

## **Profile: Dr Peter Coombes**

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Dr Coombes is a Systems Thinker, scientist, engineer, Problem Solver and policy analyst, a Provider of alternative perspective and a designer of sustainable cities, projects and buildings. He has spent more than 30 years dedicated to the development of systems understanding of the urban, rural and natural systems with a view to finding optimum and equitable solutions for the sustainable use of ecosystem services, provision of infrastructure and urban planning. He has been involved in a wide range of projects, advised many clients and governments, providing strategic design, policy, research and economic advice to the satisfaction of governments and society. (see [www.urbanwatercyclesolutions.com](http://www.urbanwatercyclesolutions.com), Linkedin: Peter Coombes, Twitter: @PeterJCoombes).

## **Qualifications**

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Doctor of Philosophy, University of Newcastle, 2002

Bachelor of Engineering (Civil) (Hons), 1997

Bachelor of Surveying (Hons), 1998

Associate Diploma of Engineering (Hons), 1992

GreenStar Accredited Professional, 2008

## **Membership of professional associations**

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Member of Engineers Australia

Member of the Australian Water Association

Member of the Stormwater Industry Association (past Chairman)

## **Recent employment**

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### **Revision of Australian Rainfall and Runoff**

#### **Engineers Australia**

November 2014 to present, Canberra Australia. Dr Peter Coombes from Urban Water Cycle Solutions is currently assisting Engineers Australia with the revision of Australian Rainfall and Runoff. He is drafting a discussion paper on the need to integrate the stormwater component of Australian Rainfall and Runoff with the modern approaches to urban water management. The discussion paper will be used as a facilitate discussion with industry over changes to urban drainage design methods. Dr Coombes will also contribute to drafting of new chapters on urban stormwater management in Australian Rainfall and Runoff.

#### **Chief Scientist**

#### **Office of Living Victoria**

June 2013 – November 2014 (1.5 years) Melbourne Area, Australia. Dr Peter Coombes from Urban Water Cycle Solutions is currently the Chief Scientist at the Office of Living Victoria (OLV). His key task is to provide robust, independent scientific and economic analysis to inform the evidence based role of OLV. A major element of this role is the use of world-leading Systems Framework that was developed over the last 20 years by Dr Coombes to provide insight into reform programs that deliver the optimum liveability and sustainability outcomes at a reasonable cost.

### **Stormwater, flood management and IWCM strategy**

#### **Metropolitan Planning Authority, Melbourne Water, and Department of Planning and Community Development**

Dr Peter Coombes from Urban Water Cycle Solutions was commissioned by the Metropolitan Planning Authority (MPA) to provide advice and designs for the draft East Werribee Precinct Structure Plan. This analysis was supported by Mark Colegate from TGM and finalised our previous innovative solutions to solve the historical flooding and water quality challenges at the site. This work built on previous work that commenced in 2009 where Dr Coombes and Bonacci Water developed a conceptual integrated water cycle management (IWCM) strategy that incorporated the objectives of a Multi-Agency Working Group and investigated options for use of regional stormwater and local rainwater harvesting, aquifer storage and recovery, wastewater reuse within the Precinct and water efficiency. The IWCM strategy was dependent on a stormwater management solution that mitigates the significant legacy of flooding and stormwater pollution at the site and incorporates the principles of water sensitive urban design (WSUD). The stormwater management elements of the proposed IWCM strategy were incorporated into a Development Services Scheme (DSS) developed by Dr Coombes in 2010 for Melbourne Water Corporation.

### **Advisor and Systems Analyst – integrated stormwater and flood management**

#### **Australian Capital Territory Environment and Sustainable Development Directorate**

October 2012 – June 2013 (9 months) Canberra, Australia. Developed a systems framework for integrated catchment management for the ACT and surrounding region including downstream impacts on the Murray Darling Basin. This analysis supported the ACT government business case for integrated catchment management. The ACT government successfully submitted the business case to the Australian Federal government and the supporting analysis was positively reviewed as part of the process. The systems analysis highlighted the impacts of cumulative loads of pollutants on regional waterways and catchments. A new policy regime was recommended.

### **Systems analyst – flood investigations for the Western Highway**

#### **VicRoads**

October 2010 – June 2014, Ballarat, Australia. Dr Peter Coombes from Bonacci Water and Urban Water Cycle solutions led the development of a systems framework for integrated catchment management for understand flood risks for the upgrade of the Western Highway for VicRoads. This project required first principles analysis of hydrology and hydraulics across different topography, weather and catchment areas to define flood risks of gauged and ungauged catchments. An innovative combination of two dimensional analysis using historical flooding records from multiple sources (including from interviews and photos) was utilised to resolve the actual flood dynamics of the regions.

### **Advisor**

#### **Office of Living Victoria**

July 2012 – June 2013 (1 year) Melbourne. Independent review of the Metropolitan Water Supply Demand Strategies. This review provided the recommendations for reform and business planning for the OLV. Develop draft Melbourne Integrated Water Cycle Management Strategy by 20 December

2012 as a starting point for ultimate delivery of Melbourne's Water Future to government. Contribute to the development of Melbourne Water Future strategy and ultimate submission to government.

### **Systems analyst – flood management, stormwater and IWCM strategy for Ararat Prison**

#### **Department of Justice**

October 2010 – June 2013, Ararat, Australia. Dr Peter Coombes from Bonacci Water and Urban Water Cycle solutions led the development of an integrated water cycle management strategy for the upgrade of the Ararat Prison. The project utilises rainwater harvesting and wastewater reuse for water supply, and to manage impacts on regional wastewater infrastructure and river catchments. This analysis also determined the flood risks on the upgrade of the Ararat Prison and designed a strategy to mitigate local and regional flooding impacts on the site. An innovative combination of two dimensional analysis using historical data from multiple sources (including from interviews, photos and gauged data) was utilised to resolve the actual flood dynamics of the upper Hopkins River catchments.

#### **Managing Director**

##### **Bonacci Water**

January 2008 – June 2012 (4 years 6 months) Melbourne, Australia. Develop and manage a think tank for systems analysis, development of policy for sustainable management of water resources, and optimum design of infrastructure.

#### **Advisor**

##### **United Nations ESCAP**

January 2009 – December 2009 (1 year) Asia Pacific. Collaborate with the UN ESCAP to provide an advisory report on development of eco-efficient water infrastructure. This process involved research, participation in workshops and discussions, and ultimately delivery of a report to UN ESCAP.

### **Research Leader for Innovative Water Sensitive Urban Design**

#### **eWater Cooperative Research Centre**

January 2005 – June 2009 (4 years 6 months) Newcastle, Australia. Served as the National Research Leader in the eWater CRC for the E2 research program to investigate innovative water sensitive urban design strategies. This research programme included integration of hydrology, hydraulics, asset management, behavioural water demands, economics and ecosystems within biophysical systems approaches.

#### **Associate Professor**

##### **University of Newcastle**

January 2004 – December 2007 (4 years) Newcastle, Australia. Associate Professor of Integrated Water Cycle Management. Initiated, led and contributed to a range of applied research projects in molecular sciences and systems analysis of biophysical systems including water resources and urban planning. Supervised 5 completed PhD research programs and generated more than 50 peer reviewed publications.

#### **Member of working group**

### Prime Minister's Science, Engineering and Innovation Council

January 2006 – December 2006 (1 year) Canberra, Australia. Member of PMSEIC working group for water resources reporting to the Australian Federal Government

### Advisor

#### National Water Commission

January 2005 – December 2006 (2 years) Canberra, Australia. Member of the advisory panel on urban water management reporting to the National Water Commission and the Australian Government.

### Postdoctoral Fellow

#### University of Newcastle

May 2002 – May 2004 (2 years 1 month) Newcastle, Australia. Development of systems analysis of and optimum solutions for integrated water cycle management including shadow prices. Contributed to research programs investigating integrated water cycle management. Published over 20 peer reviewed articles in scientific literature.

### Member of advisory panel for Our Water Our Future policy

#### Victorian Government

January 2005 – December 2006 (1 year) Melbourne, Australia. The Victorian Government developed the Our Water Our Future policy for management of water resources. Served on the advisory panel for alternative water resources as part of developing the Our Water Our Future policy.

## Key strengths

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- Systems thinker and strategist
- Ability to understand and solve complex problems with associated leadership
- Investigation and design of stormwater management, flood mitigation, water supply and wastewater management strategies
- Capacity building and management of multiple disciplinary teams involved in change processes
- Strong experience of political processes involved with water cycle management policies at international, federal, state and local government levels. Indeed this experience includes initiating policy reform at Ministerial levels.
- Research leadership and management in challenging environments
- Data collection, forensic analysis, software development and simulation of systems
- The ability to design and deliver integrated systems, particularly water cycle systems
- Technical investigation and academic research using first principles engineering analysis, investment economics and microbiological science
- Extensive government, policy and regulatory understanding of water, urban development, planning and sustainability issues
- Creation of evidence based policies and regulation
- Excellent oratory skills - public speaking, seminars, technical lectures and media engagements
- Strong written communication style - technical publications, consultancy reports, public policy and public commentary such as opinion pieces

## Summary of experience

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### Consulting and research

- Designed and developed over 120 sustainable developments in Australia and internationally
- Author of over 150 research publications, including book chapters, journal articles, keynote papers and conference publications, and supervision of 5 completed PhD research programs
- Delivery of many research and consulting projects across science, engineering and economic issues relating to water resources including integrated water cycle management, source control, catchment management, ecological sustainability, water demand, water balance modelling, water resource economics and bio-chemistry
- Awarded more than \$3 million in competitive and industry research funding
- Founding and Managing Director of Bonacci Water (2008 - 2012)
- Managing Director of Urban Water Cycle Solutions (1998 -)
- National research leader for innovative Water Sensitive Urban Design strategies in eWater CRC (2005 – 2010)
- Chairman of the Stormwater Industry Association
- Initiator and advisor on the creation of the Bluescope Water by Bluescope Steel

### Government advisory

- Chief Water Scientist at Office of Living Victoria in the Victorian Government (2012 - 2013)
- Member of water advisory panel of the Prime Minister's Science, Engineering and Innovation Council (2006-07)
- Member of the Urban Water Advisory Panel of the National Water Commission (2006 - 2008)
- Advisor, United Nations Water Security Section, Environment and Development Division
- Advisor to international Governments including Canada, Saudi Arabia, India, Korea and New Zealand
- Assisted New South Wales, Victoria, Western Australian and Queensland Governments in the development of water, planning and regulatory policy (1999 - )
- Author of policy reviews and design guides for Water Sensitive Urban Design and Integrated Water Cycle Management across all levels of Government
- Member of Victorian Government's Our Water Our Future panel on alternative water sources (2007)
- Advisor on regional stormwater management projects for the Victoria Department of Sustainability and Environment (2006).
- Author of and expert adviser to the Victorian Government *Living Melbourne, Living Victoria* water policy for Greater Melbourne (2010 - )
- Author of the integrated systems analysis, alternative water and business strategy for the Greater Sydney region for the Board of Sydney Water Corporation.
- Leader and co-developer of the original capacity building program for integrated water cycle management and water sensitive urban design in the Hunter region of New South Wales that involved 16 local government areas, water authorities, government agencies and the community (1998 – 2002).
- Special project officer, Infrastructure and Planning Manager, Newcastle and Maitland City Councils

- Director of the program to develop the Melbourne Integrated Water Cycle strategy for the Office of Living Victoria
- Leader of water reform process for restoring the Al Asfar Lake system in the historical city of Al Hasa in Saudi Arabia

### Conferences and publications

- Chair, 13th International Rainwater Catchment Systems Conference, Sydney, 2007
- Chair, 5th International Water Sensitive Urban Design Conference, Sydney, 2007
- Co-author of "Australian Runoff Quality"

### Career highlights

- Appointment as Office of Living Victoria's Chief Water Scientist and contribution to the successful submission of Melbourne's Water Future strategy to the Victoria Government Cabinet.
- Strong experience in leading high level teams in complex and challenging political environments
- Development of non-linear economic methods that account for the actual depreciation of water assets that allow more realistic planning for infrastructure management
- Establishment of the one of the first stormwater management divisions within a local government authority.
- Development of integrated systems analysis approaches that allow understanding of the decentralised, multiple scaled and regional impacts of water and energy solutions throughout cities, regions and countries. This process provides understanding of the performance of solutions at multiple scales in response to multiple objectives.
- Developed and refined first principles methods for combining hydrology, hydraulics, topography, weather and demographics in analysis of flooding, stormwater runoff, wastewater discharges, water use and environmental impacts in a systems framework.
- Development of dynamic systems economic methods to allow understanding of the value of solutions at multiple scales across society.
- Delivery of systems analysis and policy research, and applied policy processes to led to government policies to allow and encourage urban rainwater harvesting and decentralised water management. In particular, research and policy advice that ultimately led to creation of the state environmental policy BASIX in New South Wales. This project included interaction with the NSW Cabinet.
- Completion of PhD research that developed a systems approach to water cycle management and economics. Followed by the award of an Australian Research Council Post Doctoral Fellowship and ultimately an Associate Professor at University of Newcastle and Melbourne University. Awarded over \$3 million in competitive and industry research funding, and completion of a large number of influential publications in less than a decade.
- Leader and strategist in the original capacity building program for water cycle management and Water Sensitive Urban Design in the Hunter Region of New South Wales. This was essentially a change program to move the water and planning industries from traditional approaches to a more diverse range of solutions and to augment the capacity of those professions. Importantly, this original program has been replicated throughout Australian in a range of similar strategies such as Clearwater in Melbourne and WSUD in Sydney.
- A contribution over a period of more than twenty years as a forensic and systems analyst to find solutions to significant problems throughout the Australian and international water industry. This

has involved the resolution of a wide range of challenges from country towns, regional flooding and metropolitan water resources. This contribution has also included key roles in many major projects.

- Founding and Managing Director of Urban Water Cycle Solutions and Bonacci Water. Both companies have been dedicated to development of systems and forensic analysis leading to transparent policy and project advice to industry and government. Both companies have achieved financial success from start up (Bonacci Water ultimately achieved an annual value of about \$2 million) in a difficult business environment already dominated by existing consultancies with established relationships with bureaucracy.
- Contribution to and leadership in many policy processes including The Living Victoria Living Melbourne water policy reform process, the Sydney Water Alternative Water Strategy, The Water Advisory Group of the Prime Minister's Science Engineering and Innovation Council and Urban Water Advisory Group of the National Water Commission.
- Initiated and contributed to the creation of Bluescope Water as a subsidiary company of Bluescope Steel to provide an alternative water solutions throughout Australia
- Provided advice to the Canadian national government that led to policies for wastewater reuse, stormwater and rainwater harvesting.
- Leader of a program to restore the Al Asfar Lake system at Al Hasa in Saudi Arabia. This role included liaison with all levels of the government and coordination of efforts to change attitudes and policies relating to the water cycle.