

CSIRO Operational Plan

2007-08

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

CSIRO has sought to develop strong and well-integrated processes for planning, measuring, managing and reporting performance. The 2007-11 CSIRO Strategic Plan articulates Organisational vision and aspirations, and describes a broad path to achieving these through a set of strategic initiatives and objectives. The 2007-08 CSIRO Operational Plan provides an overview of the first year of strategy implementation activities and the allocation of resources to those activities for the year ahead. In a broad sense the Strategic Plan describes what we hope to achieve and the Operational Plan begins to describe how we set about achieving it. These two enterprise-wide documents are supported by more specific detail in Theme Statements and Divisional, Flagship and Corporate Group plans.

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CHIEF EXECUTIVE'S FOREWORD

The 2007-08 Operational Plan is the first in the series of annual plans which will 'operationalise' the new CSIRO Strategic Plan 2007–2011. This strategy remains based upon six 'key messages': **greater focus** on major scientific challenges and opportunities for Australia with a strong **outward-looking** emphasis, **stronger partnerships** with universities, other science agencies and industry with a '**service from science**' culture, a **unified One-CSIRO**, making full use of our collective strengths and **growing our impact and relevance** in service to the nation.

The 2007-08 Operational Plan seeks to builds on a solid year of achievement in 2006-07 in which CSIRO has continued to 'deliver the goods' in terms of its relevance and impact across a broad sweep of economic, social and environmental issues and opportunities. The quality of our science has been recognised with significant awards, and the results of the Divisional Science Reviews continue to confirm the strength of CSIRO's science base while usefully pointing to those areas where further improvements can be made. Our success in establishing the National Research Flagships was affirmed in the findings of an independent review and was fundamental to the allocation of significant new funding to expand the initiative in the 2007-08 Federal Budget.

The 2007-08 Operational Plan reflects CSIRO's new 'Outcome-Outputs Framework' agreed with the Federal Government whereby CSIRO's outcome-oriented Themes are presented in four groups of 'Outputs':

- National Research Flagships;
- Core Science;
- Science Outreach: Education and Scientific Publishing; and
- National Research Infrastructure: National Facilities and Collections.

The Plan highlights the planned activities and outputs associated with the Themes in each output group, together with the allocation of resources to Themes through the recent Science Investment Process. Underpinning the delivery of our Theme objectives are the capabilities that reside in our research Divisions and Joint Ventures. The Plan provides an insight into planned development of these capabilities as well as an overview of activities in the critical enabling functions of 'Enterprise Strategy and Governance' and 'Enterprise Support Services'.

2007-08 promises to be an exciting year for CSIRO as we focus on delivery of the objectives set in our 2007-2011 Strategic Plan. We will build on the success of our Flagship programs, and continue to progress our leadership role in supporting Federal and State government strategies in respect of major challenges such as water, energy, climate change and promoting health, as well as pursuing opportunities in support of an internationally competitive industrial sector. We will further strengthen our relationships with customers and partners so as to maximise the impact of our work. And we will nurture both innovation and efficiency in our enterprise by moving to cement new leadership roles and behaviours appropriate to our matrix organisation, and to implement necessary enabling processes and technologies.

I commend the plan to all staff and interested stakeholders.

Geoff Garrett
Chief Executive
June 2007

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Introduction and context

The Science and Industry Research (SIR) Act 1949 requires CSIRO to formulate an annual Operational Plan, that sets out: the strategies the Organisation proposes to pursue; the activities the Organisation proposes to carry out; and the resources the Organisation proposes to allocate to each activity during the year, giving effect to the relevant Strategic Plan. The Act further requires that the Plan be submitted for approval by the CSIRO Board before the commencement of the financial year.

The Plan is organised as follows:

- Part A provides an enterprise level overview of the Organisation's roles, strategy implementation and governance.
- Part B describes the goals and activities planned for 2007-2008 in relation to CSIRO's research Themes¹
- Part C looks at CSIRO's capabilities – our strength in science and technology
- Part D focuses on the enterprise functions undertaken to support the conduct of research.
- Part E provides a convenient overview of enterprise-wide resource allocation and planned financial performance.

The 2007 – 2011 Strategic Plan

CSIRO has a strong culture of strategic planning. Much attention is paid to the development of Strategic Plans that are relevant to industry, the broader community and the organisation alike. Our strategic plans (currently produced on a 4 year cycle) are developed as specified by Section 34 of the SIR Act, which sets out the broad objectives of the organisation and a broad outline of the policies and strategies to be pursued by the organisation to achieve these objectives.

The 2007-2011 Strategic Plan extends, enhances and builds upon CSIRO's 2003-2007 plan as part of a 15 year journey to 2015. The strategy incorporates consideration of major challenges and opportunities facing Australian industry, community and the environment in the global and national context; as identified through a comprehensive consultation process. The Strategy demonstrates CSIRO's response to the external environment with a shift in science direction and a strategy that will ensure strong R&D capability for Australia's ongoing benefit.

Specifically CSIRO's Strategy for 2007-2011 aims to grow our impact by delivering great science and innovative solutions for industry, society and the environment through three major elements:

- Addressing national challenges and opportunities, faster and better ;
- Focusing and strengthening our core science capability and delivery; and
- Strengthening our enterprise and enhancing operational excellence.

Taken together, these three strategic elements, and the specific strategic objectives that support them (see Figure 1), are designed to maximise CSIRO's continuing contribution to ensuring that:

"Australia has a strong capability in scientific research and development that delivers ongoing economic, social and environmental benefits and provides science and technology solutions relevant to current and emerging national challenges and opportunities."²

¹ The 'Theme' concept is introduced and explained on page 11.

² This is the formal statement of the outcome or purpose for which the government appropriates funds to CSIRO through the budget appropriation bills.

STRATEGIC ELEMENTS	STRATEGIC INITIATIVES	STRATEGIC OBJECTIVES
National Challenges <i>Addressing national challenges and opportunities, faster and better</i>	1.1 Building on Flagship Success	<p>1.1.1 Accelerating and Expanding Flagships – Grow targeted National Flagships to more rapidly address key national challenges and opportunities.</p> <p>1.1.2 Growing Flagship Collaborations – Accelerate our delivery of Flagship goals by increasing the level of collaboration with world-leading research partners, both nationally and internationally.</p>
	1.2 Power Partnerships	<p>1.2.1 Building Major Partnerships – Boost science capability to achieve more effective science and technology solutions for the Australian community, industry and the environment through targeted partnering, alliances and ventures.</p> <p>1.2.2 Developing Science Hubs through Co-locations – Continue to build nationally significant integrated clusters of science capabilities with others in the National Innovation System to facilitate the development of critical mass, to help enhance science delivery for Australia.</p>
Discovery and Delivery <i>Focusing and strengthening our core science capability, and delivery</i>	2.1 Focused Science	<p>2.1.1 Progressing Science Direction Setting – Continue to focus CSIRO's science investment, capability development and performance in areas of greatest impact and relevance.</p> <p>2.1.2 Building Transformational Capability Platforms – Ensure long-term sustainability and future impact of the organisation by strengthening vital cross-organisational capabilities in transformational biology, advanced materials, computational and simulation sciences, and sensor network technologies.</p> <p>2.1.3 Ensuring Sustainable National Facilities and Collections – Management and delivery of national and international research infrastructure that underpins the CSIRO and National Innovation System research portfolio.</p>
	2.2 Increased Adoption	<p>2.2.1 Developing our Business – A step-change improvement in our business relationships to ensure effective science and technology uptake, sustainably.</p> <p>2.2.2 Accelerating Science and Technology Transfer – Ensure effective technology transfer to partners by continuing to develop flexible and fast adoption pathways.</p> <p>2.2.3 Enhancing Communications – Promote the contribution of science in driving innovation and support the delivery of societal benefit from CSIRO science.</p>
One-CSIRO Foundations <i>Strengthening our enterprise and enhancing operational excellence</i>	3.1 People and Organisational Development	<p>3.1.1 Nurturing our Innovative Culture – Foster a safe environment where innovation, collaboration, flexibility and performance flourish.</p> <p>3.1.2 Working Effectively and Efficiently in our Enterprise – Utilise common systems, structures and improved processes to support our matrix operations and optimise the use of our facilities, equipment and information assets.</p>
LOOK OUT!!! – FOCUS, FOCUS, FOCUS – SERVICE FROM SCIENCE – ONE-CSIRO – PARTNER OR PERISH – GO FOR GROWTH		

Figure 1: The Path 2007 to 2011: Building Momentum and Increasing Impact
 (Source: CSIRO Strategic Plan 2007-2011)

Strategy Implementation and Major Strategic Initiatives

CSIRO's strategy revolves around addressing major national challenges and opportunities even faster and better, focussing and strengthening our core science capability for greater impact, and enhancing our operational excellence.

In order to achieve and maintain an increasingly high level of national impact we need to continue building world class teams, partnering with purpose, focusing on high priority research areas, ensuring effective knowledge transfer, and deepening our one CSIRO culture and behaviours.

Our strategy will be delivered through the integration, coordination and delivery of a number of powerful strategic initiatives. While each initiative is important to the enterprise in its own right, it is the skilful combination of those initiatives that will deliver substantial and sustained value.

The effective sponsorship, ownership and coordination of strategy implementation is vital. Each Strategic initiative is sponsored, and driven, by a member of the Executive Team on behalf of the enterprise – this sponsor draws upon expertise and resources from across the breadth of CSIRO (and beyond) to deliver the necessary outcomes. Steering committees have been established to support the effective governance of the largest and most complex strategic initiatives – membership includes CSIRO Executives, relevant Project Directors and external experts.

The effective fusion of the individual strategic initiatives is led by a member of the Executive Team supported by the Strategic Program Office. The SPO has a vital role in the effective coordination and execution of strategy across the enterprise - from assessing new change initiatives for alignment with strategy, to coordination and optimisation of the strategic portfolio, to addressing the cultural and behavioural aspects of change right through to facilitating and acting upon post implementation reviews.

A Strategic Change Program Advisory Committee comprised of selected business unit and functional leaders has been formed to advise on the direction and control of current and future enterprise strategic initiatives. The Committee has an important role in advising on the practical roll out of strategic initiatives, particularly at the business unit level.

Change management activities have been undertaken in parallel with the strategic initiatives. The Change Partner Network supports the strategic change program on the ground in Divisions and Flagships. Change partner workshops continue to be important elements in communicating and coordinating change initiatives, and this network has been active in supporting the implementation of strategy. The Enterprise Feedback Network (EFN) is providing feedback on the progress of the change program. This feedback is used to continually improve our communication and change management efforts.

A number of major strategic initiatives moved into full implementation during 2006-07, and they hold us in good shape as we move forward. In 2007-08 the focus will remain on implementation with refinement of the Science Investment Process (SIP), the further design and implementation of our capability architecture to support enhanced science delivery, roll-out of the Business and Enabling Technologies Replacement (BETR) project to support human resources, finance and project management processes, provision of education and training to underpin our readiness for change. A complete list of our focus areas for 2007-08 is encapsulated in the Strategy Implementation Goals (see Appendix 1).

CSIRO Organisational Structure and Governance

CSIRO is an Australian Government statutory authority constituted and operating under the provisions of the *Science and Industry Research Act 1949* (SIR Act). Reporting, accountability and other rules for CSIRO's operations are set out in the *Commonwealth Authorities and Companies Act 1997* (CAC Act).

CSIRO is part of the Education, Science and Training portfolio and under the responsibility of the Minister for Education, Science and Training. Commencing this year, the Minister provides an annual Statement of Expectations to the CSIRO Board, which responds with a Statement of Intent. These documents outline the Government's expectations regarding the strategic direction, governance, communication and monitoring and review of the Organisation. The Statements should be read alongside the 2007-08 to 2010-11 Quadrennium Funding Agreement and the 2007-2011 CSIRO Strategic Plan.

The CSIRO Board is responsible to the Australian Government for the overall strategy, governance and performance of CSIRO and gives directions to the Chief Executive. It operates partly through Remuneration, Audit and Commercial Committees and in accordance with a written charter, which is consistent with CSIRO's legislation.

The Chief Executive is responsible to the Board for the overall development of strategy, management and performance of CSIRO. The Chief Executive and Executive Team manage the Organisation in accordance with the strategy, plans and policies approved by the Board.

The Chief Executive is supported by the Executive Management Council which incorporates the Executive Team, Business Unit and Portfolio Leaders and some Corporate General Managers and provides a high level forum for consideration and communication of strategic and management issues. An organisational chart is at Figure 2 and a full list of Executive Management Council Membership is in Appendix 2.

The CSIRO Governance Framework incorporates overarching external and internal elements (such as the governing legislation and structures, delegation and advisory mechanisms); and the enabling elements related to directing, controlling and managing and assuring (such as the science investment process, strategic and operational plans, policy framework and science assessment and performance measurement framework).

The CSIRO Governance Framework and practices will be updated during 2007-08 to incorporate and implement amendments in June 2007 to the SIR Act, anticipated amendments to the CAC Act and the other outcomes of the Government's Review of the Corporate Governance of Statutory Authorities and Office Holders (the Uhrig review). The CSIRO Authorities Manual will be aligned with Organisational Design Principles and provide information on authorities by position and policy area.

Commencing in October 2007, CSIRO will be required to complete an annual Compliance Report to the Government regarding the Organisation's compliance with the CAC Act and its financial sustainability. Internal control mechanisms are being examined to support this declaration.

For further information see the CSIRO Board and Governance intranet page <http://intranet.csiro.au/intranet/governance/index.htm>.

Minister

The Honourable Julie Bishop
Minister for Education Science and Training

CSIRO Board

Chairman: Dr John Stocker AO
Prof. Suzanne Cory, AC., Dr Terry Cutler, Dr Eileen Doyle, Dr Geoff Garrett, Mr Brian Keane,
Ms Deborah O'Toole, Prof Alan Robson AM

CSIRO

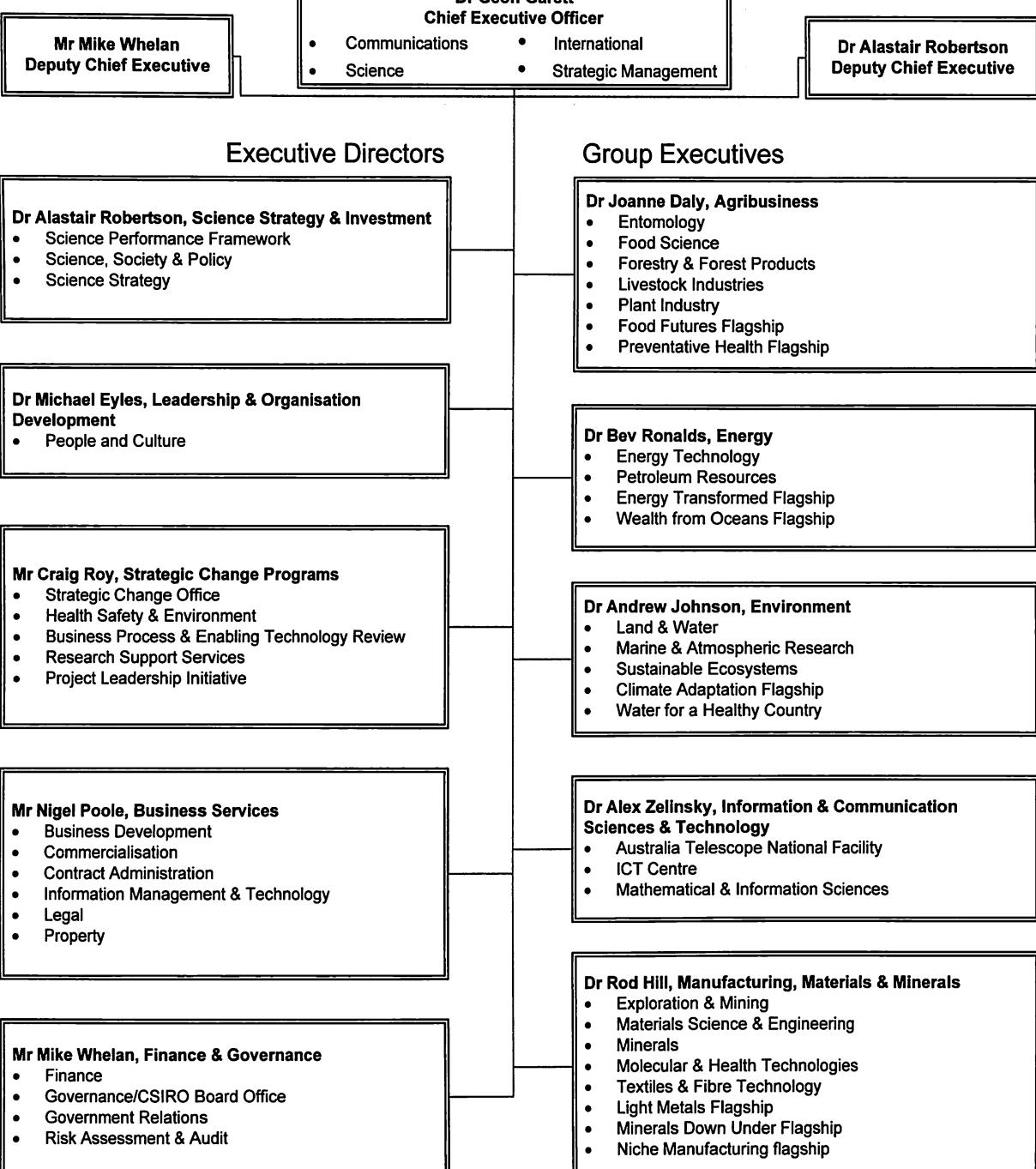


Figure 2: CSIRO Organisational Chart (as at 1 July 2007)

CSIRO's Roles

Public research organisations contribute to national wellbeing in different ways. For CSIRO, the focus is on delivering scientific solutions direct to Australian industry and communities, while building Australia's science base. By specifying our roles and functions explicitly, CSIRO is able to build cohesive research teams, prioritise funds across our portfolio and demonstrate the benefits science brings to Australia.

Creating clarity around our responsibilities is an important first step towards ensuring that the 6,500 scientists and staff within CSIRO are able to focus their activities where they will have the greatest impact. Clarity around CSIRO's roles is also important in facilitating collaboration with other players in the Australian innovation system.

By answering a number of questions:

- What is the value of the role to Australia?
- Is CSIRO the best party to fulfill the role?
- What is the relative long-term benefit of the role to Australia?
- How would CSIRO prioritise and allocate resources to the role?
- What is the opportunity cost for investing (or not investing) in the role?
- How important is the role in delivering on CSIRO's existing core activities?

we identify five core roles, a number of satellite roles and two enabling functions for CSIRO.

CSIRO's roles can be represented diagrammatically as a house (Figure 3), with CSIRO's core roles illustrated at the centre of the diagram, surrounded by a number of satellite roles. Enabling functions are represented as the roof and floor of the house, highlighting the support they provide to the other roles. Detailed descriptions of the roles are provided in Appendix 3.

Science Investment and Planning

Themes, Streams and Projects

CSIRO's research is organised into **Themes, Streams and Projects**. This classification has been adopted across the organisation to ensure the alignment of individual projects with high level strategic goals and to monitor progress toward these goals through the 'Program Performance' element of the Performance Measurement Framework (see following section).

A Theme refers to a significant area of research that is directed towards a specified outcome with a clear strategic purpose. For example, the goal for the Urban Water Theme in the Water for a Healthy Country Flagship is: *To provide science and technology that enables the delivery of socially acceptable, affordable and environmentally beneficial management solutions for Australia's urban water infrastructure and natural water systems - to address the projected 2030 water deficit of up to 1,000 GL in our cities.* Increasingly, individual Themes draw on capabilities drawn from across the organisation and external partners. The Urban Water Theme amalgamates all of CSIRO's urban water research to bring CSIRO's full weight and diverse skill base to advance research in this priority area.

In addition to the Theme information available in Section B of this plan, a separate Theme Statement is prepared for each Theme. This provides a detailed summary of the Theme's relevance and planned impact, the capabilities and resources applied, and specific Stream-level annual performance goals. A full list of Themes is provided in Appendix 4.

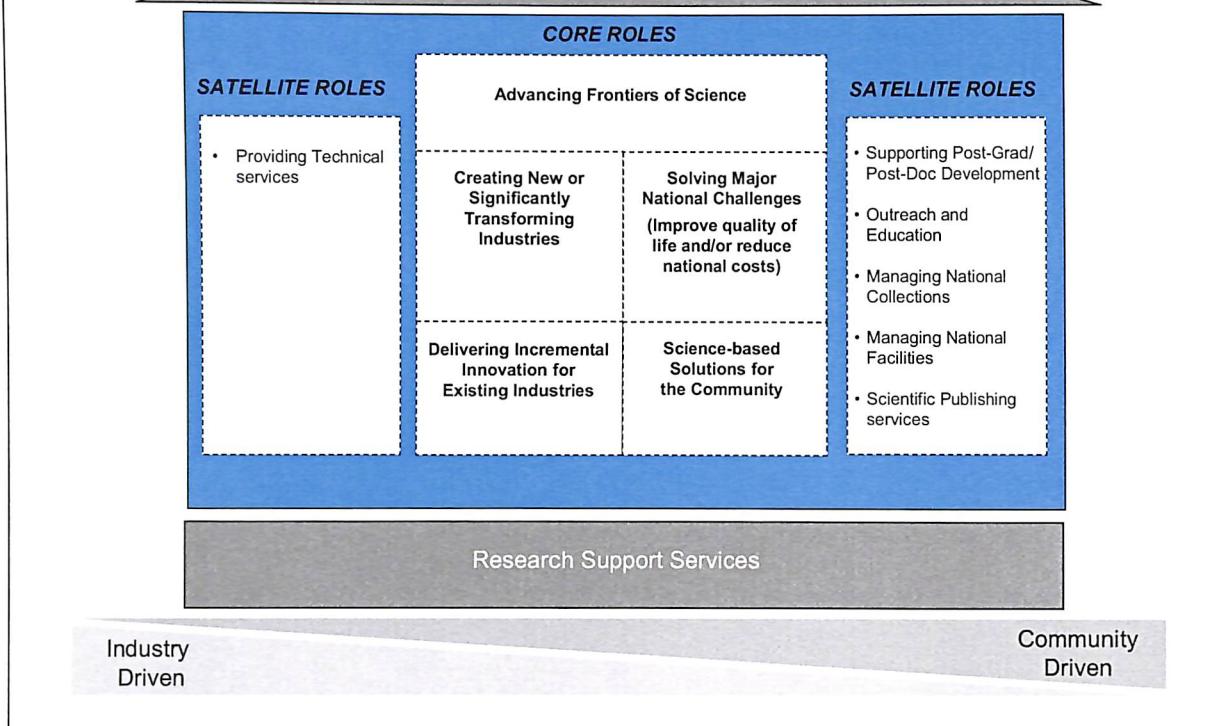


Figure 3: The CSIRO Role House

A Stream represents a collection of related projects that address a particular aspect of the Theme Goal. For example, the goal of the Urban Water Theme is pursued through five mutually supporting streams of activity: *Integrated water systems, Demand management, Recycling and diversified supply, Infrastructure technologies, and Urban water environments*. Each Stream has an explicit medium-term Stream Objective supported by annual performance goals (APGs). APGs include both scientific/technical milestones and other milestones – specifically engagement with delivery partners – that are necessary for the achievement of the stream objectives and the outcomes articulated in the theme goal.

A Project is the core unit of research activity and budgetary control. Individual projects are required to have a project plan in accordance with CSIRO's project management policy.

Research Capability and Delivery Mechanisms

As described above, Themes represent the portfolio of outcomes toward which CSIRO's investment is directed. The conduct of research activities, and the delivery of outputs which contribute to the achievement of these outcomes, draws on the scientific and related capabilities of CSIRO and its research partners.

Each of CSIRO's research Divisions has a number of core capabilities built on particular disciplinary skills, facilities and relationships. Planning, developing and maintaining these capabilities is the responsibility of Research Program Leaders who work collaboratively with Theme Leaders to assign

capabilities as needed to support the delivery of Theme Objectives. While Divisions provide a home for the development and nurture of these capabilities, one of CSIRO's great strengths is in drawing together the diverse range of capabilities across Divisional boundaries. The Flagship Programs are prime examples of this "One-CSIRO" approach.

In order to build a more competitive and effective capability in Food Science and Forestry Research, CSIRO has entered into formal joint venture arrangements with the Victorian Government (creating Food Science Australia) and with the New Zealand forest research agency Scion (creating Ensis).

There are numerous other collaborative mechanisms in place for research delivery, the most significant of which is CSIRO's participation in Cooperative Research Centres (CRCs). CSIRO is the largest single participant in the CRC program. CSIRO continues to be committed to the CRC Program and during 2006-07 was a participant in 37 of the 56 currently active CRCs. Of these 37, CSIRO was a core participant in 34 CRCs, a supporting participant in two CRCs and an affiliate participant in the other. For further information, refer to CSIRO's Annual report section 3.1

Science Assessment Review Process

In line with the Triennium Funding Agreement for 2004-07 CSIRO developed and implemented a rolling program of Divisional science assessment reviews. This robust, rigorous and independent process of assessment is closely aligned with the broader and evolving Research Quality Framework. It involves peer review of a Division's science capabilities by independent experts, from both Australia and overseas.

The keystone of the review process is the testing by the review panel of each Division's self-assessment of its capabilities and the relationship with both the underpinning science-base and the outcome-oriented applications (themes). Part C of this plan outlines the capabilities residing in each Division and their ratings as per the review process. The assessment ratings use a scale from Benchmark to Weak on two dimensions - research community impact and industry/community impact. Definitions of the rating criteria are provided in Appendix 5. Findings are provided to the CSIRO Board, along with Divisional management's response plans, with a follow up on post review implementation due 12 months later.

The Science Investment Process

CSIRO adopts a systematic and deliberate approach to managing its research portfolio to:

- focus CSIRO skills and energies on the most important issues for Australia;
- continue to increase the impact and relevance of CSIRO science;
- maintain an appropriate balance between all the roles and responsibilities of CSIRO; and
- ensure the wise investment of taxpayers' dollars (our appropriation funding).

The approach is comprised of two major components. In the first phase - 'broad direction setting' - the senior executives of the organisation, taking into consideration a large array of internal and external factors, translate CSIRO's Strategy into medium term investment priorities. Divisions, Groups and Flagships then respond to these high level directions through an iterative process to give effect to required directional shifts and deliver specific outcomes through investment in Themes and capability development. Details of the 'relevance and impact' criteria used to guide the decision making process are set out in Appendix 6.

Broad Science Directions

The following broad science directions have been developed from a comprehensive review process commenced in 2005 and further refined during 2006.

- Continue to strengthen our world-class environmental research to provide practical solutions and options for the community, industry and policy makers, with particular emphasis on water supply and utilisation, and adapting to climate change
- Increase cross-organisational and cross-disciplinary integration and focus and ensuring more-explicit and early consideration for the effective adoption of our science
- Build underpinning capability platforms in transformational biology, advanced materials, sensor network technologies and computational and simulation sciences
- Combine environmental sustainability expertise with research into agricultural productivity, leading to higher-value agricultural products
- Focus our research in health, including the relationship of food with nutrition and benefit of healthier lives for all Australians
- Continue our partnership contribution for developing solutions to broader national security and biosecurity issues
- Develop technologies to help provide Australia with a competitive edge in the global minerals market, as well as providing solutions for safer and more efficient mining, environmentally sustainable processing, and value-adding products
- Increase the intensity of our research into energy including exploration, production, electricity generation, distribution, end-use efficiency and greenhouse gas reduction and alternative transport fuels
- Further focus our efforts in renewable energy, by aligning our activities to those in which we have competitive advantage and where we can have significant impact
- Fully integrate our world-class ICT expertise with demand-driven community and industry areas
- Redirect elements of our physics, mathematics, biology, chemistry and engineering capabilities to grow our impact in the (niche) manufacturing domain
- Focus on next-generation radio astronomy through research leading to the successful implementation of the Square Kilometre Array initiative
- Increase research and development efforts to deliver enhanced services across industries in the economy
- More broadly and deeply integrate our capabilities in mathematics and computational science.

Parts B and C of this Operational Plan set out, respectively, the portfolio of themes and the trajectory of capabilities planned in response to these broad science directions.

Performance Measurement and Reporting

CSIRO's success is primarily dependent on delivering results with relevance and impact for Australia. This in turn is dependent on:

- Building and maintaining strong relationships with customers, partners, staff and other stakeholders
- Performing high-quality science
- Effective and efficient resourcing of activities.

Taken together, indicators of performance over time in these four crucial dimensions will provide a snapshot of the overall effectiveness of CSIRO's strategy. To provide such a snapshot we have selected key indicators (shown in the box) that pick up important measurable dimensions of the four success factors. The selection of indicators has been informed by the availability and reliability of data, potential behavioural implications and the needs of a variety of stakeholders. These indicators will be monitored regularly (and performance reported at least annually).

Success Measures and Indicators

Impact: Delivering Results with Relevance and Impact

- *Economic, Social, Environmental and Intangible Benefits*
- *Progress to National Flagship Goals*
- *Intellectual Property and Client Reporting*

Relationships: Building and Maintaining Strong Relationships

- *CSIRO Customer and Partner Feedback*
- *CSIRO Staff Satisfaction*
- *Health, Safety and Environmental Performance*

Science: Performing High Quality Science

- *Scientific Output*
- *Science Infrastructure and Outreach*
- *Capability Assessment*

Resources: Effective and Efficient Resourcing of Activities

- *Revenue Mix*
- *Staff Composition*
- *Investment in Science*

As illustrated in Figure 4, the success measures and indicators are drawn from and underpinned by a Performance Measurement Framework (PMF) that plays a crucial role in keeping us 'on track' toward our goals. Using the PMF, CSIRO's management and Board regularly review progress and assess performance in four key dimensions:

- Strategy Implementation;
- Program Performance;
- Organisational Health; and
- Outcomes (Adoption and Impact).³

³ Progress against each area of performance is considered by the Executive Team and reported to the CSIRO Board three times a year in an Organisational Performance Report, providing a strong linkage between our plans and our management reporting processes.

Taken together, the four dimensions of the framework cover strategic and operational considerations relating to performance over both the short and longer term. They also incorporate both an historical and a forward looking perspective – thus providing a strong foundation of information for analysis and management action.

The PMF also provides the information foundation for reporting in accordance with CSIRO's obligations under the Government's 'Outcomes and Outputs' Framework.⁴

CSIRO's Outcome-Output Framework

CSIRO contributes to the following **Outcome**

"Australia has a strong capability in scientific research and development that delivers ongoing economic, social and environmental benefits and provides science and technology solutions relevant to current and emerging national challenges and opportunities "

through the delivery of four **Outputs**

- National Research Flagships;
- Core Research;
- Science Outreach: Education and Scientific Publishing;
- National Research Infrastructure: National Facilities and Collections.

The presentation of theme-based information in Part B of this Operational Plan reflects the alignment of themes to these four outputs. Transition to this output structure will be finalised this year. Consequently, the themes in this plan do not reflect a complete output view, as yet.

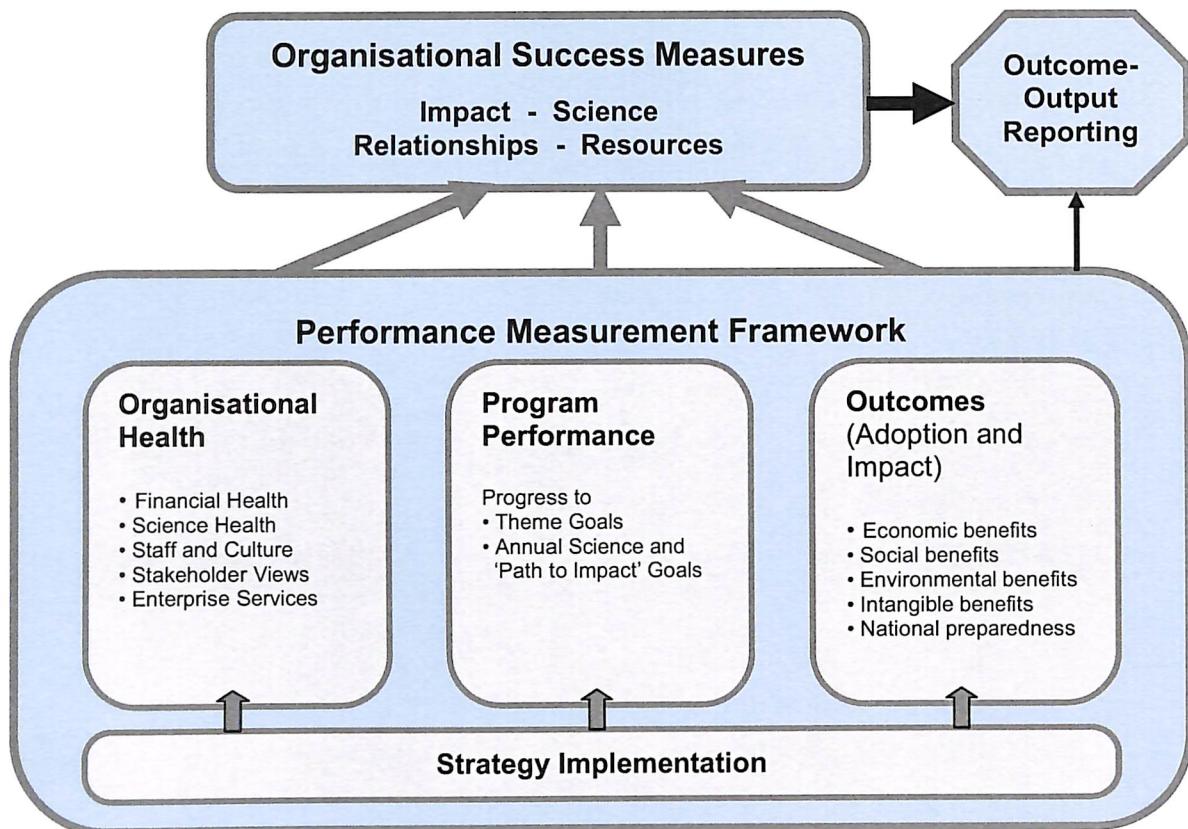


Figure 4: Performance Measurement Framework

⁴ For information on the Outcomes and Outputs Framework see www.finance.gov.au.

Risk Management

The identification and articulation of risk has been integral in the development of the 2007-2011 CSIRO Strategy. Consideration of risk in determining the likelihood of successfully implementing and achieving CSIRO's strategic objectives has resulted in;

- The identification of specific risks associated with the strategy
- Re-calibration and revision of the strategy in light of those risks
- Development of mitigation strategies consistent with the overall strategy

Strategic risks have been identified and categorised in a manner consistent with CSIRO's Performance Framework and Measures of Success. This framework describes how CSIRO's success comes from delivering results with relevance and impact for Australia and this in turn is dependent upon ensuring effective and efficient resourcing of activities, to perform high quality science that is delivered through strong relationships across all stakeholder groups. Consistent with the overarching thrust of CSIRO's strategy, risks have been identified only where it is clear that the resulting event would hinder CSIRO's ability to achieve impact. In summary, CSIRO's key strategic risks are;

- Risks associated with the **resourcing** of the enterprise through implementation of major organisational change initiatives, development of enterprise business processes, governance, leadership and infrastructure
- Risks associated with our core **science** including broad direction setting, attracting talent and developing capabilities
- Risks associated with our **relationships** in managing the expectations of key stakeholders, partnering and collaborating effectively and achieving growth through commercial relationships
- Risks directly associated with the achievement of **impact** through the Flagship program, influencing policy and demonstrating impact to the broader community

Operational risks are owned and mitigation strategies implemented by line management. Risk identification is undertaken by the Enterprise Risk Advisory Committee (ERAC), reviewed by the Risk Assessment & Audit Function and monitored by the Board Audit Committee. This is a dynamic process with risk rankings and categorisations reviewed and adjusted on a regular basis. It will be a key focus area for ERAC as detailed operational plans are developed in the implementation phase of CSIRO's new strategy.

Alignment to National Research Priorities

CSIRO is committed to supporting the Government's National Research Priorities (NRPs). This commitment is not only in relation to the level of investment but also to delivery of impact from that investment. Both aspects are reflected in an annual NRP progress report prepared for the Minister for Education, Science and Training. Planned alignment to the priority goals in each of the four priority areas is illustrated in Figure 5. A brief description of the priority areas and goals is included at Appendix 7 and further information can be found at www.dest.gov.au.

Summary of Planned Investments in the National Research Priorities (2007-08)

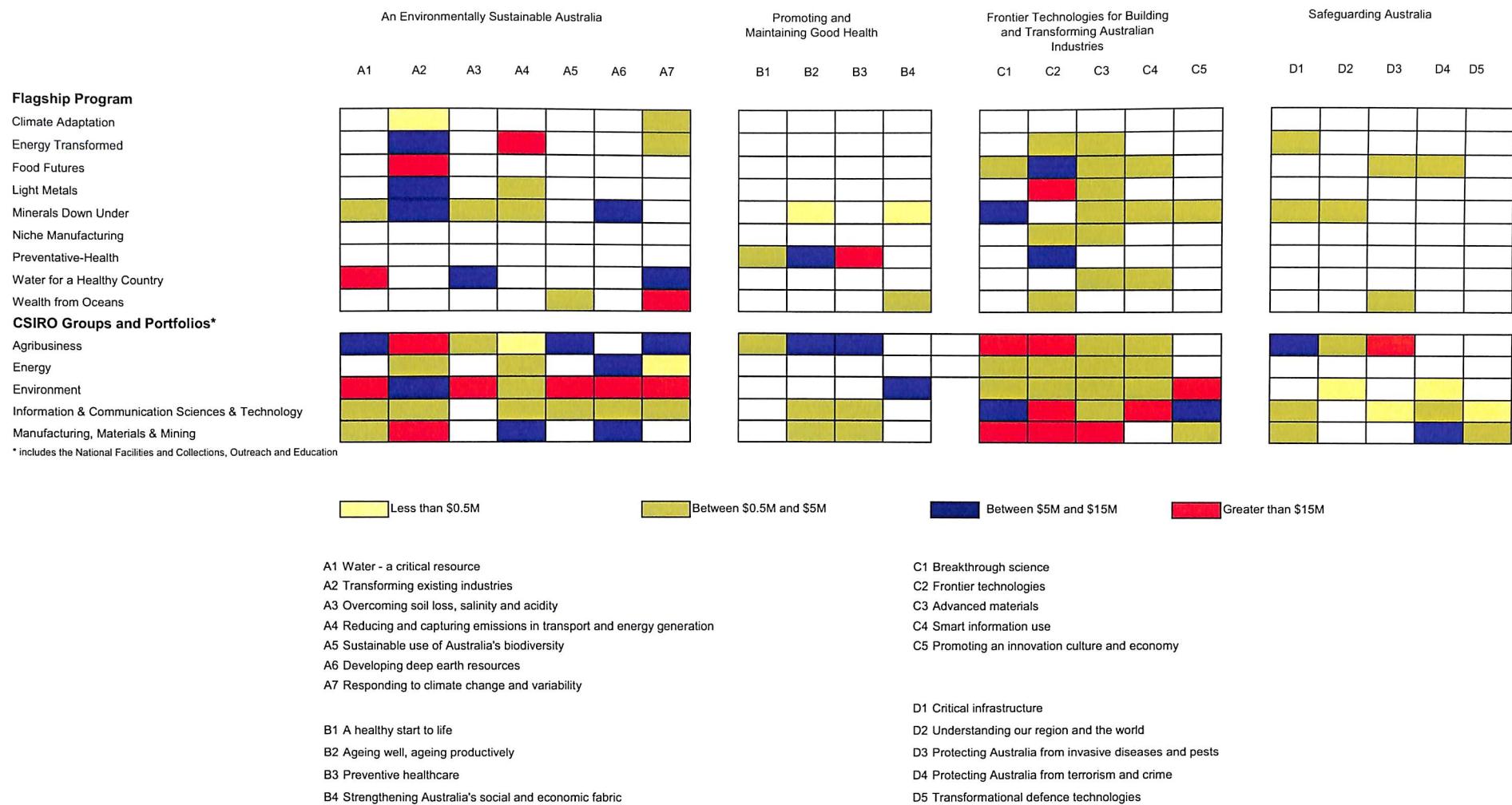


Figure 5: CSIRO Alignment to the National Research Priorities

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National Research Flagships

Executive Director: Alastair Robertson

Overview

The National Research Flagships are partnerships involving CSIRO, other leading scientists, research institutions, Government agencies, commercial companies and selected international partners that aim to make a sustained contribution to Australia's economic growth, social wellbeing and environmental sustainability. They focus CSIRO's and its partners' research efforts and resources on major issues of longer-term national importance, closely aligned with the National Research Priorities. Partnerships are essential to ensure that the Flagships bring the full range of multidisciplinary capability to bear on national problems, and to ensure that research outputs are translated into real outcomes in the Australian economy, community and environment.

The Flagship initiative was expanded with the announcement of new funding in the 2007 Federal Budget. In addition to the original six National Research Flagships – Energy Transformed; Food Futures; Light Metals; Preventative Health; Water for a Healthy Country; and Wealth from Oceans – three new Flagships will be established during 2007-08: Climate Adaptation; Minerals Down Under; and Niche Manufacturing. Flagship resourcing is summarised in the following Table.

Flagship Resources (\$m)	2003-04	2004-05	2005-06	2006-07	2007-08
New Appropriation ^(a)	20	30	35	38.5	75.6
Redirected Appropriation	56.1	99.1	110	132.5	168.2
External including in kind ^{(b) (c)}	6.4	38.5	42.2	69.4	132.4
Total including in kind ^{(b) (c)}	82.5	167.6	187.2	240.4	376.2

Note: Includes Flagship Directors and Implementation Office, but not allocation of other Corporate Support Costs.

(a) Funding provided to CSIRO for the Flagship Initiative under the second "Backing Australia's Ability" program and subsequent decisions in the 2007 Federal Budget.

(b) To reflect the full impact of the Flagship Program external revenue includes revenue earned by the Food Science Australia and Ensis Joint Ventures. For accounting reasons these revenues are accounted for in the Joint Ventures and are not recorded as revenue by CSIRO.

(c) Includes estimates of in-kind contributions from our partners such as use of research facilities.

Governance of the Flagship initiative is the responsibility of CSIRO's Flagship Oversight Committee (FOC). Chaired by the Executive Director, Science Strategy & Investment, the FOC includes all Group Executives, the Executive Director Finance and Governance and CFO, the Chief of Staff Business

Services, Executive Director People & Culture and Organisational Development, and one representative Flagship Director (on a rotational basis). It meets at least four times a year to ensure that:

- Flagship research portfolios are appropriately aligned with long-term Flagship goals
- the Flagships' research portfolios are appropriately balanced and aligned with the Organisation's strategic research initiatives
- research in the Flagships remains of the highest quality, and to
- review the performance of the Flagships against their annual performance plans.

Each Flagship also has an advisory committee, whose role is to provide advice to the Flagship Director about maximising the effectiveness of the R&D portfolio and about technology transfer opportunities and options.

Climate Adaptation

Director: Andrew Ash (Acting)

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1013	Climate Adaptation (Andrew Ash, acting)	\$1m	<i>The Climate Adaptation National Flagship will commence on 1 July 2007 and is in early stages of planning. The initial focus will be on identifying strategic research needs and developing research programs to address these needs. A communication strategy will be developed, and research relationships between CSIRO scientists, external scientists, and stakeholders will be facilitated. The Flagship's Goal is to equip Australia with practical and effective adaptation options to climate change and in doing so create \$xBn p.a. in net value by 2030. (The following theme structure is subject to final approval by the Flagship Oversight Committee)</i>
1155	Pathways to adaptation (TBA)	\$ TBA	This Theme will develop integrated research programs and knowledge that underpin Australia's successful adaptation to climate change. Existing research projects aligned with this theme will be brought into the Flagship. Strategic information gaps will be identified and research projects developed to address these gaps. This theme will develop of the Flagship communication strategy. Research relationships will be established or facilitated with appropriate scientists and stakeholders.

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1156	Pathways to adaptation (TBA)	\$ TBA	<p>This theme will develop integrated research programs and knowledge that address the threats and opportunities posed by climate change to Australia's urban and coastal areas.</p> <p>Existing research projects aligned with this theme will be brought into the Flagship.</p> <p>Strategic information gaps will be identified and research projects developed to address these gaps.</p> <p>This theme will contribute to the development of the Flagship communication strategy.</p> <p>Research relationships will be established or facilitated with appropriate scientists and stakeholders.</p>
1157	Liveable cities, coasts and regions (TBA)	\$ TBA	<p>This theme will develop integrated research programs and knowledge to address the threats and opportunities posed by climate change to Australia's native biodiversity, ecosystems, and natural resources.</p> <p>Existing research projects aligned with this theme will be brought into the Flagship.</p> <p>Strategic information gaps will be identified and research projects developed to address these gaps.</p> <p>This theme will contribute to the development of the Flagship communication strategy.</p> <p>Research relationships will be established or facilitated with appropriate scientists and stakeholders.</p>
1158	Protecting ecosystems and natural resources (TBA)	\$ TBA	<p>This Theme will develop integrated research programs and knowledge to address the threats and opportunities posed by climate change to Australian enterprises, industries, and communities.</p> <p>Existing research projects aligned with this theme will be brought into the Flagship.</p> <p>Strategic information gaps will be identified and research projects developed to address these gaps.</p> <p>This theme will contribute to the development of the Flagship communication strategy.</p> <p>Research relationships will be established or facilitated with appropriate scientists and stakeholders.</p>

Energy Transformed

Director: John Wright

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1016	Energy Futures (Paul Graham)	\$3.2m	<p>Assessing alternative transport futures for Australia via a Transport Futures Forum.</p> <p>Development of an innovative energy modelling system.</p> <p>Assessing public attitudes to alternative low emission technologies.</p>
1017	Low Emissions Electricity (Jim Smitham)	\$25.6m	<p>Partner with electricity generators to provide pilot plant scale evaluation of technologies for post combustion capture of CO2 from power plants to provide industry options for large scale deployment (AP6).</p> <p>Develop the models and partnerships required to demonstrate CO2 storage through enhanced coal bed methane production.</p> <p>Partner with the CO2 CRC in key aspects of Australia's first sequestration demonstration at the Otway project.</p> <p>Complete the coal gasification program with the CRC for Coal in Sustainable Development, including pilot gasification trials of a suite of Australian coals.</p> <p>Develop the path to commercialisation of cLET gas cleaning technologies through small scale demonstration and partner engagement.</p> <p>Develop the industry and government partnerships for MW scale deployment of CSIRO's SolarGas technology.</p> <p>Demonstrate at the CSIRO Energy Centre, new energy storage concepts to reduce the intermittency of renewable electricity generation.</p>
1018	Low Emission Transport (David Lamb)	\$11.9m	<p>Demonstrate LFP-RTIL-Li metal battery energy 120Wh/kg, 300W/k.</p> <p>Achieve signed-off plan for hybrid and electric vehicle development with full engagement.</p> <p>Achieve first production Ultra batteries in Japan, production plan for other territories and engagement for ongoing research.</p> <p>Develop an expanded program in alternative transport fuels to deliver the goals of the NPP.</p>

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1019	Low Emissions Distributed Energy (Terry Jones)	\$8.3m	<p>Distributed Generation:</p> <ul style="list-style-type: none"> Partner with GTL for commercialisation of the PEM electrolyser. Construction and commissioning of the VAMCAT demonstration unit. <p>Waste Heat:</p> <ul style="list-style-type: none"> Build a prototype Residential Desiccant Cooling System and provide market intelligence reports. Construct and test prototype solar microCHP system with commercialisation partner. Engagement of external partner(s) for the commercialisation of the CSIRO integrated ORC technology. Build and commission a demonstration Thermal electric DG system using waste heat from a Genset exhaust stream. <p>Energy Management Technologies</p> <ul style="list-style-type: none"> Construct and demonstrate; an energy management system for commercial enterprises that optimises the efficiency of local electrical loads and a domestic-targeted energy management agent. Engage with a commercial partner. Provide reports and simulations of the value proposition for Distributed Energy in Australia.

Food Futures

Director: Bruce Lee

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1020	Future Grains, Grain-based foods & feed (Mathew Morell)	\$15.9m	<p>Development of cereals with increased levels of dietary fibre and resistant starch.</p> <p>Validation of instrument-based methodologies for the in vitro prediction of glycemic index and resistant starch.</p> <p>Optimisation of breakthroughs in plant production of omega-3 fatty acids to target crop plants.</p> <p>Definition of key genes controlling end-use quality parameters critical to the export competitiveness of Australian wheat.</p> <p>Completion of studies on consumer attitudes to omega-3 and carbohydrate modification technologies and translation into strategies supporting technology adoption.</p>
1021	Breed Engineering (Nigel Preston)	\$10.3m	<p>Enhance the production and viability of in vitro cultured beef cattle spermatogonial stem cells and demonstrate their viability in recipient testes.</p> <p>Demonstrate that Field Programmable Gate Arrays are as fast as current computing technology for high dimensional genetic data (e.g. SNP arrays for beef cattle).</p> <p>Quantify the response to selection for superior growth in Atlantic Salmon and Black Tiger Prawns and the associated economic benefits in collaboration with national and international industry partners.</p> <p>Identify candidate genes for sex in abalone.</p> <p>Characterize bioactive compounds in the Food Futures novel aquafeeds; quantify their impacts on growth rates in farmed prawns.</p>
1022	Value added ingredients & food (Jay Sellahewa)	\$10.7m	<p>Build capability in materials science of natural plant structures and food biopolymers for controlling functionality in nutrition, taste and texture.</p> <p>Optimise separations technologies for isolation of two new bioactives.</p> <p>Develop prototype products structured using only natural plant materials</p> <p>Demonstrate reduction of fat content in two food prototypes without loss of sensory properties</p> <p>Characterise the molecular structures and behaviour of concentrated food proteins in process related environments.</p>
1023	Quality Biosensors (Stephen Trowell)	\$6.6m	<p>Demonstrate synthetic transduction of a model odorant binding to an odorant receptor.</p> <p>Document the effects on grape and wine chemistry, flavour and aroma of specific viticultural manipulations.</p> <p>Initiate pre-competitive consumer sensory preference studies on wine.</p>

Light Metals

Director: Raj Rajakumar

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1000	Aluminium and Magnesium Manufacturing (Kevin Rogers)	\$5.9m	<p>T-Mag Pty Ltd operational and project proceeding to plan.</p> <p>Sign first production license for HPDC heat treatment and demonstrate the effectiveness of the technology on large scale parts critical to leading global companies.</p> <p>Build on Flagship Collaboration Fund Cluster to strengthen national approach to Light Metals products research and development.</p>
1001	Alumina (Chris Vernon)	\$9.0m	<p>Complete research to enable PCT patent application for novel high silica bauxite processing technology.</p> <p>Commence 2 major multi-partner (AMIRA) collaboration projects on fines formation.</p> <p>Commence collaborative research with Chinese AP6 partners in high silica bauxite processing and residue management.</p>
1002	Aluminium (Richard Bean)	\$8.1m	<p>Continue partnership with Rio Tinto Aluminium to develop low energy Drained Cathode Cell Technology and implement results in pilot cell.</p> <p>Demonstrate effectiveness of anode coating technology in multiple, full-scale smelter trials.</p> <p>Identify prospective new materials for aluminium cells which enable new low-energy designs.</p>
1003	Magnesium (J Rankin, acting)	\$1.8m	Achieve technology milestones agreed with partners, secure partner investment and proceed to pre-pilot stage of the MagSonic Process.
1004	Titanium (Raj Rajakumar)	\$9.0m	<p>Form the partnership required to progress the TiRO process to pilot stage and commence plant construction.</p> <p>Continuous operation of CSIRO's alloy process demonstrated. Form a strategic partnership with a major global end-user of titanium alloys and initiate joint research.</p> <p>Demonstrate commercial standard product from one powder consolidation technology and attract partner investment.</p>

Minerals Down Under

Director: Peter Lilly

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1160	Discovering Australia's Mineral Resources (Paul Roberts)	\$21.0m	<p>Assist Government agencies to increase the Australian share of global exploration expenditure through the implementation of the NCRIS plan for the establishment of the Auscope Virtual Core Library and progress towards the Auscope National Data Grid.</p> <p>Aim to reduce the cost of mineral discovery by the development of predictive modelling software and its application to industry targeting projects which will result in changes to some of the exploration strategies employed by industry.</p> <p>Measure the solubility and speciation of Cu, Ni and other base metals in hydrous solutions at extremes of temperature and pressure using synchrotron and nuclear microprobe techniques to enhance understanding of hydrothermal-magmatic systems.</p>
1161	Transforming the Future Mine (Jock Cunningham)	\$4.9m	<p>In conjunction with AMIRA and as part of the AMIRA Drilling Roadmap, complete a scoping project for cross-over drilling technology from the Petroleum Industry to the Metalliferous mining industry.</p> <p>Complete the development or a web-based, long distance control system for a mine-site rock breaker which will contribute to the development of geological intelligent surface mining methods.</p> <p>Develop a hierarchical processing framework for a real time risk based mine control system.</p>
1162	Securing Australia's Future Ore Reserves (Jonathon Law)	\$7.1m	<p>Deliver on project milestones for external heap leaching and bio-processing projects which will improve our knowledge on how we can add sub-economic deposits to the ore reserve inventory.</p> <p>Evaluate performance of CSIRO dry processing technologies for selected nickel laterite, mineral sands and iron ore samples.</p> <p>Complete scoping studies on in-situ leaching and consult with stakeholders on the social, technical and environmental challenges associated with the possible implementation of in-situ leaching technologies.</p>
1163	Driving Sustainable Processing Through Systems Innovation (Sharif Jahanshahi)	\$7.4m	<p>Complete the technical feasibility and life cycle assessment on the conceptual flow sheets for; early removal and safe disposal of arsenic prior to metal production and zero waste processing of sulphide tailings</p> <p>Assist the reduction of greenhouse emissions and water usage in industry by completing a technical assessment of the new integrated slag granulation and heat recovery process through pilot scale tests.</p> <p>Establish a Minerals Futures Forum in conjunction with the Minerals Council of Australia.</p>

Niche Manufacturing

Director: Vicki Tutungi

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1008	Interim Theme to establish the Flagship (Vicki Tutungi)	\$6.1m	<p>Engagement with key stakeholders in the development of the Theme portfolio and Path to Impact strategy.</p> <p>Identification of appropriate Themes and appointment of Theme Leaders by October 2007.</p> <p>Preparation and sign off on the NMF Business Plan by November 2007.</p> <p>Prioritisation and commencement of the NMF Research Program by November 2007.</p> <p>Establishment of a NMF Advisory Committee by August 2007.</p>

Preventative-Health

Director: Richard Head

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1025	Colorectal Cancer and Gut Health (Trevor Lockett)	\$12.9m	<p>Complete 2 preclinical trials with Starplus™, one in colorectal cancer, the second in control of diarrhoea ..</p> <p>Begin CRC protein-biomarker case/control qualification study in stool in collaboration with a commercial partner.</p> <p>Complete animal studies evaluating our second generation Microencapsulation technology for delivery of hydrophobic bioactives to the colon.</p>
1026	Neurodegenerative disease, mental disorders and brain health (Peter Hudson)	\$9.1m	<p>Characterize potential disease-blocking compounds and engage research partners for in vitro testing.</p> <p>Complete first phase evaluations for the AIBL (Alzheimer's disease) Cluster Study.</p> <p>Evaluate non-invasive neuroimaging technologies for diagnosis of neurodegenerative diseases.</p>
1027	Health Data & Information (Christine O'Keefe)	\$8.8m	<p>Prototype molecular data display and analysis for Preventative Health.</p> <p>Achieve agreement for transfer of the colonoscopy simulation technology to a commercial partner.</p> <p>Broaden the application of HDI to Preventative Health, including progressing the Australian Cancer Grid Activity.</p> <p>Commence project to deliver tailored weight management information to individuals.</p> <p>Complete Kids Eat, Kids Play.</p>
1146	Obesity and Health (Peter Clifton)	\$7.1m	<p>Investigate the influence of a high protein diet on human health.</p> <p>Explore food-based approaches to enhancing satiety.</p> <p>Undertake community trials of weight loss and cholesterol lowering / children's plan.</p> <p>Identify inhibitors of fatty acid synthesis.</p>

Water for a Healthy Country

Director: Tom Hatton

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1006	Urban Water (Alan Gregory)	\$27.4m	<p>Implement the Hydroplanner integrated Urban Water Model in Canberra and Brisbane to evaluate the water quantity and quality impacts of city water strategy alternatives.</p> <p>Develop risk based national guidelines for managed aquifer recharge.</p> <p>Provide the underpinning water quality infrastructure, social, and economic science to enable implementation of purified recycled water in South East Queensland.</p> <p>Evaluate and characterise potential new membrane materials to reduce the energy required for desalination and recycling.</p>
1010	Water Resources Observation Network (WRON) (Ross Ackland)	\$14.3m	<p>Complete WRON Reference Model (Version 1.0).</p> <p>Work with BoM to deliver WRON tools under the Water Information R&D Alliance (WIRADA) These will include Water reporting tools for dam levels, water restrictions, stream flow forecasting and prediction .</p> <p>Work with Colleambally Irrigation to design and install implementation to enable real-time metering and management of irrigation water.</p> <p>Through Tasmania ICT Centre, design and deploy improved sensor networks for water resources monitoring.</p>
1136	Healthy Water Ecosystems (Mike Grundy)	\$19.9m	<p>Managing the Murray Icon Sites – Guidelines for the Asset Managers (goals and targets for conservation and management of flood-dependent native vegetation communities in relation to future climate change and environmental flow scenarios).</p> <p>Living Murray – Operational model to manage Murray environmental flows for maintaining or re-establishing floodplain vegetation.</p> <p>Coorong scenario analysis – impact of different climate and river management combinations on water level and salinity in the Coorong.</p> <p>Great Barrier Reef catchments – A policy and climate impact assessment tool (SEPIA model) in use that simulates hydrological functions, erosion dynamics, economic indicators and vegetation change at paddock scale.</p> <p>Great Barrier Reef policy – A tool for shaping adaptive policy processes developed with the Reef Water Quality Partnership.</p>

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1137	Better Basin Futures (Glen Walker)	\$26.6m	<p>Assessment of water sharing plans across Murray-Darling Basin under various climate and land use scenarios: Changes in reliability of surface and groundwater resources around the MDB.</p> <p>Estimation of climate and vegetation impacts on surface- and groundwater: From the various hydroclimate initiatives (SEACI, IOCI, AGO, eWater CRC, etc.): high resolution climate change projections; statistical and dynamic downscaled daily rainfall to drive hydrological models; seasonal streamflow forecasts; and impacts of climate change on water resources.</p> <p>Synthesis of dryland salinity in Australia, with an emphasis on the origins of salt, its mobilisation and transport in the regolith and response times for salinisation, de-salinisation and salinity processes and salinity effects on agriculture and groundwater dependent ecosystems.</p> <p>Analysis of policy options for water: Analysis of future scenarios for the Lower Murray Region and validation of approach for assessment of regional NRM and water plans.</p> <p>Planning for sustainable irrigation in Northern Australia: (a) Development of a prototype sustainability framework for the Lower Burdekin that may be applicable across Northern Australia (b) Identification of hydrological constraints and opportunities for Northern Australia and (c) Analysis of biophysical processes with regard to advantages and disadvantages of irrigation mosaics as a basis for sustainable irrigation.</p>

Wealth from Oceans

Director: John Gunn (Acting)

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1063	Ocean System Prediction and Responses (Kate Wilson)	\$10.3m	<p>BLUElink I: Delivery of an operational national ocean forecasting capacity.</p> <p>Commence activity in the BLUElink II project to develop a coupled ocean-atmosphere model on a regional and coastal scale.</p> <p>Develop nested biogeochemical models for SW WA from mesoscale to lagoon scale, incorporating benthic-pelagic coupling, and data from new IMOS observing systems.</p> <p>Quantify relative contributions of ocean nutrients vs sediment nutrients to SW WA marine primary production.</p> <p>Establish new activities to capitalise on NCRIS funding of the IMOS initiative.</p> <p>Produce a predictive model of the Australian seabed change (aligned to Regional Marine Plans in the NW region, NE region (Barrier Reef), and Northern (Arafura Sea) region) over the next 50 years using existing seabed sampling data and estimates of climate change scenarios.</p>
1064	Ocean based forecasts of Australian climate (Andreas Schiller)	\$12.4m	<p>Through the newly established Western Australian Marine Science Institution, initiate research activities on Indian Ocean predictability and its impact on regional currents, the Leeuwin current and its impact on shelf ecosystems and climate impacts on the Ningaloo reef.</p> <p>The main activities in ACCESS in 07/08 will be to couple the AusCOM ocean/sea ice model to the UK Met Office's latest atmospheric model (HadGAM1a) and perform test simulations with the coupled system, and to develop and commence implementation of a plan for evaluation and improvement of the ocean/sea ice model.</p> <p>Assess the relative importance of the major climate drivers on regional climate across Australia, explore the predictability and synoptic processes associated with these drivers, and determine gaps in our knowledge that will inform future investment in seasonal climate research.</p> <p>Through better understanding of adaptive capacity develop new approaches to incorporate climate information into agricultural decision-making at enterprise and regional scales.</p> <p>Deliver the first predictions of future range for pelagic fish species, and the likely impact of changed distributions on fisheries production and regional management of tuna and billfish resources.</p>

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1065	Ocean based industry development and Growth (Blue GDP) (Edson Nakagawa acting for Mayela Rivero)	\$20.3m	<p>Numerical models for: improving our understanding of potential hydrocarbon reservoirs sub-seafloor; and improved design of pipelines in gas fields to avoid gas hydrate formation.</p> <p>Technological advances through: the delivery of multiscale x-ray imaging/visualization of rock samples from fault zones; the deployment of prototype hydrocarbon sensors for use in the oceans; a prototype compact high-pressure gas-water separator; and the design and construction of a hydrates flow loop.</p> <p>Test the potential to create innovative industries with products derived from material based on natural marine resources and also define pathways to commercialisation for new products that will significantly improve the management of existing ocean industries such as maritime transport (research in biofouling) and defence (subsea mapping capability).</p> <p>Actively engage with industry partners in the majority projects in Blue GDP through JIPs and individual partnerships.</p> <p>Secure our collaborative research with external research organizations through, for example, the use of the Flagship Collaboration Fund and grow new collaborative opportunities in the biofouling and sand production research areas.</p>
1066	Ocean based regional development and growth (Marine Nation) (Bill de la Mare)	\$13.8m	<p>Demonstrate prototype of Ningaloo multiple-use system model for Ningaloo Collaboration Cluster.</p> <p>Develop Derwent/Huon underwater sensor network prototype system.</p> <p>Develop socioeconomic, industry and biogeochemical components of multiple-use management models.</p> <p>Demonstrate prototype management strategy model for the SE Queensland Healthy Waterways Partnership.</p>
1133	Sustainable Australian fisheries and ecosystems (Tony Smith, Acting)	\$15.1m	<p>Finalise package of ecological risk assessment reports for Commonwealth fisheries and assist Australian Fisheries Management Authority (AFMA) in development of risk management responses.</p> <p>Assist AFMA to meet its obligations from the Ministerial Direction by providing and supporting scientifically based harvest strategies for key target species.</p> <p>Develop options for bycatch management in key Commonwealth fisheries.</p> <p>Develop options for integrated spatial management of Commonwealth fisheries to meet the Ministerial Direction.</p> <p>Assess the extent in terms of catch and effort of illegal fishing in the north to support the compliance program of AFMA and coastwatch.</p>
1134	Marine conservation and biodiversity management (Nic Bax)	\$7.0m	<p>Establish collaborative research portfolio to predict marine biodiversity and provide management options for its conservation with Geoscience Australia, AIMS, University of Tasmania and Museum of Victoria through the CERF Hub.</p> <p>Demonstrate successful integration of a sex-distorting genetic construct in zebra fish and explore application to other pest species (carp, cane toads).</p> <p>Develop rigorous spatially-resolved, hazard-based approach to marine indicator selection that can be applied to selecting marine indicators for State of the Environment reporting.</p> <p>Determine effects of fishing on Australia's deep sea seamounts with focus of effects on endemic species.</p> <p>Establish a scientific and strategic approach to support the short term needs of Australia's marine bio-regionalisation program.</p>

Core Research

Overview

CSIRO's core research areas, like the Flagship programs, are areas where a significant level of resources are focussed on activities that are strongly aligned with the National Research Priorities. However, whereas the Flagships are most strongly focussed on 'Horizon 2' research (represented by CSIRO's roles in 'Creating new or significantly transforming industry' and 'Solving major national challenges'), our core research themes also include a significant component of 'Horizon 1' research (represented by CSIRO's roles in 'Delivering incremental innovation for Australian industry' and 'Science-based solutions for the community'). CSIRO's core research areas are areas in which CSIRO is (or has the potential to be) distinctive and can deliver high value for Australia.⁵

In 2007-08, core research themes are managed through five CSIRO Groups:

- Agribusiness
- Energy
- Environment
- Information and Communication Sciences and Technology
- Manufacturing, Materials and Minerals

Each Group is led by a Group Executive who is a member of the Executive Team. Research within each Group is represented by a number of portfolios Theme portfolios for which the leaders of the various business-units in the Group are responsible.

⁵ The 'horizons' terminology is taken from [The Alchemy of Growth](#) (Baghai, Coley and White, 1999). In the CSIRO context, Horizon 1 activities are at the heart of the organisation, they are critical to short-term performance and delivery, with a significant component of applied research, and they nurture skills and provide resources for growth. Horizon 2 activities tend to be longer term, they are more reliant on strategic/discovery research, and they complement and extend existing research in new directions. Horizon 3 activities are at the frontiers of research science and technology; while undertaken with clear intent, they will often feed into Horizon 1 and 2 activities in unanticipated ways and ensure that CSIRO stays at the leading edge of global innovation.

Core Research - Agribusiness Group Portfolios

Group Executive: Joanne Daly

Forestry and Forest Products

Portfolio Manager: Tom Richardson (CEO, Ensis)

SIP No.	Theme Name (Theme Leader)	Budget ⁶ 07-08	Activities and Outputs for 2007-08
1072	Optimised BioFibre Quality (nee Wood Quality Solutions) (Simon Potter)	\$4.8m	<p>Next generation SilviScan high-throughput phenomics tool developed to underpin biofibre informatics platform.</p> <p>Commercial application of in-field and in-mill biofibre quality assessment tools and value propositions developed</p> <p>Engagement with NCRIS Plant Phenomics Centre and Scion Cell Wall Biotechnology Centre to examine biogenesis of biofibres</p> <p>Application of decision-support software system for quality via commercial partnerships</p>
1073	Forest fibre prediction and production systems (Michael Battaglia)	\$5.0m	<p>Weathering model for supply-limited landscapes developed</p> <p>Forest sensor network capturing forest structural changes developed to proof of concept</p> <p>Forest health decision support tool developed to simulate impacts of climate change on pest damage</p> <p>CABALA tool applied to at least one new forest product or service</p>
1074	Next Generation Forests and Fibre (Harry X Wu)	\$7.5m	<p>New germplasm developed for bioeconomy end-uses</p> <p>Advanced breeding and deployment strategy developed</p> <p>Two or more joint breeding programs established with major international forestry organizations</p> <p>Completion of association genetics for at least 100 genes.</p>
1075	Risk Management in Forest Landscapes (Brian Richardson)	\$3.1m	<p>Finalise review of worldwide information on forest ecosystem resistance to pest impacts.</p> <p>Undertake risk assessments on a forest pest not yet established in Australia or NZ</p> <p>Assess the impacts of climate change on pest dynamics on trees</p> <p>Develop an initial-attack model for aerial suppression of bushfires.</p>
1076	Sustainable Biofibre Products (Steven Loffler)	\$8.1m	<p>Complete evaluation of at least two novel technologies for biofibre segregation</p> <p>Develop a novel range of pigmented dyes from nano-structured inorganic precursors</p> <p>Complete laboratory based trial of natural binder for biocomposites</p> <p>Conduct scale-up trials on the Franich Process™ and finalise IP protection</p>

⁶ Note that budget figures for Ensis Themes are for Ensis Australian activities only whereas activities and outputs are across Ensis.

Entomology

Portfolio Manager: Mark Lonsdale (Acting Chief, CSIRO Entomology)

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1077	Biosecurity and invasive species (Andy Sheppard)	\$11.4m	<p>Engage and develop biosecurity research around pests, weeds and diseases in a changing climate and engage in the new Climate Adaptation Flagship priorities.</p> <p>Align research priorities and activities to AusBIOSEC framework and sectorial strategies for both the bioeconomy and the environment.</p> <p>Delivery of milestones and deliverables in joint active projects with 3 CRCs (AWMCRC, NPBCRC, IACRC) around invasives, biosecurity preparedness and management of impacts to food security.</p> <p>Develop strategies that reduce impacts of existing and emerging national priority invasive pests and weeds threatening Australian plant health and ecosystems.</p>
1079	Invertebrate Biodiversity Assets and Informatics (John LaSalle)	\$ 5.8m	<p>Build cross linkages with other CSIRO collections through Biological Collections Group, CERF Taxonomy Hub, Atlas of Living Australia.</p> <p>Fully engage in the ET biodiversity Review.</p> <p>Grow the Atlas of Living Australia activity area through engagement with: Encyclopedia of Life, GBIF, other partners both nationally and globally.</p> <p>Build capacity for delivering biodiversity information for use in conservation policy.</p>
1080	Building Bioindustries with Synthetic Biology (Peter East)	\$11.8m	<p>Platform IP positions for metabolic engineering of crops for production of various industrial chemicals.</p> <p>New products and synthetic processes for enabling sustainable biomass utilisation and biofuels production.</p> <p>Delivery of optimised enzymes for in situ remediation of environmentally stable pollutants.</p> <p>Multipurpose high-throughput diagnostic platforms for rapid assessment of ecosystem health and function.</p>

Food Science

Portfolio Manager: Anthos Yannakou (CEO, Food Science Australia)

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1030	Processing Innovation (Lyndon Kurth)	\$10.4m	Develop and apply innovative processing technologies combined with knowledge of the structural biology and chemistry of agribusiness raw materials to create designed food structures (products) with predictable sensory and nutritional impacts in the body; and thus provide a market advantage which improves the competitiveness and sustainability of the Australian food industry. Sign non-disclosure agreements with at 4 companies to demonstrate proof of concept for the new technology applications
			Optimise efficiency in unit process operations and supply chains through the use of advanced sensing and measurement techniques to capture data which allows optimisation modelling and experimental validation of process innovations that will increase efficiency, leading to greater market competitiveness. Engage with commercial clients to generate at least \$2.0m from commercial agreements for proof of concept demonstrations or technology transfer programs.
1031	Food Structure (Lyndon Kurth)	\$8.0m	Develop and apply innovative processing technologies combined with knowledge of the structural biology and chemistry of agribusiness raw materials to create designed food structures (products) with predictable sensory and nutritional impacts in the body; and thus provide a market advantage which improves the competitiveness and sustainability of the Australian food industry. Sign non-disclosure agreements with at 4 companies to demonstrate proof of concept for the new technology applications
			Develop and utilise knowledge of complex systems chemistry to enable predictable transformation of agribusiness raw materials (across sectors: dairy, grains, horticulture, meat etc.) into consumer ready food products that have familiar and desirable sensory properties but radically different composition. Establish a syndicate of 4 clients to co-fund the first 12 months of pre-competitive research program with the aim of establishing at least 2 specific company-focussed research programs in the second year.
1032	Food Safety & Quality (Gary Dykes)	\$10.4m	Investigate selected pathways of transmission and the mechanisms of the survival and persistence (as related to food and environment structure) of at least four bacterial species of concern in food environments. In so doing provide the science base to enhance food safety and security for government, industry and the consumer as indicated by publication of at least ten scientific papers, three new industry relationships and broad consultation of government and regulators with the theme.
			Examine the application of novel technologies and food formulations in controlling at least five major spoilage and pathogenic bacteria and fungi and determine the underlying effect of these processes at a single cell and molecular level. In so doing develop novel ways for Australian food manufacturers to process food for microbiological safety and quality as indicated by engagement with commercial clients to generate at least \$1M in funding and by the publication of at least five scientific papers.
			Explore the influence of animal diet and polyphenolics on food flavour, cross-modal sensory interactions and panel performance studies on sensory perception, and the role of sustained acceptance and children's diets on consumers. In so doing allow food producers and manufacturers to enhance food quality and consumer acceptance of new and existing products as indicated by engagement with at least four new industry clients and the publication of at least five scientific papers.
1033	Food & Nutrition (Michael Fenech)	\$3.4m	Define the impact of folate status on telomere length maintenance.
			Develop a micro-culture system for a minimally invasive high-throughput method for measuring DNA damage.
			Determine the impact of intake of different food groups on DNA damage in vivo in humans.

Livestock Industries

Portfolio Manager: Alan Bell (Chief, CSIRO Livestock Industries)

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1044	Transforming Animal Biosecurity (Deborah Middleton)	\$26.2m	<p>Identify candidate antiviral targets for an emerging zoonotic disease.</p> <p>Initiate proof-of-concept for RNAi based control of avian influenza in poultry.</p> <p>Demonstrate proof-of-principle for molecular diagnosis of internal parasite populations.</p> <p>Generate genome sequences of at least 2 high-impact livestock or zoonotic pathogens.</p>
1045	Transforming the Animal and its Products (Ian Purvis)	\$19.2m	<p>Translate outcomes from research assessment of welfare status during road transport into policy through incorporation in the Australian Standards and Guidelines for the Welfare of Animals.</p> <p>First panel of DNA markers for parasite resistance commercialised and released to industry.</p> <p>Investigate epigenetic effects on bovine production traits.</p> <p>Identify micro-organisms capable of reducing methane production by ruminants and promote these alternatives with bioactives.</p>

Plant Industry

Portfolio Manager: Jeremy Burdon (Chief, CSIRO Plant Industry)

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1038	New Horizons in Plant Science (Frank Gubler))	\$13.7m	<p>Develop novel strategies to manipulate and control complex reproductive and development traits with major impact on yield, seed quality and early plant development.</p> <p>Improve the understanding of small RNAs and their role in the control of gene expression.</p> <p>Develop technologies that permit highly specific control of genes for the expression of novel traits in existing and new crops.</p> <p>Link functional genomics and bioinformatics to enhance understanding of key processes in plant production.</p>

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1039	Delivering Quality Crops for Health and Consumer Choice (Mark Peoples)	\$11.4m	<p>Through application of advanced genetic technologies, physiology and phenotypic selection techniques identify the genes and genetic loci controlling key quality attributes for a range of horticultural crops.</p> <p>Utilising the modern genetic tools available through conventional (markers) and new breeding technologies to package the genes controlling quality attributes of products into elite germplasm and cultivars.</p> <p>Improve the understanding of the interactions between genetic, environment and farm management factors and their impact on the quality of horticultural and field crops.</p>
1040	Plant Fibre and Biofactories for New Agricultural & Industrial Products (TJ Higgins)	\$19.0m	<p>Utilising traditional plant breeding and enhanced genetic selection, develop improved germplasm for the Australian cotton industry delivering better water use efficiency, higher yields and improved fibre quality.</p> <p>Apply advanced genetic technologies for selecting new varieties for the Australian sugar industry that will enable the development of novel plant products tailored to specific high-value industrial markets.</p> <p>Establish the feasibility of producing high-value industrial fatty acids in oilseed crops by developing enabling metabolic engineering technology.</p>
1041	Designing Crops and Pastures for Australian Environmental Challenges (John Manners)	\$22.3m	<p>Develop innovative solutions to major weeds and plant pests through selective breeding and development of improved management practices.</p> <p>Utilise the latest breeding and gene discovery technologies for the development of innovative solutions to major plant diseases.</p> <p>Identify novel genes and control pathways for the development of new crop varieties with improved adaptation to drought, temperature stresses.</p> <p>Combine genetic and management approaches to investigate plant-soil interactions important for overcoming chemical and physical constraint that are a common in the majority of Australian soils.</p>
1042	Biodiversity and Conservation (Andrew Young)	\$3.4m	<p>Quantify processes important in determining species recruitment, persistence and abundance in native vegetation communities.</p> <p>Elucidate systematic and evolutionary relationships within the Australian flora</p> <p>Identify strategies for the potential use of native germplasm in agricultural crop breeding programs</p> <p>Maintain and enhance the Australian National Herbarium in collaboration with other state and international partners.</p>
1147	Transformational Biology (Jeremy Burdon)	\$3.2m	Develop capability platform for delivery of research outputs to be utilised by other industry focussed themes and the broader scientific community.

Core Research - Energy Group Portfolios

Group Executive: Beverly Ronalds

Energy Technology

Portfolio Manager: David Brockway (Chief, CSIRO Energy Technology)

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1140	Secure and Sustainable Energy Technologies (John Carras)	\$10.9m	<p>Advance the science of organic photovoltaic devices through international partnerships with ICOS.</p> <p>Commercialise core fuel cell and ionic technologies.</p> <p>Develop personal energy generation and storage technologies for mobile applications.</p> <p>Provide clear guidance to the commonwealth Department of Environment and Water Resources on the health impacts of using E10 blends in the Australian motor vehicle fleet.</p> <p>Increase the productivity and quality of export coal through intelligent plant sensing and control technologies.</p>

Petroleum Resources

Portfolio Manager: Beverly Ronalds (Chief, CSIRO Petroleum Resources)

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1092	Maximising Australia's Petroleum Self Sufficiency(Peter McCabe)	\$12.0m	<p>Partner with Geoscience Australia, State Surveys, and oil companies to identify areas and research projects where new technology can improve exploration and development success, with a particular focus on onshore areas.</p> <p>Develop novel approaches to reservoir characterisation and engineering, well stimulation, enhanced oil recovery, improved drilling technology, and identification of prospective petroleum basins.</p> <p>Examine the feasibility of cleaner oil shale exploitation and coal seam gas development, and establish new protectable IP.</p>

Core Research - Environment Group Portfolios

Group Executive: Andrew Johnson

Agricultural Sustainability Initiative

Portfolio Manager: Brian Keating (Chief, CSIRO Sustainable Ecosystems)

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1129	Australian Agriculture Transformed (Mark Howden)	\$6.8m	<p>Option development for environmental forestry on farms.</p> <p>Application of new technology for animal management.</p> <p>Development of options and models for land stewardship and ecosystem services.</p>
1130	Economic and Environmental Performance of Australian Agriculture (Peter Carberry)	\$17.4m	<p>Develop common frameworks for assessing triple-bottom-line performance of Australian agriculture.</p> <p>Expansion of precision agriculture R&D to new industries.</p> <p>Assess value chain benefits of diversification for agricultural industries.</p>
1131	Agroecosystem Function and Prediction (Pete Thrall)	\$17.6m	<p>Movement toward common software engineering protocols, and increased interactions between modelling platforms.</p> <p>Quantification of the ecosystem services provided by agro-ecosystems.</p> <p>Advancing research in soil biology, function and biomonitoring.</p> <p>Development of an integrated monitoring and prediction framework for assessing landscape vegetation condition, water use, carbon stored and annual fluxes and salinity benefit.</p>

Land and Water

Portfolio Manager: Neil McKenzie (Acting Chief, CSIRO Land and Water)

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1037	L&W Opportunity Development Fund (Neil McKenzie)	\$0.8m	Innovation Bank
1119	Centre for Environmental Contaminants Research (Simon Apté)	\$9.5m	Improve the protection of Australian natural resources through the development of new guidelines and frameworks to measure, control and manage contaminants (e.g. National Environmental Protection Measures, Water and Sediment Quality Guidelines).
			Assist industry and allay public fears by providing an objective evaluation of the risks posed by emerging contaminants of concern (endocrine disrupting chemicals, pharmaceuticals, flame retardants, nanoparticles).
			Provide guidance on the safe usage of solid wastes (e.g biosolids), wastewaters and recycled water in Australia.
			Assist in the sustainable development of Australian industry by providing sound and trusted advice on the environmental impact of proposed developments (e.g. the mining and minerals and water utilities industries).
			Provide national and international leadership in the development of new methods and databases for Acid Sulfate Soils by leading projects and sub-committees under the auspices of the National Committee for Acid Sulfate Soils.
			Provide soil forensics expertise to police forces, government agencies and non-government organisations and assist with the resolution of crime and environmental pollution cases in Australia and overseas.
1139	Managing Australia's Soil And Landscape Assets <i>(Hamish Creswell, interim)</i>	\$4.4m	Provide open access to the best available information on the nation's soils through development of the Australian Soil Resource Information System (ASRIS).
			Provide new capability to predict soil carbon dynamics and greenhouse gas emissions from soil and thus support the national carbon accounting process.
			Contribute to national standards and emerging policies on soil protection in collaboration with the <u>National Committee for Soil and Terrain</u> .
			Provide new methods for assessing and monitoring threats to soil function (e.g. acidification) and identify the suitability of land for sustainable agricultural development including niche locations (opportunities) for high-value enterprises

Marine and Atmospheric Research

Portfolio Manager: Greg Ayers (Chief, CSIRO Marine and Atmospheric Research)

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1094	Complex Systems Science (John Finnigan)	\$2.4m	Apply the approaches of complex systems science to integrate the biophysical social and economic fields in an expanded scientific worldview to improve solutions and policy advice to government and industry.
1132	Climate and Atmosphere Theme (Tony Hirst)	\$20.1m	Contribute to the development of ACCESS infrastructure and improve the ability of ACCESS to simulate the global carbon cycle, processes at the land surface, and the chemistry of the atmosphere.
			Produce projections of future climate change over Australia for impact studies based on the most recently available science including the IPCC Fourth Assessment Report.
			Produce regional and fine-scale simulations of past and future climate and assess the implications of climate change on the frequency and distribution of extreme weather and climate related events.
			In partnership with industry and government improve the management of, and enhance services from the atmospheric environment.
			Monitor and report on status of the atmospheric environment and develop model-data fusion techniques for incorporation into earth system models.
1135	Marine and Atmospheric Capability (Greg Ayers)	\$2.6m	Provide the Quantitative Marine Science Program in partnership with UTas and participate with other universities in the training of early career scientists.
			Provide advice on the collection and identification of marine invertebrate specimens and their lodgement in state museums and ensure the curation and management of the microalgal collection.
			Represent CSIRO and provide Key Account Management and outreach services for CSIRO activities with the Australian Greenhouse Office.

Sustainable Ecosystems

Portfolio Manager: Brian Keating (Chief, CSIRO Sustainable Ecosystems)

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1012	Sustainable Regional Development (Dan Walker)	\$13.2m	<p>Integrated modelling and analyses of impacts on regions of external drivers of change (e.g. globalisation; demographic change).</p> <p>Development and testing of institutional and market-based options for achieving collective regional goals.</p> <p>Development of analytical tools and procedures that address trade-offs for decision-making in natural resource investment and policy decisions at a range of scales.</p>
1014	Healthy Terrestrial Ecosystems (Iain Gordon)	\$9.5m	<p>Development of modelling frameworks that incorporate a mechanistic understanding of invasive spread in landscapes.</p> <p>Design and testing of practical applications of first generation outcome-oriented stewardship incentives for improving biodiversity conservation and ecosystem services on privately managed land</p> <p>Support and conduct research directed at systematic, biogeographic and population genetic understanding of vertebrate diversity of Australia and the surrounding region.</p>
1028	CSE Opportunity Development Fund (Brian Keating)	\$2.4m	The Opportunity Development Fund Theme resources CSE's Internal Venture Capital Fund and the Staff Development Fund to stimulate research innovation and develop high priority skills.
1101	Future Cities (Allen Kearns)	\$6.7m	<p>Building partnerships with industry and developing prototype case study projects that demonstrate integrated urban planning, design and development for healthy and sustainable urban environments.</p> <p>Identifying materials and construction processes that reduce resource use per capita by working in partnership with leaders in the design and development of sustainable buildings and urban infrastructure.</p> <p>Providing integrated urban knowledge and insights to government for improved urban management of complex risks and vulnerabilities arising from major national urban challenges such climate change, bushfires, water shortage, energy security and health threats in cities.</p> <p>Advancing the emerging science of urban sustainability through international research networks and cross-disciplinary collaboration with universities in Australia.</p>

Core Research - Information and Communication Sciences and Technology Group Portfolios

Group Executive: Dr Alex Zelinsky

Radio Astronomy

Portfolio Manager: Brian Boyle (Director, Australia Telescope National Facility)

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1068	Technologies for Radio Astronomy (Graeme Carrad)	\$4.6m	<p>Compact Array Broadband Backend (CABB) – Extending the backend bandwidth of the Australian Telescope Compact Array (ATCA) by a factor of sixteen to take advantage of broadband receivers.</p> <p>20/13 and 6/3cm Broadband Compact Array receiver upgrade – Increasing the capability of the original receivers to utilise the capabilities of CABB.</p> <p>7mm receiver systems commissioned at ATCA, to meet both NASA spacecraft tracking requirements, and ATNF user needs.</p> <p>Commission a pulsar digital filter bank at Parkes, meeting user requirements for a precision pulsar timing system.</p> <p>Develop a new 13mm receiver for Parkes, with a threefold increase in sensitivity in the 16-26GHz frequency range.</p>
1069	Astrophysics (Robert Braun)	\$6.1m	<p>Produce 100 refereed publications, more than 60 to be in journals in highest impact quartile, plus citation counts for ATNF researchers.</p> <p>A minimum of 12 invitations to speak at international scientific meetings, and minimum of 16 symposia/colloquia at other institutes.</p> <p>Ongoing leadership of the MIRANDA (SKA) science case with detailed simulations to support/influence engineering.</p>
1070	ASKAP: The Australian SKA Pathfinder (David DeBoer)	\$10.4m	<p>Boolardy site (WA) established with initial infrastructure to support radio astronomy facilities.</p> <p>Milestones in 07/08 project plans achieved, including protection of the radio quiet zone.</p> <p>Engagement of Australian industry, initially in antenna development and data transportation.</p>

Information and Communication Technologies

Portfolio Manager: Alex Zelinsky (Director, CSIRO ICT Centre)

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1057	eHealth (Bruce Barraclough)	\$6.0m	<p>Research on semantics and health data to improve query and reporting on heterogeneous, linked data sets, including longitudinal data. Development of prototype release software for further validation and deployment within health sector.</p> <p>Research to improve cancer stage classification algorithms using knowledge encoded in report metadata and medical terminologies, as well as information from other modalities, such as radiology reports. Development of prototype release software for further validation and deployment within health sector.</p> <p>Development of software prototype tools to enable quantitative measures of functional capacity with the underlying physiological parameters for clinical assessment of chronic disease patients in the community.</p> <p>Develop tools and algorithms to extract, analyse and fuse information across imaging modalities to improve diagnosis and enhance the safety and quality of care for patients.</p>
1058	eResearch (John Colton)	\$5.2m	<p>Establish a research framework and platform for intense collaboration that matches forms of 'Mixed Presence Setting' support to tasks and context.</p> <p>Develop a service-oriented middleware infrastructure (namely the Dynamic Collaboration Service) for the aforementioned platform, including a definition of semantics for electronic contracts (e-Contracts) and related negotiation, agreement and termination protocols.</p> <p>Research, specification and partial implementation of a resource management protocol at the IP networking layer facilitating a self-tuning end-to-end QoS Internet. Planned outcomes are to be submitted conference and journal papers, with a push into standards body as an initial RFC draft for IETF and partial implementation on network processors.</p> <p>Identify a partner and commercialise the software version of the Trust Extension Device (TED) which provides a trusted execution environment for client applications.</p> <p>Perform a field study with an external collaborator (TBD) investigating use of 'Mixed Presence Setting' tools in their work context.</p>
1059	eTechnology (Ross Wilkinson)	\$8.6m	<p>Undertake an algorithm study for the Adaptive Wireless study and seek out an industrial agreement with Agere and Boeing in the adaptive Wireless space.</p> <p>Develop an ultra broadband communications subsystem and gain an industry investment for the smart antennae systems and mm-technology.</p> <p>Integrate search technology with complex delivery on desktop.</p> <p>Develop the Unmanned Aerial Vehicle (UAV) inspection capability to proof-of-concept and demonstrate safe power line inspection.</p> <p>Develop the Autonomous Guided Vehicles (AGV) material handling capabilities to proof-of-concept.</p>

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1060	ICT for Safeguarding Australia (Jay Guo)	\$3.7m	<p>Gain a co-investment partner for the mm-wave imaging and terahertz imaging project.</p> <p>Develop for the Emergency Services for Data environment project the process for the integration of multiple sources for coherent delivery.</p>
1061	Mining ICT and Automation (Graeme Winstanley)	\$7.6m	<p>Continue research into Longwall automation, dozer research and excavator research with a view to delivering increased automation and productivity.</p> <p>Develop a low cost localisation system and the open communications standard for surface mining.</p> <p>Conduct research into active controls, web-based equipment control and the future mine control room.</p>
1062	Sensor Networks (Peter Corke)	\$10.8m	<p>Develop and deploy bio-chemical sensors.</p> <p>Develop and deploy a data integration model.</p> <p>Develop a platform that can securely and autonomously monitor and detect data.</p>

Mathematical and Information Sciences

Portfolio Manager: Murray Cameron (Chief, CSIRO Mathematical and Information Sciences)

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1029	CMIS - Opportunity Development Fund (Murray Cameron)	\$0.3m	This Theme has been established to manage the Chief's Development Fund which will mainly be used for vacation & PhD and other post-graduate students.
1084	Discovery Bioinformatics and Imaging (David Mitchell)	\$4.7m	<p>Establish deep collaborations with research groups for validation studies of identified biomarkers.</p> <p>Explore possible metagenomic applications through high density arrays.</p> <p>Raise our international profile through a concerted effort in publication.</p>
1085	Decision Technologies (Andrew Dingian)	\$7.4m	<p>With key finance sector companies develop and validate risk estimation systems. Leverage the IP and apply to other risk sectors.</p> <p>Increase the impact of research by increasing commercial adoption of software tools including the Reditus options pricing platform and the eRostering application.</p> <p>Develop tools for network optimisation and "negotiated scheduling" in a complex decision environment and apply these results in industries in which Australia has a competitive advantage such as the wine, coal and steel industry.</p> <p>Integrate and couple Discrete Element (DEM) and Smooth Particle Hydrodynamics (SPH) methods and deliver high-value solutions to clients in the mining and mineral processing areas.</p> <p>Develop tools for global airspace management that improve the safety, efficiency and capacity of airspace.</p>
1086	Environmental Monitoring and Modelling (Bronwyn Harch)	\$5.6m	<p>In collaboration with key natural resource management agencies improve carbon accounting and land condition monitoring methodology that works successfully at regional, national and global scales.</p> <p>Enable effective monitoring and management of urban and coastal environments using digital aerial photography.</p> <p>Develop statistical modelling frameworks that allow the synthesis of all information sources, whether they are observational data sources, model output and/or expert knowledge, and provide appropriate measures of uncertainty.</p> <p>Develop mathematical technologies for understanding climate variability and incorporating extreme events in the overall context of climate change.</p>
1087	Terabyte Science (John A Taylor)	\$3.2m	<p>Develop new tools and capability in data and model assimilation with specific application in biogeochemical models.</p> <p>Provide facilities for sharing technologies for data driven science and solve data driven problems.</p>

Core Research - Manufacturing, Materials and Minerals Group Portfolios

Group Executive: Rod Hill

Exploration and Mining

Portfolio Manager: Steve Harvey (Acting Chief, CSIRO Exploration and Mining)

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1115	Mining Technology and Specialist Services (Greg Rowan)	\$14.5m	<p>Develop the application of the Sirovision photogrammetry system for underground geological structural mapping.</p> <p>Develop new microscopic optical imaging techniques (Coal Grain Analysis) to improve fine coal recovery with flotation and develop optimised coal utilisation processes during coke making.</p> <p>Develop and demonstrate advanced methodologies for large open pit slope design and management.</p> <p>Develop and demonstrate rock excavation systems for surface mining based on the SMART*CUT technology.</p> <p>Establish CSIRO as a key participant in the AP6 Coal Mining Taskforce and Australia-China Climate Change Programmes to demonstrate and promote CSIRO's ground control, gas drainage, fire control and mine design and planning techniques globally.</p>

Materials Science and Engineering

Portfolio Manager: Calum Drummond (Chief, CSIRO Materials Science and Engineering)

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1083	Facility Management (Allan Farmer)	\$5.7m	<p>Manage the NASA facility to deliver agreed outcomes while maintaining and enhancing the NASA relationship.</p> <p>Manage the Lindfield site effectively and efficiently, and provide services to NMI and OFT.</p>

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1103	Alloy Technologies (Barrie Finnin)	\$8.1m	<p>Industry projects (85% of activity) in: <u>Materials development</u> (metals and advanced ceramics); <u>Technology development</u> (casting and forming technologies) to achieve weight reduction (eg auto applications); and <u>Sustainable materials and manufacturing</u> (eg reduced GHG emissions and lower cost manufacturing) and safety and durability (eg armour and surface engineering).</p> <p>Strategic research (15% of activity) focused on: developing new alloys through rapid cooling (eg in conjunction with CET for CO2 or H2 membranes); Multi-scale modelling (for corrosion, fatigue mechanisms, etc) and Cold Spray (in conjunction with Monash).</p>
1104	Sustainable Polymeric Materials (Veronica Hall)	\$12.8m	<p>In response to a Path to Impact Strategy, establish proof of concept for novel self-healing polymeric materials. Further develop combinatorial capabilities. Demonstrate the feasibility of developing a selective strippable paint system for Boeing. Complete Stage 2 of Boeing project on development of next generation aerospace resins through the use of computational design approach.</p> <p>Develop and use a new molecular approach in various systems for understanding biodegradation of bioplastics from microbiological viewpoint. Raise public awareness of CSIRO's research activities and facilities relating to bioplastics development and testing. Investigate feasibility of developing designer bioplastics using genetically modified starch with high amylose contents.</p> <p>Undertake a critical review of the regenerated protein fibres project (technical and commercial potential). Scale up production to produce sufficient fibre for manufacturing sample products, and process sufficient fibres to identify processing difficulties and product attributes. Engage with industry to obtain externally funded projects in the area of nano-structured fibres and textiles.</p>
1106	Industrial Research Services (John Clampett)	\$6.9m	Provision of: research and development services; complex testing and consulting services to a range of companies, particularly SMEs; and evidence of Australian products complying to Australian and international standards which allow Australian companies to gain access to export markets. This service is provided to a range of small to larger companies.
1142	Manufactured Devices: Growing Globally Competitive (Scott Martin)	\$15.2m	<p>The dysphagia catheter technology will be developed to the point at which it will transfer out of CSIRO.</p> <p>Successful detection of UneXploded Ordnances (UXOs) with rotating gradiometer in a field trial with commercial partner. Secure funding from industrial partner for commercialisation of a SQUID-based metal-in-food detector targeting the meat safety market.</p> <p>Step-change improvements in thermoelectric energy conversion efficiencies using novel nanoparticle composites. Possible routes for synthesis and fabrication of such new thermoelectric materials will be investigated by adopting high-throughput approaches to determine whether real devices will capture the potential predicted by theory.</p> <p>Building on the successful technology transfer of the process rheometer to a local manufacturer in 06-07, increase production efficiency in one or more local processing industries via adoption of high-power ultrasound devices.</p>
1145	Nano-Additives for the Fine Chemicals Industry (Tony Hughes)	\$7.7m	<p>Work with targeted industry partners to develop new nano-designed materials and additives for new products and to add value to existing products. Projects involve: molecular design advances in the area of geo-polymers for a number of applications for infrastructure; Establishing encapsulation and high throughput techniques; Engaging with high value added fabric manufacturers to produce foundry ware with much longer lifetimes than the current garments; Developing new customers to align the theme's activities more closely with theme goals.</p> <p>On the strategic research side we will expand the activities on: Multiscale modelling activity to align sensing of structures with a fundamental understanding of the material-performance relationship; Establishing the convergence of high throughput work with a combinatorial approach.</p>

Minerals

Portfolio Manager: Bart Follink (Chief, CSIRO Minerals)

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1052	Opportunity Development Fund - Minerals	\$2.4m	Appoint OCE Science Leader (Prof M Chen) and establish a team to explore novel interfacial chemistry and microbiological approaches to future Minerals' processes. Test and incubate novel ideas and opportunities for transformational mineral processing.
1053	Iron ore – Maximising export marketability (Ralph Holmes)	\$4.3m	Develop new methodologies in iron ore characterisation, in partnership with end users.
			Develop sintering and pelletising methodologies for Australian iron ore producers.
			Develop alternative agglomeration methods for Australian iron ores, in partnership with end users.
1054	High-performance mineral processes for Australia (John Farrow)	\$11.0m	Develop generic solutions to complex mineral processing issues for multiple end-users.
			Customise mineral processing concepts for application within specific industry domains.
			Develop new mineral processing capabilities to support emerging industry engagement.
1055	Instrument Systems for On-Line Analysis (Nick Cutmore)	\$6.6m	Develop novel technologies and commercialisation strategies for instruments for the (mineral) process industry.
			Develop novel technologies and commercialisation strategies for instruments for security applications.
			Develop novel technologies and commercialisation strategies for instruments for instrument productisation.

Molecular and Health Technologies

Portfolio Manager: Graeme Woodrow (Chief, CSIRO Molecular and Health Technologies)

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1035	CMHT Opportunity Development Fund (Andrew Groth)	\$4.4m	Throughput materials screening
1048	National Security Technology Partnerships (Peter Osvath)	\$7.5m	Identify and engage potential end users in the development and support of new and/or enhanced security technologies. Major demonstrations of the CIPMA system for four extreme event critical infrastructure failure scenarios.
			Develop situational awareness and decision making tools suitable for the Protective Security Coordination Centre and partners as part of the PM&C PACCT program.
			Further develop product authentication technologies and commercialise the Modulated Digital Imaging technology.
1088	Australian Biotech Growth Partnerships (Paul Savage)	\$8.9m	Add value to the biotech industry by partnering with selected biotech companies in their discovery pipeline and growth strategies. For example, using a multi-disciplinary approach, develop new ligands that inactivate HIV replication (\$6m Avexa collaboration).
			Ensure the success of the newly formed CRC for Cancer Therapeutics by contributing protein engineering, fermentation, animal trials and medicinal chemistry to the collaboration.
			Assist in the establishment of the \$15 million bioprocessing facility at Clayton, based on NCRIS, Victorian Government, and CSIRO commitments. This consortium-run facility will be a focal point for tissue culture and microbial fermentation in Australia.
1089	Biomedical Materials and Regenerative Medicine (Keith McLean)	\$10.7m	In response to a Path to Impact strategy, develop and evaluate new platform biomedical materials capable of regulating biological function ("smart biomedical materials") for application in tissue repair, replacement and regeneration.
			Work with end users to develop novel smart polymers and surfaces for biomanufacturing including the expansion of stem cells; novel scaffolds for new materials and surface coatings for novel ophthalmic devices, smart polymers and targeted ligands for biomanufacturing for expansion of stem cells, novel synthetic, natural and recombinant scaffolds for regenerative medicine including cartilage, neural and wound repair and novel biomedical adhesives.
1090	Transformational Products through Electroactive Materials (Gerry Wilson)	\$7.5m	Develop new organic photovoltaic materials. Meet material and device efficiency milestones within the SERD-funded project .
			Develop new charge transport polymers. Establish fully funded projects with industrial partners.
			Build HTPS capability. Successfully implement the ODF ≥ 2 seconds into world leading HTPS labs.
1144	Imaging for Early Disease Detection (Peggy Stasinos)	\$7.2m	As part of a Path to Impact strategy, identify a novel imaging agent and bioconjugation methodology to proof of concept stage.
			Develop hardware and software for imaging .
			Develop new methods of macromolecular structure determination using synchrotron radiation, in particular to determine the structure and function of integral membrane proteins.

Textile and Fibre Technology

Portfolio Manager: Nigel Johnson (Chief, CSIRO Textile and Fibre Technology)

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1034	Building Sustainable Protein Biofibre Industries (Anthony Pierlot)	\$7.3m	<p>As part of a Path to Impact strategy, investigate and evaluate, using existing fabrics of known skin comfort performance, up to three possible technologies leading to a prototype instrument to measure prickle. The development of the instrument and associated QA system will enable end products to be routinely tested objectively to ensure that consumers will have a satisfactory and indeed positive skin comfort response from approved garments containing fine Australian wool.</p> <p>Investigate and demonstrate feasibility of at least one new radical processing technology targeting improved productivity or product performance.</p> <p>Develop a fundamental understanding of the interaction and spreading of fluids and polymers on highly curved surfaces, particularly superfine wools and ultra-fine fibres and publish outcomes.</p> <p>Integrate the on-farm and post-farm activities and demonstrate feasibility of genetically enhancing at least one new fibre trait for improved product performance.</p> <p>In partnership with Australian Wool Innovation, develop at least 3 new wool product innovations.</p>
1036	Advanced Fibrous Materials (Niall Finn)	\$8.0m	<p>Fibrous tissue-scaffold research: Establish relationships between cell-growth and the structure of fibrous tissue scaffolds and test the biocompatibility of carbon nanotube yarns for a range of cell lines.</p> <p>Electronic applications of carbon nanotubes: Benefits of carbon nanotube structures for optical photovoltaics devices demonstrated.</p> <p>Establish the interest of the Australian military in using first generation fabric anodes for a textile lithium battery developed as part of a project to develop re-chargeable wearable battery technology.</p> <p>Prototype impact and strain sensing fabrics tested in conjunction with the AIS for boxing and motion monitoring applications.</p> <p>Fabricate and carry out preliminary testing of novel electrospun fibre membranes for high temperature filter applications.</p>

Outreach and Education

Overview

Outreach and Education is one of CSIRO's Satellite Roles. Promoting the importance of science and its application to students, parents, teachers and the Australian community has long been one of CSIRO's great strengths. CSIRO is strongly positioned to help create a knowledgeable society, by raising scientific literacy so the community can engage with major issues related to science.

While this role is principally served through three distinct Themes – CSIRO Publishing, CSIRO Discovery, and CSIRO Education - many activities undertaken through our Flagship and Core Science themes also contribute significantly to achieving these goals

CSIRO Publishing, Discovery and Education

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1151	Discovery Centre (Jim Peacock)	\$1.9m	CSIRO Discovery's main focus is an interactive exhibition showcasing the latest research. The centre also offers: Education programs for students; Free information about CSIRO science (InfoCell); A cafe, meeting and conference space. Science is presented in an entertaining way to demystify it, and educate people of all ages about the fascinating world of research and innovation.
1153	Education Programs (Ross Kingsland)	\$7.5m	<p>Nine CSIRO Science Education Centres (CSIROSECs), including the Lab on Legs program, the Student and Teacher Research Schemes and the Cutting-Edge Lecture Series showcasing Australian science.</p> <p>CSIRO's Double Helix Science Club, incorporating the club's magazines The Helix and Scientriffic as well as hundreds of club events and an online club shop.</p> <p>The Science by Email weekly e-newsletter and the SCOPE television program produced with Network Ten.</p> <p>The CREST program that supports students to design and undertake their own science and technology projects.</p> <p>The BHP Billiton Science Awards.</p>
1154	CSIRO Publishing (Paul Reekie)	\$10.0m	<p><u>Journal Publishing</u>: Grow the number of journals published; Reposition existing journals to grow the revenue base; Prepare for an Open Access environment.</p> <p><u>Book Publishing</u>: Grow the range & type of books being commissioned; Increase the number of books published: Seek co publication contracts & new agency business; Identify new book lists for acquisition.</p> <p><u>Multimedia</u>: Expand multimedia & elearning contract business; Provide on demand multimedia services to CSIRO; Develop the ScienceImage service for CSIRO & external customers.</p> <p><u>Magazines</u>: Reposition existing & develop new magazine products; Manage CSIRO magazines (ECOS, Farming Ahead) on behalf of the Organisation.</p>

National Research Facilities and Collections

Overview

The management of National Facilities and the management of National Collections are two important satellite roles that CSIRO undertakes on behalf of the Australian national innovation system.

Accessing world-class infrastructure is important in many areas of research. Retaining core capabilities for Australia requires Australians to host and run key facilities. CSIRO fulfils this role by managing the Australian Animal Health Laboratory, the Australia Telescope National Facility, and the CSIRO National Research Vessel Southern Surveyor.

The creation, enhancement and maintenance of National Collections is a service for the present and future of Australian science. Notable CSIRO collections include the National Herbarium (managed by the Division of Plant Industry); the Australian National Insect Collection (managed by the Division of Entomology); the Australian National Fish Collection (managed by the Division of Marine and Atmospheric Research); and the Australian National Wildlife Collection (managed by the Division of Sustainable Ecosystems).

National Facilities

SIP No.	Theme Name (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1047	Diagnosis Surveillance and Response [AAHL] (Peter Daniels)	\$25.8m	<p>Implement the 8 key diagnosis, surveillance and response service deliverables agreed under the MOU with DAFF.</p> <p>Provide national and international leadership of diagnostic test validation through activities such as participation in SCAHLS working groups, hosting the World Association of Veterinary Laboratory Diagnosticicians (WAVLD) biannual conference, and submitting 3 new tests for SCAHLS evaluation.</p> <p>Contribute to the control of H5N1 Avian Influenza in Southeast Asia through implementation of AusAid and ACIAR funded activities in the region.</p> <p>Strengthen AAHL'S FMD diagnostic capability through further validation of diagnostic tests and establishment of the OIE 'twinning' arrangement with the Southeast Asia FMD Regional Reference Laboratory, Pakchong, Thailand.</p>
1067	Australia Telescope National Facility Operations (David McConnell)	\$15.2m	<p>To continue to operate the radio astronomy facilities (Parkes, ATCA, Mopra, LBA) in order to serve the Australian and International scientific community.</p> <p>To commission and characterise the new 7mm band on the ATCA and the new 13mm receiver on Parkes; to continue building the quality of support for mm-wave science on Mopra and the ATCA.</p> <p>To design a new operating model for ATNF facilities that will meet the expected demands of 2012 and beyond.</p>
1099	Marine National Facility Operations (Fred Stein)	\$12.0m	<p>Continuous improvement of the infrastructure available to Australian scientists for the conduct of marine research in Australia's regional seas and oceans.</p> <p>Continuous improvement of the delivery of MNF capability to the Australian Marine Science community.</p>

National Collections

SIP No.	Theme Name * (Theme Leader)	Budget 07-08	Activities and Outputs for 2007-08
1081	Australian National Insect Collection (John La Salle)	TBA	<p>Provide support and information for ET Biodiversity Review</p> <p>Build across linkages with other CSIRO collections through Biological Collections Group, CERF Taxonomy Hub, Atlas of Living Australia</p> <p>Provide duty of care to the Australia National Insect Collection.</p>
TBA	Australian National Herbarium (TBA)	TBA	<p>Maintain the Australian National Herbarium (ANH) as the national focus of an Australia-wide set of botanical collections,</p> <p>Make information about the ANH collections and Australian plant diversity, occurrence and distribution freely accessible through collaborative database projects and the Internet for research, community benefit and government policy development and decision-making for management, conservation and sustainable use of biodiversity.</p> <p>Incorporate 70% of plant names covering 80% of angiosperm families into web-based Australian Plant Census, following assessment and national agreement.</p>
1095	Australian National Fish Collection (Greg Ayers)	TBA	Curate and manage the facility and its collection of Australian, Antarctic and Indo-Pacific fishes, their data, photographs, radiographs, genetic samples and taxonomic reprints to enable research on biodiversity and biogeography of Australian and Indo-Pacific fishes.
1128	Australian National Wildlife Collection (Iain Gordon)	\$1.3m	Maintain and build the national reference collection of vertebrates of Australia and the surrounding region.

* The recognition and definition of National Collections as Themes will be completed during 2007-08. This is part of the transition to CSIRO's new Outcome-Output framework (see Performance Measurement and Reporting in Part a).

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Agribusiness Group – Business Units and Capabilities

Group Executive: Joanne Daly

Ensis

CEO: Tom Richardson

Total Budget: \$28.677m[^] (2007-08)

Research Staff: 143.4[^] (Ensis Australia Only)

Capability (Research Program Leader)	Status: Research **	Status: Industry/ Community **	Trajectory
Risk Management* [30 FTE/13.2FTE's]+ (Brian Richardson)	Bushfire - Favourable Biosecurity - Strong	Bushfire - Benchmark Biosecurity - Benchmark	This has been an area of growth in Ensis capability and now faces the challenges of increasing competition. Ensis will respond by extending into new areas (particularly around economic risks) and integrate our water relations and remote sensing competencies to grow.
Forest Production Systems* [153 FTE/56 FTE's]+ (Clive Carlyle/Simon Potter/Bob Shula)	Germplasm, Molecular & Propagation - Favourable Forest Management - Strong	Germplasm, Molecular & Propagation - Strong Forest Management - Benchmark	Ensis will migrate elements of this capability into focusing on non-wood values and risk management.
Non-wood values of forestry* [40 FTE/19.5 FTE's]+ (Clive Carlyle)	Non-wood - Strong	Non-wood - Benchmark	This has been an area of growth in Ensis capability and faces the challenges of increasing competition. Ensis will respond by extending into economic modelling and social impacts of forestry while deepening our capability through refocusing our forest production systems capability.
Imaging* [27 FTE/18 FTE's]+ (Bob Shula/Clive Carlyle/Jamie Hague)	Tools and Technologies - Favourable	Tools and Technologies - Benchmark	Ensis will invest and develop in this growth area.
Process and material knowledge* [83 FTE/37 FTE's]+ (Jamie Hague/Bob Allison)	Innovative Wood Products - Favourable Fibre Optimisation and Smart Products - Strong	Innovative Wood Products - Benchmark Fibre Optimisation and Smart Products - Strong	Ensis will refocus elements of this capability into areas such as the bioeconomy, biofibres and biorefinery approaches.

+ The first number of FTEs is for Ensis Australia and New Zealand. The second is a 'best estimate' for Ensis Australia only.

* Note that Ensis Business Units do not match Ensis capabilities. ** Review panel assessment as at April 2007. ^ Total budget and Research Staff, as per budget as at 15th August.

Entomology

Chief: Mark Lonsdale (Acting)

Total Budget: \$32.050m[^] (2007-08)

Research Staff: 203.1 FTE[^]

Capability (Research Program Leader)	Status **	Trajectory
Enzymology and synthetic biology [41 FTE] (Robyn Russell)	Benchmark	<p>Grow capability in Transformational Biology.</p> <p>Direct capability towards potential engagement in Minerals Down Under, Energy Transformed and Niche Manufacturing Flagships.</p> <p>Continue to develop capability in partnership with ANU.</p> <p>Grow capability in ecogenomics.</p>
Invasion biology and functional ecology [86 FTE] (Owain Edwards)	Benchmark	<p>Engage in development of Climate Adaptation Flagship.</p> <p>Grow impact through engagement in Australian Biosecurity System.</p> <p>Grow capability through engagement in 3 CRCs (AWMCRC, NPBCRC, IACRC).</p> <p>Build linkages with related capabilities.</p>
Invertebrate genomics and evolution [66 FTE] (Geoff Baker)	Strong	<p>Grow NCRIS project 5.2.3 Atlas of Living Australia and build cross linkage with international diversity initiatives (e.g. Encyclopedia of Life, GBIF etc).</p> <p>Engage in ET Biodiversity Review.</p> <p>Continue to build cross linkages with other collections through CERF bids.</p> <p>Build capability for delivery to conservation policy.</p> <p>Continue to build links between molecular biology and systematics.</p>

** Review panel assessment as at February 2005, reaffirmed by self-assessment November 2006.

[^] Total budget and Research Staff, as per budget as at 15th August.

Food Science Australia

CEO: Anthos Yannakou

Total Budget: \$48.391m[^] (2007-08)

Research Staff: 252.9[^]

Capability (Research Program Leader)	Status **	Trajectory
Processing Innovation [44 FTE] Phil Clarke	Favourable	This capability will be maintained with some re-focussing in line with theme strategy
Ingredient functionality [62 FTE] Phil Clarke	Strong	Capability to be increased with targeted project leaders
Supply chain logistics [14 FTE] Phil Clarke	Strong	This capability will be decreased and staff re-deployed
Food safety [34 FTE] Phil Clarke	Strong/benchmark	Capability level to be maintained
Sensory science [12] Phil Clarke	Strong	Increase in capability to deliver Pure and Flagship Themes outcomes
Nutrition Science [82 FTE] Phil Clarke	Benchmark	Increase in capability to deliver Pure and Flagship Themes outcomes

** Review panel assessment as at April 2005.

[^] Total budget and Research Staff, as per budget as at 15th August.

Livestock Industries

Chief: Alan Bell

Total Budget:\$ 78.518m[^] (2007-08)

Research Staff: 372.3 FTE[^]

Capability (Research Program Leader)	Status: Research **	Status: Industry/ Community **	Trajectory
Emergency disease preparedness [75 FTE] (Peter Daniels)	Benchmark / Strong	Strong	Grow capability in support of an expanded role as a national facility.
Novel strategies for disease control [121 FTE] (Deborah Middleton)	Strong	Strong	Maintain capability in avian and porcine diseases with a focus on avian influenza Reduce overall efforts in endemic infectious disease research in ruminants, maintain capacity in parasitology
Livestock management [30 FTE]) (Rob Kelly)	Strong / Favourable	Favourable	Focus capability on Agricultural Sustainability initiative and explore application of capability to Climate Change Adaptation
Genomics and gene delivery [113 FTE] (Ian Purvis)	Benchmark/ Strong	Benchmark / Favourable	Maintain capability at forefront of genomics as it moves into an era of post genomics / systems biology. Engage with and contribute to Transformational Biology Theme. Apply microbial genomics capability to diverse human/ livestock / environmental issues. Extend bioinformatics capability into systems biology Deliver science capability directly and through P-Health and Food Futures Flagships.
Integrated mammalian biology [30 FTE] (Ian Purvis)	Strong / Favourable	Favourable	Maintain or slightly decrease capability in reproductive biology in line with external income and Food Futures Flagship priorities. Increase capability in welfare through linking to genomics / genetics capability.

** Current self-assessment as at May 2007 following significant changes post January 2006 Science Review.

^ Total budget and Research Staff, as per budget as at 15th August.

Plant Industry

Chief: Jeremy Burdon

Total Budget: \$83.340m[^] (2007-08)

Research Staff: 533.9 FTE[^]

Capability (Research Program Leader)	Status **	Trajectory
Program H - Centre for Plant Biodiversity Research [37.36*** FTE] (Judy West)	Benchmark	Maintain existing level of investment with any growth to be funded largely from collaborative partnerships with government.
Program K – Mediterranean Crops and Pastures [29.16 FTE] (Karam Singh)	Favourable	Maintain existing appropriation funding with any growth supported by industry funding.
Program L – Horticultural Crop Improvement [42.90 FTE] (Simon Robinson)	Strong	Maintain existing appropriation funding with any growth supported by industry funding.
Program M – Integrated Crop Physiology & Genetic Improvement [88.16 FTE] (Graham Bonnett)	Strong	Maintain existing appropriation funding with any growth supported by industry funding.
Program P – High Performance Crops for Australia [52.34 FTE] (Richard Richards)	Benchmark	Maintain existing appropriation funding with any growth supported by industry funding.
Program R – Horticultural Systems [26.53 FTE] (Rob Walker)	Favourable	Maintain existing appropriation funding with any growth supported by industry funding.
Program S – Biodiversity and Sustainable Production [45.31 FTE] (Andrew Young)	Benchmark	Focus in areas associated with strong interest in novel conservation and restoration strategies and use of Biological collections information. Growth to be funded largely from collaborative partnerships with government.
Program T – Cotton Improvement and Production [42.56 FTE] (Greg Constable)	Favourable #	Maintain existing appropriation funding with any growth supported by industry funding.
Program V – Metabolic Engineering of New Plant Products [55.71 FTE] (Allan Green)	Strong	Continued modest rebuilding of specific capabilities and skills to reflect tighter specific focus; increasing linkage with processing industries; jointly with Food Futures Flagship.
Program X – Genomics and Plant Development [79.33 FTE] (Frank Gubler)	Benchmark	Maintain existing level of investment.
Program Y – Genetic Engineering for Plant Improvement [34.54 FTE] (Jeff Ellis)	Benchmark	Maintain existing appropriation funding with any growth supported by industry funding.

[^] Total budget and Research Staff, as per budget as at 15th August. * Excludes students and post-retirement fellows.

^{**} External (International) Science Review panel assessment as at October 2006. ^{***} Includes Commonwealth Department of environment and Water Resources Staff (18eft's)

CSIRO's own assessment is that this program should be rated 'benchmark' in the delivery of relevant science outputs to revolutionise the Australian cotton industry

Energy Group – Business Units and Capabilities

Group Executive: Bev Reynolds

Energy Technology

Chief: David Brockway

Total Budget: \$28.130m[^] (2007-08)

Research Staff: 142.3 FTE[^]

Capability (Research Program Leader)	Status **	Trajectory
Low emission fossil fuel utilisation [65 FTE] David Harris	Benchmark to Favourable (Gasification – Benchmark) (Hydrogen and syngas-Favourable) (Energy modelling – Favourable) (Coal preparation – Strong)	Grow capabilities in post combustion capture of CO ₂ , syngas processing and separation and coal/syngas to liquid fuels. Maintain capability in gasification, coal preparation, energy modelling, sequestration and enhanced coal bed methane (ECBM). Capability recognises the facilities of the PCC pilot plant, the Pressurised Entrained Flow Reactor (gasification) and syngas processing and separation facilities at QCAT (cLET)
Renewable energy, management and storage [75 FTE] John Carras	Benchmark to Favourable (Solar Thermal – Strong) (Distributed Energy – Favourable) (Energy Storage- Benchmark) (OPV – Favourable)	Grow capability in energy storage, distributed energy, grid security and organic photovoltaics (OPV). Maintain capability in solar thermal technology, fuel cells and ionic technologies and emissions from energy cycles. Capability recognises facility of the National Solar Energy centre (NSEC) at Newcastle and the CSIRO environmental chamber at Lucas Heights..

** Review panel assessment as at May 2006.

[^] Total budget and Research Staff, as per budget as at 15th August.

Petroleum Resources

Chief: Beverley Ronalds

Total Budget: \$26.154m[^] (2007-08)

Research Staff: 129.1 FTE[^]

Capability (Research Program Leader)	Status **	Trajectory
Petroleum Geoscience [51 FTE] (Dave Dewhurst)	Favourable	A modest increase, particularly in partnership with WAERA, with a focus on younger, higher profile talent.
Petroleum Geo-Engineering [79 FTE] (Lincoln Paterson)	Benchmark	A modest increase, particularly in partnership with WAERA, with a focus on younger, higher profile talent. With the result of additional funding through ET flagship, we anticipate significant growth with alternative fuels related to Gas to Liquids and a group established in ARRC lab

** Review panel assessment as at July 2004.

[^] Total budget and Research Staff, as per budget as at 15th August.

Environment Group Business Units and Capabilities

Group Executive: Andrew Johnson

Land and Water

Chief: Neil McKenzie (Acting)

Total Budget: \$68.488m[^] (2007-08)

Research Staff: 362.4 FTE[^]

Capability (Research Program Leader)	Status **	Trajectory
Surface Water and Groundwater Interactions [20 FTE] (Chris Smith)	Strong	Will grow capacity by about two FTE through 2007/08, attaining benchmark status within two years.
Groundwater Hydrology [16 FTE] (Chris Smith)	Strong	Will grow capacity by one FTE through 2007/08. Will provide national leadership and attain benchmark status in two years.
Catchment Hydrology [19 FTE] (Chris Smith)	Strong	Will grow capacity in river basin modelling through 2007/08 to maintain national leadership and attain benchmark status in two years.
Irrigation Systems [20 FTE] (Chris Smith)	Strong	Modest growth in 2007/08 to provide the science capacity/quality to achieve benchmark status in two years in irrigation water management.
Soil Biogeochemistry [17 FTE] (Simon Apte)	Strong/ Benchmark	Staff numbers will remain stable in 2007/08. Will attain double benchmark status in two years.
Trace Organics and Risk Assessment [16 FTE] (Simon Apte)	Strong/ Benchmark	Staff numbers will remain stable in 2007/08. Will attain double benchmark status in two years.
Aquatic Chemistry and Toxicology [16 FTE} (Simon Apte)	Benchmark/ Benchmark)	Staff numbers will remain stable in 2007/08. Will maintain double benchmark status.
Soil Processes and Distribution [30 FTE] (Chris Smith)	Staffed from groups assessed as Favourable, Strong and Benchmark	Will build capability by two FTE through the new theme entitled Managing Australia's Soil and Landscape Assets (MASALA). The Agricultural Sustainability Initiative (ASI) portfolio will also utilise this capability in soil science and farming systems. We aim to consolidate soil science capability in CLW, unify science quality (towards benchmark) and maintain national leadership.
Aquatic Biogeochemistry and Ecology [24 FTE] (Andrew Steven)	Strong	Will grow in quality through 2007/08, attaining benchmark status in two years. FTEs will remain stable in 2007/08.

Capability (Research Program Leader)	Status **	Trajectory
River Geomorphology and Material Fluxes [23 FTE] (Andrew Steven)	Strong	Will grow in quality through 2007/08, attaining benchmark status in two years. FTEs will remain stable in 2007/08.
Social Science [14 FTE] (Geoff Syme)	Strong	Will grow in quality through 2007/08, attaining benchmark status in two years. FTE increases will depend on theme demands.
Economics and Policy [15 FTE] (Geoff Syme)	Strong	Will grow in quality through 2007/08, attaining benchmark status in two years. FTE increase will depend on theme demands.
Spatial Science [21 FTE] (Stuart Minchin)	Strong	Will grow in quality through 2007/08, attaining benchmark status in two years.
Remote Sensing [16 FTE] (Stuart Minchin)	Benchmark	Maintain investment and quality.
Prediction and Reporting Technologies [20 FTE] (Stuart Minchin)	Benchmark	Maintain investment and quality.
Water Use and Reuse [17 FTE] (Peter Franzmann)	Strong/ Benchmark	Will grow in size and quality through the Urban Water Theme in the WfHC Flagship in 2007/08.
Water Resource Protection [20 FTE] (Peter Franzmann)	Strong/ Benchmark	Will grow in size and quality through the Urban Water Theme in the WfHC Flagship and MDU theme in 2007/08.
Integrated Urban Water Systems [28 FTE] (Peter Franzmann)	Strong	Will grow in size and quality through the Urban Water Theme in WfHC in 2007/08, attaining benchmark status in two years.

** Review panel assessment as at March 2006. A further review was undertaken in February 2007, specifically for the Society and Economy Policy theme.

^ Total budget and Research Staff, as per budget as at 15th August.

Marine and Atmospheric Research

Chief: Greg Ayers

Total Budget: \$77.500m[^] (2007-08)

Research Staff: 376.5 FTE[^]

Capability (Research Program Leader)	Status **	Trajectory
Marine System Characterisation [82 FTE] (Alan Butler, Peter Rothlisberg)	Strong	This is a stable, established capability. A focus for on-going development is enhanced integration across ecological disciplines and with cognate disciplines (eg biogeochemistry). There will also be some reduction in MSC observational capabilities and an increase in modelling capabilities.
Marine System Modelling [28 FTE] (Alan Butler, Peter Rothlisberg)	Strong	This is a stable, established capability with some growth envisaged. A focus for on-going development is enhanced integration across ecological disciplines and with cognate disciplines (eg biogeochemistry).
Marine Management Strategy Evaluation [29 FTE] (Alan Butler, Peter Rothlisberg)	Strong to benchmark	Maintain and continue to build expertise in MSE, risk management and multiple use management. Build small economic capability and seek complementary expertise in the economic and social sciences through partnerships with other Divisions and institutions.
Climate Impacts [20 FTE] (Helen Cleugh, Acting)	Benchmark	Extend climate impacts capability to work being done in fisheries, coastal and marine ecosystems areas.
Ocean, Atmosphere Characterisation [107 FTE] (Helen Cleugh, Acting)	Varies ***	Maintain capability in this area with some investment needed in cutting edge atmospheric instrumentation.
Ocean, Atmosphere Modelling [66 FTE] (Helen Cleugh, Acting)	Strong and upwards, trending toward benchmark in some areas	Strengthen and extend this capability, in particular through ACCESS and CAWCR partnership with Bureau of Meteorology.
Aquaculture Production [24 FTE] (Alan Butler)	Strong	Maintain capability in this area and continue active collaborations particularly with other CSIRO Divisions.

** Review panel assessment as at July 2005.

*** Varies from favourable (Air quality assessment) to strong (Marine biogeochemistry) to benchmark (Greenhouse observation).

[^] Total budget and Research Staff, as per budget as at 15th August.

Sustainable Ecosystems

Chief: Brian Keating

Total Budget: \$50.273m[^] (2007-08)

Research Staff: 257.9 FTE[^]

Capability* (Research Program Leader)	Status **	Trajectory
Ecology [74 FTE] (Peter Stone)	Strong	Consolidate on 2006-07 recruitments. Invest in strategic partnerships. Grow future leadership capability
Agricultural Systems / Farming Systems [54 FTE] (Bruce Pengelly)	Strong	Expect stable numbers, with shift in skill base towards integration of economic and environmental dimensions.
Urban Systems, Engineering and Infrastructure Technology [43 FTE] (Matthew Inman)	Strong	Entering a consolidation and integration phase as this capability and others in CSE are examined to identify linkages and cross disciplinary opportunities for impact in the urban sustainability arena. Additional senior leadership capacity now on board and will influence new research directions in 2007/08.
Social and Economic Science Systems Integration Complex Systems Science [78 FTE] (Melinda Spink)	Favourable / Strong	Injection of science leadership and underpinning capacity to lift status. Ensure linkages with disciplinary partners. Continue to build and nurture capabilities in complex systems science and socio-economic integration.

* The capability areas and Programs are currently not aligned. In other words, Programs contain a mix of capabilities. We have allocated Research Program Leaders to capability areas on a best fit basis.

** Review panel assessment as at October 2005

[^] Total budget and Research Staff, as per budget as at 15th August.

Information and Communication Sciences and Technology Group – Business Units and Capabilities

Group Executive: Alex Zelinsky

Australia Telescope National Facility

Director: Brian Boyle

Total Budget: \$ 18.694m[^] (2007-08)

Research Staff: 100.5 FTE[^]

Capability (Research Program Leader)	Status	Trajectory
Telescope Operations [53 FTE] (David McConnell)	Benchmark **	Maintain capability underpinning productivity from current facilities while redirecting resources over time to operation of new facilities in WA.
Front-end technologies - sensors [22 FTE] (Graeme Carrad)	Strong *	Maintain support for current facilities and grow by seeking external instrumentation contracts.
Back-end technologies - processors [15 FTE] (Graeme Carrad)	Very strong *	Grow, particularly in areas relevant to focal plane array and other technologies relevant to the next generation telescopes such as ASKAP.
Astrophysics [20 FTE] (Robert Braun)	Benchmark *	Maintain centimetre capability. Grow to fully exploit window of opportunity provided by new mm systems on Compact Array and Mopra, which offer a unique view of the universe until ALMA starts operations (expected in 2010).
Software Development [7 FTE] (Tim Cornwell)	Strong *	Growth in capability of high performance computing

** Self assessment. * Review Panel assessment as at April 2007

[^] Total budget and Research Staff, as per budget as at 15th August.

Information and Communication Technologies

Chief: Alex Zelinsky

Total Budget: \$44.649m[^] (2007-08)

Total Staff: 217 FTE[^]

Capability (Research Program Leader)	Status **	Trajectory
Antennas & Propagation [23 FTE] (John Kot)	Benchmark	Maintain
Communications & signal processing [23 FTE] (Iain Collings)	Benchmark	Grow both capabilities and depth.
Distributed Intelligence [9 FTE] (TBA)	Developing	Grow capacity and depth
Human factors [20 FTE] (TBA)	Favourable	Develop strength to support collaborative research
Information Retrieval [19 FTE] (David Hawking)	Benchmark	Maintain a key strength
Medical Imaging [15 FTE] (Sebastien Ourselin)	Favourable	Develop
Millimetre – wave techniques [11 FTE] (Oya Sevimli)	Favourable	Maintain
Multimedia [9 FTE] (TBA)	Favourable	Wind down and redeploy staff
Network Science [15 FTE] (Zvi Rosberg)	Favourable	Develop depth
Robotics [18 FTE] (Jonathan Roberts)	Benchmark	Grow capacity by recruitment.
Security and Privacy [7 FTE] (TBA)	Developing	Grow this capability – critical to a large proportion of projects in networking, e-Health, Sensors and Sensor Networks, ICT of r Safeguarding Australia
Web Services [13 FTE] (Athman Bouguettaya)	Favourable	Maintain
Sensor Networks [30 FTE] (Peter Corke)	Favourable	Develop

**Self assessment

[^] Total budget and Research Staff, as per budget as at 15th August.

Mathematical and Information Sciences

Chief: Murray Cameron

Total Budget: \$28.783m[^] (2007-08)

Research Staff: 164.3 FTE[^]

Capability (Research Program Leader)	Status **	Trajectory
Computational Mathematics [30 FTE] David Lovell; Richard Jarrett; Bronwyn Harch	Strong - Benchmark	Level
Mathematical & Statistical modelling & Inference [67 FTE] David Lovell; Richard Jarrett; Bronwyn Harch	Favourable – Strong	Trending up
Image Segmentation & Classification [19 FTE] David Lovell; Bronwyn Harch	Favourable – Strong	Trending up
Simulation & Optimisation [22 FTE] David Lovell; Richard Jarrett;	Favourable	Trending up

** Review panel assessment as at May 2006.

[^] Total budget and Research Staff, as per budget as at 15th August.

Manufacturing, Materials and Minerals Group – Business Units and Capabilities

Group Executive: Rod Hill

Exploration and Mining

Chief: Steve Harvey (Acting)

Total Budget: \$37.263m[^] (2007-08)

Research Staff: 182 FTE[^]

Capability (Research Program Leader)	Status **	Trajectory
Mining Science & Engineering Research Program (Hua Guo)		
Mining Automation [21 FTE] (David Hainsworth (tbc))	Strong	Modest growth through further expansion of automation and communications technologies into broader mining, quarrying and civil industry sectors
Mining Systems [44 FTE] (Rao Balusu (tbc))	Strong	Modest growth through increased focus on metalliferous mining activities including mine ventilation, environmental management and innovative mine access development systems
Mining Geoscience [26 FTE] (Graham O'Brien (tbc))	Strong	Modest growth through external earnings to develop new geo-sensing technologies and analysis techniques
Exploration Geoscience Research Program (Chris Yeats)		
Computational Geoscience [32 FTE] (Robert Woodcock (tbc))	Strong	Modest growth through commitment to NCRIS AuScope capability development and input into Minerals Down Under Flagship
Regolith Geoscience [19 FTE] (David Gray (tbc))	Strong	Maintain but refocus with current staffing levels post CRC LEME and in response to Minerals Down Under Flagship goals
Mineral and Environmental Sensing [20 FTE] (Tom Cudahy (tbc))	Strong	Growth through AuScope and Minerals Down Under Flagship
Ore Systems Science [16 FTE] (Brent McInnes (tbc))	Strong	Growth through embedded researcher program and Minerals Down Under Flagship

** Review panel assessment as at June 2006.

[^] Total budget and Research Staff, as per budget as at 15th August.

Materials Science and Engineering

Chief: Calum Drummond

Total Budget: \$71.432m[^] (2007-08)

Research Staff: 315.7 FTE[^]

Capability (Research Program Leader)	Status **	Trajectory
Materials Physics, Instrumentation and Engineering [85 FTE] (Cathy Foley)	Benchmark/Strong	Design, create, optimize and characterize advanced materials for use in fabricated devices that are integrated into fully functioning systems. These systems will solve significant challenges for the resources, energy, manufacturing, health and security industry sectors. Use of fundamental theory to understand the scientific basis of the materials, devices, systems and applications.
Thermal and Fluid Dynamics [29 FTE] (Murray Rudman)	Strong-plus	Maintain the capability with focus on synergy of low friction materials and fluid dynamics for the petroleum and minerals industries. Grow micro fluidics capability to support nano-manufacturing devices and identify science collaborators to move capability to benchmark
Metallurgy [39 FTE] (Rob O'Donnell)	Strong-plus	In conjunction with Monash and Light Metals Flagship create integrated Benchmark capability.
Nanosensing & Measurement [27 FTE] (Brett Sexton)	Benchmark	Expand capability through greater interaction with Australian Science, partnership in Medical Imaging Institute (with monash, Melbourne and Latrobe) and Terabyte Science , Security and Sensing and sensor Net Themes
Polymeric Materials [46 FTE] (Dong Yang Wu)	Strong (Research) Benchmark (Industry)	Critical capability for Advanced Materials. Expand with particular emphasis on combinatorial methods
Surface Science [23 FTE] (Scott Furman)	Strong-plus	As part of the focus on Advanced Materials, expand in conjunction with CSIRO (ESI-Hierarchical materials) and International partners (TNO on self repair) both in commitment and quality
Materials Performance [32 FTE] (John Clampett)	New	Capability formed to scientifically underpin our Industrial Research Services
Particulate Materials & Processes [32 FTE] (Mahnaz Jahedi)	New	New capability formed to provide direct fabrication expertise into both flagships and divisional theme – Maintain funding levels

** Review panel assessment as at March 2005 - Industrial Physics. ** Review panel assessment as at October 2005 – Manufacturing and Materials Technology

[^] Total budget and Research Staff, as per budget as at 15th August.

Minerals

Chief: Bart Follink

Total Budget: \$46.927m[^] (2007-08)

Research Staff: 207.1 FTE[^]

Capability (Research Program Leader)	Status **	Trajectory
Hydrometallurgy-Alumina [26 FTE] Chris Vernon	Strong	Maintain but with increased environmental emphasis
Hydrometallurgy – Base Metals and Gold [30 FTE] Dave Robinson	Favourable	Maintain but with increased focus on modelling and collaboration with CLW on bioleaching. New OCE Science Leader recruited into this area
High temperature processing [23 FTE] Shouyi Sun	Strong	Maintain but with increased emphasis on cross-discipline applications; e.g., use of biomass and waste processing
Mineral Processing and Agglomeration [28 FTE] Jonathan Campbell	Favourable	Maintain but increased emphasis on automating characterisation and linking of characterisation with down-stream processing performance, such as in flotation
Material Characterisation [19 FTE] Howard Poynton	Benchmark	Slight growth through QEMScan at Waterford and increased synchrotron and neutron beam applications
Fluids Process Modelling [16 FTE] Phil Schwarz	Strong	Grow through capability development in multi-scale modelling, large eddy simulation and CFD-based process control. Stronger links with synergistic capabilities in CMIS and CMMT, and model experimentation. Opportunity progressed to co-locate with similar groups on the Clayton campus
Online Analysis & Control [28 FTE] Mike Millen	Strong	Maintain, but enhanced capability to convert instrumentation concepts to market-ready products ('productisation')
Process Engineering [33 FTE] Alan Manzoori	Strong	Slight growth through LMF; increased effort in ionic liquids electrochemistry both internally and through collaborations.

** Review panel assessment as at April 2005.

[^] Total budget and Research Staff, as per budget as at 15th August.

Molecular and Health Technologies

Chief: Graeme Woodrow

Total Budget: \$52.220m[^] (2007-08)

Research Staff: 257.4 FTE[^]

Capability (Research Program Leader)	Status **	Trajectory
Bioactive Molecules [32 FTE] (Peter Duggin)	Favourable	Maintain
Biomaterials [55 FTE] (John Ramshaw)	Strong	Continue to grow
Biotransformation [9 FTE] (Geoff Dumsday)	Tenable	Maintain – develop as an Organisational capability
Nano-structured Materials [28 FTE] (Karen Kozielski)	Favourable	Focus on particular Theme outcomes and increase interactions across CSIRO
Photo-induced processes [8 FTE] (Peter Osvath)	Favourable	Grow in line with the Electroactive Materials Theme
Fit for Function Polymers [31 FTE] (Graeme Moad)	Strong	Maintain and focus on particular Theme outcomes
Protein Engineering [52 FTE] (Tim Adams)	Benchmark	Maintain
Protein Structure/Function [25 FTE] (Tom Peat)	Favourable	Maintain

** Review panel assessment as at October 2005.

[^] Total budget and Research Staff, as per budget as at 15th August.

Textiles and Fibre Technology

Chief: Nigel Johnson

Total Budget: \$21.853m[^] (2007-08)

Research Staff: 81.7 FTE[^]

Capability (Research Program Leader)	Status **	Trajectory
Biomedical and Nano Textiles [27FTE] (Bill Humphries)	Strong/ Favourable	Grow capability in line with needs of Niche Manufacturing Flagship and Advanced Fibrous Materials Theme.
Surface, Fibre and Protein Chemistry [18 FTE] (Tony Pierlot)	Strong	Stabilise capability in line with needs of the Australian wool industry, but increase involvement in activities outside the traditional wool textile field.
Fibrous Structures and Products [25 FTE] (Geoff Naylor)	Strong/ Benchmark	Maintain, but increase activities related to creating fibrous structures and products aimed at high value, technical uses.
Instrumentation and Flexible Electronics [13 FTE] (Stuart Lucas)	Strong/ Benchmark	Maintain, and seek to contribute to needs of other business units. Flexible electronics to focus on creating solutions for specific Australian needs.

** Review panel assessment as at March 2007.

[^] Total budget and Research Staff, as per budget as at 15th August.

PART D: SUPPORTING THE RESEARCH ENTERPRISE

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Office of the Chief Executive

Chief Executive: Dr Geoff Garrett

Executive Office

(Geoff Clarke)

Brief Description	Budget	Major Planned Activities/Outputs
Provide an effective leadership, strategy and governance framework for the organisation and ensure effective management of critical external relationships	\$5.8m	<p>Continued effective operation of the OCE, the Executive Team and Executive Management Council</p> <p>Support and enhance the governance of the organisation and its relationships with key stakeholders</p> <p>Ensure optimum alignment of organisational structure and leadership to enable effective implementation of strategic priorities</p>

Communications/Marketing

(John Curran)

Brief Description	Budget	Major Planned Activities/Outputs
By understanding end-user needs and deploying a wide range of communication tools, we support the promotion of the role of science in driving innovation, informing policy and delivering benefit to society.	\$5.7m	<p>Integrated four year rolling plan to map communication and marketing resources to enterprise priorities identified in the Strategic Plan 2007-2011 and Science Investment Process</p> <p>Stimulate internal and external debate on major national issues including energy, climate adaptation, nanotechnology and the bioeconomy.</p> <p>Establish mechanisms for sharing market analysis and stakeholder feedback to inform communication activities</p> <p>Foster interest in science and an understanding of its value to industry and the community through integrated series of events and promotions, and a more focussed web-presence.</p> <p>Establish enterprise protocols for contact databases and events management.</p> <p>Complete the redesign of the intranet and internal newsletters, focussing on accessibility of information and support for the new operational environment</p>

International

(James Moody)

Brief Description	Budget	Major Planned Activities/Outputs
CSIRO International is focused on helping the enterprise reach its vision of Global Reach by sourcing the best scientists from the global talent pool, creating opportunities for our researchers on projects of international significance and aligning with other government priorities such as increasing our engagement in China and India. The group will also enhance CSIRO's strong connections within the Global System of Innovation in order to harness international science and technology for the benefit of Australia.	\$1.4m	<p>Facilitate exchanges of staff members in and out of the organisation through identifying opportunities for and reducing the barriers to visiting students and fellows and provide opportunities for Australian scientists to obtain international experience through international exposure, networks and secondments.</p> <p>Appropriately, integrate "international" considerations into the Science Investment Process to increase the impact and potential outcomes of our international activities and improve internal coordination and communication, with a particular focus on key partners in China and India.</p> <p>Promote CSIRO's International Strategy through consultation with and understanding the needs of business units, creation of an international advisory group and identification and support of international leaders in key themes</p> <p>Reposition the CSIRO Office of Space Systems and Applications within the International Team and facilitate a review of CSIRO's capacity in remote sensing with the view to attracting additional resources in this area.</p> <p>Review CSIRO's role within the global system of innovation and the use of its international linkages to provide value to business units; use representational activities and host visiting delegations to position CSIRO internationally as a coordinated, unified and highly capable organisation.</p>

Science Team

(Jim Peacock)

Brief Description	Budget	Major Planned Activities/Outputs
The Science Team encourages, promotes and supports science through the development of scientists and communication of science.	\$0.3m	<p>Develop and enhance programs including the Postdoctoral Fellowships, Postgraduate Scholarships, CEO Science Leaders.</p> <p>Promote CSIRO's science through regular science speakers at the Executive Team and Executive Management Council meetings.</p> <p>Encourage and promote interactions with external organisations through our Distinguished Visiting Scientist program.</p> <p>Reposition the Emerging Science Initiative to increase our investment in emerging science and technology areas.</p> <p>Facilitate increased scientific discussion across CSIRO, university collaborations and interactions with top international experts through a series of science symposia. Increase the level of interaction across CSIRO on important issues and developments in science through a series of challenging science workshops.</p>

Business Services

Executive Director: Nigel Poole

Business Services provides a range of professional capabilities to the organisation in support of science.

Client and Partner Relationships

(Rick Ede)

Brief Description	Budget	Major Planned Activities/Outputs
Responsible for building organisational capability leading to an improvement in major client and partner relationships and the resources derived from these; delivery of client and partner relationship & revenue performance & improvement metrics; entry point internally and externally for major government collaborative research funding schemes, including CRCs	\$1.4m	<p>Review and reset of 10 of the Top 50 major client and partner relationships</p> <p>Embed CVS performance metrics into enterprise performance management framework</p> <p>Extend CRC Office scope and function to include other major Government research collaboration funds</p>

Commercialisation and Equity Management Services

(Jan Bingley)

Brief Description	Budget	Major Planned Activities/Outputs
Generate IP revenue from licensing of IP and equity related transactions; responsible for management of CSIRO's equity holdings	\$2.5m	<p>Smart SME/AGP programme in place</p> <p>Internal and External Communications ramped up</p> <p>Budget IP revenue target \$21M</p>

Contract Administration

(Kathy Heinze)

Brief Description	Budget	Major Planned Activities/Outputs
Responsible for the operational aspects of CSIRO's research contracting process including delivering para-legal services, capture and reporting of contracts data and records, and CSIRO's contracts systems	\$2.8m	BETR input and implementation Improved contract turnover and cycle time Processes benchmarked externally Customer satisfaction level of 80% achieved

Information Management & Technology Services

(David Toll)

Brief Description	Budget	Major Planned Activities/Outputs
Deliver enterprise-wide IT, Records and Information Services.	\$66.0m	Revised client engagement strategy in place Delivery of an appropriate suite of "production" services to CSIRO staff Transition of Libraries, Records and High Performance Computing services into the Service Delivery structure. Progress five major IT infrastructure projects to enable major service improvements

Intellectual Property Management

(Gordon Meijis)

Brief Description	Budget	Major Planned Activities/Outputs
Improve organisational capability in protecting, managing and exploiting intellectual property.	\$0.6m	<p>Establish capability by targeted hiring.</p> <p>Develop in-house administrative and processing capability.</p> <p>Deliver first module of skill building program and policy revision.</p> <p>Select and implement portfolio software tool.</p>

Legal Services

(Adam Liberman)

Brief Description	Budget	Major Planned Activities/Outputs
Responsible for delivery of enterprise wide legal services.	\$9.2m	<p>Continue to implement the six Vision Tasks</p> <p><i>Knowledge and Education Management:</i></p> <ul style="list-style-type: none"> to ensure a strong knowledge base for our lawyers including precedents and advice database; <p><i>Intellectual Property Management:</i></p> <ul style="list-style-type: none"> to take the lead in implementing an enterprise wide IP and IP management strategy; <p><i>Practice Management:</i></p> <ul style="list-style-type: none"> to implement efficient systems in the delivery of services; <p><i>Professional Development:</i></p> <ul style="list-style-type: none"> to create a skills base that matches CSIRO's needs and to develop, attract and retain our talent pool; <p><i>Stakeholder Management:</i></p> <ul style="list-style-type: none"> to create a trusted adviser and model client relationship with our client base; <p><i>Performance Measurement and Management:</i></p> <ul style="list-style-type: none"> to measure and manage how we and those who we engage perform against relevant performance criteria. <p>Implement the proposed on-line trade practices compliance program</p>

Major Transactions

(*Jack Steele*)

Brief Description	Budget	Major Planned Activities/Outputs
Manage large/complex business development transactions (includes new, and restructured, significant joint ventures and the like) through to closure, working closely with line management, CSIRO Legal and CSIRO Finance, and including passage through approvals processes. Responsible for the ComEx and BCC secretarial functions.	\$1.0m	<p>2 – 3 major transactions closed during FY (Includes NCRIS fabrication; FSA).</p> <p>Manage support processes for ComEx (approximately 18 scheduled meetings per FY) and Board Commercial Committee (6 meetings)</p>

Property Services

(*Trevor Moody*)

Brief Description	Budget	Major Planned Activities/Outputs
Provide professional, effective and efficient property and facility management services to support CSIRO's science and business objectives	\$91.0m	<p>Identify and develop strategic options for better utilisation and alignment of CSIRO facilities on priority sites.</p> <p>Develop, within annual capital expenditure cap, and maintain cost-effective, safe and functional research facilities.</p> <p>Improve operating cost efficiency through ongoing zonal rationalisation of property and facilities services</p> <p>Develop portfolio initiatives to optimise environmental sustainability.</p> <p>Minimise personnel and property physical security risk.</p>

Finance and Governance

Executive Director: Mike Whelan

The Finance and Governance Group brings together into a single enterprise function, staff associated with supporting the financial, risk, audit, governance and government relationship activities of CSIRO. It is made up of four operational teams.

CSIRO Board and Governance

(Phillip Moore)

Brief Description	Budget	Major Planned Activities/Outputs
The office of the CSIRO Board and Governance is a small Canberra based team that works to enhance the integration and effectiveness of the CSIRO Governance Framework and to provide high level support to the CSIRO Board.	\$1.3m	Implementation of changes to CSIRO governance arrangements flowing from the Uhrig review

Finance

(Mike O'Loughlin, Acting)

Brief Description	Budget	Major Planned Activities/Outputs
CSIRO Finance is a large scale enterprise-wide team that provides financial and procurement services to support the organisation. Finance staff can be found working in a mix of settings including within business units, regional processing centres and centralized specialist services.	\$19.4m	Implementation of revised financial reporting arrangements associated with implementation of the Organisation Design Principles (ODP) Supporting the implementation of financial system and processes associated with the roll out of the Business Enabling Technology Review (BETR)

Government Relations and Ministerial and Parliamentary Liaison

(*Les Rymer*)

Brief Description	Budget	Major Planned Activities/Outputs
The Government Relations and Ministerial and Parliamentary Liaison team is a medium sized Canberra based team whose goal is to support CSIRO staff members in positioning the organisation as the primary and trusted source of scientific and policy advice to the Federal Government and to provide information and advice to the Minister and to CSIRO staff to assist CSIRO in meeting its legislative and administrative responsibilities.	\$0.9m	Implementation of proactive management arrangements for CSIRO relationships with key Federal Government agencies

Risk Assessment and Audit

(*Peter Duffy, Acting*)

Brief Description	Budget	Major Planned Activities/Outputs
Risk Assessment and Audit is a medium size Melbourne based team responsible for the audit of policies, systems and management processes across CSIRO and the coordination of the assessment of all risks (other than those risks associated with the success of research) and the evaluation of controls in significant areas.	\$1.4m	<p>Broaden the scope of RA&A activities to provide assurance over management processes including Themes, Capability Development, Flagships, Partnerships &Collaborations</p> <p>Expansion and refinement of Control Self Assessment to improve control effectiveness and compliance within Business Units</p> <p>Implementation of an Organisation wide risk management system and data base to improve the identification, analysis reporting and monitoring of risk</p>

Leadership and Organisational Development

Executive Director: Michael Eyles

People and Culture

(Trevor Heldt)

Brief Description	Budget	Major Planned Activities/Outputs
CSIRO People & Culture provides support and leadership on people to leaders and staff across CSIRO. Our goal is to develop high performing teams working across boundaries.	\$14.8m	Improve performance management and people development practices across the organisation and align them with the needs of our strategy
		Develop a strategy to align behaviours with Strategy.
		Develop a four year people plan to support the implementation of the 07/11 Strategy.
		Develop a new industrial instrument to support implementation of Strategy

Science Strategy and Investment

Executive Director: Alastair Robertson

Science Performance Framework

(TBA)

Brief Description	Budget	Major Planned Activities/Outputs
Ensure that science investment policies and processes continue to support and signal key investment areas (both capabilities and outcomes), are aligned with organisational strategy, and are linked to performance measurement processes.	TBA*	Facilitate strong governance and effective, consistent support for the National Research Flagships through the Flagship Oversight Committee and Flagship Operations Office.
		Further develop performance measurement processes in alignment with organisational strategy and reporting requirements and enhance integration of investment, planning and performance measurement processes.
		Work with People and Culture to strengthen the alignment of performance management and reward systems with CSIRO's Strategy and desired outcomes. Work with the CEO's Science Team to further develop the science quality culture of CSIRO.
		Continue to refine the science assessment process and develop a program of individual Flagship reviews.

Science, Society and Policy

(*Les Rymer*)

Brief Description	Budget	Major Planned Activities/Outputs
Assist Australia's awareness on issues of scientific and technological importance and provide scientific input as requested by governments and communities.	TBA*	Develop and commence to roll out a strategic and systematic approach for identifying, analysing and responding to S&T issues that are of significance or concern to the community and government.

Science Strategy

(*Attila Brungs*)

Brief Description	Budget	Major Planned Activities/Outputs
Develop and put in place processes and frameworks to ensure that CSIRO remains focused on outcomes which have tangible and sustained impact on Australia's economic prosperity, societal wellbeing and environmental sustainability.	TBA*	Develop high-level, cross-organisational strategic arrangements which provide the basis for forward managing CSIRO's extensive capability to anticipate and address national research needs. Ensure these are agreed, supported and integrated in relevant processes throughout the organisation. Define and articulate clearly the research domains in which CSIRO is the natural research leader in Australia.

* The total budget for the Science Strategy and Investment Group is \$2.2m.

Strategic Change Programs

Executive Director: Craig Roy

Business Process and Enabling Technology Replacement

(Roze Frost)

Brief Description	Budget	Major Planned Activities/Outputs
Design and implementation of an enterprise systems platform, and associated business process improvements, for the effective management of core CSIRO processes.	\$6.4m	Complete business process mapping relevant to BETR and have agreed design requirements for Phase 1 implementation
		Finalise delivery of BETR Phase I across the enterprise
		Finalise design for BETR Phase II and gain necessary approvals

Health Safety and Environment

(Colin Macdonald)

Brief Description	Budget	Major Planned Activities/Outputs
Provide effective leadership, strategy and coordination of the organisation's HS&E.	\$0.6m	Develop, launch and implement a four-year HSE Strategy that actively drives the continual improvement of HSE performance across the enterprise.
		Develop and deliver an enhanced HS&E awareness program to raise the profile of HS&E at leadership levels across the enterprise.

Project Leadership Initiative

(Nicole Goldschmidt)

Brief Description	Budget	Major Planned Activities/Outputs
The Project Leadership Initiative (PLI) is a program of cultural change and the development and implementation of a range of processes, tools and support mechanisms to help achieve a new standard of project leadership in CSIRO.	\$0.7m	<p>Finalise delivery of the Foundations project leadership program across all CSIRO Divisions</p> <p>Support the BETR team in advancing CSIRO project management policy</p> <p>Transition the Foundations program to the L&D team (People & Culture) for business-as-usual delivery within the larger scope of L&D programs.</p>

Research Support Services

(Bob Garrett)

Brief Description	Budget	Major Planned Activities/Outputs
Effective enterprise delivery of Research Support Services	\$1.9m	<p>Transition RSS to business as usual ensuring effective performance of RSS functions</p> <p>Finalise a post implementation performance review and ensure continuous improvement and ongoing customer satisfaction with the RSS functions</p>

Strategic Program Office

(Craig Roy)

Brief Description	Budget	Major Planned Activities/Outputs
Effectively coordinate, monitor and, at times, plan and execute enterprise strategic initiatives.	\$4.6m	<p>Integrate and coordinate the four year strategic initiatives to ensure effective delivery of those programs.</p> <p>Engage across the enterprise to ensure effective business level implementation of strategy and change.</p>

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Financial Summary

REVENUE	2006-07	2007-08	Change \$m	Change %	2007-08	Change \$m	Change %
	ACTUAL \$m	PBS* \$m			Op Plan \$m		
Appropriation	610	665	+55	+9%	665	+55	+9%
Research Services (Co-Investment/Consulting)	286	310	+24	+8%	328	+42	+15%
Intellectual Property	31	37	+6	+20%	36	+6	+20%
Other (e.g. interest, asset sales, donations)	46	21	-25	-54%	61	+15	+33%
Total revenue	973	1033	+60	+6%	1090	+117	+12%
EXPENSES							
Staffing	563	610	+47	+8%	629	+66	+12%
Operating	333	330	-3	-1%	381	+48	+14%
Other (e.g. depreciation)	76	93	+17	+22%	80	+7	+9%
Total expenses	972	1033	+61	+6%	1090	+118	+12%

* as per the Portfolio Budget Statement (May 2007)

Budgeted Income Statement for period ended 30 June – Summary

	2006/07 Actuals 000's	2007/08 Budget 000's	2006/07 - 2007/08 Change %
REVENUE			
EXTERNAL REVENUE			
Co-Investment	224,158	262,790	17%
Consulting & Services	61,614	65,673	7%
Co-Investment, Consulting & Services	285,772	328,463	15%
IP, Royalties, etc	31,326	36,033	15%
Research & Services	317,098	364,496	15%
Other External	37,069	40,674	10%
Interest	6,406	6,500	1%
TOTAL EXTERNAL	360,572	411,671	14%
APPROPRIATION REVENUE	610,060	664,470	9%
REVENUE FROM THE SALE OF ASSETS	2,714	10,932	303%
TOTAL REVENUE	973,347	1,087,073	12%
EXPENSES			
Salaries & Related Expenses	563,176	628,798	12%
Travel	36,176	39,661	10%
Other Operating	297,244	338,972	14%
Depreciation & Amortisation	75,731	79,642	5%
TOTAL EXPENSES	972,327	1,087,073	12%
OPERATING RESULT	1,020	0	

Budgeted Income Statement for period ended 30 June – Analysis of Expenses

EXPENSE CATEGORY	2006/07	2007/08	2006/07 - 2007/08
	<u>Actuals</u> <u>000's</u>	<u>Budget</u> <u>000's</u>	<u>Change</u> <u>%</u>
Advertising & Promotion	1,760	2,352	34%
Bad Debts	80	100	25%
Cleaning	5,219	5,502	5%
Computing/IT Costs	31,151	32,537	4%
Contracted Consulting Services	1,130	1,696	50%
Contracted Research & Development	40,125	50,780	27%
Doubtful Debt Expense	544	650	19%
Entertainment	1,056	1,070	1%
Grants & Contributions	7,498	10,293	37%
Insurance	2,425	2,203	(9%)
Joint Venture Contributions	42,228	41,249	(2%)
Laboratory & Workshop Supplies	36,817	39,756	8%
Legal	10,038	10,992	10%
Library	10,687	11,261	5%
Motor Vehicles	6,328	7,309	15%
Office Supplies & Printing	7,725	8,666	12%
Operating Leases	510	559	10%
Patents	5,542	6,279	13%
Postage & Freight	3,116	3,264	5%
Property	27,523	28,981	5%
Recruitment & Relocation	4,918	6,156	25%
Repairs & Maintenance	17,652	18,860	7%
Security	1,938	2,246	16%
Telecommunications	9,659	11,015	14%
Training	7,985	8,725	9%
Utilities	16,620	17,524	5%
Other	(3,030)	8,945	395%
TOTAL OTHER OPERATING	297,244	338,972	14%

Budgeted Balance Sheet as at 30 June

	<u>2006/07</u>	<u>2007/08</u>	<u>2006/07 - 2007/08</u>
	<u>Actuals</u>	<u>Budget</u>	<u>Change</u>
	<u>000's</u>	<u>000's</u>	<u>%</u>
ASSETS			
CURRENT ASSETS			
Cash	131,048	113,648	(13%)
Trade Debtors	50,973	58,314	14%
Work in Progress	15,000	17,160	14%
Other Receivable	20,473	20,473	0%
Inventory	1,075	1,075	0%
TOTAL CURRENT ASSETS	218,569	210,670	(4%)
NON - CURRENT ASSETS			
Land & Buildings	1,040,151	1,054,612	1%
Plant, Equipment & Intangibles	266,645	288,776	8%
Other Investments	50,154	50,154	0%
TOTAL NON CURRENT ASSETS	1,356,950	1,393,542	3%
TOTAL ASSETS	1,575,519	1,604,212	2%
LIABILITIES			
Trade Creditors	29,200	33,810	16%
Accrued Expenditure	26,170	30,302	16%
Deferred Revenue	59,800	68,411	14%
Finance Leases	72,004	67,807	(6%)
Employee Provisions	177,707	193,243	9%
Other Payables	42,328	42,328	0%
TOTAL LIABILITIES	407,208	435,901	7%
NET ASSETS	1,168,311	1,168,311	0%
EQUITY			
Accumulated Results - Operations	451,908	451,908	0%
Reserves	716,403	716,403	0%
TOTAL EQUITY	1,168,311	1,168,311	0%

Enterprise Support Services – Total Expenditure Budget 2007-08

	<u>2006/07</u>	<u>2007/08</u>	<u>2006/07 - 2007/08</u>
	<u>Actuals</u>	<u>Budget</u>	<u>Change</u>
	<u>000's</u>	<u>000's</u>	<u>%</u>
Chief Executive Office			
Science Strategy & Investment	12,032	13,163	9%
People & Culture	1,773	2,217	25%
Finance & Governance	15,932	14,775	(7%)
Strategic Change Programs (includes BETR)	19,617	23,012	17%
Business Services	10,017	14,253	42%
Group Executives	175,489	174,527	(1%)
Flagship Support	3,364	3,015	(10%)
TOTAL ENTERPRISE SUPPORT SERVICES	244,995	254,180	4%

Output Portfolio View 2007- 08

Group/Portfolio	Revenue 000's			Expenses 000's					000's Surplus/(Deficit)
	Internal	External	Total Revenue	Research Labour	FTE's	Research Operating	Business Unit & Enterprise Ohd's	Total Expenses	
AGRICULTURE GROUP									
Ensis	15,433	14,096	29,529	48	0	15,314	14,166	29,529	0
Entomology	16,162	12,839	29,001	13,616	156	4,270	11,115	29,001	0
Food Science Australia	12,951	12,198	25,149	1,246	14	12,129	11,773	25,149	0
Livestock Industries	42,310	28,841	71,151	23,930	300	6,682	40,540	71,151	(0)
Plant Industry	36,238	36,755	72,993	33,758	452	7,623	33,612	74,993	(2,000)
Food Futures Flagship	36,246	5,340	41,586	13,477	144	14,942	13,166	41,586	0
Preventative Health Flagship	29,534	7,710	37,244	15,394	156	7,739	14,111	37,244	0
AGRICULTURE GROUP TOTAL	188,673	117,778	306,652	101,471	1,223	68,697	138,484	308,652	(2,000)
ENERGY GROUP									
Energy Technology	7,693	3,200	10,893	4,368	41	2,665	3,860	10,893	0
Petroleum Resources	6,863	5,104	11,967	5,550	48	2,142	4,274	11,967	0
Wealth from Oceans Flagship	41,854	14,821	56,675	24,444	219	10,377	21,854	56,675	0
Energy Transformed Flagship	36,269	12,850	49,119	19,222	181	12,978	16,919	49,119	0
ENERGY GROUP TOTAL	92,878	35,975	128,853	53,584	488	28,162	46,907	128,853	0
ENVIRONMENT GROUP									
Land & Water	8,468	6,140	14,608	6,597	71	2,224	5,788	14,608	0
Marine & Atmospheric Research	36,965	22,187	59,151	22,358	211	16,381	20,412	59,151	0
Sustainable Ecosystems	48,456	25,148	73,614	31,742	327	11,708	30,164	73,614	0
Water for a Healthy Country Flagship	51,676	35,684	87,360	37,987	364	15,770	33,802	87,360	0
Climate Adaptation Flagship	1,006	0	1,006	0	0	1,006	0	1,006	0
ENVIRONMENT TOTAL	146,581	89,169	235,739	88,884	872	47,089	88,886	235,739	0
INFORMATION & COMMUNICATION SCIENCE & TECHNOLOGY GROUP									
Australia Telescope National Facility	29,656	6,719	36,375	10,243	101	14,148	11,984	36,375	0
Maths & Information Sciences	14,279	6,684	21,163	11,245	112	2,007	7,911	21,163	0
ICT Centre	30,887	10,924	41,811	19,602	171	5,580	16,629	41,811	0
INFORMATION & COMMUNICATION SCIENCE & TECHNOLOGY TOTAL	74,822	24,527	99,349	41,091	385	21,735	35,523	99,349	0
MANUFACTURING, MATERIALS, & MINERALS GROUP									
Exploration & Mining	6,677	7,848	14,525	5,787	54	3,984	4,755	14,525	0
Materials Science and Engineering	29,150	27,328	56,478	21,914	204	11,256	23,808	56,478	(500)
Molecular & Health Technologies	29,657	16,642	46,298	19,674	209	4,857	21,768	46,298	0
Minerals	13,728	10,605	24,333	9,591	98	3,073	11,669	24,333	0
Textiles & Fibre Technology	8,339	6,941	15,280	6,012	53	879	8,389	15,280	0
Light Metals Flagship	24,764	8,988	33,752	13,139	119	5,667	14,946	33,752	0
Niche Manufacturing Flagship	6,106	0	6,106	2,122	21	1,472	2,511	6,106	0
Minerals Down Under Flagship	23,579	16,836	40,415	17,542	162	6,211	16,663	40,415	0
MANUFACTURING, MATERIALS, & MINERALS GROUP TOTAL	141,899	85,168	237,167	85,780	821	-37,398	104,509	237,167	(500)
ENTERPRISE OUTPUTS GROUP									
Discovery Centre	1,526	330	1,856	384	6	405	1,067	1,856	0
High Performance Computing Centre	4,184	510	4,694	911	12	2,838	945	4,694	0
Education Programs	3,753	3,698	7,451	3,458	29	1,420	2,573	7,451	0
Publishing	0	10,024	10,024	3,310	48	2,123	3,918	9,351	673
Rppers	5,000	0	5,000	0	0	5,000	0	5,000	0
Other	850	0	850	0	0	0	1,523	1,523	(673)
ENTERPRISE OUTPUTS GROUP TOTAL	15,313	14,532	29,875	8,063	94	11,786	10,026	29,875	0
UNALLOCATED RESOURCES									
Science Themes	6,310	0	6,310	4,957	50	1,353	0	6,310	0
Operating Buffer	25,084	0	25,084	21,938	137	646	0	22,584	2,500
CEO Contingency	4,000	0	4,000	2,667	27	1,333	0	4,000	0
Smart SME's	1,700	0	1,700	0	0	1,700	0	1,700	0
Flagship Collaboration Fund	5,144	0	5,144	0	0	5,144	0	5,144	0
UNALLOCATED RESOURCES TOTAL	42,238	0	42,238	29,562	214	10,176	0	39,738	2,500
TOTAL OUTPUT PORTFOLIO INVESTMENT	702,504	377,189	1,079,693	428,235	4,297	225,043	426,415	1,079,693	(0)
RECONCILIATION OF OUTPUT VIEW TO THE OPERATING STATEMENT									
CAPABILITY BUDGET (NET OF RECOVERIES TO OUTPUTS)	0	7,379	7,379	0	0	0	7,379	7,379	0
OPERATING STATEMENT POSITION			1,087,072	428,235	4,297	225,043	433,794	1,087,072	0

Capability/Business Unit View 2007 - 08

Group/Portfolio	Revenue			Expenses					000's			000's Capital	
	Appropriation	External	Revenue	Research	Labour	FTE's	Business Unit O'hd's	Enterprise O'hd's	Total Expenses	Planned Recoveries from Output Themes	Profit/(Loss) on Sale of Assets	Surplus/(Deficit)	
AGRICULTURE GROUP													
AAHL	0	682	682	10,483	125	21,433	5,030	36,946	(36,264)	0	0	6,086	
Entomology	0	162	162	17,814	203	3,794	10,628	32,237	(32,075)	0	0	669	
Food Science	0	25	25	6,851	84	2,503	13,968	23,322	(23,297)	0	0	859	
Forest & Forest Products	0	0	0	0	0	5,802	8,295	14,098	(14,096)	0	0	567	
Livestock Industries	0	839	839	20,103	247	10,642	12,595	43,340	(42,501)	0	0	1,227	
Plant Industry	0	0	0	41,749	534	12,979	28,881	83,609	(83,609)	0	0	5,549	
AGRICULTURE TOTAL	0	1,708	1,708	97,000	1,194	57,152	79,397	233,549	(231,842)	0	0	14,957	
ENERGY GROUP													
Energy Technology	0	0	0	14,933	142	4,304	8,894	28,130	(28,130)	0	0	4,354	
Petroleum Resources	0	0	0	14,778	129	4,292	7,089	26,158	(26,158)	0	0	3,014	
ENERGY TOTAL	0	0	0	29,710	271	8,596	15,983	54,289	(54,289)	0	0	7,368	
ENVIRONMENT GROUP													
Land & Water	0	210	210	36,378	362	12,101	20,003	68,481	(68,271)	0	0	2,762	
Marine & Atmospheric Research	0	0	0	38,604	359	15,118	20,909	74,630	(74,630)	0	0	4,621	
Oceanographic Research Vessel	0	0	0	1,719	17	510	651	2,880	(2,880)	0	0	245	
Sustainable Ecosystems	0	0	0	25,939	258	10,124	14,323	50,386	(50,386)	0	0	1,138	
ENVIRONMENT TOTAL	0	210	210	102,640	997	37,852	55,885	196,377	(196,167)	0	0	8,966	
INFORMATION & COMMUNICATION SCIENCE & TECHNOLOGY GROUP													
Australia Telescope National Facility	0	0	0	10,168	101	6,790	5,131	22,089	(22,089)	0	0	9,763	
Maths & Information Sciences	0	0	0	17,063	164	3,953	7,849	28,866	(28,866)	0	0	125	
ICT Centre	0	0	0	24,425	217	9,576	10,650	44,651	(44,651)	0	0	450	
INFORMATION & COMMUNICATION SCIENCE & TECHNOLOGY TOTAL	0	0	0	51,656	482	20,320	23,629	95,605	(95,605)	0	0	10,338	
MANUFACTURING, MATERIALS, & MINERALS GROUP													
Exploration & Mining		0		20,461	182	6,729	10,073	37,263	(37,263)	0	0	1,085	
Materials Science and Engineering	0	200	200	34,361	316	12,454	24,926	71,741	(71,541)	0	0	4,444	
Minerals	0	0	0	21,030	207	12,846	13,055	46,931	(46,931)	0	0	950	
Molecular & Health Technologies	0	0	0	24,576	257	11,128	16,666	52,370	(52,370)	0	0	4,699	
Textiles & Fibre Technology	0	0	0	9,030	82	7,004	5,819	21,853	(21,853)	0	0	435	
MANUFACTURING, MATERIALS, & MINERALS GROUP TOTAL	0	200	200	109,459	1,044	50,162	70,538	230,159	(229,959)	0	0	11,613	
ENTERPRISE OUTPUTS GROUP													
Discovery Centre	0	0	0	384	6	746	321	1,451	(1,451)	0	0	350	
High Performance Computing Centre	0	0	0	911	12	481	464	1,856	(1,856)	0	0	0	
Education Programs	0	0	0	3,458	29	729	1,844	6,031	(6,031)	0	0	180	
Publishing	0	0	0	3,310	48	3,578	340	7,228	(7,228)	0	0	50	
Other	0	0	0	0	0	0	516	516	(516)	0	0	0	
ENTERPRISE OUTPUTS GROUP TOTAL	0	0	0	8,063	94	5,534	3,486	17,083	(17,083)	0	0	580	
UNPLANNED RESOURCES TOTAL	0	0	0	29,707	215	0	0	29,707	(29,707)	0	0	0	
TOTAL BUSINESS UNIT CAPABILITY BUDGET	0	2,118	2,118	428,235	4,297	179,616	248,918	856,769	(854,652)	0	0	53,822	
ENTERPRISE SUPPORT SERVICES													
Enterprise Support Services		5,262		0	0	0	254,179	254,179	0	10,932	(237,986)	79,454	
Recoveries from Business Units	0	0		0	0	0	(248,918)	(248,918)	0	0	248,918	0	
TOTAL ENTERPRISE SUPPORT SERVICES		5,262		0	0	0	5,262	5,262	0	10,932	10,932	79,454	
TOTAL CAPABILITY BUDGET		7,379		428,235	4,297	179,616	254,180	862,031	(854,652)	10,932	10,932	133,276	

Capital Expenditure 2007-08

	Land and Buildings			Plant & Equipment			Intangibles			Total		
	Actual 2006/07 \$k	Budget 2007/08 \$k	Change %	Actual 2006/07 \$k	Budget 2007/08 \$k	Change %	Actual 2006/07 \$k	Budget 2007/08 \$k	Change %	Actual 2006/07 \$k	Budget 2007/08 \$k	Change %
Forestry incl Ensis	408	0	-100.0%	1,438	628	(56%)	0	0	-	1,846	628	(66%)
Entomology	0	0	-	811	669	(18%)	0	0	-	811	669	(18%)
Food Science Australia	0	0	-	642	567	(12%)	0	0	-	642	567	(12%)
Hman Nutrition	0	0	-	216	231	7%	0	0	-	216	231	7%
Livestock - AAHL	13,039	1,900	-85.4%	239	4,186	1,649%	0	0	-	13,278	6,086	(54%)
Livestock excl AAHL	0	0	-	475	1,227	159%	0	0	-	475	1,227	159%
Plant Industry	43	0	-100.0%	1,670	5,549	232%	0	0	-	1,712	5,549	224%
Agribusiness	13,489	1,900	-85.9%	5,491	13,057	138%	0	0	0%	18,980	14,957	(21%)
Sustainable Ecosystems	0	0	-	624	1,138	82%	0	0	-	624	1,138	82%
Marine and Atmospheric Research	0	0	-	1,534	4,821	214%	0	0	-	1,534	4,821	214%
Land & Water	112	0	-100.0%	2,300	2,762	20%	0	0	-	2,412	2,762	15%
Oceanographic Research Vessel	0	0	-	330	245	(26%)	0	0	-	330	245	(26%)
Environment	112	0	-100.0%	4,788	8,966	87%	0	0	0%	4,891	8,966	83%
Energy Technology	0	0	-	1,228	4,354	255%	0	0	-	1,228	4,354	255%
Petroleum Resources	0	0	-	1,660	3,014	82%	0	0	-	1,660	3,014	82%
Energy	0	0	-	2,887	7,388	155%	0	0	0%	2,887	7,388	155%
Material Science and Engineering	0	0	-	1,717	4,444	270%	0	0	-	1,717	4,444	270%
Textile & Fibre Technology	0	0	-	1,117	435	(61%)	0	0	-	1,117	435	(61%)
Minerals	11	0	-100.0%	1,234	950	(23%)	0	0	-	1,244	950	(24%)
Exploration & Mining	0	0	-	1,777	1,085	(39%)	0	0	-	1,777	1,085	(39%)
Molecular and Health Technologies	0	0	-	2,810	4,699	67%	0	0	-	2,810	4,699	67%
Manufacturing, Materials & Minerals	11	0	-100.0%	8,655	11,613	34%	0	0	0%	8,685	11,613	34%
Mathematics & Information Sciences	0	0	-	65	125	93%	0	0	-	65	125	93%
Information & Communication Technology	0	0	-	1,344	450	(67%)	0	0	-	1,344	450	(67%)
Aust Telescope National Facility	0	0	-	5,725	9,763	71%	0	0	-	5,725	9,763	71%
Info & Communication Science & Technology	0	0	-	7,134	10,338	45%	0	0	0%	7,134	10,338	45%
Total Research Groups	13,612	1,900	-86.0%	28,955	51,342	77%	0	0	0%	42,567	53,242	25%
Capital Program	34,005	62,804	84.7%	0	0	-	0	0	-	34,005	62,804	85%
Discovery Centre	0	0	-	74	350	374%	0	0	-	74	350	374%
High Performance Super Computer	0	0	-	29	0	(100%)	0	0	-	29	0	(100%)
Publishing	0	0	-	14	50	265%	0	0	-	14	50	265%
Education Programs	0	0	-	107	180	68%	0	0	-	107	180	68%
CSIRO IT	13	0	-100.0%	16,445	12,550	(24%) ¹	0	0	-	16,458	12,550	(24%)
SAP Implementation	0	0	-	0	0	-	16,109	3,600	(78%)	16,109	3,600	(78%)
Corporate Activities	0	0	-	19	220	1,052%	0	280	-	19	500	2,518%
Strategic Asset Contingency	0	0	-	0	0	- ²	0	0	-	0	0	-
Other	34,018	62,804	84.6%	16,688	13,350	(20%)	16,109	3,880	(76%)	66,815	80,034	20%
TOTAL CSIRO	47,630	64,704	35.8%	45,643	64,692	42%	16,109	3,880	(76%)	109,382	133,276	22%

Notes:

1. Plant and Equipment includes IT infrastructure.

2. The 2007-08 Plant and Equipment budget is based on budget bids for 2007/08 (not yet approved).

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PART F: APPENDICES

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Appendix 1: Strategy Implementation Goals, 2007-08

Strategy Implementation Goal	Strategic Objective	ET Sponsor	Approvals	Measures
National Challenges				
1. Successfully establish the three new National Research Flagships (Climate Adaptation, Niche Manufacturing and Minerals Down Under) and significantly expand existing Flagship activities in alternative transport fuels (Energy Transformed Flagship) and childhood obesity/children's wellbeing (Preventative Health Flagship)	1.1.1. Accelerating and Expanding Flagships	Alastair Robertson	FOC	Business plans signed off, resources committed, new Flagships launched and continued growth in our total Flagship investment
2. Review CSIRO's property and facilities portfolio consistent with the aim of continuing to build nationally significant clusters of science capabilities with others in the NIS and releasing further capital for investment in scientific infrastructure and equipment.	1.2.2. Developing Science Hubs through Co-locations	Nigel Poole and Mike Whelan	ET	Review and associated implementation and communications plans are approved leading to release of capital and deeper relationships with research collaborators.
Discovery and Delivery				
3. Streamline the Science Investment Process to encompass a "whole of investment" approach, reduce the cycle time and improve integration with other planning and reporting processes.	2.1.1 Progressing Science Direction Setting	Alastair Robertson	ET	The revised process is approved and explicitly: reduces the timeframe for SIP III planning and decision making; promotes a more integrated view of total CSIRO investment consistent with ODP and the capital management strategy; and is effective and efficient in its delivery.
4. Develop a capability management framework and associated processes to support the active development of capability platforms, and development and deployment of scientific capability	2.1.2 Building Transformational Capability Platforms	Alastair Robertson; Michael Eyles and Craig Roy	ET	New structures, systems and processes defined, agreed and widely communicated. Implementation commenced and two Platform Capabilities have approved plans.
5. Identify and address relationship 'challenges' in the execution of our business strategy, and implement procedures to enhance our business relationships.	2.2.1 Developing our Business	Nigel Poole, Group Executives and Mike Whelan	ET	i) Principles and procedures regarding improved business relationships endorsed and implemented (NP); ii) Improve the level of our customer satisfaction metrics (NP); iii) Review 20 of our most significant partnerships for appropriateness of business relationship and effectiveness of science and technology uptake (NP/GEs); and iv) Enhance the strategic partnerships with three key portfolio stakeholders (DTEWR, DITR and DAFF) (MW).

Strategy Implementation Goal	Strategic Objective	ET Sponsor	Approvals	Measures
6. Define guidelines and processes for fully integrating 'path to impact' into enterprise planning and management processes, and ensure effective implementation across the output portfolios.	2.2.2 Accelerating Science and Technology Transfer	Nigel Poole and Group Executives	ET	i) Finalise and gain endorsement for guidelines and processes including reviewing and sharing best practice learnings and IP best practice (NP); ii) integrated into SIP III portfolio design (GEs) and iii) Effective operational delivery (GEs)
7. Implement a revised communications and accountabilities framework that better enables information flow between and across all levels of the enterprise, and the effective management of the publishing pipeline to ensure timely communication of advice to key stakeholders and enhanced science into policy outcomes.	2.2.3 Enhancing Communications	Mike Whelan	ET	i) Enshrine communication as an explicit accountability in CSIRO code of conduct and related policies and delegations; ii) Establish a two-way information flow through the line – cascading from the Chief Executive to "on the ground bench scientist" and incorporating feedback loops iii) Incorporate into at all levels of decision making communication process; iv) Document the publishing pipeline with a view to improving governance, informing policy and supporting statement of expectation requirements
One-CSIRO Foundations				
8. Articulate what we value at CSIRO, the behaviours and performance required to successfully deliver the CSIRO strategy, and develop an implementation plan for these to be embedded.	3.1.1. Nurturing our Innovative Culture	Michael Eyles and Craig Roy	ET	Behaviours, values and performance expectations defined, agreed and widely communicated. Implementation commenced.
9. Develop strategies and associated mechanisms to drive a sustainable step change improvement in our i) Health and Safety culture and performance, and ii) Environmental sustainability	3.1.1. Nurturing our Innovative Culture	Craig Roy and Andrew Johnson	ET	Strategies approved and implemented across the enterprise.
10. Implementation of BETR Phase I including the related business process improvements and finalise scoping and planning for Phase II.	3.1.2 Working Effectively and Efficiently in our Enterprise	Craig Roy	BETR PSC & ET	Delivered in accordance with the approved Business case.

Appendix 2: CSIRO Executive Management Council

CSIRO Executive Management Council

July 2007

Enquiries: 1300 363 400 Email: enquiries@csiro.au

Web: www.csiro.au

To email any of these executives: firstname.lastname@csiro.au

Executive Team

Dr Geoff Garrett	Chief Executive	02 6276 6621
Dr Alastair Robertson	Deputy Chief Executive: Science Strategy & Investment	02 9490 8468
Mr Mike Whelan	Deputy Chief Executive: Finance & Governance	02 6276 6598
Dr Joanne Daly	Group Executive: Agribusiness	02 6246 4025
Dr Andrew Johnson	Group Executive: Environment	07 3214 2383
Dr Rod Hill	Group Executive: Manufacturing, Materials & Minerals	03 9545 8300
Dr Bev Ronalds	Group Executive: Energy	08 6436 8700
Dr Alex Zelinsky	Group Executive: Information & Communications S&T	02 9372 4202
Dr Michael Eyles	Executive Director: Leadership & Organisation Development	02 9490 8341
Mr Craig Roy	Executive Director: Strategic Change Programs	02 9490 8564
Mr Nigel Poole	Executive Director: Business Services	02 9490 8504

Divisions, Flagships & Joint Ventures

Agribusiness Group

Entomology	Dr Mark Lonsdale (Acting)	02 6246 4360
Food Futures Flagship	Dr Bruce Lee	02 9490 8490
Livestock Industries	Dr Alan Bell	07 3214 2999
Plant Industry	Dr Jeremy Burdon	02 6246 5546
Preventative Health Flagship	Dr Richard Head	08 8303 8819
Ensis (JV)	Dr Tom Richardson	+64 7 343 5889
Food Science Australia (JV)	Dr Anthos Yannakou	03 9731 3530

Energy Group

Energy Technology	Dr David Brockway	02 4960 6046
Energy Transformed Flagship	Dr John Wright	02 4960 6080
Petroleum Resources	Dr Bev Ronalds	08 6436 8700
Wealth from Oceans Flagship	Dr John Gunn (Acting)	03 6232 5375

Environment Group

Climate Adaptation Flagship	Dr Andrew Ash (Acting)	07 3214 2346
Land & Water	Dr Neil McKenzie (Acting)	02 6246 5922
Marine & Atmospheric Research	Dr Greg Ayers	03 9239 4687
Sustainable Ecosystems	Dr Brian Keating	07 3214 2373
Water for a Healthy Country Flagship	Dr Tom Hatton	02 6246 5745

Information & Communications S&T Group

Australia Telescope National Facility	Dr Brian Boyle	02 9372 4300
ICT Centre	Dr Alex Zelinsky	02 9372 4200
Mathematical & Information Sciences	Dr Murray Cameron	02 9325 3203

Manufacturing, Materials & Minerals Group

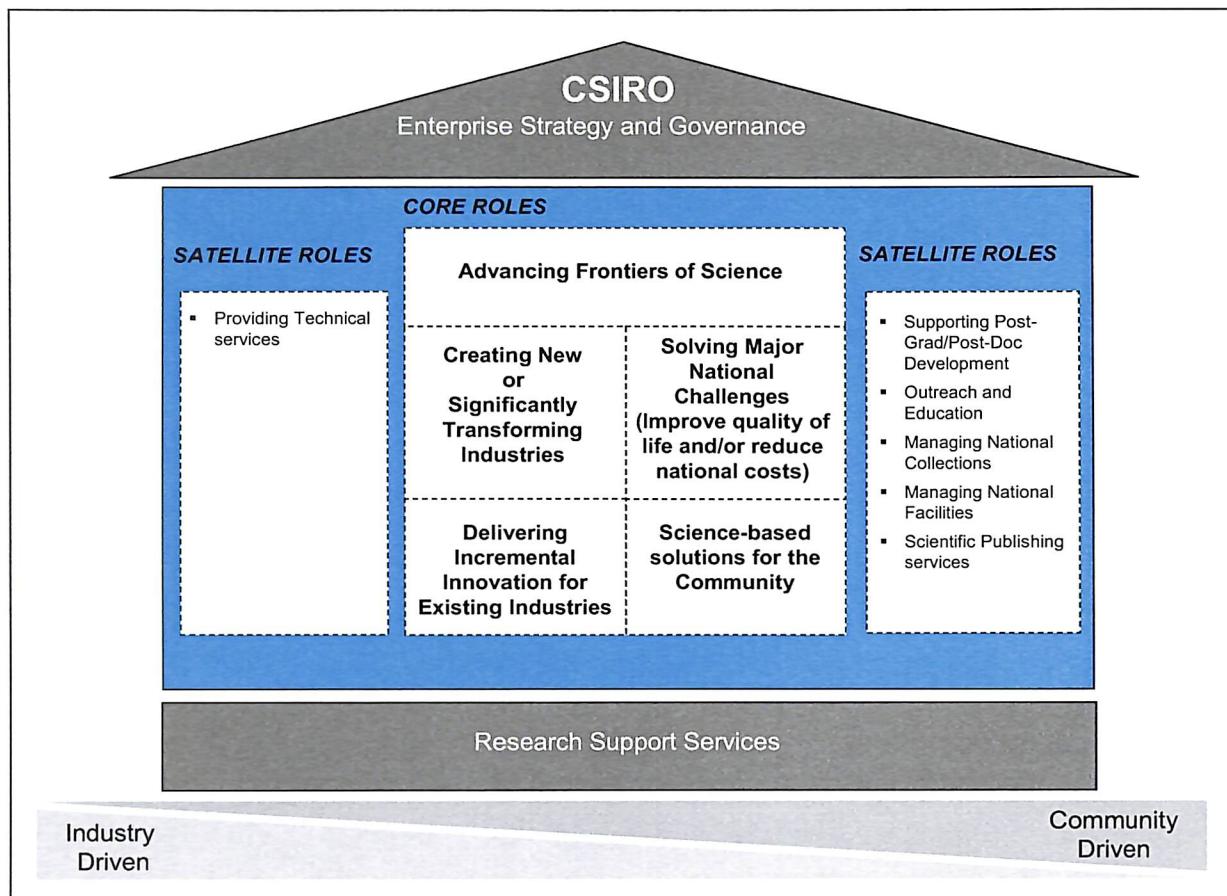
Exploration & Mining	Dr Steve Harvey (Acting)	08 6346 8610
Light Metals Flagship	Dr Raj Rajakumar	03 9545 8625
Materials Science & Technology	Dr Calum Drummond	02 9413 7800
Minerals	Dr Bart Follink	03 9545 8605
Minerals Down Under Flagship	Dr Peter Lilly	08 6436 8613
Molecular & Health Technologies	Dr Graeme Woodrow	03 9662 7135
Niche Manufacturing Flagship	Ms Vicki Tutungi	03 9545 2049
Textiles & Fibre Technology	Dr Nigel Johnson	03 5246 4777

Other EMC members

Dr Attila Brungs	General Manager: Science Investment	02 9490 8572
Dr John Curran	General Manager: Communications	02 6276 6438
Dr Rick Ede	General Manager: Client & Partner Relationships	03 9545 2227
Ms Roze Frost	Project Director: BETR	02 6276 6601
Mr Bob Garrett	Project Director: RSS	02 6276 6601
Mr Trevor Heldt	General Manager: People Services	02 6276 6493
Mr Mike O'Loughlin	General Manager: Finance Services (Acting)	02 6276 6170
Dr Jim Peacock	Chair: OCE Science Team	02 6246 5250
Dr Jack Steele	General Manager: Major Transactions	02 9490 5086
Mr David Toll	Director: Property & Information Services	02 6214 2933

Appendix 3: CSIRO Roles

The house diagram illustrates the continuum at CSIRO between industry driven activities (left side of the house) and community driven activities (right side of the house). The strength and effectiveness of each role supporting the house contributes to the ability of CSIRO to deliver for the public good.



Five core roles for delivering impact

The core roles are the principal means by which CSIRO delivers impact for Australia. They are areas in which CSIRO is (or has the potential to be) distinctive and can deliver high value for Australia. At CSIRO there are currently five core roles.

1. Science-based solutions for the community. Few other organisations are able to conduct targeted community-interest research with a national perspective, and deliver it locally. Through this role, CSIRO provides advice, information, research, and specific community solutions to inform and protect society and the environment. Through this role, CSIRO builds connections with communities and industry and informs Government policy.

2. Delivering incremental innovation for existing industries. For many companies, the difference between success and failure may be a few points of profit margin. Applied R&D can give an important boost to industry profitability and sustainability. At the same time, financial pressures from the day-to-day operations of a business can make it hard for companies to justify significant in-house R&D. This is especially true for Australia's numerous small and medium enterprises.

CSIRO helps solve this problem by delivering incremental innovation to improve the efficiency, effectiveness and competitiveness of existing industries. CSIRO's skill base, capability set, infrastructure, client focus, track record, relationships and reputation are distinctive in delivering in this role.

3. Solving major national challenges. Within Australia, CSIRO is unique in the breadth and depth of our expertise and in our ability to perform research focused on solving major national challenges. This research is important for CSIRO and for Australia, and represents CSIRO's third core role.

The national (as opposed to regional or local) nature of CSIRO, together with its collaborative and multidisciplinary culture, makes solving major national challenges a critical role for the enterprise. If CSIRO did not participate in this role, many of these challenges would continue unchecked.

4. Creating new or significantly transforming industries. There are not many organisations in Australia with the scale necessary to perform the sort of R&D that leads to the creation or transformation of industries. By sustaining high-risk, long-term projects in partnership with business, CSIRO is able to lead outcome-focused, R&D intensive, mission directed strategic research aimed at creating the next generation industries, products, services and businesses.

CSIRO's scale and long-term perspective is the key to its differentiation and ability to perform this role. Only a small number of other organisations, consortia or government bodies could lead such projects and ensure delivery. In this role, CSIRO aims to increase the competitiveness and sustainability of Australian industry through dramatic innovations.

5. Advancing frontiers of science. Paradigm-shifting science aimed at advancing fundamental scientific understanding takes place within all of CSIRO's core roles. Indeed, some of CSIRO's biggest scientific breakthroughs have come from work being driven through other roles.

Research aimed at advancing fundamental scientific understanding is vital in its own right. It helps to maintain world-class scientific skill in Australia; it is critical for maintaining connectivity with the international research community and for creating options for advancing new application areas in the long-term.

This role balances high risk in terms of project success rate with the high returns that successful projects generally provide, and develops world-class scientific talent in Australia. It also has the potential to generate new science, technical platforms, capabilities and intellectual property. Frontier science is important to the sustainability of all our other core roles.

Satellite roles enhance core roles

CSIRO performs ancillary or "satellite" roles related to our core science activities

Outreach and Education - Promoting the importance of science and its application to students, parents, teachers and the Australian community has long been one of CSIRO's great strengths. CSIRO is strongly positioned to help create a knowledgeable society, by raising scientific literacy so the community can engage with major issues related to science.

Management of National Facilities - Accessing world-class infrastructure is important in many areas of research. Retaining core capabilities for Australia requires Australians host and run key facilities. CSIRO fulfils this role by managing the Australian Animal Health Laboratory, the Australian Telescope National Facility, and the CSIRO National Facility Vessel Southern Surveyor.

Scientific Publishing Services - A reflection of CSIRO's longstanding commitment to knowledge diffusion and technology transfer, CSIRO Publishing operates as an independent entity, publishing science and technology books, journals, papers, and technical reports. With a global reputation for quality products and services, CSIRO Publishing has approximately \$9 million in annual turnover and is profitable.

Support for Post-Grad/Post-Doc Development - Supporting undergraduates, post-graduates, and post-doctoral researchers helps to boost the calibre of researchers working in the Australian community. CSIRO gives young researchers experience in technology transfer and uptake, which is important for Australia's future innovation capacity.

Management of National Collections - The creation, enhancement and maintenance of National Collections is a service for the present and future of Australian science. Notable CSIRO collections include Plant Industry's Herbarium; Forestry and Forest Products Wood Collection; Atmospheric Research's Cape Grim air samples; Entomology's Insect collection; Molecular Science's Compound Collection; Marine Science's Fish Collection; and Sustainable Ecosystem's Australian National Wildlife Collection.

Providing Technical Services - We offer industry, the community and government access to deep scientific knowledge not available through private sources. In many cases, these services fill an important market gap, assisting where a market for the service required does not yet exist, has not adequately developed or is not economically viable due to Australia's relatively small scale. This role is

particularly important for small and medium enterprises, which are often unable to develop the services they need in-house.

Enabling functions underpin all of CSIRO's roles

Certain supporting activities enable CSIRO to fulfil our other roles. In CSIRO the two most important enabling functions are as follows.

Providing Research Support Services - CSIRO currently spends a great deal on the provision of research support services. These functions include laboratory management and support, corporate finance and accounting, corporate property management, payroll and human resources benefit administration, CSIRO communications, procurement, and management of IT systems.

Enterprise Strategy and Governance - Ensuring a well-communicated and understood strategic and operational framework exists helps CSIRO staff fulfil their duties and helps external organisations interact more effectively with us. CSIRO must invest in effective strategy and governance to ensure appropriate processes are in place for strategic direction setting and to guide key management decisions.

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Appendix 4: List of Research Themes

Theme No.	Name	Leader	2007/08	
			Total Revenue (\$m)	Planned Research FTEs
NATIONAL RESEARCH FLAGSHIPS				
1007	Flagship Collaboration Fund	Paul Harris	5.1	0.0
	Climate Adaptation	Andrew Ash (Acting)		
1013	Climate Adaptation Flagship	Andrew Ash (Acting)	1.0	0.0
1155	Pathways to adaption		tba	tba
1156	Liveable cities, coasts and regions		tba	tba
1157	Protecting ecosystems and natural resources		tba	tba
1158	Adaptive enterprises, industries and communities		tba	tba
	Energy Transformed	John Wright		
1016	Energy Futures	Paul Graham	3.2	12.3
1017	Low Emissions Electricity	Jim Smitham	25.6	86.5
1018	Low Emission Transport	David Lamb	11.9	52.4
1019	Low Emissions Distributed Energy	Terry Jones	8.3	34.5
	Food Futures	Bruce Lee		
1020	Future Grains, grain based food and feed	Matthew Morell	15.9	67.0
1021	Breed Engineering	Nigel Preston	10.3	46.2
1022	Designed food and ingredients	I. Appleqvist	10.7	41.2
1023	Quality Biosensors	Stephen Trowell	6.6	27.3
	Light Metals	Raj Rajakumar		
1000	Aluminium and Magnesium Manufacturing	Kevin Rogers	5.9	18.2
1001	Alumina	Chris Vernon	9.0	32.8
1002	Aluminium	Richard Bean	8.1	31.1
1003	Magnesium	Richard Bean	1.8	6.2
1004	Titanium	Raj Rajakumar (acting)	9.0	30.7
	Minerals Down Under	Peter Lilly		
1160	Discovering Australia's Mineral Resources	Paul Roberts	21.0	79.2
1161	Transforming the Future Mines	Jock Cunningham	4.9	20.0
1162	Securing Australia's Future Ore Reserves	Jonathon Law	7.1	34.3
1163	Driving Sustainability processing through systems innovation	Sharif Jahanshahi	7.4	28.8
	Niche Manufacturing			
1008	Niche Manufacturing Flagship - Interim Theme	Vicki Tutungi	6.1	21.4
	Preventative-Health	Richard Head		
1025	Colorectal Cancer and Gut Health	Trevor Lockett	12.9	56.1
1026	Neurodegenerative disease, mental disorders and brain health	Peter Hudson	9.1	33.4
1027	Health Data & Information	Christine O'Keefe	8.8	38.0
1146	Obesity and Health	Peter Clifton	7.1	40.1
	Water for a Healthy Country	Tom Hatton		
1006	Urban Water	Alan Gregory	27.4	117.6
1010	Water Resources Observation Network (WRON)	Ross Ackland	14.3	62.1
1136	Healthy Water Ecosystems	Mike Grundy	19.9	84.8
1137	Better Basin Futures	Glen Walker	26.6	108.2
	Wealth from Oceans	John Gunn (Acting)		
1063	Ocean System Prediction and Responses	Kate Wilson	10.3	41.1
1064	Ocean-based forecasts of Australian climate	Andreas Schiller	12.4	46.1
1065	Ocean based industry Development and Growth – Blue GDP	Edson Nakagawa (A/g for Mayela Rivero)	20.3	80.1
1066	Ocean based regional development and growth – Marine Nation	Bill de la Mare	13.8	51.3
1133	Sustainable Australian Fisheries and Ecosystems	Tony Smith (Acting)	15.1	63.4
1134	Marine conservation and biodiversity management	Nic Bax	7.0	30.2
	sub-total national research flagships		383.8	1522.5
CORE RESEARCH				
	AGRICULTURE GROUP	Joanne Daly		
	Forestry and Forest Products	Tom Richardson		
1072	Optimised Biofibre Quality	Simon Potter	4.8	20.5
1073	Forest Fibre prediction and Production Systems	Michael Battaglia	5.0	20.6
1074	Next Generation Forests and Fibre	Harry X Wu	7.5	31.4
1075	Risk Management in Forest Landscapes	Brian Richardson	3.1	13.0
1076	Sustainable Biofibre products	Steven Loffler	8.1	32.0
	Entomology	Mark Lonsdale (Acting)		
1077	Biosecurity and invasive species	Andy Sheppard	11.4	61.6
1079	Invertebrate Biodiversity Assets and Informatics	John LaSalle	5.8	29.9
1080	Building Bioindustries with Synthetic Biology	Peter East	11.8	64.2
	Food Science Australia	Anthos Yannakou		
1030	Processing Innovation	Lyndon Kurth	10.4	40.3
1031	Food structure	Lyndon Kurth	8.0	30.2
1032	Food Safety and Quality	Gary Dykes	10.4	44.4
1033	Food and Nutrition	Michael Fenech	3.4	17.9
	Livestock Industries	Alan Bell		
1044	Transforming Animal Biosecurity	Deborah Middleton	26.2	117.6
1045	Transforming the Animal and its Products	Ian Purvis	19.2	102.9
	Plant Industry	Jeremy Burdon		
1038	New Horizons in Plant Science	Frank Gubler	13.7	73.9
1039	Delivering Quality Crops for Health and Consumer Choice	Mark Peoples	11.4	63.5
1040	Plant Fibre and Biofactories for New Agricultural & Industrial Products	TJ Higgins	19.0	102.5
1041	Designing Crops and Pastures for Australian Environmental Challenges	John Manners	22.3	139.9
1042	Biodiversity and Conservation	Andrew Young	3.4	48.3
1147	Transformational Biology	Jeremy Burdon	3.2	24.0
	ENERGY GROUP	Bev Ronalds		
	Energy Technology	David Brockway		
1140	Secure & Sustainable Energy Technologies	John Carras	10.9	40.7
	Petroleum Resources	Bev Ronalds		
1092	Maximising Australia's Petroleum Self Sufficiency	Cedric Griffiths	12.0	48.1

Theme No.	Name	Leader	2007/08	
			Total Revenue (\$m)	Planned Research FTEs
CORE RESEARCH con't				
	ENVIRONMENT GROUP			
	<i>Agricultural Sustainability Initiative</i>	Andrew Johnson		
1129	Australian Agriculture Transformed	Brian Keating		
1130	Economic and Environmental Performance of Australian Agriculture	Mark Howden	6.8	29.8
1131	Agroecosystem Function & Prediction	Peter Carberry	17.4	82.1
	<i>Land and Water</i>	Pete Thrall	17.6	77.7
1037	Opportunity Development Fund - CLW	Neil McKenzie (Acting)	0.8	4.0
1119	Centre for Environmental Contaminants Research	Neil McKenzie - Deputy Chief	9.5	46.9
1139	Managing Australia's Soil and Landscape Assets (MASALA)	Simon Apte	4.4	20.0
	<i>Marine and Atmospheric Research</i>	Hamish Creswell (interim)		
1094	Complex System Science	Greg Ayers	2.4	9.0
1132	The Climate and Atmosphere	John Finnigan	20.1	78.7
1135	Marine and Atmospheric Capability	Tony Hirst	2.6	12.2
	<i>Sustainable Ecosystems</i>	Greg Ayers		
1028	Opportunity Development Funds - CSE	Brian Keating	2.4	10.6
1012	Sustainable regional development	Dan Walker	13.2	59.3
1014	Healthy Terrestrial Ecosystems	Iain Gordon	9.5	42.8
1101	Future Cities	Allen Kearns	6.7	31.2
	Information and Communication Sciences and Technology			
	<i>Australia Telescope National Facility</i>	Alex Zelinsky		
1068	Technologies for Radio Astronomy	Brian Boyle		
1069	Astrophysics	Graeme Carrad	4.6	17.2
1070	The Australian SKA Pathfinder	Robert Braun	6.1	18.9
	<i>ICT Centre</i>	David DeBoer	10.4	11.8
1057	eHealth	Alex Zelinsky		
1058	eResearch: (secure) distributed multimedia systems	Bruce Barraclough	6.0	25.4
1059	e-Technology	John Zic	5.2	18.3
1060	ICT for Safeguarding Australia	Iain Collings	8.6	35.4
1061	Mining ICT and Automation	John Colton	3.7	15.8
1062	Sensors and Sensor Networks	Graeme Winstanley	7.6	31.4
	<i>Mathematical and Information Sciences</i>	Peter Corke	10.8	44.9
1029	Opportunity Development Fund - CMIS	Murray Cameron	0.3	23.0
1084	Biotechnology and Health Informatics	Murray Cameron	4.7	20.9
1085	Decision Technologies	David Mitchell	7.4	31.8
1086	Environmental Informatics	Andrew Dinigian	5.6	24.1
1087	Terabyte Science - Delivering knowledge from large datasets	Bronwyn Harch	3.2	12.5
	Manufacturing, Materials and Minerals			
	<i>Exploration and Mining</i>	Rod Hill		
1115	Mining Technology and Specialist Services	Steve Harvey (Acting)		
	<i>Materials Science and Engineering</i>	Greg Rowan	14.5	54.1
1083	Facility Management	Calum Drummond		
1103	Light Alloy Technologies	A Farmer	5.7	4.0
1104	Sustainable Polymeric Materials	Barrie Finnin	8.1	29.7
1106	Industrial Research Services	Veronica Hall	12.8	54.2
1142	Manufactured Devices: Growing Globally Competitive	J Clampett	6.9	29.9
1145	Nano-Additives for the fine chemicals industry	Scott Martin	15.2	56.9
	<i>Minerals</i>	Tony Hughes	7.7	30.7
1052	Opportunity Development Fund - Minerals	Bart Follink	2.4	10.6
1053	Iron ore - maximising export marketability	Bart Follink	4.3	19.6
1054	High-performance mineral processes for Australia	Ralph Holmes	11.0	42.8
1055	Instrument Systems for On-Line Analysis	John Farrow	6.6	25.4
	<i>Molecular Health Technologies</i>	Nick Cutmore		
1035	Opportunity Development Fund - CMHT	Graeme Woodrow		
1048	National Security Technology Partnerships	Andrew Groth	4.4	13.1
1088	Australian Biotech Growth Partnerships	Peter Osyath	7.5	34.2
1089	Biomaterials and Regenerative Medicine	Paul Savage	8.9	38.1
1090	Transformational products through Electroactive Materials	Keith McLean	10.7	51.7
1144	Imaging for early disease detection	Gerry Wilson	7.5	33.9
	<i>Textiles and Fibre Technology</i>	Peggy Stasinos	7.2	37.6
1034	Building sustainable Protein Biofibre industries	Nigel Johnson		
1036	Advanced Fibrous Materials	Tony Pierlot	7.3	25.6
		Niall Finn	8.0	27.1
			sub-total core research	585.3
				2622.3
OUTREACH AND EDUCATION				
1151	Discovery Centre	Jim Peacock	1.9	5.9
1153	Education Programs	Ross Kingsland	7.5	28.5
1154	CSIRO Publishing	Paul Reekie	10.0	37.2
PubBal	Publishing Balance of COH, internally funded		0.8	0.0
			sub-total outreach and education	20.2
				71.6
NATIONAL RESEARCH FACILITIES AND COLLECTIONS*				
	<i>National Facilities</i>			
1047	Diagnosis Surveillance and Response - Aust'n Animal Health Laboratory	Peter Daniels	25.8	79.6
1067	Australia National Facility Operations	Dave McConnell	15.2	53.2
1099	Marine National Facility	Capt. Fred Stein	12.0	17.4
	<i>National Collections</i>			
1081	National Insect Collection	John LaSalle	tba	tba
	National Herbarium	Andrew Young	tba	tba
1095	National Fish Collection	Greg Ayers	tba	tba
1128	National Wildlife Collection	Dan Walker	1.3	6.2
			sub-total facilities and collections	54.3
				156.4
SCIENCE TEAM**				
			sub-total science team	6.3
				50.2
OTHER***				
			sub-total other	40.6
				12.2
			TOTAL	1090.5
				4435.2

* National Collections Themes are still under development, hence this provides an incomplete picture.

** Includes Science Communications, Frontier Science Seed Funding & Scientist Development/Resources

*** includes Chief Executive Development, SMART SME's program, HPSC

Note: Planned Research FTE's do not include non research staff in enterprise governance and support functions

Appendix 5: Science Assessment Review Criteria

SCIENTIFIC / TECHNICAL COMPETITIVE POSITION

This is a "double ladder" encompassing

- leadership and recognition in the international research community, as well as
- the ability to provide scientific/technical means for leadership to those organisations adopting and using CSIRO's research results.

It has been constructed this way to reflect CSIRO's role.

Research Community Position

Benchmark	Sustained scientific leader – well recognised in the international research community for this.
Strong	Able to set and sustain new scientific/technical directions within the international research community.
Favourable	Able to maintain a good position in the international research community "pack"; not a scientific leader except in developing niches (not mainstream areas).
Tenable	Not able to set or sustain independent scientific/technical directions – a sense of being continually a follower.
Weak	Declining quality of scientific/technical output compared with other research groups. Often a short term "fire-fighting" focus.

Industry / Community Impact Position

Benchmark	Research results used to set the pace and direction of technically-based commercial, environmental, community or policy development – recognised in industry or community for this.
Strong	Research results able to be used by organisations to distinguish themselves from peers or competitors.
Favourable	Research results able to be used by organisations to improve their position relative to peers or competitors.
Tenable	Research results able to be used by organisations to maintain, but not improve, their position relative to peers or competitors. Research results not able to be used to differentiate organisations from their peers or competition.
Weak	Research results not able to be used by organisations to even maintain their position relative to peers or competitors.

Appendix 6: Science Investment Process

Relevance and Impact criteria were developed to assist the Executive Team in making decisions through both the Broad Direction Setting and Theme Review phases of the Science Investment Process. The criteria are applied slightly differently in each of the phases, as outlined in the following tables.

Broad Direction Setting

The BDS criteria provide a basis for asking critical questions about CSIRO's remit, roles and future direction. For example: should CSIRO be engaged in the area of research (relevance), what is the likelihood of adoption (impact), how competitive is CSIRO's research? (impact)

Relevance	Value from R&D Size of the area (industry / market size, growth rate, employment, exports etc) Addressable benefit to Australia (social, economic, environmental) CSIRO should be engaged Fit with CSIRO role vs other members of NIS Responsive to National Research Priorities Relevance of R&D (science and technology is a key component)
Impact	Likelihood of adoption State of "receptor" system Willingness of partners / receivers of technology R&D productivity / potential CSIRO research competitiveness (now and future networks)

Theme Review Phase

The criteria for the Theme review have been split into two groups, or lenses, distinguishing between those indicators or measures that are objective in nature and those that are more subjective (requiring greater judgment). All criteria are important, but it was felt important to acknowledge the different natures.

	Prioritisation	Judgment / Balance
Relevance	Significant potential capturable benefit for Australia (industry / community) Aligned with National Research Priorities or stated government or industry priority area Delivery of science and technology is key to achieving outcomes	Builds important capability in CSIRO with broad applicability (including intellectual assets / intellectual property) Results in valuable additional benefits (eg reputation enhancement, Australian global positioning) Top leadership commitment Aligned with CSIRO strategy (CSIRO role in the national innovation system)
Impact	Distinctive (and differentiated) science (science quality) Theme researchers' track record of delivery (last five years including delivery of scientific outcomes) Clear community / industry delivery pathway (including intellectual property / knowledge diffusion pathway)	Science "hotspot" Appropriate leadership capacity (Divisional performance and competencies) Staff "achievability" (recruitment / refocussing) Appropriate investment level Level of technical uncertainty Level of other risks: political, legal, cultural, reputation

Appendix 7: National Research Priority Areas and Priority Goals

A. An Environmentally Sustainable Australia

Transforming the way we utilise our land, water, mineral and energy resources through a better understanding of human and environmental systems and the use of new technologies

A1. Water – a critical resource

Sustainable ways of improving water productivity, using less water in agriculture and other industries, providing increased protection of rivers and groundwater and the re-use of urban and industrial waste waters.

A2. Transforming existing industries

New technologies for resource-based industries to deliver substantial increases in national wealth while minimising environmental impacts on land and sea.

A3. Overcoming soil loss, salinity and acidity

Identifying causes and solutions to land degradation using a multidisciplinary approach to restore land surfaces.

A4. Reducing and capturing emissions in transport and energy generation

Alternative transport technologies and clean combustion and efficient new power generation systems and capture and sequestration of carbon dioxide.

A5. Sustainable use of Australia's biodiversity

Managing and protecting Australia's terrestrial and marine biodiversity both for its own value and to develop long term use of ecosystem goods and services ranging from fisheries to ecotourism.

A6. Developing deep earth resources

Smart high-technology exploration methodologies, including imaging and mapping the deep earth and ocean floors, and novel efficient ways of commodity extraction and processing (examples include minerals, oil and gas) while minimising negative ecological and social impacts.

A7. Responding to climate change and variability

Increasing our understanding of the impact of climate change and variability at the regional level across Australia and addressing the consequences of these factors on the environment and on communities.

B. Promoting and Maintaining Good Health

Promoting good health and well being for all Australians

B1. A healthy start to life

Counteracting the impact of genetic, social and environmental factors which predispose infants and children to ill health and reduce their well being and life potential.

B2. Ageing well, ageing productively

Developing better social, medical and population health strategies to improve the mental and physical capacities of ageing people.

B3. Preventive healthcare

New ethical, evidence-based strategies to promote health and prevent disease through the adoption of healthier lifestyles and diet, and the development of health-promoting products.

B4. Strengthening Australia's social and economic fabric

Understanding and strengthening key elements of Australia's social and economic fabric to help families and individuals live healthy, productive, and fulfilling lives.

C. Frontier Technologies for Building and Transforming Australian Industries

Stimulating the growth of world-class Australian industries using innovative technologies developed from cutting-edge research

C1. Breakthrough science

Better understanding of the fundamental processes that will advance knowledge and facilitate the development of technological innovations.

C2. Frontier technologies

Enhanced capacity in frontier technologies to power world-class industries of the future and build on Australia's strengths in research and innovation (examples include nanotechnology, biotechnology, ICT, photonics, genomics/phenomics, and complex systems).

C3. Advanced materials

Advanced materials for applications in construction, communications, transport, agriculture and medicine (examples include ceramics, organics, biomaterials, smart material and fabrics, composites, polymers and light metals).

C4. Smart information use

Improved data management for existing and new business applications and creative applications for digital technologies (examples include e-finance, interactive systems, multi-platform media, creative industries, digital media creative design, content generation and imaging).

C5. Promoting an innovation culture and economy

Maximising Australia's creative and technological capability by understanding the factors conducive to innovation and its acceptance.

D. Safeguarding Australia

Safeguarding Australia from terrorism, crime, invasive diseases and pests, strengthening our understanding of Australia's place in the region and the world, and securing our infrastructure, particularly with respect to our digital systems

D1. Critical infrastructure

Protecting Australia's critical infrastructure including our financial, energy, communications, and transport systems.

D2. Understanding our region and the world

Enhancing Australia's capacity to interpret and engage with its regional and global environment through a greater understanding of languages, societies, politics and cultures.

D3. Protecting Australia from invasive diseases and pests

Counteract the impact of invasive species through the application of new technologies and by integrating approaches across agencies and jurisdictions.

D4. Protecting Australia from terrorism and crime

By promoting a healthy and diverse research and development system that anticipates threats and supports core competencies in modern and rapid identification techniques.

D5. Transformational defence technologies

Transform military operations for the defence of Australia by providing superior technologies, better information and improved ways of operation.

Source: www.dest.gov.au/priorities

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Your CSIRO

Australia is founding its future on science and innovation. Its national science agency, CSIRO, is a powerhouse of ideas, technologies and skills for building prosperity, growth, health and sustainability. It serves governments, industries, business and communities across the nation.