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WaterShed

contents

A National System of Heritage Rivers

by Professor Peter Cullen

The conservation of biodiversity is a major issue of public concern, and there has been a lot of effort to protect biodiversity in both terrestrial and marine ecosystems. Much less effort has been invested in the area of freshwater conservation.

Most States appear to be moving towards a broader concept of water planning where they no longer look simplistically upon rivers as systems where the critical issue is how much water can be reliably removed. It is now appreciated that a certain amount of water must be retained if we are to have healthy rivers. The activity over environmental allocations has been to address this issue. The underlying reason is the wish to maintain the plants and animals that live in our rivers and on our river-floodplain systems.

It seems that each jurisdiction in its water planning is identifying rivers of conservation value, and they are protecting them from further development. The Paroo River and Coopers Ck in Qld and the Ovens River in Victoria are examples. Other important and relatively undamaged rivers worthy of attention include the east Alligator in NT, the Clarence in NSW and the Fitzroy in WA.

The trouble with this current State approach is that it leaves the designated rivers vulnerable to pressure with a change of Government or some other factors. I believe we need a National System of Heritage River Reserves that allows present levels of usage to continue, but protects designated rivers from further development.

COOPERATIVE RESEARCH CENTRE FOR FRESHWATER ECOLOGY

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The Cooperative Research Centre for Freshwater Ecology improves the condition of Australia's rivers, lakes and wetlands

The Protection Required

The threatening processes that we should seek to limit in these designated heritage rivers would include:

- Any further licenses to extract water
- Any further weirs or structures
- Any existing weirs should have a priority for fish passages
- Any de-snagging or other "river protection" activity
- Any further drainage of existing wetlands
- Any further levees that stop floodplain inundation
- Any stocking with non-native fish

We should also seek to limit commercial and recreational fishing and prevent further clearing of riparian vegetation.

The States have identified some of these high conservation value rivers and recognized the importance of protecting them from development. However the current protection is of a limited nature, and in revisions of these plans the pressures to "develop" these water resources to provide for agriculture, urban and mining uses will increase as water becomes scarce and the price of it continues to escalate. Pressures on Ministers in these situations can be intense, and so a system of designation in perpetuity, such as we have developed for National Parks and Nature Reserves seems an essential step to long term protection of these systems.

conservation of biodiversity is a major issue

The present approach in the Murray-Darling Basin to capping water extraction and water trading does not necessarily give the protection that is needed for these undamaged rivers. Water could be traded in and out of valleys within the rules of the cap and allow development that could destroy these remaining undamaged rivers. Outside the Basin we do not even have the constraints of a Cap to restrict pressures.

In return for designation that gives longer term protection landholders and managers could be given access to funding for the actions identified such as fish ladders and riparian works.

Catchment management agencies need to be encouraged to take a more comprehensive approach and manage flow regimes, structures, riparian zones, catchment conditions, fish populations and biological invasions. The National Heritage River Reserve System could provide both a model and funding to encourage this management approach.

These ideas obviously focus on whole catchments. Some are, however, appropriate for reaches of rivers where upstream protection is not possible. This requires an understanding of the ecological and biodiversity values, and the threatening processes that may need to be restricted, eg. recreational fishing. Surveys have shown that in some rivers, 25% of the cod species (Trout cod and Murray cod) had damage to their mouth parts from fishing hooks. This is obviously a major threatening process in some areas.

Much of our present energy is devoted to trying to restore severely degraded river systems. It is important that we identify river systems that are in good condition and prevent further degradation.

There are three clear reasons for this. One is to meet our international biodiversity obligations. Another is to provide benchmark reference areas so we can assess the extent to which managed rivers have departed from their natural state. We also need long term reference sites if we are to understand the impacts of climate variability in this country. The third reason is to provide "seeding" sources to help re-colonise downstream areas. Rivers are linear systems that are seeded with biological material from intact upstream reaches and this is essential to maintain downstream river health. The need for connectivity both upstream, downstream and from the stream to the floodplain is now recognised.

The States have established processes for identifying such rivers. What we now need is a formal system of designation that provides ongoing protection for these rivers. The IUCN has categories of protected areas that allow existing use to be maintained, such categories would be appropriate for these rivers.

Peter Cullen and Ian Lawrence Honoured in Banksia Awards

Peter Cullen: Champion of Healthy Rivers

Professor Peter Cullen, Chief Executive of the Cooperative Research Centre for Freshwater Ecology, has received the Prime Minister's most prestigious award for services to the environment. The Prime Minister's 'Environmentalist of the Year Award' recognises Peter's outstanding contribution to improving the performance of governments and communities in the conservation and management of water resources.

Peter has been involved in freshwater ecology research for 30 years and as founding Director of the CRC for Freshwater Ecology has been instrumental in the establishment of new models for knowledge generation and knowledge exchange. He has been a tireless campaigner for water reform and has contributed to the public understanding of the science behind such issues as environmental flows, dryland salinity and the ecological processes that sustain our rivers.

Peter has made an enormous contribution to the knowledge base upon which we as a society are able to make decisions about the management of our natural resources.

The award is sponsored by Environment Australia.

Ian Lawrence: Improving our Urban Landscapes

Mr. Ian Lawrence was awarded the Banksia Environmental Foundation Award for "Outstanding Individual Achievement". This award recognises outstanding individual contribution towards improving Australia's sustainable future through effective leadership.

Ian's 38 year-long contribution to the sustainable use of water resources is well recognised across Australia and internationally. The techniques developed by Ian have contributed to the quality and amenity of aquatic ecosystems nationally. Ian has also changed the way urban planning for water amenity is conducted in the ACT and has developed water pollution and control guidelines that are used throughout the world.

Ian was seconded to the CRC for Freshwater Ecology in 1993 to manage the Urban Water Research Program. He is a highly sought-after consultant to the Federal, State and Local governments in the areas of catchment management, water resource and ecology related management issues.

The award is sponsored by Environment ACT.

Professor Peter Cullen, awarded the Prime Minister's Environmentalist of the Year Award for his outstanding contribution to the management of Australia's water resources. Photo: Environment Australia

Mr Ian Lawrence, recipient of the Banksia Award for Outstanding Individual Achievement, for his contribution to improving our urban landscapes. Photo: Adrian Redman

The Sustainable Rivers Audit: Assessing the Health of the Murray – Darling Basin

by Dr John Whittington

As water becomes an increasingly valuable resource, the Murray-Darling Basin community seeks assurance that the Basin's rivers are managed sustainably. There is a lack of detailed information on the health of the Basin's rivers – information that can be used to compare the health of rivers between valleys, in a common language and a consistent manner. At the Basin-scale this lack of information has made it difficult to identify the effectiveness of current and past land and water management – and equally difficult to justify major policy initiatives aimed at improving the riverine environment. To address this, the Murray-Darling Basin Ministerial Council has established an audit capacity for river health. The regular audits will inform debate about river health in the Basin and will assist the setting and monitoring of valley targets for catchment and river health. The Audit will provide a trigger to review threats to the rivers of the Basin.

This audit of river health is called the Sustainable Rivers Audit (SRA) and will occur on an annual basis. It will be an independent audit process, with a direct reporting line to the Ministerial Council. Based on the model of the Independent Audit Group for the Cap on Diversions, it involves a panel of eminent experts who scrutinise and assess the interpretations of river health and health trends provided by the State agencies, and report their findings on river health across the Basin to the Ministerial Council.

The CRC for Freshwater Ecology was commissioned to develop a framework for the SRA, which it has designed to be a comprehensive annual assessment of the ecological condition of the Basin's rivers. While there are several State and National programs that report river health in the Murray-Darling Basin, these programs did not fully satisfy the information and reporting requirements of the proposed Sustainable Rivers Audit. A lack of uniformity in assessments and reporting between jurisdictions does not generally allow Basin-wide inter-valley comparisons. Few programs have on-going funding commitment. Many of the sites used in existing programs were selected to monitor the impacts of specific operations and so cannot be used to provide an unbiased assessment of river health at the valley scale. Consequently, while the Sustainable Rivers Audit builds on previous programs, much of it is new.

there is a lack of detailed information

Approach

Key challenges for the Sustainable Rivers Audit are to assess the current health of the Basin's rivers, to detect trends in health through time, and predict the long-term ecological consequences of these changes. To meet these challenges, the CRC for Freshwater Ecology developed conceptual models of river function to identify the critical elements and processes that contribute to river health and to develop indicators for these.

The Sustainable Rivers Audit framework has chosen to define river health as ecological integrity. The framework recommends measuring river health as '...the degree to which aquatic ecosystems sustain processes and communities of organisms and habitats with a species composition, diversity, and functional organisation relative to that of natural habitats within a region'. Therefore a referential approach has been adopted for each of the indicators, where current condition of an indicator is assessed relative to the expected natural condition for that indicator. This approach is similar to the AUSRIVAS methods that have been successfully used to describe river health using macroinvertebrates.

Indicators

The SRA framework recognises biota (assessed by fish and macroinvertebrates) and biological processes as the fundamental measure of river health and has developed indices that reflect these. The Audit has also developed hydrological, habitat and water quality indices to assess the condition of the riverine environment that influence the biotic indices. Indices of hydrology, water quality and habitat will be used as diagnostic tools to interpret the condition of the fish and macroinvertebrate indices.

Site Selection and Sampling Intensity

The design for the Sustainable Rivers Audit is based on a stratified random sampling design. Broad geomorphic zones within the river valleys, called Valley Process Zones, are used to stratify site selection. There are usually three Valley Process Zones in each river valley – representing the upper, the mid slope and the lowland regions. The allocation of test sites to Valley Process Zones is weighted by area of catchment upstream.

The number of samples required and the frequency of sampling is driven by a number of factors including the magnitude of the desired detectable change, the confidence in detecting that change, the initial condition score, the variability in the indicator and the reporting scale. Using existing and modeled data, the CRC for Freshwater Ecology has determined the number of sites required for each indicator to detect a recommended change of 10% (20% in the case of water quality) in the condition of each indicator.

Reporting Scales

Natural resource management at the Basin scale requires information on resource condition to be measured and reported at a commensurate scale. The Audit framework is designed to report the health at the river valley scale e.g. Namoi, Paroo, Kiewa – the same scale that Cap compliance is reported. The Audit framework also allows river health to be reported for the upper, the mid slopes and the lowland sections of the river valley – at the Valley Process Zones scale. The Sustainable Rivers Audit can be adapted to report at a finer scales with the inclusion of more sites.

Interpretation

Scores for individual sites are combined (aggregated) to the appropriate scale using various statistics, so that for example, the proportion of river impaired or average condition can be reported for each index. Ideally, each of the indices is reported separately, as combining (integrating) is not conceptually defensible and also leads to a significant loss of information. If a single value for river health is required, the framework recommends that a biotic index score (using fish and macroinvertebrate indices) be used.

Outlook

The SRA will provide, for the first time, comprehensive and consistent information on the health of the Basin's rivers using a common language. Annual reporting will allow trends in river health to be assessed and provide a trigger for the review of river management. The monitoring and analysis of the indices outlined in the framework will be the responsibility of the State and Territory governments with scrutiny and assessment provided by three independent riverine ecology experts reporting directly to he Ministerial Council. The framework will be further developed and tested during a Pilot Audit over the next 18 months. Following the Pilot, the Basin community can expect the Sustainable Rivers Audit to report river health for each of the Basin's river valleys in following years.

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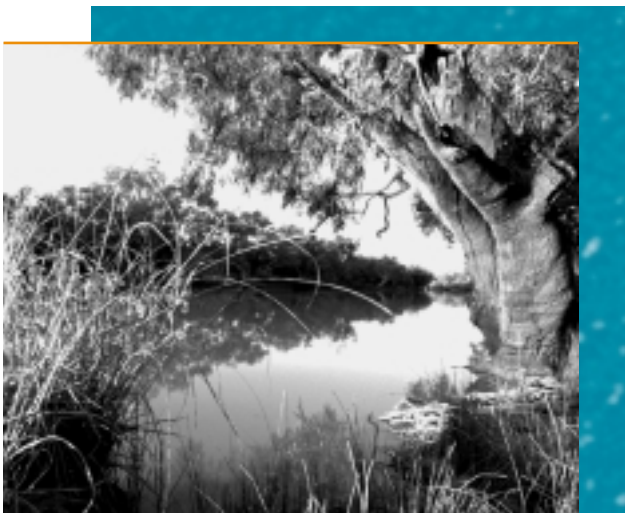

The SRA will provide comprehensive and consistent information on the health of rivers in the Basin, such as the Paroo River, Queensland. Photo: Andrew Tatnell

Billabongs: The Story So Far

by Dr Terry Hillman

Terry Hillman can't remember when he first stepped into a billabong, but after nearly 30 years of researching freshwater ecosystems he is acknowledged as one of Australia's leading experts on billabong function and ecology. This issue of Watershed coincides with Terry's retirement and in the following article he discusses some of the findings that have emerged over these years of endeavour.

In the beginning I spent a lot of time learning what others probably already knew – not surprising as I was a bright (not) young (fairly) post-doc about to start a tenured position studying zooplankton population dynamics in a fjord in Norway. Suddenly diverted for family reasons, to a 2-year contract in Albury-Wodonga, catch-up was the name of the game. Because of the obvious detrimental effects of some land and water management practices on them, I soon put billabongs on my list of threatened ecosystems.

Over the years a number of facts and theories about billabongs have emerged:

1. Billabongs are biologically quite different from the main river (<50% of combined invertebrate species found regularly in both habitats).
2. The biodiversity of billabongs is much greater over time than is that of the river channel.
3. At any time the community (at least the invertebrate community) differs between billabongs and notably at times between permanent and temporary billabongs.
4. A very large proportion of energy transfer in billabongs takes place at the microbial level [zooplankton down] (*Boon et.al. 1992*) and this includes a considerable component of exchange between bacterial groups and between algae and bacteria (Rees 2000).
5. When water is added to billabongs there is a rapid response amongst microbes and microinvertebrates which reproduce/recruit rapidly towards (or even past) the density levels they enjoyed before dilution. This response appears to be independent of season – although different species are involved at different times of year.

What is this eclectic group of observations telling us? Firstly, that billabongs are a significant source of biodiversity in riverine ecosystems and they should be conserved. They also provide some clues regarding ecological processes in billabongs and how they might fit into the functioning of a floodplain/lowland river ecosystem.

Given how productive billabongs are it is tempting to think of them as cauldrons of food, that when inundated or flooded, exchange water and biota with the river. The fact that they responded so positively to inundation only reinforced this view. Not only were they always full of food, but when you added water – more food. Also, if, as we believed, native fish reproduced during high flow, maybe they take advantage of the opportunity to lay their eggs in the billabongs, or perhaps the larvae swim in to receive their life-saving banquet. [Ah! If life were that simple.]

billabongs are a significant source of biodiversity

Of course there are problems too. Although billabongs quite often constitute more than half the water surface area in a stretch of river, their volume relative to the river is likely to be quite small over time. This means that we might expect the contribution of billabongs to the system to be more strategic than in the line of bulk resources.

To study the reaction of the billabong and the river to a single high flow event we carried out a full-scale field experiment, funded by Natural Resources Management Strategy and Land and Water Australia. Ignoring difficulties such as three years of drought and the drying out of some control billabongs, appropriate flows eventually occurred in August 2000. Intensive sampling followed and we have now reached data-analysis time (the happiest kingdom of them all), working feverishly – driven by approaching deadlines and an

ever-rising curiosity as to what they will show. Our current hypothesis is that the addition of water to a billabong triggers a sequence of events (regardless of whether the billabong and river remain connected or not) so that:

- 12 – 24 hours after filling, dissolved carbon and nutrients reach maximum concentrations
- 1 – 5 days after filling, microbial processes and biomass reach a maximum, and
- 5 – 14 days after filling, zooplankton numbers are maximised.

[Note that this hypothesis is yet to be tested properly against the data.]

The prediction then is that what the billabongs return to the river "in exchange for water" depends on how long the two systems remain connected – the duration of the high flow.

To put this in perspective, we are dealing with one aspect (billabong/river interaction) of one flow condition (high flow) of the riverine ecosystem. Much needs to be done. However this study and research being conducted on other aspects of riverine function by Ben Gawne, Paul Humphries, Martin Thoms, Darren Baldwin, and Rod Oliver in the CRC and Alistar Robertson at Charles Sturt University is providing parts of the jigsaw. We are hopeful that the research will result in satisfactory functional models of the riverine ecosystem.

If natural resource management is to advance from "clever exploitation" to "indefinite stewardship" we will need to understand how our river systems work, not just how to get the most out of them.

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Terry, immersed in Ryans 2 billabong near Albury, NSW, one of the most studied billabongs on the Murray River. Photo: Bill Bachman/ Australian Geographic

Terry Hillman – The Billabong Man

Were he not diverted for family reasons some 35 years ago, Terry Hillman might still be studying zooplankton in the Fjiords of Norway, instead of wading waist deep in Murray River billabongs. Born in New South Wales, Terry was educated in Victoria and the ACT. From 1962 to 1969 he worked with CSIRO Entomology on the population ecology of orchard insect pests. From 1971 to 1974, he worked with the Research School for Biological Sciences, Australian National University on primary production in an artificial impoundment under the influence of high turbidity and heavy metal pollution.

After completing his PhD in 1974, Terry moved to Albury to work for the Albury-Wodonga Development Corporation (AWDC) investigating problems of accelerated urban and industrial development in the River Murray catchment. The team of four scientists (including Ralph Coghill, John Hawking and Warren Embury) were housed in a laboratory that was located in an Army Hut at Bandiana, near Wodonga. In 1980 the group moved to the Peter Till Environmental Laboratory, the present location of the Murray-Darling Freshwater Research Centre (MDFRC).

Terry's research has helped reveal the immense value of billabongs to the health of the river system. Photo: Bill Bachman

During 1986 Terry was seconded to the MDFRC and in 1993 he was appointed its Director. He is also the Director (Regional Laboratories) of the Cooperative Research Centre for Freshwater Ecology.

While wearing a number of administrative titles Terry has maintained a strong research profile in the following areas:

- Ecology of billabongs and other floodplain waters.
- Response of floodplain ecosystems to flow management.
- River/floodplain interactions.
- Long-term changes to river systems – especially flow and salinity.

Renowned for his love and commitment to the billabongs of the Murray River, Terry has been heard to say "he would die in a ditch for a billabong" and he has spent nearly 30 years unravelling their secrets.

He is a member of the Northeast Catchment Management Authority, numerous expert panels and committees, and is currently a member of the Riverine Issues Advisory Committee for the Murray Darling Basin Commission and the Community Reference Committee for environmental flows for the Murray and Lower Darling.

He has over 80 publications and reports, for which he was awarded an honorary Doctor of Science by La Trobe University in 2000.

Terry's "wicked" sense of humour is well known. On more than one occasion he has brought the house down with his insightful comments. He is a friend and colleague of many in the Australian limnological community. Through his long career he has always been an "ideas person", available to bounce ideas off, to review and discuss emerging ideas, and to lend his great capacity for conceptual thinking.

This issue of Watershed coincides with Terry's retirement, we hope that his great knowledge about Australian limnology and ecology will not be lost, and that he maintains his highly valued connections to the CRC for Freshwater Ecology.

Dalby River Health Forum

From time to time the CRC for Freshwater Ecology organises and facilitates ecological knowledge exchange workshops and forums. In response to a request from Queensland, Natural Resources and Mines the CRCFE recently facilitated such a forum for the Condamine Balonne community in Dalby, Queensland. Ninety-five people attended the forum from a variety of occupations, including farmers, representatives of irrigation organisations, council members, government-employed natural resource managers, environmentalists and others.

The purpose of the forum was to present the latest scientific knowledge on how rivers work, and how to assess the health of inland rivers, with particular examples drawn from the Condamine-Balonne. The forum was organised following strong community and government interest in the health and future management of the Condamine-Balonne River system.

A key aim of the day was to allow the community to challenge the river health assessment and river ecology knowledge and information presented by the scientists. To this end, the CRCFE adopted a panel–forum format with approximately half of the time devoted to speakers and half to questions from the audience. For each forum session, our guiding framework was to get scientists to put forward their opinion (with supporting ecological principles, data or other forms of evidence) and to verify this against the community's understanding and knowledge.

local knowledge and expertise is valued

Senior CRCFE ecologists with experience in the northern parts of the Murray Darling Basin and other scientists with specific experience of the Condamine Balonne presented a broad and state-of-the-art perspective on river ecology and health. Additional information was provided by specialists outside the CRC. The forum was planned into three sessions:

Session 1. How do rivers work, how do you know if your river is healthy, and exactly how healthy do you want or need your river to be?

The forum heard that "declining river health reduces the ability of a river to deliver the ecosystem services that we as a community desire".

Professor Sam Lake identified flow as a key driver of river function and argued that alterations in flow will impact on river function. Professor Lake argued that maintaining ecological and hydrological connectivity is critical to sustaining healthy rivers. Changes to the flow regime, construction of levees and barriers to passage such as channelisation and floodplain water harvesting all reduce connectivity.

Associate Professor Richard Norris explained that river health is measured relative to a benchmark or reference state. Two types of indices are measured to assess river health: driver indicators and outcome indicators. Information from these is combined to assess river health and understand the causes of river health. This approach has been adopted for the Assessment of River Condition approach in the National Land and Water Resources Audit

Attending the River Health Forum were Professor Gary Jones (left), with graziers Mrs Inez Rosser, Killarney and Dirranbandi irrigators and graziers, David Hardie and Donald Crothers. Photo: Ross McIntyre NR & M, Qld

Session 2. How healthy is the Condamine-Balonne?

The forum heard from a number of scientists including Associate Professor Martin Thoms, Drs Margaret Brock, Satish Choy, Glenn Wilson, Lee Benson (Sinclair, Knight and Mertz) and Ms Linda Lee. Most of the monitoring in the Condamine Balonne valley carried out by NR & M, indicates a river that is in moderate to good condition in the headwaters but that is progressively degraded moving downstream – for at least water quality, fish and macroinvertebrates. However, Dr Lee Benson argued that SKM's recent study does not accord with this view. The SKM study sampled a limited number of sites in the Lower Balonne on a single sampling occasion. Given the natural variability in these parameters the results of SKM remain equivocal. Also, the non–standard application of macroinvertebrate sampling employed in the SKM study does not allow a direct comparison with the AUSRIVAS macroinvertebrate sampling undertaken by NR&M.

Session 3. What are the guiding principles for "Ecological Best Practice" in river management, and how might these help direct local, 'on-ground' actions?

Professor Stuart Bunn argued, "What is ecological best management practice will change over time to reflect both community attitudes and increased understanding of the environmental consequences of land and water management? Currently, ecological best practice for managing the Condamine-Balonne includes maintaining lateral and longitudinal connectivity, protecting refugia and maintaining, or, where appropriate, rehabilitating riparian zones".

Jo Voller explained that in the Condamine-Balonne many of these activities are occurring – with many examples of protection and rehabilitation of the riparian zone, contol of gully erosion and refugia. The audience indicated that significant challenges remain including weed and pest control and maintaining lateral connectivity.

The audience were keen to gain clear, reliable data about the health of the Condamine-Balonne, many expressing strong concerns about water issues and management in the Condamine-Balonne Valley. A strong message that came out from the day was the interest people have in working with scientists, on both local actions and larger scale projects, with the proviso that local knowledge and expertise is valued.

For more information, please contact:
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Approximately 95 people attended the Forum.
Photo: Ross McIntyre NR&M, Qld.

SideStream

Peter Cullen On World Bank Working Group

Peter Cullen visited the World Bank in Washington between 16-20th April to take part in Water Week. Water Week brings together many of its staff, consultants and advisers involved with water developments to review strategic directions and to share information.

Peter was invited to work with Jackie King (South Africa) and Mike Ackerman (UK Wallingford) to advise on environmental flow aspects of World Bank projects. Jackie King presented a seminar on the Lesotho project, which involved a number of CRC staff, and is a benchmark study for this aspect of dam planning. Peter presented a seminar on the MDBC as a cross–jurisdictional management model. The team then met with a number of Bank Project managers to discuss how they might be able to help in a variety of situations, including the Mekong. For further information, please contact Peter Cullen on 02 6201 5168; Email: pa@lake.canberra. edu.au

Fenner Conference 2001

'Biodiversity Conservation in Freshwaters' was the theme of the Fenner Conference on the Environment 2001 held at the Australian Academy of Science 5-7 July. The objective of the Conference was to bring together scientists, policy makers and managers to exchange ideas and perspectives on biodiversity conservation and management in freshwater ecosystems. Professor Peter Cullen presented the keynote address to over 180 participants on possible strategies to protect rivers, while providing for future needs.

The conference was hosted by the Cooperative Research Centre for Freshwater Ecology and the Australian Academy of Science.

Publications

Cottingham, P. *et al*. Large-Scale Ecological Studies and their Importance for Freshwater Resource Management. *Report of a forum held at the Bayview Conference Centre, Monash University, 15th December 2000*. Technical report no. 4/2001 .

Cottingham, P. *et al*. Assessment of Ecological Risk Associated with Irrigation Systems in the Goulburn Broken Catchment, Technical report no.9/2000.

Both reports are available from the CRCFE website, www.freshwater.canberra.edu.au.

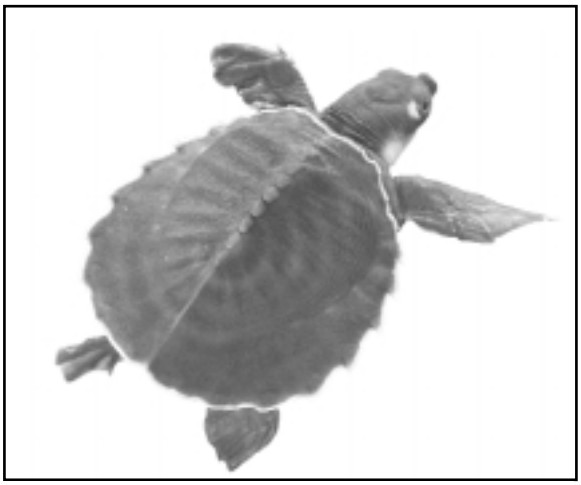


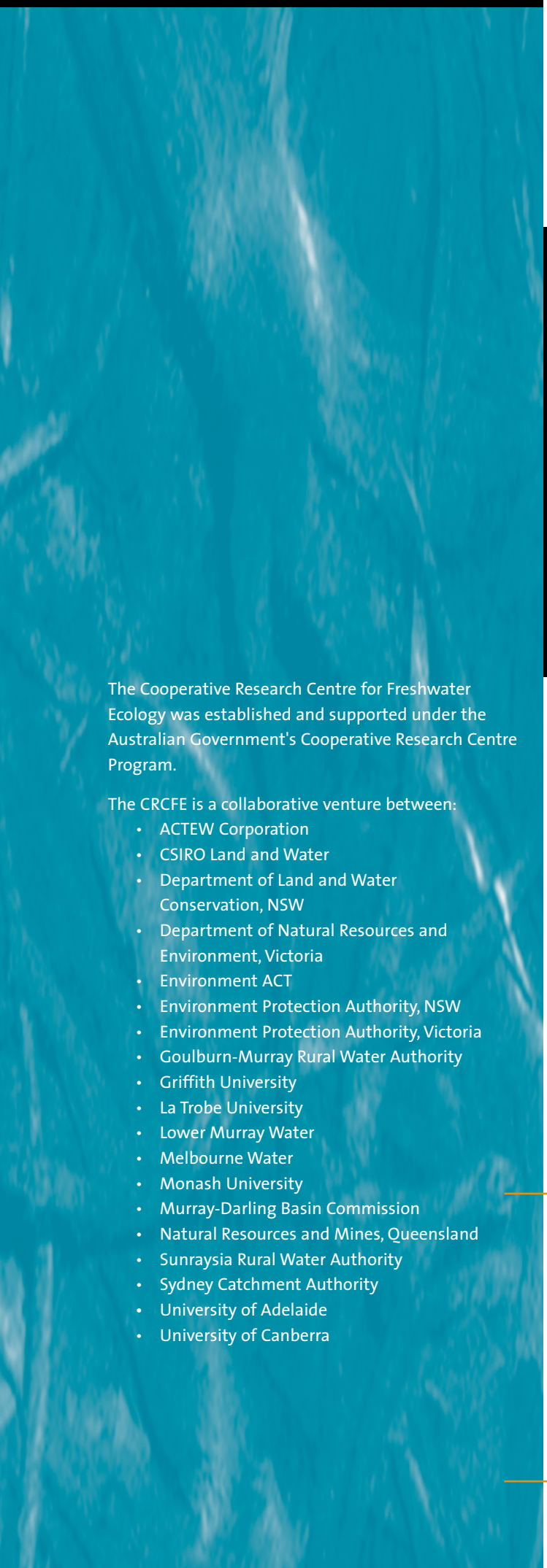
Photo: Arthur Georges

The creature feature for this issue is: The pig-nosed turtle

Class Reptilia
Order Testudines
Family Carettochelydidae
Genus *Carettochelys*
Species *insculpta*

The Pig-nosed Turtle is Australia's most unusual freshwater turtle. It is the sole surviving member of a once globally widespread family, and was first recorded in Australia in 1978. Weighing up to 20kgs and measuring over half a metre in length it is our most aquatic of freshwater turtles. Its distribution in Australia is restricted to the Victoria, Daly, Alligator and possibly Roper rivers in the Northern Territory.

CRCFE web site:
http://freshwater.canberra.edu.au



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- Department of Natural Resources and Environment, Victoria
- Environment ACT
- Environment Protection Authority, NSW
- Environment Protection Authority, Victoria
- Goulburn-Murray Rural Water Authority
- Griffith University
- La Trobe University
- Lower Murray Water
- Melbourne Water
- Monash University
- Murray-Darling Basin Commission
- Natural Resources and Mines, Queensland
- Sunraysia Rural Water Authority
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