



2016-2017 ANNUAL REPORT



Goyder Institute For Water Research

CONTENTS

About / Partners & Associates	1
Message From The Chair	2
The Goyder Institute Management Board	3
Message From The Director	4
The Goyder Institute Research Advisory Committee (RAC)	5
Strategic Research Plan 2015 - 2019	6
Climate Action	7
Healthy Ecosystems	8
Economic Development	9
Goyder Water Forum 2017	10
Our People	11
Goyder Institute Financial Summary To 30 June 2017	12



Enquiries should be addressed to:

Goyder Institute for Water Research
Level 4, 33 King William Street
GPO Box 860
ADELAIDE SA 5001
Tel: (08) 8236 5200
Email: enquiries@goyderinstitute.org

Copyright © 2017 Goyder Institute for Water Research. To the extent permitted by law, all rights are reserved and no part of this publication covered by copyright may be reproduced or copied in any form or by any means except with the written permission of the Goyder Institute for Water Research. Disclaimer: The Participants advise that the information contained in this publication comprises general statements based on scientific research and does not warrant or represent the completeness of any information or material in this publication.

Cover image by Graham Green

PARTNERS & ASSOCIATES

GOYDER INSTITUTE PARTNERS

The Goyder Institute for Water Research is a partnership between the South Australian Government through the Department of Environment, Water and Natural Resources, CSIRO, Flinders University, the University of Adelaide, the University of South Australia and the International Centre of Excellence in Water Resources Management (ICE WaRM). The Institute enhances the South Australian Government's capacity to develop and deliver science-based policy solutions in water management. It brings together the best scientists and researchers across Australia to provide expert and independent scientific advice to inform good government water policy and identify future threats and opportunities to water security.



University of
South Australia



GOYDER INSTITUTE ASSOCIATES

Goyder Institute Associates typically contribute expertise and capabilities in areas outside of those contributed by the Goyder Institute Partners. Associates may participate in capacity building, knowledge exchange and/or specific research projects, and invest in the Goyder Institute Research Program with in-kind commitments in the same manner as Goyder Institute Partners. The following Associate organisations have contributed to the outcomes of the Goyder Institute in 2016-2017.



MESSAGE FROM THE CHAIR

Since its British settlement in 1836, South Australia has been acutely aware of the need to access and manage water – in order to sustain life, develop our economy and protect our natural environment. Over the years we have developed considerable expertise and a deep knowledge of our water resources and how to manage them.

Given this history, South Australians are acutely aware of the risks our State now faces from increasing climate variability, and projections for an overall drier climate. These changes will put pressure on good quality water supply and reliability across our State.

That means challenges for the environment, our lifestyle and the economic development of the State – especially our mining and agricultural sectors.

The Goyder Institute was established in 2010 to help meet these challenges by

providing expert, independent, scientific advice to underpin policy development and decision-making.

Now well into its second term of funding, I am pleased to report a year of major progress for the Institute. With the new administration arrangements with ICEWaRM well in place, the Institute has been able to focus on the delivery of the research program. The vision and direction for the second term was launched in July 2016. All research investment is to be aligned to this direction, with the majority of research projects now underway. It is an exciting and diverse program, with excellent science capability underpinning this policy focussed research program.

I am pleased to be able to now be part of the Institute and to guide its direction over the next two years. I recognise and thank Ben Bruce, Interim Chair, for his efforts over the past year.



I also acknowledge the leadership provided to the Institute by our outgoing Director Michele Akeroyd and wish her well in her new role.

Finally, I thank the Management Board, Research Advisory Committee and research teams in establishing the second term of the Institute and making this year a successful one for the Goyder Institute. The Board looks forward to seeing the outcomes of this exciting research program making a major difference for South Australians in the coming years.

John Hill

THE GOYDER INSTITUTE MANAGEMENT BOARD

The Management Board met quarterly during 2016-2017 to set the strategic vision and direction for the Goyder Institute and to monitor its implementation and outcomes.

The Board comprises an Independent Chair, two representatives from the State Government, two representatives from CSIRO, and one representative from each of Flinders University, the University of Adelaide, the University of South Australia and the International Centre of Excellence in Water Resources Management. The Members of the Goyder Management Board from July 2016 - June 2017 were:

Hon. John Hill *(from May 2017)*
Independent Chair

Ben Bruce *(to May 2017)*
Interim Chair
Dept. Environment, Water and Natural Resources

Sandy Carruthers *(from February 2017)*
Dept. Environment, Water and Natural Resources

Tim Goodes *(to February 2017)*
Dept. Environment, Water and Natural Resources

Jo Collins *(from February 2017)*
Primary Industries and Regions SA

Graham Cooper *(to February 2017)*
Dept. Premier and Cabinet

Darryl Day *(to February 2017)*
International Centre of Excellence in Water Resources Management

Hon. Karlene Maywald *(from February 2017)*
International Centre of Excellence in Water Resources Management

Prof Okke Batelaan
Flinders University

Prof Chris Saint
UniSA

Prof Megan Lewis *(from December 2016)*
The University of Adelaide

Prof Phil Weinstein *(to December 2016)*
The University of Adelaide

Dr Peter Stone *(from March 2017)*
CSIRO

Dr Paul Bertsch *(to March 2017)*
CSIRO

Scott Keyworth
CSIRO

MESSAGE FROM THE DIRECTOR



The seventh year of Institute operations has been extremely rewarding with the research direction set for the second term and investment in key research projects underway. Engaging with a range of stakeholders has been critical in establishing this new research portfolio to ensure it is aligned with key government priorities whilst enabling scientific advancement and quality of the Institute's research program. One of the key achievements during the year was

the launch of the new Strategic Research Plan that is the guiding document for all investment through the Goyder Institute. The new Impact Areas of Economic Development, Healthy Ecosystems and Climate Action capture the broader remit of the Institute in its second phase, and ones that align with State Government priorities whilst building on the foundational research programs delivered under the first phase of the Institute. With the research strategy set, the complete suite of research investment was scoped, projects developed and all are now underway or about to commence. This was an enormous effort by the Research Advisory Committee to establish the entire research portfolio during the course of the year. This portfolio is diverse with innovative and novel science that will challenge and shape our thinking for the future. Our challenge over the next two years is to enable effective communication and knowledge pathways for this excellent science to be accessible to stakeholders to support evidence-based decision-making.

It has been very rewarding to be part of the collaborative spirit that has developed

between the Institute partners. The positive research culture that has grown within and between the research teams, state and local government staff and non-government stakeholders has been pivotal in shaping the relevant, high impact research program. Without this level of commitment to the Goyder Institute model and its objectives, the successes of the Institute would not have been realised.

I would like to thank the Management Board and Research Advisory Committee for their ongoing commitment to the Institute collaboration and their valuable and expert oversight to ensure the quality and relevance of the research program. Behind the scenes the Goyder Institute office staff are the backbone of the Institute operations, none of the activities and successes over the past 12 months would have been possible without the team of Neil Power, Graham Green and Kathryn Nicholas.

Michele Akeroyd

Director

The Goyder Institute for Water Research

THE GOYDER INSTITUTE RESEARCH ADVISORY COMMITTEE (RAC)

The RAC met three times in 2016-17 to advise the Management Board on progress, milestones and implementation of Goyder Institute research activities, and to consider the strategic direction for the research projects into the next years of the Institute. It prepared the Strategic Research Plan, guided research investment under the Institute's second term, reviewed and approved

several reports for inclusion in the Technical Report Series and formulated recommendations to the Board regarding the direction, content and quality of project plans and expressions of interest for various research activities proposed by Goyder Institute research partners.

The RAC is chaired by the Goyder Institute Director and comprises a

research coordinator from each research partner, up to two representatives from state agencies, a representative of SARDI and a representative of SA Water.

The members of the RAC from July 2016 - June 2017 were:

Dr Michele Akeroyd
(Chair), Goyder Institute

Neil Power
DEWNR

Dr Jennie Fluin *(from Feb 2017)*
DEWNR

Sandy Carruthers *(to Feb 2017)*
DEWNR

Prof Craig Simmons
Flinders University

Prof John van Leeuwen *(to March 2017)*
UniSA

Prof Peter Teasdale *(from March 2017)*
UniSA

Prof Justin Brookes
The University of Adelaide

Dr Dirk Mallants
CSIRO

Prof Jim Cox
SARDI

Jacqueline Frizenschaf *(from May 2017)*
SA Water

Assoc Prof Mike Burch *(to May 2017)*
SA Water

STRATEGIC RESEARCH PLAN 2015 - 2019

It is intended that the Goyder Institute is enhancing 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. The Goyder Institute's core function is to provide research and independent, expert advice for science-based water policy to the State Government. It is further intended that this will also strengthen the State's position as an international leader in water resource management. It is also the aim to instil confidence in the community that the best scientific minds available are being targeted at resolving the State's key water resource management issues.

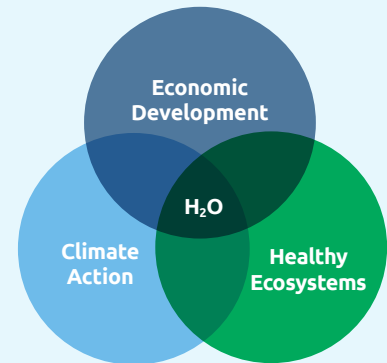
The Institute will support:

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

The Goyder Institute will provide leadership and direction in water sciences, engineering and socioeconomic research for sound, evidence-based policy development that enables optimum water management in South Australia.

The Goyder Institute's Strategic Research Plan (www.goyderinstitute.org) details the long-term strategic outcomes for this research, which 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 previous, ongoing and future research activities to the three targeted Impact Areas shown above. Within each Impact Area are focussed programs that provide the direction for new research investment, with the programs targeted



to deliver specific outcomes and/or policy directions identified by government agencies and other water industry stakeholders.

Supported ongoing and new research projects will be expected to demonstrate how they contribute to a specific Impact Area and towards the long-term strategic outcomes of the Goyder Institute. Efforts continue to be concentrated on enabling fundamental research, applied research, implementation, tools and fit-for-purpose outcomes. This enables the Goyder Institute to arrive at a balanced and integrated R&D profile in all Impact Areas and research programs.

CLIMATE ACTION

The Climate Action Impact Area will further the application of the SA Climate Ready data to address key policy challenges in implementing the State's Climate Change Strategy. These include:

- Applying the SA Climate Ready data to improve the understanding of risks, vulnerabilities and opportunities associated with climate change in South Australia;
- Developing tools that water and environmental managers in South Australia can use to develop the most appropriate mitigation strategies that incorporate an integrated assessment of climate change on water resources;
- Undertaking risk assessments of water and related natural resources in the catchment and coastal zone; and,
- Providing a science base to support achieving net zero emissions in the State through bio-sequestration.

The Climate Action research will be delivered through three programs:

- Water Security
- Climate Change and Carbon Neutral Adelaide
- Extreme Events

Projects underway include:

- Climate Resilience Analysis Framework and Tools
- Coastal Carbon Opportunities: demonstrating additionality and potential for future offsets in South Australia

- Carbon sequestration through ecological restoration at the Dry Creek Salt Field
- Knowledge gap analysis and model testing for offsetting greenhouse gas emissions through increasing soil organic carbon and improving nitrogen efficiency in South Australian agricultural systems

Project soon to be underway:

- Assessing South Australian carbon offset supply and policy for co-beneficial offsets.

HEALTHY ECOSYSTEMS

The Healthy Ecosystems Impact Area expands on the activities of the first five years of the Institute that included a significant focus on the Murray-Darling Basin, inland waters such as the South-East, Mount Lofty Ranges and Lake Eyre Basin, and socio-economic assessment of Marine Park Sanctuary Zones. These areas continue to be a priority for State Government in achieving optimal outcomes for the environment while also balancing social and economic outcomes in the context of a changing climate, stewardship and competing water demands.

The Healthy Ecosystems Impact Area will focus on:

- Furthering knowledge to support appropriate water quality and quantity for

environmental assets to ensure resilient, connected and healthy ecosystems;

- Developing frameworks that integrate hydroclimate, hydrological, environmental and economic considerations in water management to achieve sustainability;
- Enhancing the scientific basis to test resource allocation scenarios for improved water planning outcomes and individual resource allocation decisions;
- Leadership in environmental flow science and in the communication of the research outcomes to environmental managers; and,
- Establishing an evidence base to inform and evaluate environmental management commitments, including social and economic factors, in addition to biophysical assessments.

Research within Healthy Ecosystems will be delivered via three streams:

- Catchments
- Coasts and marine
- Communities

Projects soon to be underway include:

- Ecological connectivity of the River Murray: managing ecological outcomes and water quality risks through integrated river management
- Socio-ecological assessment of the ecosystems, industries and communities of Spencer Gulf

ECONOMIC DEVELOPMENT

The focus of the Economic Development Impact Area is to address the relevant State Government priorities by:

- Providing science to underpin sustainable water resource management for existing water resource developments;
- Providing science to underpin identification of future sustainable water resource development opportunities; and,
- Identifying pathways and opportunities to facilitate use of research outcomes by the private sector.

The Economic Development research will be delivered through two programs:

- Mining and Energy
- Northern Corridor
(Northern Adelaide to Whyalla)

Water continues to be a challenging State issue where independent science is needed to assist Government in addressing key economic and industry development imperatives, particularly in the mining and agriculture sectors. There are also regional communities – in particular, remote Aboriginal communities – where a secure water supply continues to be a key issue. Looking forward, there is potential for

significant investment over the next 10 years in the mining, food and wine sectors. Collaborative, demand-driven research is required to underpin sustainable growth and productivity in these sectors and to enable South Australia to prosper.

Finding sustainable water resources to support mining development will enable the mining sector to grow whilst ensuring that key community and environmental assets are maintained. A state-wide strategic approach to the provision and sourcing of water will deliver the most cost-effective and prudent management of water supply and management of waste streams for mine sites, mining camps and outback communities that do not have reliable supplies of water.

The Northern Adelaide Plains is one of the premium food and wine regions of South Australia. There is opportunity for expansion of this region to provide new employment opportunities in the northern suburbs of Adelaide. Science can support this expansion through enhanced understanding of the utilisation of recycled water, stormwater and groundwater resources of varying qualities available in this region. The Goyder Institute can provide thought leadership



in developing options for future industries and delivery of services that are visionary, integrated and sustainable.

Projects underway include:

- Finding Long-term Outback Water Solutions (Stage 3) GFLWS-3
- Sustainable Expansion of Irrigated Agriculture and Horticulture in the Northern Adelaide Plains
- Small scale, low technology desalination trial

GOYDER WATER FORUM 2017



The Goyder Institute for Water Research conducted its biennial Water Forum on the 4th and 5th of July 2017.

Held at the University of Adelaide, the event delivered a range of presentations and discussions on Goyder Institute projects, along with exceptional research from other South Australian and International water projects.

The Water Forum had stimulating discussion, technical and academic presentations from 58 water industry leaders, as well as six keynote speakers, including Hon. Ian Hunter MLC, Chief Executive of DEWNR, Sandy Pitcher and zoologist Prof Kristofer Helgen.

Two streams of presentations each day covered a range of topics including groundwater, climate action, healthy ecosystems and carbon and coastal environments.

The Water Forum Dinner at the National Wine Centre followed proceedings on day one where guests were treated to two fabulous guest speakers: Former head of CSIRO Land and Water, Dr John Williams, and climate scientist Prof Andy Pitman.

Dr Williams, one of Australia's most respected and trusted scientists with extensive experience in providing national and international thought-leadership in natural-resource management, spoke about the state of water policy reform in Australia. He said reform had stopped in Australia at a time when they should be preparing for

the next drought and building Australia's resilience against climate change and the shocks of droughts and floods.

Professor Pitman, a climate modeller with a major focus on terrestrial processes in global and regional climate models, treated the audience to an entertaining look at climate extremes and how these are likely to change in the future, along with transformative research in climate science.





OUR PEOPLE

Institute Office

Michele Akeroyd, Director

Neil Power, Director State Research
Coordination, DEWNR

Graham Green, Research Manager

Kathryn Nicholas, PR &
Communications Manager

Project Leaders

Seth Westra, University of Adelaide

Bronwyn Gillanders, University of
Adelaide

Sabine Dittmann, Flinders University

Jim Cox, PIRSA-SARDI

Jeff Connor, UniSA

Adrian Costar, DEWNR

John Van Leeuwen, UniSA

Justin Brookes, University of Adelaide

Kane Aldridge, University of Adelaide

Tim Ward, PIRSA-SARDI

GOYDER INSTITUTE FINANCIAL SUMMARY TO 30 JUNE 2017

Research Program

The 2016-17 financial year was the second year of the second term of the Goyder Institute. The first term of the Institute ended on 30 June 2015.

The final research investment for the first term of the Goyder Institute (2010-15) included the South Australian Government investment of \$21.06m cash to research projects with in-kind contributions totalling \$23.16m provided by research partners



CSIRO, Flinders University, University of Adelaide and University of South Australia as well as State research providers South Australian Research and Development Institute (SARDI) Australian Water Quality Centre (AWQC) and DEWNR. There was also an additional \$12.63m of external cash and in-kind contributions to the research program. Collective whole-of-life investment across the 46 approved research projects was \$43.94m.

The new term of the Institute (2015-19) commenced research investment in 2016 following the establishment of new administration arrangements and office location (December 2015) and release of the Strategic Research Plan (July 2016) that guides investment in research.

As of 30 June 2017, the investment in the new research program includes \$4.47m cash from the South Australian Government, \$6.56m in-kind from research partners CSIRO, Flinders University, University of Adelaide and University of South Australia as well as State research providers SARDI, DEWNR and AWQC, and \$3.52m external cash and in-kind contributions.

Administration Program

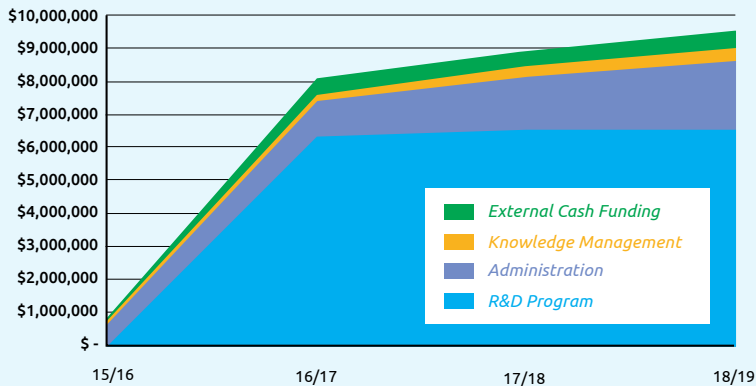
The total budget for Institute administration for 2016-17 was capped at \$0.5m with an additional \$0.1m for Knowledge Management activities. The administration program is funded in accordance with the Agreement with the South Australian Government contributing cash and no matching in-kind contributions.

Total expenditure in 2016-17 was \$0.49m which compares favourably with the budget. The administration program has tracked very close to budget during the life of the Institute.

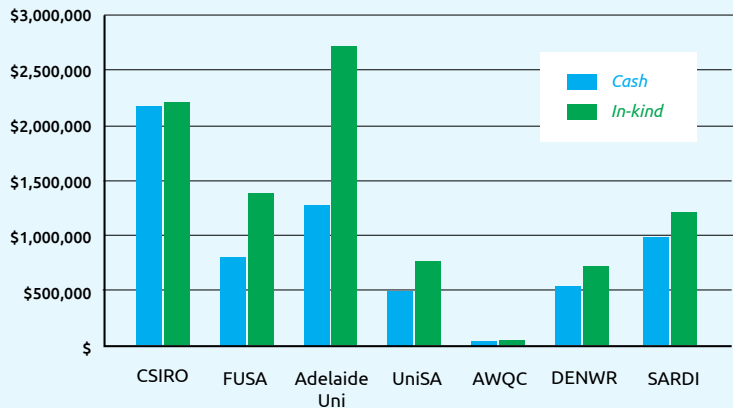
Trust Account

The closing balance of the CSIRO Trust account at 30 June 2017 was \$3,821,856 with the International Centre of Excellence in Water Resources Management also holding funds of \$330,441. During the course of the year, the CSIRO Trust received \$2,000,000 in cash from the State Government and earned \$46,056 in interest.

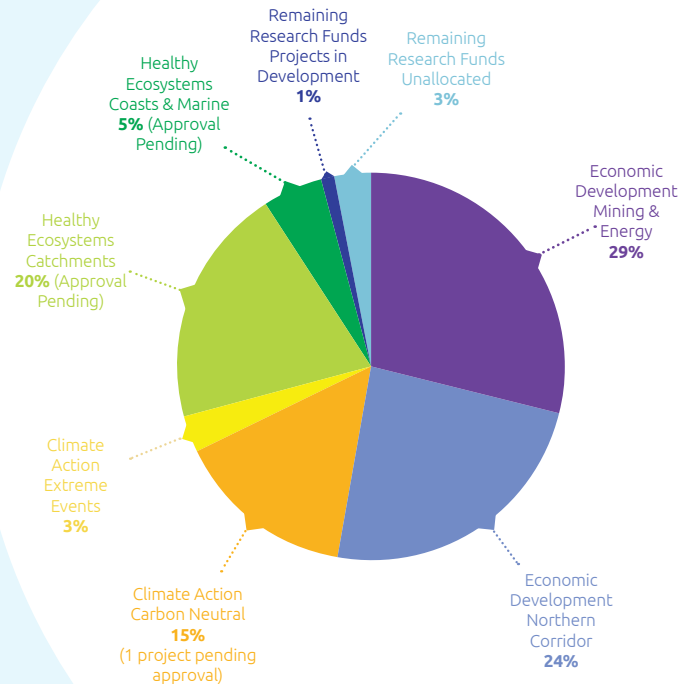
Committed and Planned Expenditure 2015-19



Research Funding



Includes project with approval pending





The Goyder Institute for Water Research is a partnership between the South Australian Government through the Department of Environment, Water and Natural Resources, CSIRO, Flinders University, the University of Adelaide, the University of South Australia and the International Centre of Excellence in Water Resources Management (ICE WaRM).

www.goyderinstitute.org

