENCE AND INDUSTRY ENDOWMENT FUND

In our opinion, the attached financial statements for the year ended 30 June 2012 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 2012 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.

Megan Clark
Trustee of the Science and Industry Endowment Fund

20 August 2012

Hazel Bennett
Chief Finance Officer of CSIRO as service provider to the Science and Industry Endowment Fund

20 August 2012

SCIENCE AND INDUSTRY ENDOWMENT FUND
STATEMENT OF COMPREHENSIVE INCOME
For the period ended 30 June 2012

	Notes	2012 $	2011 $
EXPENSES			
Scientific research grants	8	15,083,556	8,998,517
Gift fund services fees		496,050	687,405
Consulting fees		-	64,266
Audit fees		7,000	7,000
Professional fees		4,415	-
In-kind advertising and approval fees	4	4,961	4,739
Other fees		7,843	64
Total expenses		**15,603,825**	**9,761,991**
LESS:			
REVENUE			
Gift income		-	100,000
Interest		8,694,011	6,444,319
In-kind contributions received	4	4,961	4,739
Total revenue		**8,698,972**	**6,549,058**
Net deficit		**(6,904,853)**	**(3,212,933)**
Other comprehensive income		-	-
Total comprehensive loss		**(6,904,853)**	**(3,212,933)**

The above statement should be read in conjunction with the accompanying notes.

SCIENCE AND INDUSTRY ENDOWMENT FUND
BALANCE SHEET
As at 30 June 2012

	Notes	2012 $	2011 $
ASSETS			
Cash	5	140,705,328	146,984,990
Interest receivable	6	1,577,577	782,734
GST receivable		331,916	373,849
Prepayments		2,466	-
TOTAL ASSETS		**142,617,287**	**148,141,573**
LIABILITIES			
Payables			
Creditors		1,702,212	502,815
Accrued expenses	7	393,532	212,362
Total payables		**2,095,744**	**715,177**
TOTAL LIABILITIES		**2,095,744**	**715,177**
NET ASSETS		**140,521,543**	**147,426,396**
EQUITY			
Contributed equity		200,000	200,000
Retained surplus		140,321,543	147,226,396
TOTAL EQUITY		**140,521,543**	**147,426,396**

The above statement should be read in conjunction with the accompanying notes.

SCIENCE AND INDUSTRY ENDOWMENT FUND
STATEMENT OF CHANGES IN EQUITY
For the period ended 30 June 2012

	Retained Surplus		Contributed Equity		Total Equity	
	2012 $	2011 $	2012 $	2011 $	2012 $	2011 $
Balance as at 1 July	147,226,396	150,439,329	200,000	200,000	147,426,396	150,639,329
Net deficit	(6,904,853)	(3,212,933)	-	-	(6,904,853)	(3,212,933)
Closing balance at 30 June	140,321,543	147,226,396	200,000	200,000	140,521,543	147,426,396

The above statement should be read in conjunction with the accompanying notes.

SCIENCE AND INDUSTRY ENDOWMENT FUND
CASH FLOW STATEMENT
For the period ended 30 June 2012

	Notes	2012 $	2011 $
OPERATING ACTIVITIES			
Cash received			
Gift receipts from CSIRO		-	50,100,000
Interest received		7,899,168	7,515,587
Net GST received		1,580,824	887,289
Total cash received		**9,479,992**	**58,502,876**
Cash used			
Payments to grantees		15,120,858	8,830,800
Other payments		638,569	1,256,504
Bank fees paid		227	64
Total cash used		**15,759,654**	**10,087,368**
Net cash provided/(used) by operating activities	9	**(6,279,662)**	**48,415,508**
Net increase/(decrease) in cash held		(6,279,662)	48,415,508
Cash at the beginning of the reporting period		146,984,990	98,569,482
Cash at the end of the reporting period		**140,705,328**	**146,984,990**

The above statement should be read in conjunction with the accompanying notes.

SCIENCE AND INDUSTRY ENDOWMENT FUND
NOTES TO AND FORMING PART OF THE FINANCIAL STATEMENTS
For the period ended 30 June 2012

Note 1 Summary of Significant Accounting Policies

1.1 Basis of Preparation of the Financial Statements

The financial report is required by section 10 of the *Science and Industry Endowment Act 1926* and is a general purpose financial report that has been prepared in accordance with Australian Accounting Standards, Australian Accounting Interpretations, and other authoritative pronouncements of the Australian Accounting Standards Board.

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.

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 Statement of Comprehensive Income when, and only when, the flow or consumption or loss of economic benefits has occurred and can be reliably measured.

The financial statements are presented in Australian Dollars and values are rounded to the nearest dollar unless otherwise specified.

1.2 Cash

For the purpose of the Statement of Cash Flows, cash includes cash at bank and deposits at call. They are readily convertible to cash.

1.3 Revenue

Interest revenue is recognised using the effective interest method as set out in AASB 139 Financial Instruments: Recognition and Measurement.

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 10.

1.6 Taxation

The Fund is exempted from Income Tax.

1.7 Events after the Balance Sheet Date

At the time of completion of this note, the Trustee is not aware of any significant events occurring after the reporting date.

Note 2 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 funds were invested and have subsequently earned interest 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.

New Gift October 2009

In October 2009, Senator Carr announced a gift of $150 million to be donated by CSIRO to the Science and Industry Endowment Fund. The gift is intended to be used for scientific research for the purposes of assisting Australian industry, furthering the interests of the Australian community or contributing to the achievement of Australian national objectives. The gift was made subject to the terms of a Deed of Gift between the Trustee and CSIRO dated 15 October 2009.

One hundred million dollars was received in financial year 2009–10. The final instalment of $50 million was received in financial year 2010–11.

Note 3 Contingencies and Commitments

No contingent liabilities exist as at 30 June 2012.

Schedule of Commitments	**2012**	**2011**
BY TYPE	**$**	**$**
Grants payable	35,936,867	17,702,895
Total grants payable	**35,936,867**	**17,702,895**
BY MATURITY		
One year or less	11,821,391	9,218,147
From one to five years	24,115,476	8,184,868
More than five years	-	299,880
Total grants payable	**35,936,867**	**17,702,895**

Note: Commitments are GST exclusive.

Note 4 Estimated value of resources provided free of charge by CSIRO are as follows:		
– advertising and approval fees	4,961	4,739
Total	**4,961**	**4,739**

Note 5 Cash		
Cash at bank	35,997	381,349
Deposits – at call	140,669,331	146,603,641
Total	**140,705,328**	**146,984,990**

Note 6 Receivables		
Interest receivable	1,577,577	782,734
	1,577,577	**782,734**
Gross receivables are aged as follows:		
Not overdue	**1,577,577**	**782,734**

Note 7	Accrued expenses	2012 $	2011 $
	Macquarie University joint chair in Wireless Communication	246,480	-
	Service fee under Services Agreement with CSIRO	108,911	174,347
	CREST Program awards	31,141	31,015
	Audit fee	7,000	7,000
	Total	**393,532**	**212,362**

Note 8	Scientific research grants		
	CREST Program awards	31,141	31,015
	Scholarships	1,399,000	385,000
	Macquarie University joint chair in Wireless Communication	246,480	365,104
	Research Project Grants	13,406,935	8,217,398
	Total	**15,083,556**	**8,998,517**

Note 9	Cash Flow Reconciliation		
	Reconciliation of operating surplus to net cash from/(used by) operating activities:		
	Operating surplus/(deficit)	(6,904,853)	(3,212,933)
	Changes in assets and liabilities		
	(Increase)/decrease in receivables	(752,910)	50,995,819
	(Increase)/decrease in prepayments	(2,466)	482,398
	Increase/(decrease) in payables	1,380,567	150,224
	Net cash from/(used by) operating activities	**(6,279,662)**	**48,415,508**

Note 10 Financial Instruments	2012	2011
10A: Categories of Financial Instruments	**$**	**$**
Financial Assets		
Cash	140,705,328	146,984,990
Interest Receivable	1,577,577	782,734
Total financial assets	142,282,905	147,767,724
Financial liabilities		
Supplier Payables	2,095,744	715,177
Total financial liabilities	2,095,744	715,177

The net value of the financial assets are their carrying amounts.

10B: Credit risk

SIEF is exposed to minimal credit risk as financial assets represent cash and short term deposits held at reputable Australian financial institutions and receivables from the CSIRO. For the purpose of this note GST receivables are not disclosed as financial instruments as they do no meet the definition of a financial asset. SIEF has assessed the risk of default on payment to be nil as of 30 June 2012 (2011: nil).

10C: Liquidity risk

SIEF's financial liabilities are supplier payables. The exposure to liquidity risk is based on the notion that SIEF will encounter difficulty in meeting its obligations associated with financial liabilities. This is highly unlikely due to funding that is in place and internal policies and procedures to ensure that there are appropriate resources to meet its financial obligations.

10D: Market risk

SIEF holds basic financial instruments that do not expose SIEF to any market, currency or other price risk.

10E: Interest rate risk

SIEF maintains an operating bank account and short term deposits which are subject to short term interest rates. Funds are maintained in term deposits for short periods. In 2011–12 the average return on cash and short term deposits was 5.88% (2011: 5.96%).

Appendix 5: Research group structure

Energy

DIVISIONS

Earth Science and Resource Engineering

Energy Technology

PORTFOLIOS

Advanced Coal Technology

Energy Transformed National Research Flagship

Petroleum and Geothermal

Wealth from Oceans National Research Flagship

Environment

DIVISIONS

Ecosystems Sciences

Land and Water

Marine and Atmospheric Research

PORTFOLIOS

Biodiversity

Climate Adaptation National Research Flagship

Marine and Atmospheric Research

Water for a Healthy Country National Research Flagship

Ecosystems Sciences

Facilities and Collections

Australian National Fish Collection

Australian National Wildlife Collection

Marine National Facility

Food, Health and Life Science Industries

DIVISIONS

Food and Nutritional Sciences

Livestock Industries

Plant Industry

PORTFOLIOS

Food Futures National Research Flagship

Food and Nutritional Sciences

Livestock Industries

Plant Industry

Preventative Health National Research Flagship

Sustainable Agriculture National Research Flagship

TRANSFORMATIONAL CAPABILITY PLATFORM

Transformational Biology

FACILITIES AND COLLECTIONS

Australian Animal Health Laboratory

Australian National Herbarium

Australian National Insect Collection

Information Sciences

DIVISIONS

Astronomy and Space Science

ICT Centre

Mathematics, Informatics and Statistics

PORTFOLIOS

Astronomy and Space Sciences

Digital Technologies and Services

TRANSFORMATIONAL CAPABILITY PLATFORM

Computational and Simulations Sciences

Sensors and Sensor Networks

FACILITIES AND COLLECTIONS

Australia Telescope National Facility

Canberra Deep Space Communication Complex

Manufacturing, Materials and Minerals

DIVISIONS

Materials Science and Engineering

Process Science and Engineering

PORTFOLIOS

Future Manufacturing National Research Flagship

Minerals Down Under National Research Flagship

Materials Science and Engineering

TRANSFORMATIONAL CAPABILITY PLATFORM

Advanced Materials

Part six
indexes

Indexes

Acronyms

AAHL Australian Animal Health Laboratory

ACBRF Australian Animal Health Laboratory Collaborative Biosecurity Research Facility

ACCESS Australian Community Climate and Earth System Simulator

ADJR Act *Administrative Decisions (Judicial Review) Act 1977*

AGP Australian Growth Partnership

AIBL Australian Imaging, Biomarkers and Lifestyle

ALA *Atlas of Living Australia*

ANIC Australian National Insect Collection

ANFC Australian National Fish Collection

ANH Australian National Herbarium

ANU Australian National University

ANWC Australian National Wildlife Collection

ASKAP Australian Square Kilometre Array Pathfinder

ATNF Australia Telescope National Facility

CAC Act *Commonwealth Authorities and Companies Act 1997*

CDSCC Canberra Deep Space Communication Complex

CIE Centre for International Economics

CO_2 Carbon dioxide

CPGs Commonwealth Procurement Guidelines

CRC Cooperative Research Centre

CREST Creativity in Science and Technology

CSIR Council for Scientific and Industrial Research

CSIRO Commonwealth Scientific and Industrial Research Organisation

CSIROSEC CSIRO Science Education Centre

DNA Deoxyribonucleic acid

EA Enterprise Agreement

EMC Executive Management Council

EPBC Act *Environmental Protection and Biodiversity Conservation Act 1999*

ESD Ecologically Sustainable Development

ESM Enterprise Strategy Measure

ESS Environmental Sustainability Strategy

ET Executive Team

FCF Flagship Collaboration Fund

FOI Act *Freedom of Information Act 1982*

FTE Full-Time Equivalent

GE General Electric

GRA Global Research Alliance

HSE Health, Safety and Environment

HSMA Health and safety management arrangements

ICP Integrated Carbon Pathways

IOCI Indian Ocean Climate Initiative

IP Intellectual Property

IPA Indigenous Protected Area

IPS Information Publication Scheme

KEA Key Executive Action

LTIFR Lost Time Injury Frequency Rate

MNF Marine National Facility

MTFR Medical Treatment Frequency Rate

NCRIS National Collaborative Research Infrastructure Strategy

NIS National Innovation System

PCC Post-combustion capture

PCT Patent Cooperation Treaty

RAFT Reversible Addition-Fragmentation chain Transfer

R&D Research and development

SHO Super-high oleic

SIEF Science and Industry Endowment Fund

SIR Act *Science and Industry Research Act 1949*

SKA Square Kilometre Array

SMEs Small-to-medium enterprises

START STroke imAging pRevention and Treatment

WLAN Wireless Local Area Networks

Glossary

Enterprise Strategy Measures: ESMs are designed to provide evidence of our performance in four dimensions that are critical to the success of CSIRO's Strategy 2011–15.

Key Executive Actions: KEAs are designed to focus the Board and the Executive Team's attention on the most important priorities of the Organisation.

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 (for example, 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.

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.

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Compliance index – statutory reporting requirements

The index below shows compliance with information requirements contained in the *Commonwealth Authorities and Companies Act 1997*, in particular Part 2 of the *Commonwealth Authorities (Annual Reporting) Orders 2011* and the *Science and Industry Research Act 1949*.

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Contacts

Location

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CSIRO Enquiries provides a single point-of-contact for industry, teachers and students, the research community and the general public. With a mandate to provide information, guidance and referrals, CSIRO Enquiries responds to over 35,000 inbound enquiries each year. It also supports the outreach activities of the Organisation through custodianship of an extensive stakeholder database and provision of outbound e-communication services and online event RSVP.

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Feedback

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At CSIRO we ask, we seek and we solve.