

Goyder Institute Handbook – Part B
Strategic Research Plan 2011 – 2015



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1 Objectives of the Goyder Institute for Water Research

It is intended that the Goyder Institute will enhance the South Australian Government's existing capacity to develop and deliver science based policy solutions and in doing so, underpin the sustainable development of the State.

It is further intended that this will also strengthen the State's position as an international leader in water resource management and provide the South Australian community with confidence that the best scientific minds available are being targeted at resolving the State's key water resource management issues.

The Institute will provide knowledge to support:

1. The delivery of reliable and resilient urban water supplies that meet future needs;
2. The ongoing viability of existing water dependent developments and the identification of future sustainable water resource development opportunities;
3. The provision of environmental water to achieve optimal outcomes;
4. Proactive responses to climate change in water resource management; and
5. Effective water management policy and decision making with clear and transparent trade-offs.

2 Purpose of the Strategic Research Plan 2011 – 2015

The Goyder Institute will provide leadership and direction in Water Sciences Research to deliver science based policy and water management outcomes for the South Australian Government. The Goyder Institute Strategic Research Plan details the long-term strategic outcomes for this research that will help ensure the water resources of the State of South Australia are sustainably managed for economic, social and environmental benefits. The Strategic Research Plan links the ongoing and proposed research activities to these outcomes through Roadmaps.

Research effort will be focussed across four enduring Research Themes:

1. Urban Water;
2. Water for Industry Development;
3. Environmental Water; and
4. Climate Change.

Within each of these themes we have identified 1 or 2 research programmes or roadmaps that detail more specifically the science and research requirements for specific outcomes and/or policy directions that have been identified by both Government Agencies and other water industry partners. Any ongoing research projects and proposed future research projects will be expected to demonstrate how they contribute to a specific Roadmap, and hence how they contribute to a specific government policy outcome or identified knowledge gaps. The roadmap shows where efforts are being concentrated on enabling research, fundamental research, applied research, implementation, tools and outcomes. This enables the Goyder Institute to arrive at a balanced R&D profile in all research programmes. In addition, the contributions of other external research activities by affiliates or other partners can be visualised in the roadmap, thus demonstrating where there is synergy with others and where we can leverage additional input to the Goyder Institute Research Programme through external inputs.

3 Annual Research and Development Plan & Budget

Each Research Programme will be implemented through an integrated set of Research Projects with associated Research Project Plans. An annual rolling portfolio of Projects will be developed by the Director in consultation with the Research Advisory Committee and approved by the Goyder Board. Each Research Project will have a Project Leader or Leaders.

Each financial year, the Goyder Institute for Water Research will produce an update of the Annual Research and Development Plan and Budget to be approved by the Management Board. This Annual Plan describes the development and progress of individual Project Plans that will be the mechanism for achieving the outputs required to contribute to a roadmap. The portfolio of Project Plans will be formulated under the direction of the Institute Director in consultation with the Research Advisory Committee of the Goyder Institute. The individual project plans and the annual research plan may be varied and updated annually as policy priorities dictate. The long-term strategic roadmaps will only require minor adjustments from time to time depending on changes in policy or other unforeseen social issues.

The Director is responsible for the overview of all Research Projects, working with the Project Leaders. The emphasis is on managing and delivering to customers and reporting to the Board on progress and outcomes.

The Director may approve minor modifications to Project Plans that do not significantly alter the proposed outcomes and do not have significant financial consequences for the project. The Director may consult the Research Advisory Committee about these modifications.

Major modifications to Project Plans that may involve financial consequences, will be prepared in consultation with the Director (including possible consultation with the Research Advisory Committee). These modified Project Plans will be presented to the Management Board by the Director for approval.

4 Background

South Australia is a relatively dry state, with significant reliable natural surface water catchments limited to the Mount Lofty Ranges and Kangaroo Island. As a consequence, the State is highly dependent on across border inflows of water, primarily from the River Murray, and groundwater resources for domestic, livestock, irrigation, industrial and environmental purposes. In addition, part of the State's economic development future relies on the realisation of mining industry opportunities, and this will require reliable and sustainable supplies of water in isolated areas. However, in recent times, many areas of South Australia have experienced declining water security and this has resulted in an increased threat to the security of water supplies for regional communities, industry and the environment. Declining water availability is often accompanied by the risk of increased salinity, thus further restricting water use and amenity. With projected impacts of climate change indicating a generally drier outlook, the State is facing increased water scarcity.

5 Guiding Documents

The Research Plan of the Goyder Institute is guided by a number of policy and implementation documents and agreements, the chief of which are set out here. Research and development planning in the Goyder Institute will explicitly address government policy through the identification of the specific policies from these documents and agreements. The Goyder Strategic Research Plan recognises that optimal results will be achieved through the development of strategic partnerships with regional communities, natural resource management boards, industry, local government, water authorities, other government agencies, and research organisations.

5.1 The National Water Initiative Agreement

The National Water Initiative Intergovernmental Agreement, to which South Australia is a signatory, has requirements for the allocation, management and institutional arrangements for the management of water resources to help the nation recognise the full value and limits of water sources in Australia. This presents a policy challenge regarding the cost sharing arrangements associated with water resource management and in particular, for maintaining the necessary water monitoring networks and ongoing technical assessments necessary to ensure that all water resources are managed sustainably. The Goyder Research Plan is sensitive to the National Water Initiative and the Water Act 2007 (Federal legislation).

5.2 South Australia's Strategic Plan

South Australia's future economic growth and resilience is dependent on the provision of sustainable water supplies. In recognition of this, South Australia's Strategic Plan 2007 has a target (Target 3.9 Sustainable water supply) which requires that "South Australia's water resources are managed within sustainable limits by 2018". The sustainable management of water resources, and those resources yet to be developed, will require strategic alliances between Government, communities and industry, to ensure effective working partnerships for optimal utilisation of all resources.

5.3 South Australia's State Infrastructure Plan

The South Australian State Infrastructure Plan, released in March 2004, identified priorities for government and business investment over 10 year timeframes. One of the infrastructure priorities identified in the State Infrastructure Plan is to ensure energy, water and land supplies are sustainable. The water objectives of the State Infrastructure Plan is to increase the stability of the States Water supply, successful management of water resources, effective allocation of water resources, improved efficiency, increased reuse and more beneficial reuse of wastewater and stormwater.

5.4 Tackling Climate Change: South Australia's Greenhouse Strategy (2007-2020)

Tackling Climate Change is South Australia's planned long-term response to climate change. It takes three approaches: the need to reduce greenhouse emissions; the need to adapt to climate change; and the need to innovate in markets, technologies, institutions, and the way we live.

5.5 Water for Good

The State water plan, Water for Good sets out the actions the South Australian Government will take to ensure water supplies are secure, safe, reliable – and able to sustain continued growth – for at least the next 40 years. The document will provide extensive guidance to the development of the Research Program.

Analysis of the Water for Good actions indicates areas of potential research that could contribute to the implementation of the Plan. This analysis is included in Appendix 1.

5.6 NRM Plans

The Goyder Institute recognises the responsibility of government for ensuring the sustainable management of the State's water resources under the *Natural Resources Management Act 2004* and to respond to the water security issues facing the State.

The Goyder Institute Strategic Research Plan is complementary to the water allocation and natural resources management planning frameworks of the Natural Resources Management (NRM) Boards. The research programme is cognisant of industry and community aspirations for state water resources management that is both transparent and provides certainty.

6 Strategic Intent

The Goyder Institute will support world leading water resource management in South Australia through excellent science.

The key outcomes are proposed as:

1. Integration of research into policy that is adopted and makes a difference to water policy delivery on the ground.
2. Building effective human capacity in government and science agencies in South Australia to increase the cross-fertilisation of policy and science, with a focus on policy makers, government scientists and engineers and research providers working more closely and effectively together.
3. Resilient water resource management in the face of climate change.
4. Key research outputs to include new data, new methods and new knowledge.

These key outcomes should be “organising principles” that are seen in the development, delivery and implementation of all Goyder Institute research.

7 Objectives

In achieving this Strategic Intent the Institute will have three broad objectives.

7.1 Policy Objectives

The Goyder Institute Research Plan is to provide scientific knowledge to support the following policy objectives:

- reliable and resilient urban water supplies that meet future needs;
- water resource discovery and management for economic growth;
- provision of environmental water to support ecological objectives;
- proactive responses to climate change in water resource management; and
- effective water management policy and decision making that enhances community well-being.

7.2 Capacity Objectives

The Goyder Institute Research Plan is to build research leadership capacity in South Australia to inform integrated water management through:

- Adaptive management systems and tools that can be picked up and used by policy makers within state government;
- Develop capacity through support for postgraduate and research positions to build local capacity across all four research themes; and
- Develop synergies across Institutions that builds greater local capacity.

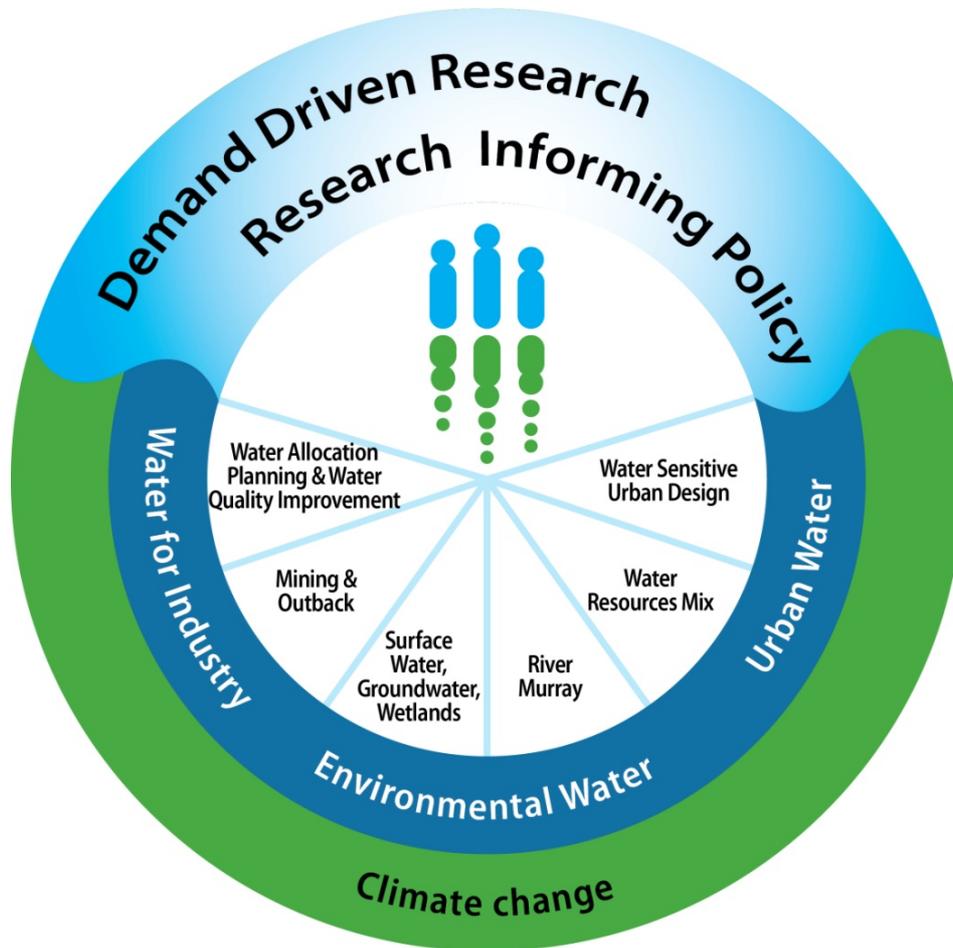
7.3 Research Activity Objectives

The Goyder Institute is to provide guidance and direction in establishing an integrated research profile for water research in South Australia. It will promote cooperation between the research partners and promote exchange of knowledge to increase synergy and to avoid unnecessary overlap and duplication. The Institute will monitor and review the quality of the research outputs and review the end products to meet stakeholder requirements.

- Each project proposal to include team members from at least two research partners.
- Adoption of at least one output from each Roadmap into policy, guidelines or validated tool.
- Three or more major achievements that raise the international profile of water research from South Australia.

8 Research Programmes & Roadmaps

The Goyder Institute Research Plan will be implemented through seven Research Programmes.



These Research Programs and Roadmaps will be expected to be of long duration and will form the basis for reporting back to Government on Goyder Institute outcomes. The roadmaps of each of these Research Programmes are included in the Appendix 2.

The Roadmaps belonging to each of the themes are:

Theme Urban Water

- U.1: Water Sensitive Urban Design
- U.2: Water Resources Mix for Adelaide

Theme Water for Industry

- I.1: Water Allocation Planning and Water Quality Improvement
- I.2: Mining and Outback Water

Theme Environmental Water

- E.1: River Murray
- E.2: Surface Water, Groundwater, Wetland Relationships

Theme Climate Change

- C.1: Regional Downscaling

All projects within each of the above programmes will be integrated, involving multiple disciplines, and where possible, inter-disciplinary research (where each discipline informs and advances the others). Particular projects may also cut across multiple programmes, although each will have a primary programme, and thus roadmap, to which they belong.

All Programmes are expected to deliver science that can be used to support policy development in priority areas and contribute towards improved decision making capability of state government as described in the relevant Roadmap.

A new Programme and Roadmap may be added if there is a large and obvious area of research that is required which doesn't easily sit under any of the seven existing Roadmaps.

9 Investment Principles

The Investment by the Goyder Institute will be prioritised to those projects that support the following Principles:

- Research will directly contribute to meeting a priority set by state government;
- Research will demonstrably support the capacity of state government to implement adaptive management processes in water management;
- Research will build capacity inside state government to develop better policies, and inside research organisations to undertake better science;
- Investment will be towards the best initiatives amongst the research partners that have a demonstrated capacity to achieve the highest standards in science;
- The highest return in terms of outcomes achieved per dollar invested will be supported;
- All partners have had the opportunity to engage in project development;
- Investment will result in high-quality research outcomes;
- There must be a clear and funded pathway for technology transfer to ensure that research outcomes are adopted;
- Project leaders will have a demonstrated excellence in project management;
- Administrative overheads will be kept to a minimum;
- Preference will be given to projects with a significant proportion of external funding (co-investment) that contributes to the strategic objectives of the Institute.

10 Operational Principles

The implementation of projects will follow these operational principles:

- Scientific research and interpretation will be undertaken and reported free from political interference or bias; and
- Researchers will respect the need for confidentiality in whatever form it is requested by the Director or the Board.

11 Business Development and Co-funding

The Goyder Institute shall identify opportunities for co-investment that will build upon the \$25,000,000 State and \$25,000,000 partner contributions in order to maximise additional external funding over five years that aligns with the Strategic Research Plan objectives. Projects should be aimed to specifically leverage cash from external funding opportunities. They should leverage in-kind capacity from existing or proposed infrastructure and/or large-scale monitoring projects. They should leverage knowledge and in-kind capacity from effective local, national and international partnerships.

12 Investment Profile

The Roadmaps will be designed to ensure that the Goyder Institute delivers early success but also retains flexibility to respond to changing pressures and priorities over time.

No more than 40% of the total budget will be committed in the first year of the Institute, and no more than 70% in the second year. One million dollars will be kept aside for special projects that may require immediate and unplanned investment up to and including year four of the Institute.

In general, project proposals will not contain contingency budgets. This will remain at the discretion of the Board.

13 Research Leaders

The development of large, integrated research project areas will require experienced leadership and facilitation.

Research Leaders will be chosen based on the following criteria:

- Credibility (seniority and track record);
- Understand and support the principles of the Goyder Institute;
- Previous experience in managing cross agency, multi-disciplinary programs and projects;
- Understand the context within which the results will be used;
- Demonstrated experience in transferring outputs into outcomes; and
- Research Leaders will be recommended by the Research Advisory Committee.

14 Research Advisory Committee

The Research Advisory Committee (RAC) assists the Director in the development of the Research and Development Plan of the Goyder Institute and ensures that research is of international quality in areas that will ensure that South Australia's science is being most effectively deployed to manage the water issues facing South Australia.

A.1 How the Strategic Research Plan addresses Water for Good actions

Water for Good outlines 94 actions that South Australia needs to take to “ensure our water supplies are secure, safe, reliable and able to sustain continued growth”. These have been reviewed to determine the extent to which research is required to underpin their implementation.

Of the 94 actions, only 12 could be argued as having an explicit research requirement based on their wording in Water for Good. However, further analysis suggests that up to 34 actions will benefit from some form of research to support their implementation. These are incorporated in the attached Research and Development Plan Roadmaps.

There are a number of actions that have a unifying theme requiring rigorous science to support their implementation. For example, water allocation planning policy (links with Actions 44 and 58), needs to be based on rigorous science that understands the balance between recharge and extractions on water resources and within this environmental water requirements.

The current roadmaps do not include some actions for which it could be argued that research is required. For example, Actions 74, 75, 77, 78 all link with water pricing and competition policy which could require research to develop policy. The roadmaps also do not address some more generic actions for which the Goyder Institute could make a contribution, such as Action 1 involving the development of an Adaptable Management Framework.

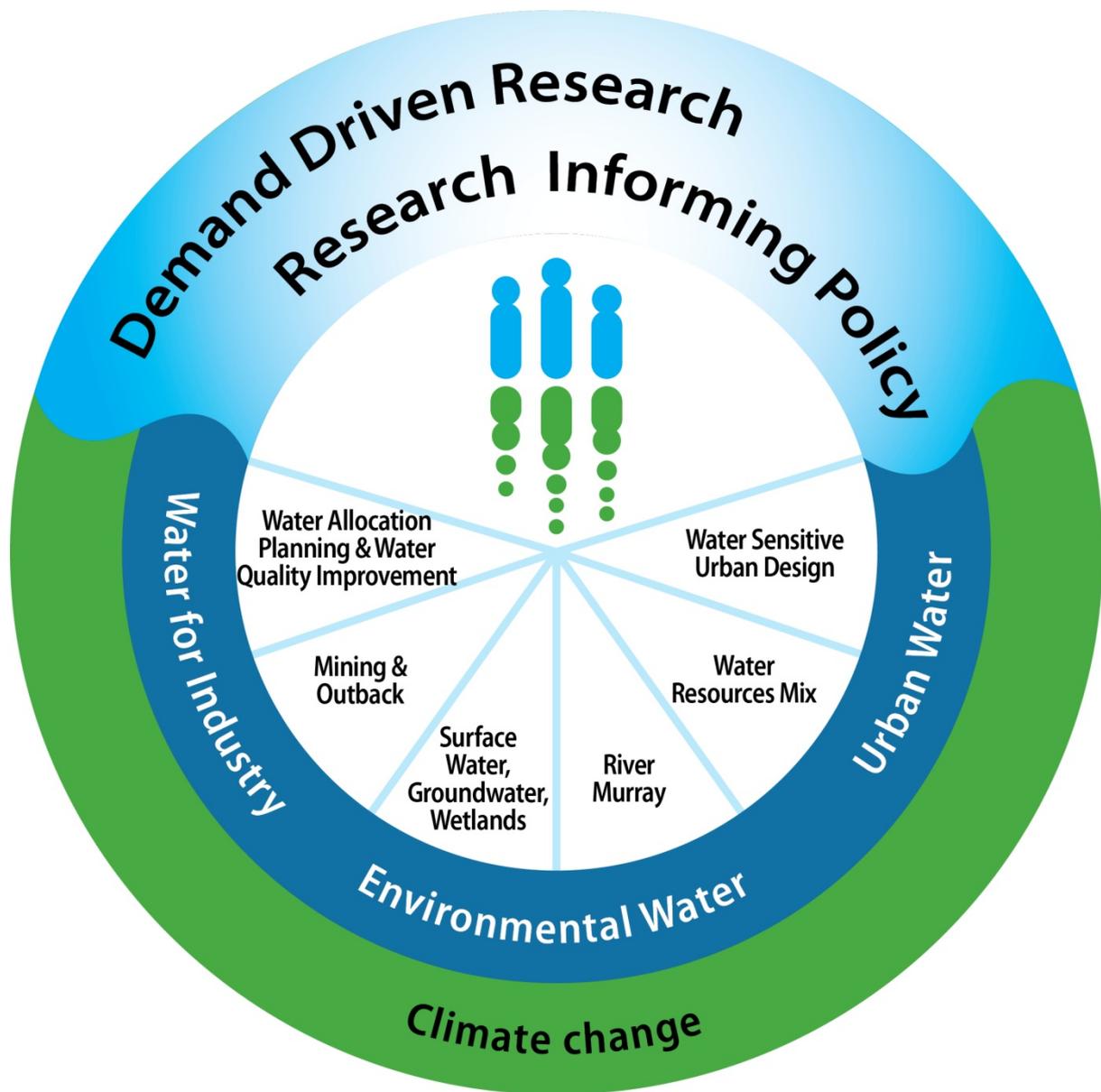
Table A1. This table presents only those Water for Good actions which have been assessed as having research requirements or that are of general relevance to the Goyder Institute. Where the research theme is labelled as general, this means that the action is of general interest to the Goyder Institute but may not have a specific research requirement. (GI = Goyder Institute.)

Water for Good action	Research Theme	Comment
Action 1 - Establish an adaptable management framework	General	GI could contribute to the annual review process by providing an annual update on Goyder Institute research outcomes.
Action 3 - Minister to establish an independent planning process if demand and supply forecasts indicate a gap is likely to exist in the foreseeable future.	Urban	GI could contribute to demand forecasting. Outcomes from climate change research could be relevant.
Action 10 - Investigate groundwater desalination to supply regional townships.	Industry	GI could facilitate a process for identifying the latest research in desalination.
Action 12 - Update, by 2010, State water recycling guidelines to reflect the Australian Guidelines for Water Recycling, and include stormwater.	Urban	This could be informed by work done under the GI Urban Water research theme.
Action 15 - Local government, SMA and stakeholders identify and develop new stormwater recycling projects in the Adelaide region.	Urban	Should draw on the work being done in the Urban Water theme.
Action 16 - Develop a master plan for effectively managing stormwater in Adelaide.	Urban	Links with integrated planning for urban water supplies through optimisation tools.
Action 19 - Develop a master plan for effectively managing wastewater in Adelaide, in concert with the stormwater recycling master plan, to ensure optimum use of both water sources.	Urban	Raises the issue of the impact on land of the large scale application of recycled water as part of irrigation developments.
Action 20 - Encourage decentralised wastewater recycling schemes in new developments, in partnership with the implementation of the Plan for Greater Adelaide.	Urban	GI could provide research to underpin best placement of wastewater recycling schemes.
Action 32 - Develop a new water information website, with clear and readily accessible information on South Australia's water resources.	General	GI could be a source of some information for this website.
Action 42 - Economic Use of SIS Water.	Industry	GI could support research into use of this water for water dependent industries in regional areas.
Action 43 - Impact of climate change for water resource management.	Climate Change	GI will contribute to this through the climate change projections project.
Action 44 - Two staged approach to water allocation planning.	Environment	Need scientific input into water allocation plans.

Water for Good action	Research Theme	Comment
Action 45 - Strategically review and, where required, expand or upgrade the water resources monitoring network.	General	GI could recommend what data is required for collection based on identified research projects. GI may also contribute to discussions regarding database management.
Action 46 - Increase regularity of statewide data collation, assessment and reporting, where required.	General	Linked with Action 45.
Action 47 - Implement a statewide policy framework for managing the water resource impacts of plantation forests.	Environment	Research and monitoring may be needed to support this framework. This Action has links with an existing GI project in the SE.
Action 48 - Require mining ventures to provide their own water supplies.	Industry	This may fall within GI's water dependent industries theme (e.g. FLOWS 1).
Action 49 - Develop water quality improvement plans for the Mount Lofty Ranges (MLR) Watershed.	Industry	Targeted research may be required to contribute to water quality improvement plans.
Action 51 - Comprehensive review of current management and protection of the MLR Watershed with a view to developing an agreed vision, targets and responsibilities for its future management by the end of 2010.	Industry	Should be informed by GI's work on AMLR. GI could contribute to developing a risk based approach and evaluation methodologies.
Action 53 - Work with the Murray-Darling Basin Authority and other Basin jurisdictions to ensure a healthy, working River Murray.	Environment	Links with the MDB Science Review and MDB monitoring and research in general. Need to identify key issues that GI could contribute to.
Action 54 - Complete, on time, the elements of the Murray Futures program designed to sustain, support and reinvigorate communities and industries within the Murray-Darling Basin in South Australia.	Environment	This could be a research opportunity through active, adaptive environmental management.
Action 55 - Undertake real-time management of environmental issues and potential risks affecting the Lower Lakes.	Environment	Real time management will need monitoring and research data. This is linked to Actions 53 and 54 as well as work on DSS and adaptive management.
Action 56 - Maintain a positive balance on the Murray-Darling Basin Salinity Register, and continue to implement strategies and actions to ensure the real time management of salinity in the lower reaches of the River Murray so that water quality remains at levels suitable for human consumption.	Environment	Could be a need for additional salt monitoring and research on the Murray.
Action 58 - Complete water allocation plans and regulatory review of water allocation plans for key areas, in the Mount Lofty Ranges, the Murray-Darling Basin, the South East and Central Adelaide.	Environment	Need more science to support water allocation planning policy development and implementation.
Action 61 - Unbundling water rights in SA.	Environment/Industry	Links with the WAP process and could require policy research.

Water for Good action	Research Theme	Comment
Action 63 - EPA will develop environmental values for priority water bodies across the State by 2014.	Environment	Environmental value determination will need a scientific basis. GI could contribute to the work of the EPA.
Action 64 - Northern and Yorke Demand and Supply statement.	Industry	Requires an increased understanding of the water quality and quantity for the Northern and Yorke region.
Action 65 - Demand and Supply Forecasting Model.	Urban	Requires development of a supply and demand model, which could be an outcome of GI's Urban Water theme.
Action 66 - Develop and implement a strategy to improve the quality of water provided to remote communities.	Industry	Links with the Flows project stage 2
Action 68 - Introducing targets for WSUD.	Urban	The GI WSUD project reviews the interim WSUD targets
Action 69 - Work with research institutions and industry to enhance co-ordination of the research effort and improve collaboration to identify priorities and ensure timely delivery.	General	Cross entity collaboration involving GI.
Action 74 - State-based recycled water pricing principles.	Urban	Work on pricing could be undertaken through one of the GI partners
Action 75 - Set water and wastewater prices to encourage economically efficient use.	Urban	Work on pricing could be undertaken through one of the GI partners
Action 77 - Maintain government ownership of SA Water and develop a State-based third-party access regime.	Urban	Work on third party access could be undertaken through one of the GI partners
Action 78 - Explore innovative and competitive arrangements which could allow for competition in the supply of bulk water.	Urban	Work on competition could be undertaken through one of the GI partners
Action 94 - Continue to support world-leading research to assess the potential for treating stormwater to a very high quality.	Urban	The GI Managed Aquifer Recharge project contributes directly to this.

A.2 Strategic Roadmaps



Theme Urban Water

- U.1: Water Sensitive Urban Design
- U.2: Water Resources Mix for Adelaide

Theme Water for Industry

- I.1: Water Allocation Planning and Water Quality Improvement
- I.2: Mining and Outback Water

Theme Environmental Water

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