Part one
Overview

Highlights of 2009–10

Recent highlights of CSIRO's science and its application include:

Climate

A joint CSIRO–AusAID project generated the first detailed regional climate change projections for Indonesia. This project provides accessible information that is now being used to assess vulnerability and adaptation options in Indonesia and other countries in the Pacific region (more on page 20).

Energy

Australia's first Zero Emission House designed to fit the Australian lifestyle, climate and budget of a typical middle income Australian family, showcases off-the-shelf building and renewable energy generation technologies, and new future-ready 'smart' energy management technologies (more on page 22).

Information technology

CSIRO's new web-based smart metering system enables householders, small businesses and electricity retailers to remotely control energy use over a broadband Internet connection (more on page 55).

Materials

A breakthrough polymer technology developed by CSIRO, dubbed RAFT, allows new materials to be designed to exactly fit customers' requirements (more on page 57).

Water

The Murray-Darling Basin Floodplain Inundation Model will allow water managers to ensure water flows can be tailored to maximise environmental outcomes (more on page 36).

Successes and challenges

The assessment of our **Impact** is positive and we have achieved most of our goals for the year. In a recent independent evaluation of the impact and value of our activities by ACIL Tasman, they concluded with high confidence that *CSIRO is delivering high value for money*. There have been some substantial projects delivered, such as the perfect prawn (see page 89). The report also found that our Flagships have begun to deliver tangible benefits and that they are on track to achieving their long-term goals.

The **Quality of our Science** is outstanding and we have delivered some excellent results this year. We continue to show a strong record of publication and citations – our average number of citations per paper exceeds comparable citation rates for Australia and the world, and is continuing to rise at a fast rate.

Our **Relationships** cover a number of areas, such as clients, partners, staff and the community. We continue to focus on improving our ability to understand our clients' strategic business requirements and improving the speed of our contract negotiations. We have successfully developed relationships and formed larger agreements with organisations, such as Orica Ltd and Centrelink.

We have had a pleasing improvement in our safety performance, with an increase in 'near miss' reporting and continued progress in the conduct of safety contacts.

Financial performance 2009–10

CSIRO's financial performance for 2009–10 is summarised in Table 3.1 on page 88.

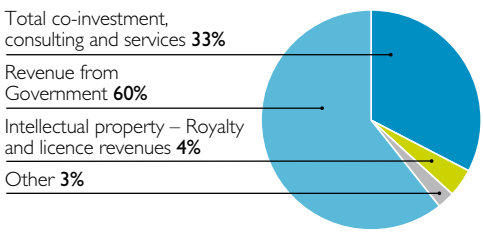
CSIRO's operating result for the year to June 2010 was a deficit of $169 million, which includes the gift from CSIRO to the Science and Industry Endowment Fund of $150 million. Also contributing to the deficit, were foreign exchange losses resulting from the wireless local area networks (WLAN) settlements recorded in 2008–09 and paid in 2009–10, write-down and impairment of assets resulting from asset valuations and other operational expenses. The operating result comprised total revenue of $1,164 million and total expenses of $1,333 million.

Looking ahead

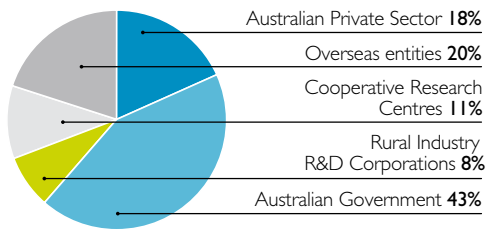
During the process of evaluating performance, the Executive Team considered the lessons learned from the past year. Some things we need to do differently are to:

- review the budget process to ensure budgets are finalised earlier in the year
- implement a multi-year budget process to provide greater certainty to projects
- ensure there is a clearer link between external revenue and project management to ensure that project milestones are more closely monitored.

Source of CSIRO revenue in 2009–10



Source of co-investment, consulting and services revenue 2009–10



Foreword by the Chairman

During 2009–10, a review began of what has been achieved under CSIRO's 2007–2011 Strategic Plan. Considerable thought has been given to how the Organisation can – through its 2011–2015 strategy – enhance its reputation globally and ensure that our National Innovation System is closely connected to the global innovation system.

There were a number of significant accomplishments achieved throughout 2009–10. During the past year, a team of our scientists were recognised for technology which has changed global communications, many of our CSIRO scientists have achieved national and international awards, and a recognised CSIRO team has achieved major marine discoveries. This Report contains many more highlights.

The economic operating environment, while still challenging, has also provided researchers and industry with an impetus to pursue co-investment and collaboration – leveraging from each other's strengths in order to tackle major barriers to sustainable development, nation building, competitive industries and job creation.

Evidence for this engagement on an international, national and local level is seen through our involvement in projects such as the Square Kilometre Array for international astronomy, the development of the *Atlas of Living Australia* to better understand our nation's ecology, studies into local waterways in order to map our country's water resources and working with industries across the aerospace, agricultural, energy and mining sectors.

Our Global Foresight Project indicates that this trend needs to continue at an enhanced level, so that science can better serve interconnected societies and environments, and better forecast

and advise on risks affecting the way we live, such as tsunami, floods, Eyjafjallajökull and global economic conditions.

Our very successful wireless intellectual property licensing campaign bore fruit in 2009, with agreements being signed with many of the world's largest technology companies. We decided to apply the proceeds to revitalise the Science and Industry Endowment Fund, thereby to fund new areas of scientific research to benefit Australia and the world. The team associated with this 18-year long endeavour received the CSIRO Chairman's Medal to recognise the achievement.

CSIRO now has another proud chapter in its history of delivering significant impact from technology development. Our experience sends a series of signals right across the innovation system – that Australian researchers continue to be able to develop world-class technology, that we live in a highly competitive global marketplace for intellectual property and that Australian entities must function expertly within this system to capture fair commercial returns.

This Report reveals the breadth of CSIRO's scientific excellence and our expertise in applying this to help governments, businesses and communities define, inform and address many of the challenges facing humanity.

On behalf of the Board of CSIRO, I congratulate and thank the management and staff of CSIRO for their contribution to the Organisation and to Australia's future.

For my part, it has been an honour to serve as Chairman of the Board. I welcome Mr Simon McKeon as the new Chairman and wish CSIRO well for 2010–11 and beyond.

Dr John W Stocker AO
Chairman of the CSIRO Board
(until 27 June 2010)

Changing of the guard: CSIRO's new Chairman

I was appointed to the CSIRO Board on 28 June 2010 and came in at the tail end of another successful year for CSIRO. I pay tribute to John Stocker who has served with distinction both as Chief Executive Officer and Chairman of CSIRO.

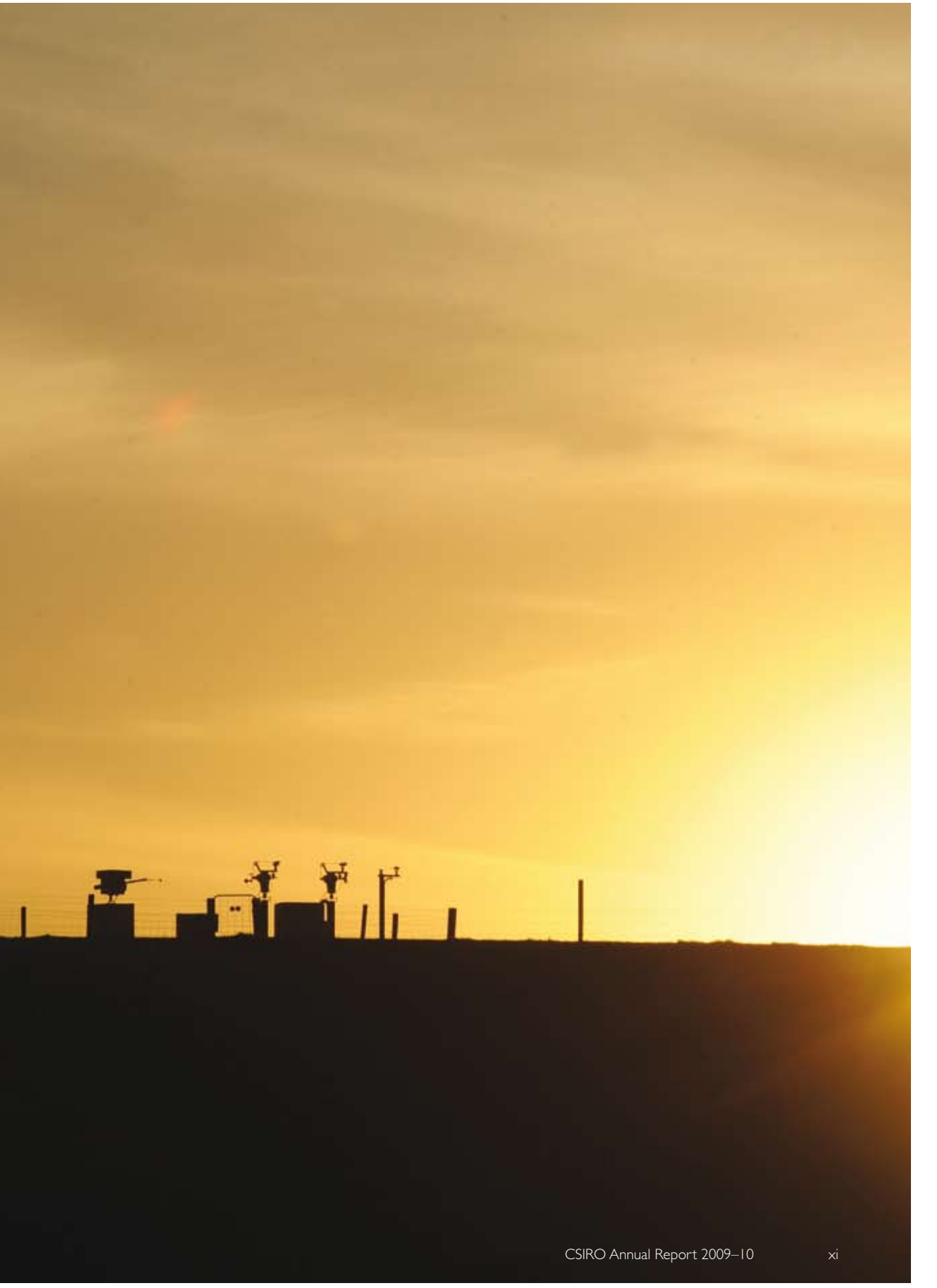
In my first few weeks, I have been travelling along my own steep CSIRO learning curve and along the way have been continually impressed with so much that I have observed, particularly the extraordinary ability and passion of CSIRO staff.

CSIRO's science is up with the world's best – and there has never been a time where the Organisation has been needed as much as now. Humanity faces some very sizeable challenges, as its global footprint increases and we continue our relentless search for an improved standard of living.

I am looking forward to 2010–11 and the prospect of more significant CSIRO initiatives and great scientific outcomes.

Simon McKeon

Simon McKeon
Chairman of the CSIRO Board
(as from 28 June 2010)



Chief Executive's report

Over the past year, CSIRO increased its positive impact on the social, environmental and economic wellbeing of Australia. Our contribution to our stakeholders and partners is reflected in a record number of active licences for our innovations, our external research services income and our research activity. We have responded quickly at home and around the globe to biosecurity threats and food security challenges.

A treatment to combat the Hendra virus was trialled; safer and faster longwall mining technology has been adopted by major equipment manufacturers; and the first signals were received from the Australian Square Kilometre Array Pathfinder (ASKAP) telescope. These are just three of the many achievements during 2009–10.

The five operational groups: Agribusiness (now Food, Health and Life Science Industries); Energy; Environment; Information Sciences; and Manufacturing, Materials and Minerals have each grown their impact, through the ten National Research Flagships, Divisional research, our national collections, as well as through our services and infrastructure.

Our performance

The **Agribusiness Group,** now the **Food, Health and Life Science Industries Group,** has made progress in improving agricultural productivity, food industry efficiency and human health outcomes.

CSIRO scientists developed a salt tolerant premium priced durum wheat that yields 25 per cent more grain than the parent variety in previously unsuitable saline soil.

In collaboration with the prawn industry we have developed a new prawn which produces record yields, supporting a sustainable food production industry and a premium product for Australian consumers and global markets.

In the health area our advanced brain scan analysis techniques will help in the development of new strategies for early diagnosis and more effective treatment of Alzheimer's disease.

Working across the full energy spectrum, the **Energy Group** has delivered results in petroleum, gas, geothermal, solar, low-emissions coal, as well as other renewable energies and energy efficiency.

A prototype hydrocarbon sensor was used to detect the movement and location of oil released during the Gulf of Mexico oil spill, helping to better understand the affected marine environment and aid in planning for future clean-up strategies.

The first Australian Zero Emission House targeting the mass market was launched in conjunction with industry partners and continues to function as a demonstration and research resource for the residential housing sector.

Understanding how Australia and the world will be affected by, and can respond to, the challenges of climate change remains a focus for the **Environment Group**.

Together with the Bureau of Meteorology, CSIRO issued the State of the Climate Report, which put on the record observations of Australia's climate.

Researchers in our Water for a Healthy Country Flagship continued to provide national leadership in quantifying water resource assets in northern Australia, south-west Western Australia and northern Tasmania, as well as enabling water security in south-east Queensland.

2010 was also the International Year of Biodiversity and the Environment Group continues to contribute to the global understanding of this subject, as well as showing national and global leadership through the development of the *Atlas of Living Australia* and contribution to the census of marine life.

The **Information Sciences Group** provides underpinning disciplines of mathematics and information and communication technologies to all CSIRO science, as well as world-leading strength in radio astronomy and space sciences.

CSIRO is now operating, on behalf of the Australian and US Governments, the Canberra Deep Space Communication Complex at Tidbinbilla in the Australian Capital Territory.

The Australian Square Kilometre Array Pathfinder (ASKAP) received the first signals from space in May through the first of 36 identical dishes that will make up the ASKAP telescope.

Our wireless local area network technology continues to grow in adoption and usage – the latest market forecast is that more than four billion devices will contain CSIRO wireless technology by the end of 2013.

During the year, we completed 15 licences for our technology. We also started the process of applying the net proceeds to new scientific research projects through the Science and Industry Endowment Fund. As Trustee of the Fund, I will ensure that Australia gains maximum benefit from the additional scientific research that has been made possible by one of CSIRO's inventions.

The **Manufacturing, Materials and Minerals Group** supports industries that are responsible for around 18 per cent of Australia's gross domestic product and over the last year supplied improved processes and technologies to generate new products and companies and stimulated the growth of green jobs.

A world record for efficient solar cells has been set with researchers developing thin film, solid state dye-sensitised solar cells. This technology has the potential to replace silicon in the next generation of solar collectors.

New automated control systems and tele-robotic technologies being trialled by CSIRO and partners are enabling mining companies to operate remote sites from a central location, creating safer, more efficient and more productive mine sites.

Our people

At the heart of our achievements and goals are our people. The effort and commitment by all our people this year has been extraordinary. I appreciate the efforts of all who have contributed to our successes and discoveries. To our staff, I reinforce the responsibility of every person in CSIRO to ensure scientific excellence, to build trust and respect each day with partners, to take the initiative to explore new horizons, consistently do what we say we will do and strive towards a healthy, safe and sustainable future.

Looking forward

We envisage an Australia where our science is used to deliver solutions for industry and the economy; to improve the wellbeing of the community and to create a sustainable future for our environment. We see a world where Australian science helps to create a sustainable future for humanity.

In the year ahead we will deliver on the milestones for the ASKAP for international astronomy research, the *Atlas of Living Australia* to document the country's flora and fauna, and a new National Marine Research Vessel to learn more about our oceans. We will also support the construction of the Australian Future Fibres Research and Innovation Centre at Deakin University and a new Indian Ocean Marine Research Centre at the University of Western Australia, which will be home to 240 researchers.

We will continue to address the Australian Government's National Research and Innovation Priorities, build external partnerships, improve our commercial practices and our ability to deliver impact, as well as delivering strategies to assist Australian industries and communities adapt to a changing climate.

I look forward to an exciting 2010–11.

Megan Clark
Chief Executive
September 2010

About CSIRO

CSIRO is Australia's national science organisation. We are one of the largest and most diverse scientific organisations in the world and we have been solving scientific problems in Australia and internationally since 1926.

We are a powerhouse of ideas, technologies and skills for building prosperity, growth, health and sustainability: we are nation builders. We seek to make a difference: to enhance national productivity through research and development, to apply our knowledge to the creation of industries, national wealth, a healthy environment and improved living standards. We do this by bringing together the right people from across multiple science disciplines to work together, explore new horizons, and produce real outcomes. We are proud of our record for science excellence and are committed to our role in sustaining Australia's prosperity and wellbeing.

CSIRO is accountable to the Australian Government. We have a four-year funding agreement with the Government that outlines our funding and reporting requirements. We develop a Strategic Plan to ensure we meet the requirements of this agreement and that we deliver on our promises to the Government and the Australian community.

CSIRO Board

The CSIRO Board is responsible to the Australian Parliament, through the responsible Minister, for the overall strategy, governance and performance of CSIRO.

Executive leadership

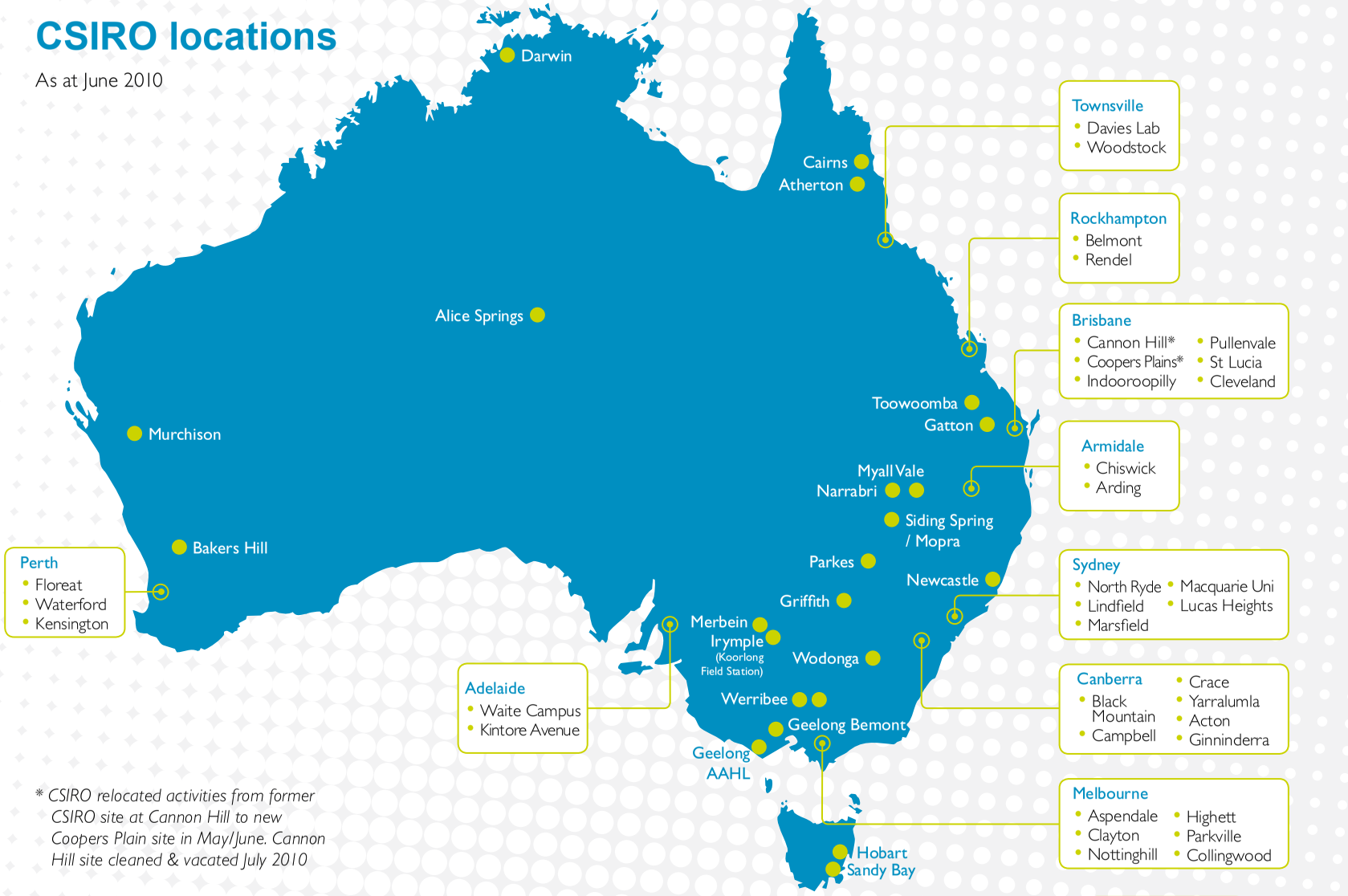
The CSIRO Chief Executive is responsible to the Board for the development of CSIRO's strategy and overall management and performance. The Chief Executive and Executive Team manage the Organisation in accordance with this strategy and the plans and policies approved by the Board. The Executive Team includes the Chief Executive, two Deputy Chief Executives, five science Group Executives and three Executive Directors.

Each science Group Executive leads a Group of Divisions, Flagships and other Portfolios, as well as Transformational capability platforms. Some Divisions are custodians of major national facilities and collections. The Deputy Chief Executives and Executive Directors lead Enterprise Functions that work across CSIRO. The Executive Management Council includes Chiefs of Divisions, Flagship Directors and other Portfolio Leaders, and General Managers. It is a forum for sharing information and discussing issues related to strategy and management.

CSIRO's organisational structure shows the reporting framework and the roles and responsibilities of senior management (see pages xviii–xix).

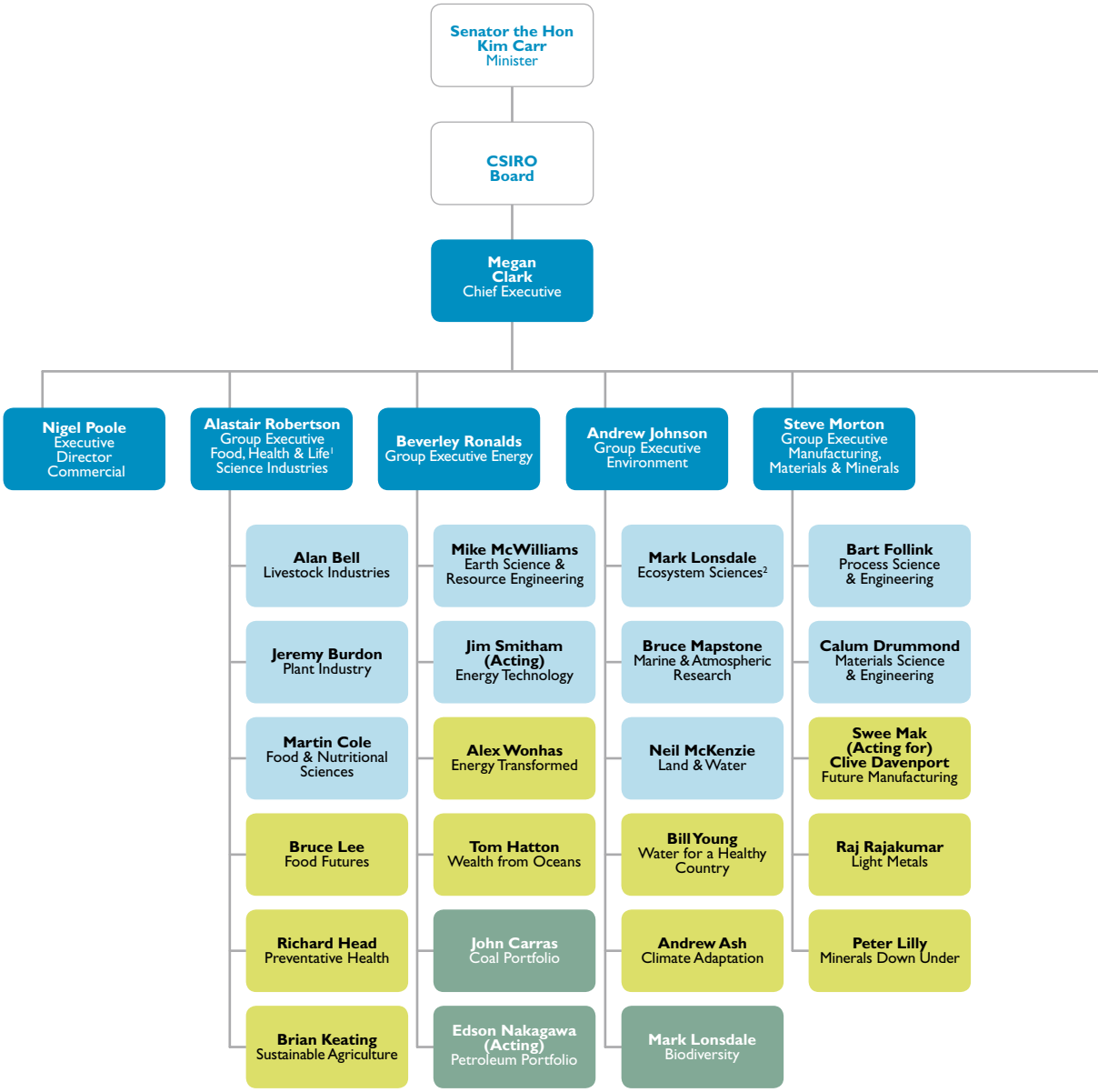
CSIRO locations

As at June 2010



* *CSIRO relocated activities from former CSIRO site at Cannon Hill to new Coopers Plain site in May/June. Cannon Hill site cleaned & vacated July 2010*

Organisational structure as at July 2010



- Executive Team Member
- Chief of Division
- Flagship Director
- Enterprise Services Leader
- Portfolio Leader

[1] *Group previously known as Agribusiness*
[2] *Previously known as Entomology and Sustainable Ecosystems*