The ANU Water Initiative is a cross-disciplinary, university-wide initiative that brings together ANU researchers and educators in the water domain.
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2008 and 2009 have so far proved to be extraordinarily busy for everyone involved in the ANUWI, as we strive to take early ideas and initiatives forward.

On the education front, the undergraduate water major has been a significant highlight and reflects the ANUWI commitment to an integrative approach to water resource management. Since its launch, a growing number of students have enrolled in the water major, which shows the keen interest of the next generation to understand Australia’s most important environmental challenge. We look forward to even greater numbers in the future.

At postgraduate level, the launch of the Aspi Baria PhD Scholarship on Australian water research, supported by ACTEW, was a moving occasion, commemorating as it did the life and work of one of Australia’s most respected and loved water scientists. The inaugural winner of the PhD scholarship, Ms Jenna Roberts, has already commenced her studies on nutrient transport and fate in the Murrumbidgee below the Lower Molongolo Quality Control Centre and we wish her every success.

This year, considerable effort has been placed on building the ANUWI’s links and profile within Australia and internationally. Successes so far include the establishment of CAPITAL-water, a joint venture with the University of Canberra to exploit our collective, complementary expertise to develop interdisciplinary, policy-relevant research projects. CAPITAL-water will be overseen by our own Professor Quentin Grafton as well as Prof Richard Norris from the University of Canberra and more details on the collaboration can be read on page 25.

Many of our members also participated in the IARU Climate Congress in March in Copenhagen. In particular, Jamie Pittock convened a very successful session on climate adaptation in the water sector, showcasing a comparative study of six projects from India, China, Mexico, Brazil, the lower Danube basin and Tanzania. The session was over-subscribed to such an extent that the organizers were worried about health and safety regulations! More details follow on page 23.

On the research front, three proposals were successful in obtaining seed funding from the ANUWI Endowment:

- National Centre for Groundwater Research and Training (Tony Jakeman)
- ANU-UTS Water-Energy Links (WEL) project (Karen Hussey, Barry Newell)
- The Climate Risk Project (Daniel Connell)

All three projects have been developing at a terrific rate, illustrated by the successful international conference Drought – Past and Future held in Canberra in November 2008 and the employment of Ms. Debborah Marsh as the postdoctoral fellow on the WEL project.

Internationally, the ANUWI’s collaboration with the pan-European organization “COST” (European Collaboration in Science and Technology), has so far proved very successful, with the first of three workshops held in Brussels in January. Involving 40 researchers from around the world, and Dr Cathy Wilson from the U.S. Department of Energy’s Los Alamos National Laboratory giving the Keynote Presentation, the outcomes from the workshop included a list of Policy Recommendations endorsed by the workshop participants and subsequently distributed to various government ministries and agencies, and the establishment of a COST
Action Network proposal for €400k ($800k) to support our activities over the next four years. The ANU-COST collaboration builds on our project with UTS, and will culminate in a side-event at the UNFCCC COP15 in Copenhagen in December 2009 (co-sponsored with the UK Environment Agency, DHI Denmark and KWR Netherlands) and the publication of a special issue of a journal.

These are just some of the highlights of our successes in 2008 and 2009. Before signing off for another year, we would like to extend our heartfelt thanks to Noel Chan, who continues to provide us with outstanding administrative support without which we could not function. We are also grateful for the outstanding work of Dr Daniel Connell, the ANUWI Research Facilitator.

Finally, we would like to remind you that the success of a cross-campus initiative like this relies on the input and feedback of all interested people on-campus, so, if you have something you would like to share with ANU’s ‘water’ community, please feel free to contact us directly, and, of course, make use of the ANUWI website and mailing list.

From the Chairs,

Karen Hussey & R. Quentin Grafton
About ANUWI

About Us

The ANU Water Initiative is a cross-disciplinary, university-wide initiative that brings together ANU researchers and educators in the water domain.

The ANU Water Initiative aims to:

- identify gaps in our understanding of the water system and provide solutions to the most important and urgent of questions for sustainable water management;
- develop a holistic approach to sustainable water management by building on, and integrating, our significant strengths across the colleges of water-related research and education;
- develop new approaches to research question formulation, collaborative teamwork, knowledge brokering and the creation of policy-relevant solutions in water; and
- engage with key stakeholders in the water domain.

Our Themes

The four core themes divide the whole into ‘conceptual regions’ that cover the most significant issues in an inherently integrative manner. Within the themes the issues are complex and require multi-sectoral and multidisciplinary approaches involving various stakeholders with different interests and policy agendas. The relationship between the research themes is similarly important for the integration of rural, peri-urban and urban water systems and management.
ANUWI Steering Committee

The ANU Water Initiative Steering Committee is a small, skills-based group of key ANU water-related researchers and educators from across the major disciplines. The Steering Committee is charged with providing leadership for the ANU Water Initiative on behalf of ANU as a whole; provide overall strategic direction of the Initiative; and to represent areas of research and/or academic areas for inclusion in the Initiative’s activities.

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
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<tbody>
<tr>
<td>Karen Hussey</td>
<td>(Co-Chair) Crawford School of Economics and Government, and Office of the Vice Chancellor</td>
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<tr>
<td>Quentin Grafton</td>
<td>(Co-Chair) Crawford School of Economics and Government</td>
</tr>
<tr>
<td>Daniel Connell</td>
<td>(Research Facilitator) Crawford School of Economics and Government</td>
</tr>
<tr>
<td>Sara Beavis</td>
<td>The Fenner School of Environment and Society</td>
</tr>
<tr>
<td>Jeff Bennett</td>
<td>Crawford School of Economics and Government</td>
</tr>
<tr>
<td>Stephen Dovers</td>
<td>Director, The Fenner School of Environment and Society</td>
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<tr>
<td>Mike Hutchinson</td>
<td>The Fenner School of Environment and Society</td>
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<td>Tony Jakeman</td>
<td>The Fenner School of Environment and Society</td>
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<tr>
<td>Judy Jones</td>
<td>ANU College of Law</td>
</tr>
<tr>
<td>D.C. “Bear” McPhail</td>
<td>Department of Earth and Marine Sciences</td>
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<tr>
<td>Barry Newell</td>
<td>The Fenner School of Environment and Society</td>
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<td>Paul Perkins</td>
<td>The Fenner School of Environment and Society</td>
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<tr>
<td>John Reid</td>
<td>Environment Studio, School of Art</td>
</tr>
<tr>
<td>Will Steffen</td>
<td>Director, ANU Climate Change Institute</td>
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<tr>
<td>Andrew Walker</td>
<td>Resource Management in Asia-Pacific Program (RMAP), Research</td>
</tr>
<tr>
<td>Ian White</td>
<td>School of Pacific and Asian Studies (RSPAS)</td>
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<td></td>
<td>The Fenner School of Environment and Society</td>
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<tr>
<td>Roz Smith *</td>
<td>ANU Climate Change Institute</td>
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<tr>
<td>Lance Heath *</td>
<td>ANU Climate Change Institute</td>
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* Coordinating role for ANU Climate Change Institute and not a member of Steering Committee
ANU Water Expertise

Water-related education and research is currently carried out across the campus in a range of disciplines and academic areas. The work conducted and expertise within these areas is summarised below.

<table>
<thead>
<tr>
<th>Academic area</th>
<th>Expertise</th>
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<tbody>
<tr>
<td>ANU College of Arts &amp; Social Sciences</td>
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</table>
| Faculty of Arts | • Creating contemporary music & visual aesthetic material addressing water  
| School of Art | • Critical re-enforcement of cultural foundations for addressing water challenges  
| School of Music | |
| Research School of the Humanities | • International water policy  |
| Centre for Aboriginal Economic Policy Research | • Economics & decision making  
| | • Water policy & regulation  
| | • Water pricing, markets & sales  
| | • Ground water access & management  
| | • Water supply & allocation  |
| ANU College of Asia & the Pacific | |
| Crawford School of Economics and Government | • Economics & decision making  
| | • Water policy & regulation  
| | • Water pricing, markets & sales  
| | • Ground water access & management  
| | • Water supply & allocation  |
| Research School of Pacific and Asian Studies | • Gender & water  
| | • Water & development  
| | • Water & communities  
| | • Social, economic & cultural aspects of water resource management  
| | • Water & environmental history  
| | • Water resource politics  
| | • Quality of water & spread of water-borne diseases  
| | • Water pricing issues  
| | • Attainment of water related MDG in Asia Pacific Region  
| | • Planning for the water needs of Asian mega-cities  |
| ANU College of Law | |
| Faculty of Law | • Federalism & water regulation  
| | • History of water use, law & policy  
| | • Human rights & water  
| | • Indigenous rights & interests in water (onshore & offshore)  
| | • Property rights in water  
| | • Regulatory design for scientific uncertainty (precaution)  
| | • The law of international watercourses  
| | • Water policy & regulation  |
| ANU College of Medicine, Biology and Environment | |
| National Centre for Epidemiology and Population Health | • Public health & water-borne diseases  
| | • Water & development  
| | • Cross-disciplinary integration for policy & practice  |
| The Fenner School of Environment & Society [including Integrated Catchment Assessment and Management (iCAM)] | • Integrated water resources management  
| | • Water policy & regulation  
| | • Water quality  
| | • Sedimentation & salinity  
| | • Ground water & surface water  
| | • Decision support systems  
| | • Water trading  
| | • Institutional analysis  
| | • Indigenous water knowledge & cultural flows  
| | • Indigenous water governance, policy, ethics, & philosophy  
| | • Cultural values & water  
| | • History of water institutions & federalism  
| | • Policy & institutional analysis  |
ANU College Physical Sciences

Research School of Earth Sciences
- Geomorphology
- Geochronology
- Trace element & isotope analysis
- Fluid dynamics

ANU Water Capacities

Researchers and educators at the ANU have established strengths across a broad spectrum of water-related issues, from global change, public health, policy analysis, environmental law, environmental economics, indigenous and gender issues, through to hydrology, geochemistry and membrane technology which are applied over a wide range of temporal and spatial scales. In 2008, ANUWI had over 100 staff/research students across different colleges and departments registered in the network.

Figure 3: Water expertise in ANU across disciplines
### ANUWI activities

<table>
<thead>
<tr>
<th>Year</th>
<th>Activities</th>
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| 2006 | ANU Water Initiative established  
      | National Water Conference, 4-5 December |
| 2007 | ‘Water Matters’ Colloquium, 24-25 August  
      | ANU NeWater Workshop on Adaptive Water Management, 28 August  
      | Water-related Undergraduate and Postgraduate Programme offered in ANU |
| 2008 | ANUWI Workshop on the Links Between Climate, Energy and Water, 6 March  
      | Seed Investment Funding Proposal on Freshwater Study  
      | Aspi Baria PhD Scholarship on Australian water research  
      | Capital-WATER established, 22 July  
      | ANU Drought – Past and Future Conference, 14-15 November |
| 2009 | ANU-COST Energy-Water Links Workshop, 19-21 January, Brussels (Workshop 1)  
      | IARU Climate Congress, 10-12 March, Copenhagen  
      | ANU-COST Energy-Water Links Workshop, 8-10 June, Brussels (Workshop 2)  
      | ANU-COST Side Event and Launch of Special Issue of Journal, UNFCCC COP15, 10-17 December, Copenhagen |
| **On-going activities** | ANUWI website and e-list: for water information and research publication exchange  
                           | ANUWI Research Facilitator: The Climate Risk Project; MDB/NWC joint project; lectures and presentations |
Activities highlights in 2008

Seed Investment Funding Proposal on Freshwater Study

April, 2008

In keeping with the spirit of the Hilda John Bequest the ANU Water Initiative (ANWI) invites proposals from groups of ANU researchers on environmental issues related to fresh water in Australia. The intention is to provide seed investments for up to three research groups to develop a series of research proposals, activities, collaborations and outputs that would assist each of the groups to successfully compete for long-term research funding in fresh water research before the end of 2010. Potential sources of external funding include the Australian Research Council and similar funding bodies as well as philanthropic foundations.

Successful proposals

- National Centre for Groundwater Research and Training (Tony Jakeman)
- ANU-UTS Climate-Energy-Water Links (CEWL) project (Karen Hussey, Barry Newell)
- The Climate Risk Project (Daniel Connell)

Aspi Baria PhD Scholarship on Australian water research

Scholarship Launch, 12 May 2008 at ANU

Aspi Baria was an admired, respected and well-known water scientist from ACTEW Corporation (ACTEW) in Canberra who tragically died following a boating accident on 12 May 2007. ACTEW and ANU have established a PhD scholarship via the ANU Water Initiative in Aspi’s name, to enhance the study of water related science in Australia. This prestigious scholarship will have water as its overall theme and the successful candidate will have a background and interest in chemical, environmental or engineering aspects of water quality and/or distribution.

Ms Jenna Roberts is the successful candidate. Jenna is an ex-ANU student who is completing a 12 month graduate placement at Geoscience Australia. Ms Roberts will commence the PhD in February 2009 under the supervision of Prof David Ellis at RSES. The PhD project will focus on nutrient transport and fate in the Murrumbidgee below the Lower Molongolo Quality Control Centre.
Capital-WATER is an equal partnership between the Australian National University and the University of Canberra to: provide professional training in all areas of water related expertise in our two institutions; expand and improve upon our water-related degree offerings across multiple disciplines; and deliver world-class water research that makes a difference in this community and beyond. The establishment of the collaboration has received a wide range of support among researchers and students in both universities as well as other research communities.
ANU Drought – Past and Future Conference

14-15 November 2008, Hedley Bull Centre ANU

This conference is the first stage of The Climate Risk Project * and an international study funded by the ANU Water Initiative (ANUWI) that will compare drought management and planning for climate change in the world's southern and northern temperate zones - southern Australia, southern Africa, southwest US, the Mediterranean rim (Portugal, Spain and Turkey), northern China and South America. The conference will present some of the work relevant to the Australian region and discuss the themes to be investigated in the larger project.

Around two hundreds participants attended the two-days conferences and presentation materials are available on the ANUWI website http://www.water.anu.edu.au/events/dpf/index.php.

Conference Themes:

1. **Knowledge** – what has been the understanding of drought and climate variability in Australia over the past two centuries?
2. **Australian drought policy** – what are the recurring issues?
3. **Political, economic and social risks** – how have these been defined and managed in the context of droughts?
4. **Contemporary case studies** of Australian drought management - what do they reveal about the interactions between communities and droughts over the past two centuries?
5. **Australian drought management** from an international perspective

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**Program and list of speakers**

**Friday 14th March**

**Bruce Campbell**, River Murray Water, Murray-Darling Basin Commission
The Murray-Darling Basin Agreement is the product of nearly a century of water sharing experience. How robust has it been as a framework for the management of the recent severe drought?

**Dr Tony McLeod**, Murray-Darling Basin Authority
A new master plan is being prepared for the Murray-Darling Basin. Will it be able to take account of climate variability and droughts?

**Dr Daniel Connell**, ANUWI & Crawford School of Economics and Government, ANU
What would the MDB Basin Plan look like if it did not have to take account of state borders?

**Prof Jun Xia**, Chinese Academy of Sciences, Beijing
Drought and predictions of increased climate variability are serious issues for north China, How is the Chinese government preparing for the future?

**Prof Quentin Grafton**, ANUWI & Crawford School of Economics and Government, ANU
How does Australia manage the risks to urban water supplies caused by droughts? What should we do differently?

**Prof Brian Head**, Institute of Social Science Research, University of Queensland
The urban water crisis in Australia and the governance of uncertainty – a challenge for the policy process.
Dr Jeff Connor, *Water for a Healthy Country CSIRO*
Water Scarcity and salinity impacts of climate change on irrigated food supply in arid and semi-arid climates.

Prof Douglas Fisher, *Department of Law, Queensland University of Technology*
Australian water law has long taken account of climatic risks such as droughts. Is this an adequate foundation for the policies and laws needed to manage the predicted impacts of climate change on water resources and water based environments?

Dr Nicole Graham, *Department of Law, Macquarie University*
Is current Australian property law an appropriate tool for water resource management given its purpose and the history of its operation and contribution to environmental law so far?

Dr Jane Doolan, *Office of Water, Victorian Department of Sustainability and the Environment*
The current drought has been devastating for riverine environments in Victoria. How are choices being made about what to save and what to let go? What are the implications for climate change?

Dr Sue Jackson, *Tropical Ecosystem Research Centre, CSIRO*
What happens to indigenous interests during times of drought? The National Water Initiative emphasizes the need to give comprehensive recognition to Indigenous interests in water. To what extent is this being realized in practice?

Prof Tony McMichael, *National Centre for Epidemiology and Population Health, ANU*
Climate change is predicted to have a number of serious implications for human health in Australia. What are the policy implications both in the field of health itself and more generally?

Dr Linda Botterill, *Research School of Social Sciences, ANU*
Reflections on the recent review of Australian Government drought policy.

John Reid, *Fenner Schoo, Art School, ANU*
Drought, what has been and what could be the contribution of the visual arts?

Dr Roger Pulwarty, *Director National Integrated Drought Information System, Colorado USA*
Lessons learned and not learned in the south-western USA

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**Saturday 15th March**

Dr John Williams, *Commissioner, Natural Resources Commission NSW*
Since early in the twentieth century the CSIRO has been Australia’s leading research organization for natural resource management issues such as adaptation to climate variability. What does its history show about the responses of Australian researchers to drought and climate variability? Where to from here?

Dr Rosalind Bark, *Arizona Water Institute*
Water supply reliability, management and drought adaption in the Colorado River Basin USA. Rosalind Bark will also discuss dry year options, water transfers, intra and interstate water banking and the new guidelines for managing the Colorado system.

Dr Jeff Loux, *University of California Davis*
Southern California has a profusion of different and often conflicting systems of water management and water rights so how do decisions get made about competing demands?

Dr Karen Hussey, *ANUWI ANU (based in Brussels)*
Drought policy in the European Union.

Prof Rodrigo Maia, *University of Porto, Portugal*
Drought management in Portugal and Spain.

Prof Stephen Dovers, *Fenner School of Resources and Environment, ANU*
Reflections on the conference proceedings and the implications for the research agenda of the international Climate Risk comparative project.
ANU water courses/programs

1) ANU undergraduate water degrees
The ANUWI has developed a major in water in the Bachelor of Interdisciplinary Studies (Sustainability (BIS) (S)) and the Bachelor of Science (BSc). This major is designed to offer students courses which expose them to water science and engineering along with policy, management and socio-cultural facets of water. The major reflects the ANUWI’s commitment to an integrative approach to water resource management as espoused in the Strategic Plan. The water majors have been offered by the ANU since 2007/2008.

The Fenner School of Environment and Society and the Department of Earth and Marine Sciences in the College of Science offers several degrees with a specific environment and sustainability focus.

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<th>ANU undergraduate water degrees</th>
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<tbody>
<tr>
<td>• Bachelor of Global and Ocean Sciences (Honours)</td>
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<tr>
<td>• Bachelor of Interdisciplinary Studies (Sustainability) – Water Science and Policy Major</td>
</tr>
<tr>
<td>• Bachelor of Interdisciplinary Studies (Honours) (Sustainability) – Water Science and Policy Major</td>
</tr>
<tr>
<td>• Bachelor of Science (BSc) - Water Science and Policy Major and Double Major</td>
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<tr>
<td>• Bachelor of Science (Resource and Environmental Management) (single and combined degrees)</td>
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Undergraduate degree with major in environment/water-related theme across different colleges

<table>
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<tr>
<th>College of Science</th>
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<tbody>
<tr>
<td>• Earth and EnviroScience</td>
<td>• Global Change Science</td>
</tr>
<tr>
<td>• Ecology and Evolution</td>
<td>• Human Ecology</td>
</tr>
<tr>
<td>• Double Major Ecology &amp; Evolution</td>
<td>• Interdisciplinary Science</td>
</tr>
<tr>
<td>• Environmental Geoscience</td>
<td>• Marine Geoscience</td>
</tr>
<tr>
<td>• Environmental Modelling</td>
<td>• Palaeoenvirons &amp; Marine GeoSci</td>
</tr>
<tr>
<td>• Geology</td>
<td>• Scientific Communication</td>
</tr>
<tr>
<td>• Double Major Geology</td>
<td>• Sustainability Science</td>
</tr>
<tr>
<td>• Geochemistry and Mineral Resources</td>
<td>• Water Science &amp; Policy</td>
</tr>
<tr>
<td>• Geography</td>
<td>• Double Major Water Science &amp; Policy</td>
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<table>
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<th>College of Arts and Social Science</th>
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<tbody>
<tr>
<td>• Biological Anthropology</td>
<td>• Human Ecology</td>
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<td>• Development Studies</td>
<td>• Human Sciences</td>
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<tr>
<td>• Environmental Resources</td>
<td>• Population Studies</td>
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<td>• Geography</td>
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<tr>
<th>College of Engineering and Computing</th>
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<tr>
<td>• Environmental Systems</td>
<td>• Sustainable Energy Systems</td>
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</table>

2) ANU postgraduate water courses
The Fenner School of Environment and Society is offering a new cross-discipline postgraduate program specific on environment in 2008:

• Master, Graduate Diploma, Graduate Certificate in Environment, specialise in:
  o Integrated Assessment and Modelling,
  o Water Science and Management
  o Global Change Science and Policy
  o Environmental Policy
  o Integrated Methods and Practice
  o Natural Resource Management
  o Society and Environment
### Postgraduate study with water-related theme in ANU

| Graduate Research Area (PhD and/or MPhil) | | Graduate Certificates by coursework | | Graduate Diplomas by coursework | | Masters by coursework & research |
|-------------------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|---------------------------------|
| Anthropology | Ecology Evolution and Systematics | Engineering and Information Sciences | Environment and Resource Management | Economics | Epidemiology, Population Health and Health Services | Geographical Sciences | Geosciences | Interdisciplinary Cross-Cultural Research | Law |
| Graduate Certificate in Environmental Law | Graduate Certificate in Environmental Management and Development | Graduate Certificate in Environment | Graduate Certificate in Forestry | Graduate Certificate in Geographical Sciences |
| Graduate Diploma in Arts Biological Anthropology Specialisation | Graduate Diploma in Law specializing in Environmental Law | Graduate Diploma in Environmental and Resource Economics | Graduate Diploma in Environmental Management and Development | Graduate Diploma in Forestry |
| Graduate Diploma in Geographical Sciences | Graduate Diploma in Science (Available with specialisations in Forestry, Geography, Human Ecology, and Resource and Environmental Management) |
| Master of Applied Anthropology & Participatory Development (MAAPD) | Master of Arts Biology Anthropology | Master of Contemporary Sciences | Master of Environmental and Resource Economics | Master of Environmental Law |
| Master of Environmental Management and Development - specializing in Water Management | Master of Environmental Science | Master of Environment (MEnv) - specializing in Water Science and Management | Master of Geographical Science | Master of Resources, Environment & Society |
| Master of Diplomacy/Master of Environmental Management & Development |

### 3) Professional development of DEWHA

The ANUWI in collaboration with University of Canberra completed a professional course in key areas of water (hydrology, environmental flows, institutions, and water trading) for the Department of Environment, Water, Heritage and the Arts. The course was a great success. The ANUWI has enlarged the course and it will be delivered again in the first half of 2009.

### ANUWI Website

ANUWI website is developed to provide the platform for information exchange between water expertise, researchers, students and public. Website information includes:

- Background of ANUWI
- Updated events and activities
- Past conference or workshop presentation
- Water related publication of WI members
- Updated international water conferences, workshops, funding and scholarship opportunities and information
1. The Managing Climate Risk project

In June 2008 I was awarded seed funding from the ANU for a project designed to develop international linkages and projects that could be used as the foundation for applications to outside funding bodies in Australia, United States, Europe, China or Japan. The central element of the first phase of this project was a conference in Canberra in November 2008 which included researchers from the United States, Portugal, Brussels and China. The international researchers both contributed to the conference proceedings and took part in discussion re the next phase which – it is proposed – will include a conference in California in April/May 2010. A book based on the November 2008 conference and the international conference on environmental flow allocations conducted in Pt Elizabeth in February 2009 – *Contested Rivers* – to be edited by myself and David Salt is being discussed with CSIRO publishing.

2. NWC fellowship

The fellowship covers travel costs in southern Australia, South Africa, south-west USA and Spain/Portugal in 2008/9 to conduct a comparative study of drought/water management. In the second half of 2008 early 2009 material was collected in southern Australia and South Africa. This included a series of interviews re water management lodged with the National Library.

3. Field trip South Africa/Mozambique - February 2009

In addition to collecting material relevant to the NWC Fellowship project I:-

- contacted authors re participation in the book *Contested Rivers*,
- gave a keynote presentation at the international conference on environmental allocations in Pt Elizabeth, and
- worked with staff at the University of Pretoria and the University of Eduardo Mondlane in Maputo Mozambique planning a workshop for policy makers and managers from across southern Africa in late 2010 and a course re water economics and governance to be offered in Maputo in 2011 as part of a new masters degree.

4. Field trip China – September & December 2008 and March 2009 to Beijing and Wuhan

Aim was to explore research links with the Chinese Academy of Sciences, the Development of Research Centre of the Ministry of Water Resources and the Research Institute of Environmental Law Wuhan University. A course is also being developed to offer to masters students at RIEL in October 2009. ANU students are to be included in 2010.
5. Japan – March 2009

I took part in an International Lake Environment Committee (ILEC) workshop held at Shiga in central Japan that considered reports on a series of projects funded by the Japanese Dept of Education on institutional issues related to lake and estuary systems from a range of countries, USA, Russia, Mexico, Kenya, Nepal, India, Thailand, Malaysia, Philippines, Korea and Japan. This will be followed up by an international conference on lakes to be held in Wuhan in November 2009 that I plan to attend. In addition, at the conclusion of the March workshop I made a second presentation to a public forum and helped prepare material for use in a course on lakes run by an ILEC associated institute for water managers from south east Asia, Africa, Turkey, Mexico and Chile.

5. Other trips

Norwegian Minister for the Environment Erik Solheim visited in May 2008. I organised an overnight field trip from Canberra to Mildura and a CSIRO briefing for him on climate change in the MDB.

6. Presentations

- Presentation - Water Forum Greens ACT branch May 17th
- Presentation - Northern Futures conference Charles Darwin University Darwin May 30th
- New course approved *Water conflicts in Australia* to be offered in mid 2009 focusing on economic, governance and institutional issues to be joint taught by myself and Quentin Grafton
- Presentation draft chapter Book workshop University of South Australia October 2008 on sustainability and the law (publication still being developed)
- Presentation Regional Futures conference Oct 20th Albury
- Presentation draft chapter Book workshop Melbourne University December 2008 (publication still being developed)

7. Lectures for other courses in the ANU

- Public Accounting Aug 27th (3rd year Accounting)
- Water Resources Management May 2nd (3rd year Fenner)
- groundwater (3rd year Earth Sciences) Oct 22nd
- Federalism April 4th (Masters Law)
- Science and Public policy Aug 18th (Masters CPAS)

8. Publications

The ANU-UTS Climate-Energy-Water Links Project

Barry Newell, February 2009

The ANU-UTS Climate-Energy-Water Links (CEWL) project is a response to the fast-growing recognition that a better understanding of the links between climate, energy and water is essential in any attempt to formulate energy and water policies for more resilient and adaptable societies. The aim of the project is to establish a new conceptual framework capable of supporting integrative policy-making in the climate-energy-water domain.

The specific issue that motivates the CEWL project is the need to overcome current sector-based approaches to energy and water policy design. Water and energy are indispensable inputs to modern economies. Energy is the basic currency of the biosphere and, defined as the ability to do work, is embedded in all systems of production and consumption (Dovers 1994). Water is essential for all life, and similarly embedded in production and consumption. Many large-scale energy-conversion processes consume water, and most bulk water-supply processes require the expenditure of significant amounts of energy (Proust, Dovers, Foran, Newell, Steffen, and Troy 2007). Climate affects both the supply of, and demand for, energy and water—and energy-conversion and water-extraction processes have the potential to contribute to climate change. There is a growing recognition, around the world, that a better understanding of the nature and possible effects of the links between climate, energy and water is essential in any attempt to formulate energy and water policies for more sustainable and adaptable societies (Marsh and Sharma 2007).

The CEWL project was initiated in October 2007. An ANU CEW Links Workshop was held on 6th March 2008 in the Mills Room, Chancelry, ANU. The workshop, which was entitled Towards an Australian Climate-Energy-Water Links Program, ran from 10.00 am to 3.00 pm and attracted some 30 participants from around Australia. The stated aims of the workshop were: to begin to document participants’ range of expertise and activities, to develop an initial view of the complexity of the Climate-Energy-Water system, to establish the basis for a broad discussion of the R&D required to support the design of integrated policy, and to provide participants with an opportunity to establish contact with potential collaborators.

The workshop was facilitated by Barry Newell using an activity taken from the system-dynamics analysis methods developed by Newell and Proust (Newell, Proust, Wiltshire, and Newell 2008). In this activity workshop participants were asked to construct influence diagrams centred around some aspect of the Climate-Energy-Water nexus. The influence diagrams produced during the workshop are being used to guide the development of initial models of the global and Australian CEW systems.

An important outcome from the workshop was the establishment of a two-year collaborative CEWL project funded jointly by The Australian National University and the University of Technology, Sydney. A formal project agreement between the ANU and UTS was signed in September 2008. The project will run until September 2010. Project outcomes will include published case studies and a conceptual framework to support policy makers who wish to take an integrative approach.

The ANU-UTS CEWL project steering committee comprises Chris Davis (UTS), Steve Dovers (ANU), Lance Heath (ANU), Barry Newell (ANU, Chair), Deepak Sharma (UTS), and Will Steffen (ANU). A CEWL Advisory Group will be formed during 2009. Debborah Marsh (debborah.marsh@uts.edu.au) has been appointed as the project Research Fellow.
The ANU-UTS CEWL project will initially comprise three linked case studies:

- The Impact of Carbon Reduction Policies on the Water-Energy Nexus in SE Australia (Debborah Marsh),
- Policy Inertia in the Australian CEW System (Barry Newell), and
- Crops and Soils in the SE Australian Climate-Energy-Water System (Eric Craswell).

In addition, there are two ANU Department of Engineering (DE) Honours projects underway that are conceptually and methodologically related to the CEWL project and that have the potential to draw on and contribute to the project:

- The Impact of Plug-in Electric Cars on the ACT CEW System (Chris Olley), and
- The Significance of Community-Owned Distributed Power Generation for SE Australia’s Energy Future (Tristan Webber).

Contact

References


The ANU-COST Collaboration in the Energy-Water Nexus

Karen Hussey, March 2009

Building on ANUWI’s collaborative project with the University of Technology, Sydney (details previous page), I have been developing research opportunities internationally

1st COST-ANU Workshop January 2009, Brussels

The aim of the 1st workshop was to develop a comprehensive understanding of how energy and water are related, where trade-offs exist, how we can measure and manage those trade-offs and, ultimately, how we can make better decisions in the energy and water sectors. Forty participants from Europe, the United States, China, India, and Australia participated in the three day workshop, and Dr Cathy Wilson from the US Department of Energy’s Los Alamos National Laboratory delivered the Keynote presentation. The workshop was facilitated by three Chairs:

- Jamie Pittock: Scale and Institutions
  Australian National University and WWF
- Trevor Bishop: Data - Sources, Needs and Accessibility
  UK Environment Agency
- Henrik Larsen: Governance, Regulation and Management
  DHI Water Policy

There were three main outcomes from the workshop: a list of policy recommendations to enable better decision-making by policy-makers and business alike (written and endorsed by the participants); the identification of four research projects to pursue funding for; and the establishment of an energy-water network to be hosted by the ANUWI.

COST Action Proposal

Immediately after the workshop, a number of the participants pulled together a proposal for a COST Action, which, if successful, would see the network pursue four key deliverables (supported by $800k over four years):

1. The development of decision-support tools to assist policy-makers in planning, including an open-source model that integrates energy-water relationships and qualitative impacts on the agricultural sector.
2. An education and training curriculum for professionals and, particularly early-stage, young scientists that will provide new approaches to understanding complex adaptive systems and equip professionals with theoretical and applied approaches to better understand and manage cross-sectoral interactions.
3. The establishment of an international network of experts to maximize the exchange of scientific and technical knowledge and ensure a comprehensive approach to existing and ongoing research activities. Short-term scientific missions will be an important tool in this knowledge transfer.
4. An international conference at the end of the Action to disseminate, discuss and exchange the research results to the broader academic and policy communities.

The COST Action would be supported by €400k ($800k) over four years.
The members of the COST Action proposal was convened by Karen Hussey and Adriana Hulsmann and the members of the team are:

**NL**: Arjen Hoekstra & P.W.Gerbens-Leenes, University of Twente, Albert Schram, University of Maastricht, Frans Schulting, Global Water Research Coalition

**UK**: Andy Howe & Trevor Bishop, UK Environment Agency, Kerry Thomas, University of Oxford

**SW**: Gustav Olsson, Lund University

**ES**: Angeles Blanco & Carlos Negro, Universidad Complutense de Madrid, Anna Osann, Universidad de Castilla-La Mancha

**G**: Dionysis Assimacopoulos, National Technical University of Athens

**BE**: Gema Sanbruno, European Small Hydropower Association, Mateo Cordier, Universite Libre de Bruxelles

**IT**: Giampero Maracchi & Simone Orlandini, University of Florence

**F**: Gilles Negro, Office International de L’Eau

**DK**: Henrik Larsen, DHI Water Policy

**CH**: Thomas Brenauer, ETH Zurich

**IL**: Itay Fishendler, The Hebrew University of Jerusalem


**RSA**: Jo Burgess, Water Research Commission

**AUS**: Jamie Pittock, Australian National University, Debborah Marsh, University of Technology Sydney

**CN**: Xingshu Zhao, Chinese Academy of Social Sciences.

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**2nd COST-ANU Workshop June 2009, Brussels**

A second, smaller workshop is planned for June, with the aim of publishing approximately 8 case studies from around the world, which, together, highlight the complexity of the climate-energy-water-food (...) interactions and which identify where better integrated policy and management strategies and solutions are needed or available. We have already identified the case studies and authors: they span the globe and provide the necessary breadth and diversity to cover the issues. Almost all of the authors were present at the first workshop. The case studies will be published in a special issue of a journal, which will in turn be launched at the UNFCCC COP15 in December 2009, in Copenhagen. Jamie Pittock and I will edit the journal, and the ANU-UTS project will contribute one of the case studies.

**Contact**

For further details on this initiative, please feel free to contact me at: karen.hussey@anu.edu.au
The Climate Risk Project

Daniel Connell, March 2009

The Climate Risk Project is an international study funded by the ANU Water Initiative (ANUWI) which is investigating the management of climate risk in the world’s northern and southern temperate zones (southern Australia, southern Africa, south-west United States, the Mediterranean rim, China and South America). These regions all share high climatic variability, long histories of attempting to manage droughts and increasing exposure to the negative impacts of climate change. The aim is to build an international network of researchers interested in social and economic resilience and governance issues relevant to the management of droughts and adaptation to climate change. The Climate Risk Project is also building links with policy makers and managers. Water policy and management practice is poorly documented and examined in the research literature and it will be essential to draw heavily on the knowledge of practitioners.

Drought is being used as the starting point for a wide ranging analysis. Extreme droughts reveal strengths and weaknesses that are hidden in less stressful times. Underlying political priorities, cultural values and the fundamental characteristics of technical and institutional systems are often most evident when contentious policies have to be implemented and choices made between competing demands. Using as a starting point the tensions created by drought the issues that are being investigated through The Climate Risk Project include the capacity to:-

- act expeditiously in the face of crisis,
- base policy on good science,
- consult effectively with the wider community about contentious issues,
- manage across political borders,
- manage economic impacts and risks,
- negotiate compromises between competing interests, e.g. rural/urban, production/environment, upstream/downstream,
- influence factors in the wider catchment impacting on water quantity/quality,
- achieve compliance in contested situations,
- promote culture change which will support major reform programs
- take account of social justice and indigenous issues, and
- adapt to novel circumstances not envisaged when the relevant institutional framework was first negotiated.

The Drought – Past and Future conference, 14-15 November 2008, was the first stage of The Climate Risk Project. The conference presented some of the work relevant to the Australian region and discussed the themes to be investigated in the larger project. The project has also developed a database on drought Information which is a collection of both recent and historic work focusing on drought in Australia.

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ANU providing Decision Support for the new National Centre for Groundwater Research and Training

Tony Jakeman, April 2009

On 22 January 2009, Senators Penny Wong and Kim Carr announced $30M for the new National Centre for Groundwater Research and Training. The Centre is expected to start up on June 1, 2009. It is a joint venture over 5 years involving some 20 organisations, including the ANU, UNSW, UQ, CSIRO, Geoscience Australia, and the NSW and SA state governments, to be headed by Flinders University. The new knowledge generated through the NCGRT programs is intended to redress some unfortunate legacies of water resource management in Australia, namely the lack of integrated management of surface and groundwater systems and, consequently, the lack of sustainable groundwater practices that have characterised historical management. The Centre also aims to address the required training in groundwater research of Postdocs, PhDs and Honours students.

Tony Jakeman has been actively working with members of the consortium over the last year to get the Centre established. For ANU and the Fenner School, the establishment of this Centre is expected to generate 3-4 new positions within the Socio-Economic, Policy and Decision Support program, as well as many Honours and PhD scholarships. Tony Jakeman, Barry Croke, Carmel Pollino, Lachlan Newham and Neil Gunningham will all make in-kind contributions to the Centre.

Contact
Tony Jakeman, Integrated Catchment Assessment and Management Centre, Fenner School of Environment and Society, The Australian National University. E: Tony.jakeman@anu.edu.au
Adapting to changes in water resources imposed by climate change will require a comprehensive response from society that addresses both the climatic and non-climatic drivers of vulnerability. In this respect, all, or nearly all, water management interventions represent a form of adaptation (or maladaptation). As the Intergovernmental Panel on Climate Change says (Kundzewicz et al. 2007:196): Adaptation to changing conditions in water availability and demand has always been at the core of water management. The session assessed adaptation in the freshwater sector to derive lessons on what motivated societies to change, which factors led to more successful adaptation, and how interventions may best be sustained. The lessons derived from three international portfolios of adaptation research projects were compared.

WWF - ANU assessments of six consistently designed freshwater adaptation case studies from six developing countries around the world were presented (Pittock in prep.), based on projects of the conservation organization WWF. Project leaders or local researchers presented cases from the Godavari River basin in India (Guja in prep.), central Yangtze river region in China (Yu in prep.), Rio Conchos in northern Mexico (Barrios in prep.), Rio Sao Joao in SE Brazil (Pereira in prep.), the lower Danube basin (Ebert in prep.) and Great Ruaha River basin in Tanzania (Kashaigili in prep.), representing diverse empirical case experiences. Also considered were lessons from the work of the Institute for Social & Environmental Transition (ISET) in South Asia (Moench and Stapleton 2007) and START’s global adaptation research program Assessments of Impacts and Adaptations to Climate Change (AIACC) (Leary 2008) which considered both autonomous and planned adaptation and the linkages therein.

A capacity audience engaged in a robust discussion of the findings presented. The session concluded that the key lessons for more effective climate change adaptation are that:

1. Robust adaptation interventions that reduce key risks should commence now despite uncertainties as to the precise magnitude of climate impacts;
2. Sustainable development and adaptation measures can be compatible;
3. Adaptation should be mainstreamed, not implemented separately;
4. Strengthening key institutions, knowledge sharing, and building human resource capacities are crucial to effective adaptation;
5. Adaptation strategies are strengthened by: community ownership and subsidiarity; concurrent and linked action at different geopolitical scales and in different sectors; consistent funding; and long term, iterative programs;
6. National governments can best help by facilitating climate risk communication and knowledge sharing opportunities for adaptation; building adaptive management into their institutions and policies, mandating and supporting sub-national institutions; removing barriers to funding sub-national institutions; and allocating funding for adaptation.

Acknowledgements

Funding for developing country and other case study participants from DANIDA, University of Copenhagen, the HSBC Climate Partnership and WWF UK was greatly appreciated.
References:


Gujia, B., Dalai, S., Shaik, H., and Goud, V. (in prep.). "Restoration of traditional water storage systems: An effective strategy to meet the water demand and adopt to the uncertainties of climate change while improving the livelihoods and ecosystems - a case study of Maner sub-basin, Godavari river, India." Climate and Development.


Pereira, L. F. M., Barreto, S., and Pittock, J (in prep.). "The basis for climate change adaptation under a successful participatory process, Sao Joao basin, Brazil." Climate and Development.

Pittock, J. (in prep.). "Lessons for climate change adaptation from better management of rivers." Climate and Development.


Contact
Jamie Pittock, Fenner School of Environment and Society, The Australian National University.
E: Jamie.pittock@anu.edu.au
Capital-WATER is an equal partnership between the Australian National University and the University of Canberra. WATER is an acronym for Water in Australasia: Training Education and Research.

**Its vision is to:**
- provide professional training in all areas of water-related expertise in our two institutions;
- expand and improve upon our water-related degree offerings across multiple disciplines; and
- deliver world-class water research that makes a difference in this community and beyond

**Vision**
Capital-WATER delivers training, education and research to resolve the multiple issues, socio-economic and environmental challenges of water for the benefit of Australia and its neighbours. This will be achieved by drawing on the complementarities in research and teaching at the Australian National University and the University of Canberra to deliver the world’s best practice.

**Mission**
Capital-WATER will draw on the strengths in training, research and teaching expertise at the Australian National University and the University of Canberra to:
- co-operate on water-related education and teaching.
- collaborate on joint research projects in water, particularly in association with federal and agencies and the ACT government.
- facilitate consultation and mutually beneficial co-operation when submitting and undertaking externally funded research.

**Professional Training**
Capital-WATER has provided three training courses to DEWHA in 2007 and 2008 on water
- environmental flows
- institutions
- hydrology, and
- economics

**Research**
- Capital-WATER (with support from the ANU and University of Canberra) is supporting research initiatives in energy and water, climate variability and water management, and integrated catchment management.

**Capital-WATER Co-Directors**

**Professor R. Quentin Grafton**
Co-chair, ANU Water Initiative
Professor of Economics, Crawford School of Economics and Government, ANU

Email: Quentin.Grafton@anu.edu.au

**Professor Richard Norris**
Director of the Institute for Applied Ecology at the University of Canberra
Leader of the eWater Education Program

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ANUWI Members’ Research & Publications

2008 Water Research and Publications

Members of ANUWI are researchers and educators who are working or studying in ANU on water-related issues. They come from a broad spectrum across different disciplines and colleges in the university. Below are the summaries of some members’ water-related research activities and publications in 2008. Publications and updates from these and other members are also available at the ANUWI website www.water.anu.edu.au.

**Jon Altman**

*Director, Centre for Aboriginal Economic Policy Research*
*Email: Jon.Altman@anu.edu.au*

**Activities and impacts**
1A Continued as an adviser to the Indigenous Water Policy Group for Northern Australia
1B Completed research on Fresh water in the Maningrida region's hybrid economy, focusing on Intercultural contestation over values and property rights. This research was sponsored by land and Water Australia and the Northern Australia Indigenous Land and Sea Management Alliance (NAILSMA) and the Bawinanga Aboriginal Corporation
1C I have collaborated with Dr Bill Arthur on a The National Water Commission commissioned project to identify the present and potential Indigenous users of water for commercial purposes.
1D I am an adviser to a CSIRO-led Tropical Rivers and Coastal Knowledge Research Hub project on the issue of non-market valuations of water
1E I participated as an invited guest at the United Nations University sponsored Indigenous Water Knowledge Indigenous Water Interest International Indigenous Expert Exchange, at the Garma Festival, Gulkula, Northern Territory and made a presentation “Northern Australian perspective from Arnhem Land”

**Publications**
2A Altman, J.C. assisted by BRANCHUT, V. “Fresh water in the Maningrida region's hybrid economy: Intercultural contestation over values and property rights”, *CAEPR Working Paper No. 46*, CAEPR, ANU, Canberra, vi+43pp

**Gabriele Bammer**

*Professor, National Centre for Epidemiology and Population Health, CMBE, ANU*
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**Research Topic**
The World Commission on Dams as a case study of integration in cross-disciplinary research collaboration

**Publications**
Leonard Carroll

PhD Scholar, The Fenner School of Environment and Society
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Research Topic
Water and Catchment Planning: Incorporating Demography and Population

Activities and impacts
Leonardo Carroll continued work towards a PhD, supervised by Professor Stephen Dovers at the Fenner School of Environment and Society at the ANU, and funded by Land and Water Australia. Major research activities during 2008 included:

- Participant in the workshop ‘Towards an Australian Climate-Energy Water Links Program’, Australian National University, 6 March 2008
- Attended the conference ‘Population, Peak Oil and Climate Change’, Canberra, 14-15 March 2008
- Presented the paper ‘How can demographers inform water and catchment planning?’ at the Australian Population Association National Conference, Alice Springs, 30 June – 3 July 2008

Publications


Daniel Connell

ANUWI and Crawford School of Economic and Government
Email: Daniel.Connell@anu.edu.au

Research Topic
- People and their environment in the Murray-Darling Basin 1750 – 2050.
- Cultural and institutions dimensions of water management
- The design of institutions involved with environmental management.
- International cross-jurisdictional water management and related cultural, economic, political and environmental issues.
- The hydrological dimensions of climate change

Activities and impacts
- See section Report from Research Facilitator.

Publications

Barry Croke

Senior Lecturer (Joint appointment with FSES (iCAM) and Department of Mathematics
Email: Barry.Croke@anu.edu.au

Research Topic
Streamflow and water quality modelling, with particular emphasis on predicting flow in ungauged catchments

Career Brief & Research Interest
Barry Croke has a BSc in Theoretical Physics and a PhD in Astrophysics from UNSW. He was a post-doctoral fellow in the Physics Department at the University of Crete between April 1994 and September 1996. From September 1996 to June 1999, he was a post-doctoral fellow in the Environmental Research Laboratory at the Foundation for Research and Technology – Hellas, working in the fields of hydrology and atmospheric research. In August 1999 he joined iCAM as a visiting fellow, and is currently a joint FSES/Department of Mathematics Senior Lecturer.

Activities and impacts
My research interests include development of models for prediction of streamflow and water quality. This includes prediction of flow at ungauged sites, which requires techniques for predicting hydrologic response based on catchment attributes such as topography and land use. This involves development of models suitable for such work, as well as exploring the relationships between model parameters and key catchment attributes. In addition, research on modelling water quality is being undertaken including estimation of sediment, nutrient and pathogen exports. A key research component is investigating model response to uncertainty in parameter values and input data through sensitivity analysis. This is an important component of model development due to the sparse nature of environmental datasets. I am one of the co-founders of the Top-Down Modelling Working Group, and was co-leader of Science Theme 6 (development of new model approaches) within the Prediction in Ungauged Basins initiative of the International Association of Hydrological Sciences from April 2005 to July 2007.

Conference
1) co-organiser of a workshop titled “Evaluating the impact of data and associated uncertainty on hydrological model predictions” at the iEMSs 2008 meeting to be held in July 2008 in Barcelona, Catalonia.
2) co-organiser of a session titled “Prediction in Ungauged Basins (PUB) to Solve Real-World Problems” at the AGU Fall meeting to be held in San Francisco, USA.

Publications
Journal

Book Chapters

Conference publications (reviewed)

Conference publications (not reviewed)

Poster presentations
- Croke, B.F.W., Representing uncertainty in objective functions: extension to include the influence of serial correlation. AGU Fall Meeting, San Francisco, December, 2008.

Project Reports

Katherine Daniel

PhD Cotutelle Scholar, Fenner School of Environment and Society and AgroParisTech, France
Email: Katherine.daniel1@anu.edu.au

Career Brief & Research Interest
Katherine has degrees in Civil Engineering and Arts and this year completed her PhD in water management and sustainable development. The cotutelle PhD was principally funded by the General Sir John Monash Foundation and further supported by the CSIRO (Land and Water), Fenner School and Cemagref (UMR G-EAU) in France.

Katherine’s on-going research interests include:
- Complex systems analysis and management
- Participatory process organisation and evaluation
- Integration of technical and non-technical approaches to water management
- Sustainability policy
- Innovation, learning and human adaptation processes

Activities and impacts
Completion the PhD thesis “co-engineering participatory modelling processes for water planning and management”
The thesis investigated how broad-scale multi-stakeholder decision-aiding processes for complex water planning and management issues are typically organised or “co-engineered” by several agencies or actors. In other words, how participatory processes are initiated, designed and implemented by a number of people. It showed that co-engineering has received scant attention in studies of participatory decision-making and remains an important gap in current knowledge. To fill this gap, the method of intervention research was used to investigate the co-engineering of two participatory modelling processes: the creation of the “Lower Hawkesbury Estuary Management Plan”, a regional risk management planning project on the northern edge of Sydney in Australia; and the “Living with Floods and Droughts” capacity building project for co-managing flood and drought risks in the Sofia region of Bulgaria. From these research interventions and their comparative evaluations, a number of important innovations and insights were identified, including that multiple and divergent objectives within co-engineering project teams often lead to conflicts which can have major impacts on the implemented participatory modelling processes. There are therefore two processes to organise to aid multi-stakeholder decision-making: the co-engineering process and the participatory water management process.
The joint awards of Doctor of Philosophy from the Australian National University (Fenner School of Society and Environment) and Doctor of Water Sciences from AgroParisTech, France were awarded with “mention très modernizat et les modernization du jury” – highest 5% equivalent – as determined by unanimous 8-member jury vote after the viva voce examination held on the 18th of November 2008 in Paris.

**Establishing connections between the European Projects “NeWater” and “AquaStress”**

Research work based in Cemagref – the French National Institute for Agricultural and Engineering Research in Montpellier – involved:

- Working in a five-member guest editorial team for a special feature in the international journal, “Ecology and Society”, entitled: *Implementing participatory water management: recent advances in theory, practice and evaluation* – Proposal writing then creating and organising the inter-project knowledge on the topic (currently 20 papers) and co-authoring and reviewing papers in collaboration with the chief journal editors.

Co-organising and participating in workgroup meetings with members and directors of both projects in the Netherlands, Germany and France to aid the completion of the final project products (books, reports and policy recommendations on participatory water management).

**Water-related presentations**

16 April 2008 Water Down Under 2008, Adelaide, Australia (also carried out session chair and reviewing activities).

10 May 2008 Presentation entitled “Coping with change: Australian Tales of Variability” to Elin Pelin stakeholders, Sofia, Bulgaria.

24 June 2008 UMR G-EAU/UMR METAFORT Scientific workshop on participatory approaches, St-Martin de Londres, France

2 September 2008 XIIIth World Water Congress, Montpellier, France.

5 September 2008 Presentation entitled “Risking it all: a participatory Bulgarian affair”, at the European Project AquaStress side event to the XIIIth World Water Congress, Montpellier, France.

**Publications**


Quentin Grafton

Professor, ANUWI and Crawford School of Economic and Government
Email: Quentin.Grafton@anu.edu.au

Research Interest
- Water pricing
- Water markets and water economics

Activities and impacts

Publications

Catherine Gross

PhD Scholar, Fenner School of Environment and Society
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Research Interest
Applying justice frameworks to environmental decision-making.

Activities and impacts
Although there is a substantial body of research and theory on justice, much of this has been abstract or external to a social context. The aim of my PhD is to find out how people interpret and react to perceived fairness, or the lack of fairness, in natural resource decision-making. The research is primarily concerned with decision-making regarding water allocation and use. Case studies include the contested North-South pipeline /Food Bowl modernization project in Victoria and the 2006 protest in NSW following a government decision to cut back on water carried over from the previous year. These are investigated through the lens of two justice constructs: procedural justice and distributive justice. Procedural justice is concerned with the fairness of decision-making processes including information, participation and being treated with respect. Distributive justice is concerned with outcomes. Using a transdisciplinary investigative framework the research explores people’s perceptions of fairness and justice through semi-structured interviews with stakeholders.

Conferences

Publications
Kate Harriden

Faculty of Science   Email: wolfkeeng@bigpond.com

Activities and impacts
Research Project
Research Project: Water Diaries – A methodology to investigate intra-household water use.

This project, largely undertaken jointly with Dr. Lahiri-Dutt of RMAP in the RSPAS, seeks to explore the potential of water diaries as a transferable (geographically and conceptually) and robust methodology to collect intra-household water use data in a wide variety of physical and socio-economic environments. This methodology aims to redress the limited practical understanding water managers and researchers have of the reality of intra-household water use. Ultimately, it tests the heterogeneous models predominately used by water resource managers. Building on the rural focus of last year’s diary trial, the 2008 trial was expanded to include urban ACT. The next phase of this research will be to run a trial of the diary in a nation of the economic south.

Partially funded by the international NGO, Gender and Water Alliance, this project has also attracted the interest of various ACT government agencies, including ACTEW.

Field work
A trial of the diary run during National Water Week October, 2008 attracted over 20 participating households, with an 85% return rate. The results are currently being collated and analysed.

Presentations
Poster Presentation (forthcoming) Singapore International Water Week Convention June 22-26, 2009

Publications
Book reviews
Drowned and Dammed: Colonial Capitalism and Flood Control in Eastern India by Rohan d’Souza Development March, 2008 51(1)


Reports

Articles
“Stormwater in Thailand: A potted history” Water March, 2008 35(2)

“Act on Gender: A peep into intra-household water use in the Australian Capital Territory (ACT) Region” Rural Society Dec., 2008 18(3). Co-authored with Dr Kuntala Lahiri-Dutt.

Karen Hussey

ANUWI, ANU Climate Change Institute & Research School of Humanities
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Research Interest
- Water policy, governance and management
- Links between water policy and other sectors i.e. energy, agriculture, services
- EU environmental policy
- Global environmental governance
- EU-Australia trade and business relationship (ARC project)

Activities and impacts
- Project Lead (with Barry Newell), ANU-UTS Climate-Energy-Water Links project
• Chair, COST-ANU Scientific Committee on Energy-Water Links
• Committee member, European Energy-Water Scientific Committee (convened by European Water Partnership)
• Working Group member, FIGS (International Surveyor’s Association) world conference 2010
• Keynote speaker, Centre for European Policy Studies conference ‘Securing European Energy Supplies’, Brussels, March
• Keynote speaker, Monash Europe Centre conference ‘Sustainable Energy Supplies in Europe and Australia’, Prato Centre, Italy, November
• Speaker, joint Forum for European Australian Science and Technology and French Embassy conference on ‘Low Emission Energy and Water Infrastructure’, Shine Dome, Canberra, November
• Speaker, ANUWI conference Drought-Past and Future, ANU, November
• Co-author, Chapter on energy-water links for European Regional Submission to World Water Forum
• Discussant, IARU Climate Congress, Climate Adaptation in the Water Sector, March

**Publications**


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**Kuntala Lahiri-Dutt**

**Research School of Pacific and Asian Studies (RSPAS)**

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**Research Interest**

My current research focus is on community initiatives and development in mining and water sectors, and for this, I often use a ‘gender lens’ to look into the heterogeneities within the broad community. For more on gender and water, see [http://rspas.anu.edu.au/gwn](http://rspas.anu.edu.au/gwn)

**Activities and impacts**

**Presentations at Workshops/Conferences and meetings**

- Workshop on Water policy and Gender, Charles Sturt University on 20th March, 2008: Paper titled ‘Intra-household water use in the rural areas of ACT’ (jointly with Kate Harriden)
- Presented on Gender in Water Management in the Asia-Pacific Region at the Asia Pacific Water Forum (APWF) Regional Synthesis meeting in Tokyo, Japan, on 15 December.
- Participation in Stockholm World Water Forum 17-23rd August.
- Organised and taught as the key resource person in a ‘Regional Training of Trainers in Gender Mainstreaming in Integrated Water Resource Management’ in Kolkata, 25 Nov – 1st Dec, 2008. All training material was translated into Bangla with my inputs and will soon be uploaded onto GWA website.
- Developed a course for a 2-week Gender Water Summer Institute to be held in May 2009 in Asia Institute of Technology.

**Publications**

**Co-edited Book**


**Co-authored articles**


**Barry Newell**

Fenner School of Environment and Society  
Email: Barry.Newell@anu.edu.au

**Activities and impacts**

Dr. Barry Newell is Visiting Fellow in the Fenner School of Environment and Society and Adjunct Associate Professor in the Department of Engineering. He has an interest in the dynamics of complex adaptive systems (CAS) and in the development of practical approaches to integrative policy-making and management. These approaches are being tested in the general arena of integrated coastal-zone management (ICZM).

Dr. Newell’s research is focused on the question of whether or not a ‘systems approach’ can contribute to the resolution of apparently intractable policy conflicts. Incommensurate worldviews are common, even between people who genuinely seek cooperation. As a result, the members of different subgroups in society often hold opposing “truths” as self-evident and disagree about what ideas and opinions are “just common sense”. They make different assumptions about what problems need to be solved, and so have different views about what constitutes good policy and what management outcomes are desirable. These differences of perception pose major barriers to the resolution of policy-making conflicts and the development of integrated policy. A systems approach, which depends on seeing the world through each other’s eyes, has the potential to reduce the height of these perceptual barriers.

These ideas are being explored in several contexts, including the ANU-UTS Climate-Energy-Water Links project (P.17). There is a growing recognition that a better understanding of the nature and possible effects of the links between climate, energy and water is essential in any attempt to formulate energy and water policies for more sustainable and adaptable societies. Nevertheless, the required integration is difficult to achieve between sectors that traditionally are seen as non-overlapping. This work involves the development of a conceptual framework to guide research into the dynamics of integrative policy making in the SE Australian climate-energy-water system. Its impact will become apparent during the period 2009-2010.

**Publications**

Jamie Pittock

PhD Scholar, Fenner School of Environment and Society
Email: jamie.pittock@anu.edu.au

Research Topic
Integrating management of rivers and climate change.

Activities and impacts
Jamie Pittock commenced work towards a PhD in October 2007, supervised by Professor Stephen Dovers and Dr Karen Hussey at the ANU. His research examines the conflicts and synergies between sustainable river management and climate change policies. Research in 2008 focused on an assessment of lessons from autonomous adaptation in rivers in China, India, Tanzania, the lower Danube, Mexico and Brazil.

Conferences/Seminars/Workshops
- Lectured at China Ecological Forum, WWF & 4th UNESCO Training Course on “Climate changes and ecosystem adaptation with a focus on the Yangtze River basin”, Institute of Geographic Science & Natural Resources Research, Chinese Academy of Sciences, Beijing in April 2008
- Attended the 118th Inter Parliamentary Union Assembly as a delegate of the UN Secretary General's Advisory Board on Water & Sanitation and as a WWF consultant to promote national ratifications of the 1997 UN Watercourses Convention, in Cape Town, South Africa, April 2008
- Presented on UN Watercourses Convention, climate change adaptation and environmental flows, and was rapporteur for the climate change theme at Stockholm World Water Week, Stockholm, August 2008
- Presented on water and climate change adaptation policies at the International Riversymposium, Brisbane, September 2008
- Presented on biodiversity, water and climate change adaptation to the Department of the Environment, Water, Heritage and the Arts, Canberra, September 2008
- Lectured on climate change adaptation and water at the International Development Law Organization training session, Sydney, October 2008
- Participated in the IBM Global innovation Outlook water workshop, Singapore, October 2008
- Participated in the 10th Ramsar Convention Conference of Contracting Parties, Changwon, October 2008
- Presented water and climate change adaptation to WWF Australia's Scientific Advisory Committee, October 2008
- Presented on nation water and climate change policies to the National Water Commission, Canberra, September 2008
- Presented on freshwater protected areas at the Australian Protected Areas Congress, Sunshine Coast, November 2008

Publications
- Pittock, J. (2008 (In press)). Freshwater biodiversity conservation through protected areas: international obligations and lessons for Australia. Australian Protected Areas Congress, Sunshine Coast.
Andrew Ross
Fenner School of Environment and Society
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Research Topics
Adaptive and integrated water management in the Murray Darling basin. Finished a case study as part of NeWater, an international project on river basin management, funded by the European Union, Murray Darling Basin Commission and National Water Commission. Started PhD, funded by Land and Water Australia.

Activities and impacts
- Keynote presentation Long Term Sustainability: Prospects and Challenges from an Australian Perspective, Berlin Conference on Global Environmental Change 22-23 February.
- Session presentation: Adaptive and integrated water management in the Murray Darling basin, NeWater summer school, Konigswinter, Germany, 18 July.
- Presentation “The challenge of groundwater governance: case studies from Spain and Australia ” to Riversymposium, Brisbane 1 September (journal article with P Martinez Santos, University of Madrid, accepted for publication in Regional Environmental Change).

Publications

Janet Stein
Fenner School of Environment and Society
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Research Interest
Her research focuses on methods of spatial analysis to support biodiversity conservation and improved natural resource planning and management. Major projects include the identification of Australia’s remaining wild rivers and the development of the national 9-second DEM and nested catchment framework.

Activities and impacts
- Completed an LWA project that developed an ecohydrological regionalization of Australia (with M.F. Hutchinson (ANU), B. Pusey, M. Kennard, S. Mackay, F. Sheldon Australian Rivers Institute, Griffith University, J. Olden, University of Washington). Rivers and streams continent-wide were grouped on the basis of their multi-variate similarities using attributes that characterize the principal climatic and landscape factors that ultimately control stream hydrology. The ability of the classification to discriminate meaningful variation in ecologically relevant aspects of the flow regime was tested using data compiled from a large set of flow gauging stations. The classification was compared to a second ecohydrological classification that was generated empirically by numerical classification of the flow gauging data.
- Completed the upgrade of the national 9 second DEM and accompanying D8 flow direction grid (with M. Hutchinson, J. A. Stein (ANU) and P. Tickle, A. Clive (Geoscience Australia)). The DEM and associated model of surface flow pathways will underpin the development of the first phase of the Australian Hydrological Geofabric. It was released by Geoscience Australia in September.
- Undertook a review of nested catchment reference systems (with M. Hutchinson, ANU) for the
Bureau of Meteorology as the first task in the development of a new set of nested catchments that will supply reporting units for the national water accounts. These catchments and associated stream network will be important elements in the Australian Hydrological Geofabric (AHG) that will supply the spatial framework for Australia’s water information related activities including the Australian Water Resources Information System (AWRIS).

- Undertook a preliminary assessment to identify Australia’s remaining free flowing rivers (with S.Blanch, WWF) and updated an earlier gap analysis to assess the contribution of recent additions to the Australian National Reserve System to the conservation of riverine ecosystems.

Conference and workshop presentations

Publications

Vinoli Thampapillai
PhD Candidate, Fenner School of Environment and Society
Lecturer, School of Law, Victoria University
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Research Topic

Publications

Jessica Weir
Research School of Pacific and Asian Studies
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Career Brief & Research Interest
Dr Jessica Weir is a Native Title Research Fellow at the Australian Institute of Aboriginal and Torres Strait Islander Studies. Dr Weir is a geographer, a member of the Ecological Humanities, and has a research focus on ecological and social issues in Australia. Dr Weir’s expertise is based in her research partnerships with Indigenous peoples, including the Murray Lower Darling Rivers Indigenous
Nations and Karajarri people from the West Kimberley. In 2008, Dr Weir graduated with a PhD from the Fenner School of Environment and Society, ANU.

**Activities and Impacts**

**Presentations**

- Weir, J. 2008 ‘Native Title and Water’, Guest Seminar, Native Title Unit, Attorney General’s Department, Wednesday 9 July.
- Weir, J. 2008 ‘Natural resource management is not caring for country’, Guest Seminar, Department of Environment and Climate Change workshop, Sydney, Wednesday 3 September.

**Media**


**Publications**

Troubled Waters: Confronting the Water Crisis in Australia’s Cities

Edited by Patrick Troy
Publisher: ANU E-Press
Published June 2008

Australian cities have traditionally relied for their water on a ‘predict-and-provide’ philosophy that gives primacy to big engineering solutions. In more recent years privatised water authorities, seeking to maximise consumption and profits, have reinforced the emphasis on increasing supply. Now the cities must cope with the stresses these policies have imposed on the eco-systems from which they harvest water, into which they discharge wastes, and on which they are located. Residents are having to pay more for their water, while the cities themselves are becoming less sustainable.

Must we build more dams and desalination plants, or should we be managing the demand for urban water more prudently? This book explores the demand for urban water and how it has changed in response to shifting social mores over the past century. It explains how demand for centralised provision of water might be reshaped to enable the cities to better cope with expected changes in supply as our climate changes. And it discusses the implications of property rights in water for proposals to privatise water services.

Information source: ANU e-press

Water First: Issues and Challenges for Nations and Communities in South Asia

Author: Kuntala Lahiri-Dutt and Robert J Wasson
Publisher: Sage Publications Ltd
Pub Date: September 2008

The book brings together current knowledge and cutting edge interdisciplinary perspectives from renowned scholars on the histories, politics, ecologies and cultures of water in South Asia.

It explores the challenges of contemporary water management practices, offers examples of local action and provides insights into the complex and dynamic relationships that exist between water and human societies - locally, regionally, nationally and internationally by eminent experts.

Information source: ANU Gender and Water Community News
# Water Links

## Australian Capital Territory

| Environment ACT | www.environment.act.gov.au |
| ACTEW | www.actew.com.au |
| ActewAGL | www.actewagl.com.au |
| ACT Water Portal | www.water.act.gov.au |
| Waterwatch | www.act.waterwatch.org.au |
| Capital-WATER | www.capitalwater.anu.edu.au |

## Australian States

| NSW Living Thing | www.livingthing.net.au |
| NSW Environment Protection Authority | www.epa.nsw.gov.au/stormwater |
| Melbourne Water | www.melbournewater.com.au |
| Western Australia Water Corporation | www.watercorporation.com.au |

## International

| International Year of Freshwater Official Site | www wateryear2003.org |
| World Water Day | www.worldwaterday.org |
| Earth Day Network | www.earthday.net |
| EdNA for Schools | www.edna.edu.au/schools/themes/water.html |
| ADB Water in Small Island Countries | www.adb.org/Water/theme3.asp |
| Dialogue on Water and Climate | www.waterandclimate.org |
| World Water Council | www.worldwatercouncil.org |
| Global Water Partnership | www.gwpforum.org |
| World Submit on Sustainable Development | www.johannesburgsummit.org |
| www.pacificwssd.org |
| Pacific Water Association | www.pwa.org.fj |
| UNEP | freshwater.unep.net/ |
| UNESCO Water and Mineral Resources Section | www.unescap.org/enrd/water_mineral/water_mineral.htm |
| UNESCO International Hydrological Program | www.unesco.org/water |
| UNU International Network on Water, Environment and Health | www.inweh.unu.edu/inweh |
| WHO Water, Sanitation and Health Program | www.who.int/water_sanitation_health |
| WMO Hydrology and Water Resources Programme | www.wmo.ch/web/homs/index.html |
| WSSCC | www.wsscc.org |