

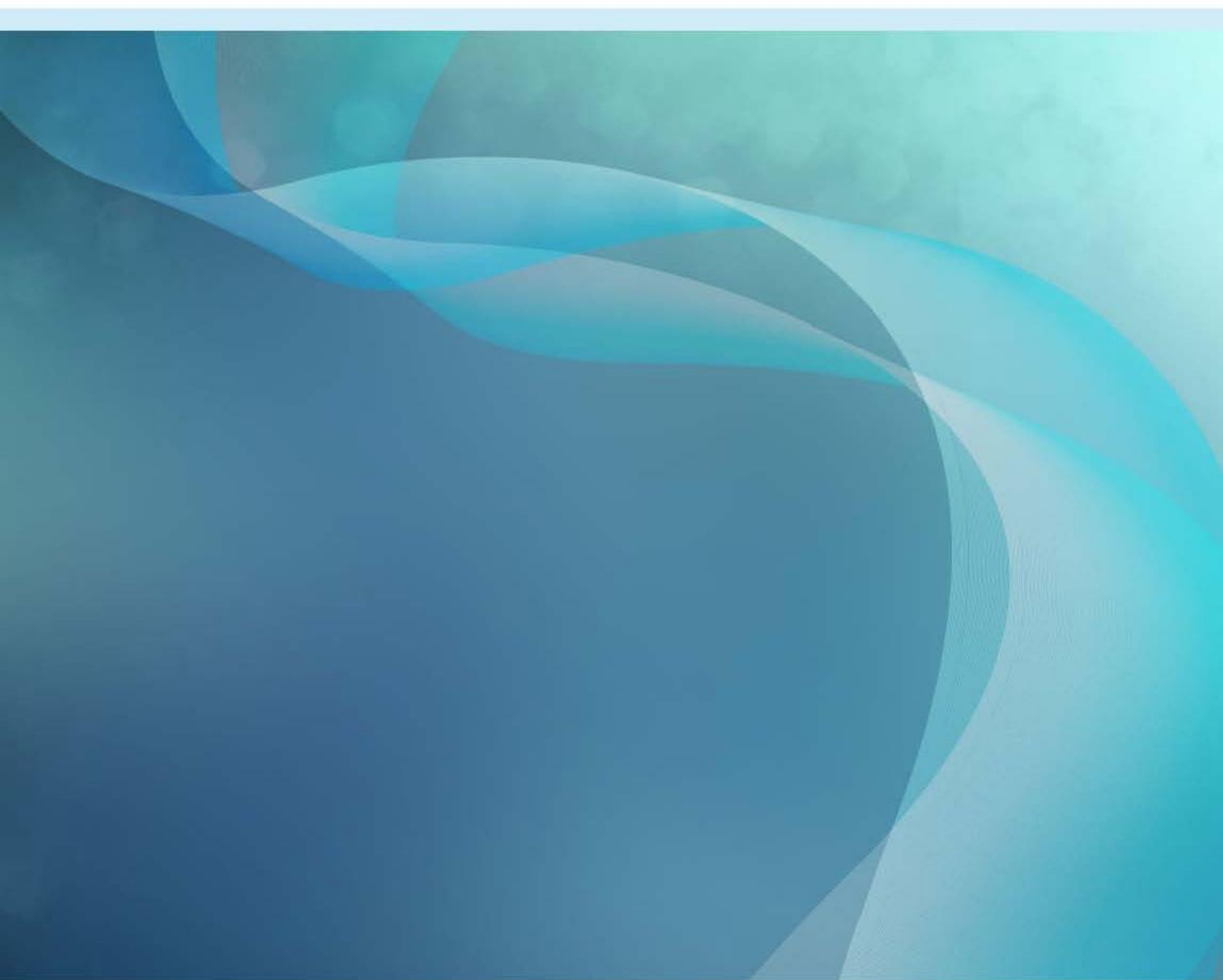


Australian Government

Bureau of Meteorology

WIRADA Research bibliography 2008-2016

Water Information Research and Development Alliance



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1 The Water Information Research and Development Alliance - 2008-16

The Water Information Research and Development Alliance (WIRADA) was a research partnership between the Bureau of Meteorology and CSIRO. It delivered the innovation required to develop national [water information](#) products and tools. WIRADA brought together CSIRO's expertise in water and information sciences and the Bureau's operational role in hydrological analysis and prediction. Together the partners invested over \$65 million in 28 projects to improve Australia's water information. This bibliography provides a record of scientific outputs over the life of WIRADA.

WIRADA achievements

Key advances were made that allow the nation to better assess the current state and future availability of our water resources, and to share its water data. Through WIRADA, a broad range of products and services were developed or supported through new science - and can be found at the Bureau's [water information](#) website. These products and services deliver national water information to the public and assist specialist users in policy, planning and water management. WIRADA achievements include:

- over 650 publications including 100 journal articles, 400 conference papers and 150 reports
- new national and international standards and tools to allow water information to be consistently managed, shared and made comparable
- research that has led to operational products and services which provide 'environmental intelligence' on our water resources.

Research themes for improved water information

To meet the challenge to develop national water information, our existing knowledge and methods needed to be pushed and translated into working products and services. Together CSIRO and the Bureau identified the strategic research needed and set this out in the WIRADA science plans:

- WIRADA Science Plan 2008-2012
- [WIRADA Science Plan 2013-16 \(685KB\)](#)

Under these Science Plans, research was conducted on four themes:







- Water information systems and informatics
- Foundational datasets
- Water balance modelling and assessment
- Streamflow forecasts and future water availability

WATER INFORMATION SYSTEMS AND INFORMATICS

To collate and use water data regardless of where it comes from required that it be consistent and comparable. The Bureau needed new systems, tools and standards to:

- develop a common water information language format to standardise how Australia manages and shares water data
- automate and facilitate reliable data delivery and sharing across data management systems
- manage information models and automate common workflows for the use of hydrological and spatial data such as data ingest and mapping, quality assurance and calibration.

Thirteen projects were initiated to address these challenges:

- 1.2 [Hydrologists workbench \(345KB\)](#)
- 1.3 Australian hydrological geospatial fabric design
- 1.4 [Water data transfer standards \(281KB\)](#)
- 1.5 [Sustainable water information models \(326KB\)](#)
- 1.6 Australian Spatial Research Data Commons (Associate Project)
- 1.7 Distributed Real-Time Water Information System
- 1.8 Describing and transforming adhoc water data
- 1.9 [Bedding-down the Geofabric](#)
- 1.10 [Spatial Information Services Stack for the Bureau](#)
- 1.11 Tools and documentation
- 1.12 [WaterML2.0 – part 2, leveraging international standards](#)
- 1.13 Informatics – WaterML2 and Geofabric
- 1.14 Informatics - data services (2015-16)

FOUNDATIONAL DATASETS

The capability to analyse, model and predict Australia's water resources and streamflow required continent-wide accurate and high resolution estimates of elevation (topography), rainfall, evapotranspiration and flood inundation.

Two projects were initiated to address these challenges:

- 2.1 [One-second continental DEM \(363KB\)](#)
- 2.2 [Foundation data products \(406KB\)](#)

WATER BALANCE MODELLING AND ASSESSMENT

To account for water resources and their use and to assess long-term trends required capability to model the distribution and movement of water across Australia's landscape and rivers. Given gaps in observations across Australia, the challenge was how to ensure that modelled information was consistent and reliable when applied across a range of scales.

Six projects were initiated to address this challenge:

3.0 [Australian Water Resources Assessment \(AWRA\) \(508KB\)](#) 

3.1 Water resources assessment and accounting

3.2 AWRA system integration

3.3 AWRA model development

3.4 AWRA dynamic land cover and landscape water

3.5 AWRA model-data fusion

3.6 AWRA modelling system development

STREAMFLOW FORECASTS AND FUTURE WATER AVAILABILITY

Flood management and optimal river and water resources management require reliable water forecasts. WIRADA worked to extend the Bureau's existing event-based flood warnings, as well as develop continuous streamflow forecasts out to 7-days and seasonal predictions of flows for months ahead and beyond.

Seven projects were initiated to address these challenges:

4.1 [Water forecasting and prediction – short term \(346KB\)](#) 

4.2 [Water forecasting and prediction – seasonal to long term \(286KB\)](#) 

4.3 Flood and short-term streamflow forecasting

4.4 Seasonal water forecasting

5.0 [Improving rainfall forecasts \(391Kb\)](#) 

5.1 Seamless rainfall forecasts

5.2 Towards improved short-range NWP precipitation forecasts

5.3 Improving multi-week rainfall predictions

2 Summary statistics

Table 1 Summary of WIRADA outputs from 2008 to 2016

PERIOD	JOURNAL PUBLISH	JOURNAL SUBMITTED	BOOKS	CONFERENCE PAPERS ¹	PUBLISHED REPORTS	INTERNAL REPORTS	ANNUAL REPORTS
0809	17		1	45	41	21	1
0910	13		0	32	26	41	1
1011	11		0	91	16	4	1
1112	22		1	79	7	7	1
1213	11		0	30	10	1	1
1314	15		5	50	14	10	1
1415	15		0	27	10	11	1
1516	9	9	1	47	13	3	1 ²
Total	113	9	8	401	137	98	8

¹ Includes abstracts and posters

² To be published

3 WIRADA management publications

ANNUAL REPORTS

1. CSIRO. 2009. Water Information Research & Development Alliance, Annual Report 2008-09.
2. CSIRO. 2010. Water Information Research & Development Alliance, Annual Report 2009-10.
3. CSIRO. 2011. Water Information Research & Development Alliance, Annual Report 2010-11.
4. CSIRO. 2012. Water Information Research & Development Alliance, Annual Report 2011-12.
5. CSIRO. 2013. Water Information Research & Development Alliance, Annual Report 2012-13.
6. BoM. 2014. Water Information Research & Development Alliance, Annual Report 2013-14.
7. BoM. 2015. Water Information Research & Development Alliance, Annual Report 2014-15.
8. BoM. 2016. Water Information Research & Development Alliance, Annual Report 2015-16.

CLIENT AND TECHNICAL REPORTS

1. CSIRO. 2008. Water Information Research & Development Alliance (WIRADA) Science Plan. CSIRO Water for a Healthy Country Flagship Program.
2. CSIRO. 2009. Water Information Research & Development Alliance (WIRADA) Implementation Strategy. CSIRO Water for a Healthy Country Flagship.
3. CSIRO. 2010. WIRADA Research Outputs and Performance Report. CSIRO: Water for a Healthy Country National Research Flagship.
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1. Argent R M, McDonald W. WIRADA from the inside - successfully delivering water research into operations [online]. In: *36th Hydrology and Water Resources Symposium: The art and science of water*. Barton, ACT: Engineers Australia, 2015: 940-947
2. Argent R M. WIRADA - Australia benefits from water research [online]. In: *36th Hydrology and Water Resources Symposium: The art and science of water*. Barton, ACT: Engineers Australia, 2015: 956-963.

4 Water Informatics publications

Hydrologists workbench (Project 1.2)

CONFERENCE PAPERS, POSTERS & ABSTRACTS

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10. Perraud J, Bai Q. 2009. Hydrologists Workbench Deployment and initial installation procedure. Briefing paper. December 2009. 32 pp.
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12. Box P. 2010. Hydrologists' Workbench ArcGIS Integration. Briefing paper. March 2010. 24 pp.
13. Cuddy S. 2010. Hydrologists' Workbench report on June 2010 release. Briefing paper. July 2010.
14. Perraud J, Bai Q. 2010. Hydrologists Workbench Deployment and initial installation procedure. Briefing paper. June 2010. 50 pp.
15. 2010. Hydrologists' Workbench Release Notes June 2010. Working Paper #61. 16 pp.
16. 2010. Hydrologists' Workbench Release Plan 2010. Working Paper #4. 7 pp.

Australian hydrological geospatial fabric (Project 1.3)

CONFERENCE PAPERS, POSTERS & ABSTRACTS

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16. Power R. 2009. A test harness toolkit for profiling relational databases. CSIRO ICT Centre Technical Report, 09/123. CSIRO, 36 pp.
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Water data transfer standards (Project 1.4)

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AWRA dynamic land cover and landscape water (Project 3.4)

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