LANDSCAPE LOGIC
LINKING LAND AND WATER MANAGEMENT TO RESOURCE CONDITION TARGETS

May 2009 Newsletter • www.landscapelogic.org.au

Contents

LANDSCAPE LOGIC is a research hub under the Commonwealth Environmental Research Facilities scheme, managed by the Department of Environment, Water Heritage and the Arts. It is a partnership between:

- six regional organisations – the North Central, North East & Goulburn–Broken Catchment Management Authorities in Victoria and the North, South and Cradle Coast Natural Resource Management organisations in Tasmania;
- five research institutions – University of Tasmania, Australian National University, RMIT University, Charles Sturt University and CSIRO; and
- state land management agencies in Tasmania and Victoria – the Tasmanian Department of Primary Industries & Water, Forestry Tasmania and the Victorian Department of Sustainability & Environment.

The purpose of Landscape Logic is to work in partnership with regional natural resource managers to develop decision-making approaches that improve the effectiveness of environmental management.

Landscape Logic aims to:

1. Develop better ways to organise existing knowledge and assumptions about links between land management actions and environmental outcomes.
2. Improve our understanding of the links between land management actions and environmental outcomes through historical studies of the effects of private and public investment on water quality and native vegetation condition.

Australian Government
Department of the Environment, Water, Heritage and the Arts

From discovery to synthesis

Prof Ted Lefroy, Director, Landscape Logic

Since our last newsletter, Landscape Logic jointly sponsored the 2009 Fenner Conference on the environment with our sister CERF Hub AEDA (Applied Environmental Decision Analysis).

The conference was well attended with an audience of environmental program managers and policy-makers from all levels of government as well as representatives from NGOs and catchment management organisations. All presentations and abstracts for the Fenner Conference can also be accessed from the link on our homepage.

Feedback from delegates (click here www.landscapelogic.org.au) indicated the presentations of work in progress within both Hubs was well received. Of particular interest to us are the responses to questions on the barriers and limitations to adoption of our research. This emphasized the perennial tension between rigour and relevance – keeping models and decision support systems as simple as possible, but sufficiently realistic to engage environmental managers.

This has been a constant theme within our Hub and becomes ever more relevant as we approach the 'pointy end' of the life of Landscape Logic. This theme will also be a feature of 9 Landscape Logic presentations in the session 'Science for Regional Environmental Decision Making' at MODSIM 09 in Cairns, July 13–16 (click here www.mssanz.org.au).

Annual Meeting

The 2009 Landscape Logic annual meeting will be held at the Tamar Valley Resort in Launceston on 14–15 October. Keep those dates free and stayed tune for more information about our preparation for this event and an outline of the agenda. The first day will be devoted to exchanging information on research progress, tools and delivery through our web interface and training modules.

Models and products

Over the last few months our Knowledge Broking team, Geoff Park and Greg Pinkard, have been very active conducting an audit of all the likely products from Landscape Logic. Between now and the annual meeting, they will be working through the details with each project to assess their development, testing and launch.

Politics, money and science

At the federal level, there was good and bad news for environmental research in the budget handed down on May 12. The closure of Land and Water Australia came as a shock and will leave a major gap in funding for applied environmental research (click here). Better news was confirmation of funding for the CERF program for three years beyond its current life (i.e. 2010–2013). Details of the priority areas to be supported and how the program will operate are currently being developed by the Department of Environment, Water Heritage and the Arts and are expected to be announced in time for the annual CERF Conference in September.

New on the web

Look out for new items on the web site on Landscape History and Vegetation Change in northern Victoria (Digby Race *et al*). This outlines the social research methods used to piece together the history of landscape change from 1860 to 2006 as part of the project to understand drivers of vegetation condition (Projects 2, 3 and 6). Also under publications are two new technical reports on the process used to select multiple sites for water quality and vegetation condition research (Bill Cotching *et al* and Dave Duncan *et al*).

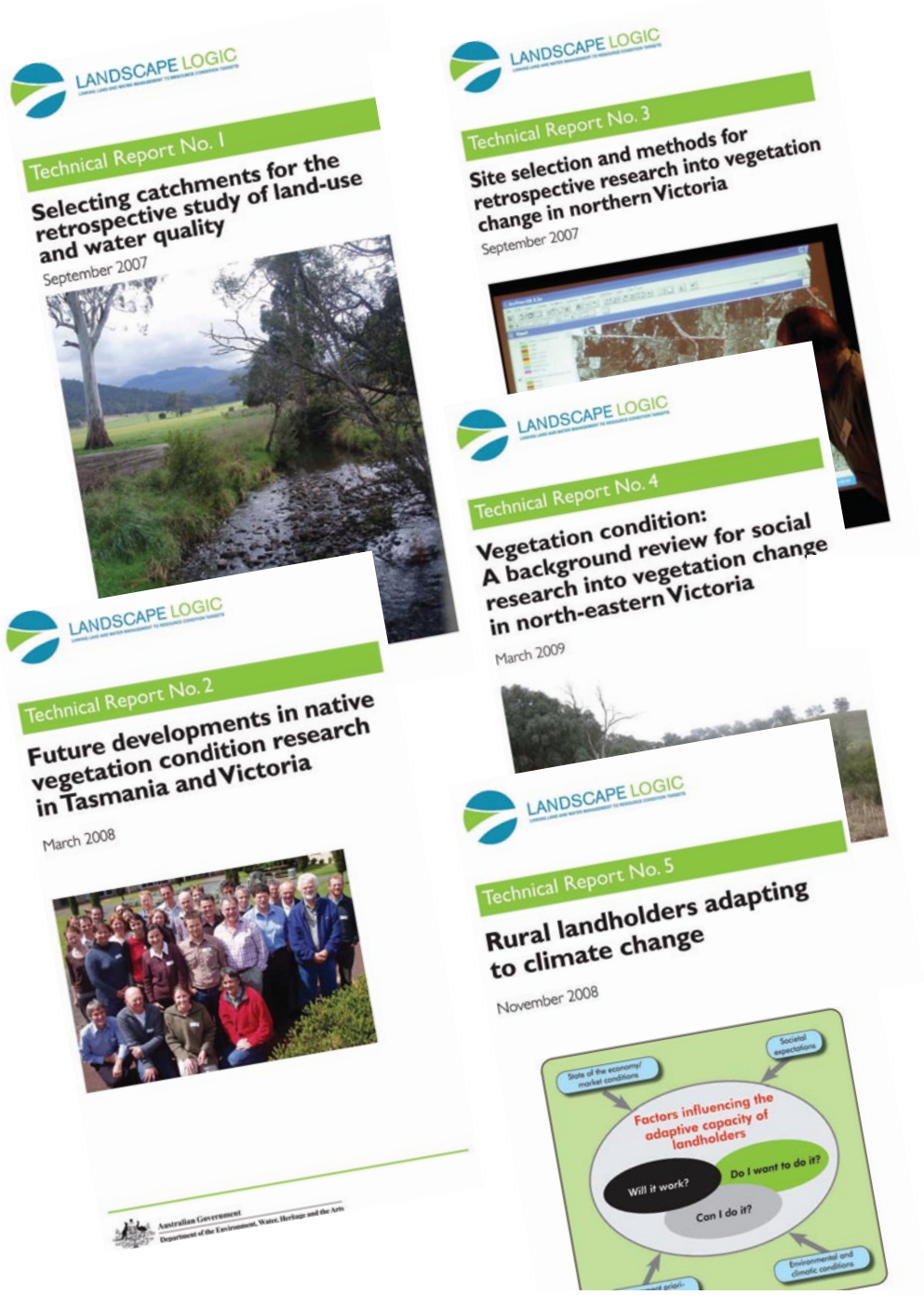
Landscape Logic launches technical report series

Landscape Logic has launched a new series of Technical Report publications.

Our ultimate goals are to produce new knowledge – fact sheets, data sets, models and decision support systems – to assist catchment management organisation and others concerned with monitoring and improving water quality and native vegetation condition. Along the way our seven projects have completed some discreet pieces of work of interest to researchers.

The Landscape Logic Technical Reports series is documenting our reflections on steps we've completed along the way which may provide useful insights for others involved in integrated landscape science.

These reports can be downloaded from www.landscapelogic.org.au/Technical_Reports.



Briefs for policy-makers

Landscape Logic also recently published its first "Brief for policy-makers."

The intention of this series is to summarise the key points of specific areas of our research which may be of use to policy-makers in the natural resource sector.

The first in this series covers the key findings of Technical Report No. 5 on the factors affecting the adaption of rural landholders to climate change. [www.landscapelogic.org.au/publications]

'Valuing' the George catchment

Marit Kragt, a PhD student working in Project 6 (Integration) has started another round of surveys in Hobart.

The Choice Experiment surveys are used to elicit information about the non-market values that Tasmanians hold towards natural resource management in the George catchment.

Marit has recently presented her work at the annual meeting of the Environmental Economics Research Hub and the annual conference of the Australian Agricultural and Resource Economics Society in Cairns, in February 2009. Her presentations on 'integrating economic values with catchment modelling' were well-received. She will also be presenting on this work at MODSIM09 in Cairns, July 13–16.

End-user seminars start to close the loop

During February and March this year, Landscape Logic held four information sessions; two for staff of the Department of Primary Industries and Water in Tasmania (one on native vegetation research and the other on water quality) and a further two general stakeholder meetings – one in Launceston and one in Melbourne.

The purpose of these seminars was to:

- To explain the objectives of the Landscape Logic research partnership
- Report on progress to date
- Discuss proposed outputs, and
- Encourage feedback on our research results and outputs.

The meeting in Launceston included representatives from local government, Hydro Tas, Hydro Consulting DPIW, Private Forests Tasmania, the dairy industry, agribusiness, consultants and NRM practitioners.

Feedback indicated that many who attended the meeting appreciated the update and the opportunity to provide feedback on the proposed outputs and indicated that they would welcome similar opportunities in the future as the research and product development progressed. Questions raised included the ability to apply the research findings to catchments outside those being studied and the applicability of the outputs at a property scale. They emphasised the need for the products to be user-friendly, accessible, supported with appropriate levels of training and technical advice, and well publicised.

Victorian Knowledge Broker for Landscape Logic, Geoff Park said of the meeting in Melbourne that it: "… was encouraging to see a diversity of potential end-users at the event." Organisations represented including catchment management authorities, Victorian Departments of Sustainability and Environment and Primary Industries, Victorian Catchment Management Council, universities, water authorities, NGOs and industry groups.

A highlight of the day was the high quality of presentations from our researchers including the Victorian Retrospective team (led by David Duncan), the Social Research team (Al Curtis, Digby Race and Maureen Rogers) and Wendy Merritt from the ANU Integration Team. It was terrific to get a first hand look at some of the exciting results emerging from these projects. Simon Jones provided an informative overview of his work on remote sensing of vegetation condition using LIDAR technology which struck a chord with a number of attendees. Ted Lefroy also provided a comprehensive insight to the range of water quality work and river health research occurring in Tasmania. This work was of obvious interest and relevance to Victorian River Health policy makers and practitioners and has led to productive follow up discussions between Landscape Logic and DSE staff.

It was pleasing to confirm that the focus of our research into the drivers of native vegetation change remains relevant and that the focus of our adoption strategy including delivery of models and decision support tools will broadly meet the needs and expectations of our end-users.

As a follow up to these meetings we plan to hold a series of regional seminars over the next few months to enable NRM practitioners to assist us in testing and finalising the products of our research. The first of these will be held at North East CMA in Victoria on 26 June.

Copies of the presentations from the general stakeholder meeting are available at www.landscapelogic.org.au.

Geoff Park, leader of the Landscape Logic Knowledge Broking team, speaking at the stakeholder meeting in Lanunceston on March 24.

Drought, climate variability or climate change: implications for the management of remnant vegetation in north-east Victoria

Maureen Rogers

By Maureen Rogers, Rik Thwaites, Nicki Mazur, Al Curtis and Michael Mitchell

Rural land managers throughout Victoria have been faced with increasing climatic challenges over the past few years, with extreme temperature conditions and significant reductions in rainfall and in-stream flows reaching unprecedented levels.

The recent fires across the state will, no doubt, be ringing alarm bells for government, community and rural land managers, and potentially challenging views and beliefs about climate change and its long-term implications.

The way landholders are responding to these emerging pressures could have positive and negative impacts on soil health, water availability and the protection of flora and fauna. Now more than ever, responses and adaptation strategies to climate change will need to be guided by sustainability principles and sound natural resource management practices.

How landholders are interpreting the science of climate change, perceiving the risks to their lives and livelihoods, their capacity to effectively respond, and the direction that their adaptation responses are taking will need to be well understood if government agencies are to provide guidance and support.

A previous study (2008) into the adaptation strategies of landholders in north-central Victoria (in the Kamarooka and Muckleford areas) found substantial changes to land management were being made in response to changing conditions, including a complex mix of economic, social and climatic pressures.

Broad-acre farmers of Kamarooka were more likely to be non-believers of climate change but were already adapting to the extended dry by building in greater enterprise diversity, growing deep-rooted perennials such as lucerne, and implementing improved water capture and distribution systems. This group of landholders expressed confidence in their ability to adapt, with extensive, multigenerational experience of dealing with risk and uncertainty. They were also extending cropping and grazing into remnant vegetation areas.

The Muckleford farmers, in contrast, were typically smaller, single enterprise landholders, with some lifestylers who had moved to the country, with a higher proportion of people believing that climate change was occurring. These landholders were adapting to the dry conditions by reducing exposure to risk by lowering input costs, reducing debt, and implementing less labour intensive management systems. They were typically more concerned about the protection of flora and fauna but had put tree-planting on hold due to the drought. They were typically less confident of their capacity to adapt.

While the specifics of this subsequent study in north-east Victoria is still being worked out, we aim to probe deeper into the way landholders are perceiving the risk of climate change and climate variability, and their capacity to respond in the short term and to take precautionary measures to protect against future unknowns.

Drawing on the remnant vegetation quality assessment work, we plan to specifically explore the impact of changed land-use practices with individual landholders. At this stage, one study site will be the farming districts centred around the Mt Pilot National Park, with a second site yet to be determined in the Mitta Mitta Valley where a variety of land forms and land-uses exists.

From the earlier studies it is clear that landholders are already adapting, which raises questions about the direction and sustainable nature of the responses, who is adopting which strategies, and why those people and those adaptations?

[See also a Technical Report and a Brief for Policy-makers on this issue at **www.landscapelogic.org.au/publications**]

Visiting US ecologist, Dan Neary

Dr Dan Neary is a US scientist on a six-month sabbatical in Australia. Dan works for the United States Department of Agriculture Forest Service at its Rocky Mountain Research Station, Flagstaff Arizona.

Dan's two major interests are the contribution of riparian vegetation to catchment water quality and fire in forested areas. Dr Neary is a team leader on a project covering water quality across the south-western US, concerned with a range of disturbances to water and soil. In particular his team looks at the effects of wildfire and prescribed fire on catchments.

While in Hobart Dan was catching up with one of his former students, Landscape Logic's Phil Smethurst. Phil is working on riparian vegetation process in LL sub-project 4.4. Dan's work in the US also covers the effects of natural and human disturbances on riparian vegetation. These disturbances include grazing, recreation, drought, fire and urbanisation. As an arid or semi-arid zone, in south-western United States riparian zones are the habitat for about 85% of fauna. Invasive plan species are also a major problem.

Dan was a consultant on the design of Phil Smethurst's experimental work at Willow Bend near Cygnet. After visiting that site, Dan headed north to Burnie and the Esk River, and then on to Victoria.

We hope to catch up with Dan at the end of his sojourn in Australia for an article on his impressions of Australia.

Profile: Ulrike Bende-Michl

Ulrike (or better known as Uli) is a postdoctoral research fellow in CSIRO Land & Water, currently involved in the Landscape Logic project 5: Catchment nutrient and sediment management.

Uli's research interests are in landscape analysis of water and nutrient balance processes and pathways. She is investigating which parts of the landscape act as sinks or 'hot spots' for nutrients – areas delivering a high proportion of nutrients to rivers. She examines which combinations of catchment characteristics like soil, land-use and land management co-exist with particular hydrometric events enabling nutrient transport into rivers.

Her research experiences includes catchment-scale application of spatially-distributed hydrologic and solute models, fuzzy-set classifications for process similarities coupled with water-quality analysis. Uli is also looking into new ways how to reduce uncertainty in these models that rely on high data demands and parameterisation efforts.

One incentive for coming to Australia was to explore what additional information about catchment nutrient and sediment dynamics could be gained from high-frequency nutrient monitoring aimed at improving the understanding of how a catchment functions during hydrologic events. By observing various nutrient species as indicators for different flow pathways Uli wants to improve the description of the timing and magnitude of nutrient entries. This might be linked to land use and can inform decisions about which nutrient problem needs to be tackled. However, high frequency monitoring in comparison to monthly water quality grab samples also allows for improved model validation and more accurate load estimation. High-frequency monitoring is one component of the 'Monitoring Guidelines' being developed in project 5.

Before coming to Australia, Uli was a member of the modular, process-oriented JAMS model (Jena Adoptable Modelling System) team at the Friedrich-Schiller University, Germany. There she was responsible for the implementation, testing and evaluation of the crop-growth model and agricultural management system routines. She worked closely with NRM agencies and other local stakeholders to design custom-tailored simulation tools.

According to Uli the main difference in landscape science done here and in Germany is the time-scale at which people work. Within a structure of long-term European goals for water quality, research is commonly carried out in collaboration with government agencies over five to 10 years. Since coming to Australian to work in Landscape Logic, Uli has observed the short-term funding for research is very challenging.

The Project 5 team is about to enter the last intensive phase of data collection in the Duck River catchment in North West Tasmania.

Circular Head Chronicle, April 1, 2009

Land use effects on estuaries

As part of his PhD, Launceston student Steven McGowan has been comparing four Circular Head estuaries to determine what effect land use has on them.

To do so he has been taking samples from the Montagu, Duck, Black and Detention rivers at regular intervals and measuring the amount of phytoplankton and zooplankton in the waters. The level of which determines whether it is a healthy waterway.

"Depending on the types of land use in a catchment, the levels of nutrients in the freshwater will also change," Mr McGowan said. "Changes in nutrients alter the types of phytoplankton and zooplankton communities living in the water." His is a sub-project of estuarine health involving many scientists from different backgrounds including the Commonwealth Scientific and Industrial Research Organisation, the Tasmanian Institute of Agricultural Research and the Tasmanian Aquaculture and Fisheries Institute. By comparing different estuaries with a wide range of land-use characteristics the group will develop a model that will help managers and policy-makers take better and more informed decisions in the future.

Mr McGowan said there is a total of 15 estuaries in the state he is sampling as part of his study. "The Duck, Black and Little Swanport estuaries are focus estuaries in which samples have been taken regularly over the past 12 months to pick up some more long term and seasonal data. These estuaries and another 11 estuaries have all been sampled in November to look at their health after high freshwater flows in winter and we are in the process of returning to all these estuaries now to look at them after low flows in summer."

Mr McGowan is joined by masters student Jason Beard who is taking samples of the river's sediment to look at Benthic Macroinvertebrates, which are animals such as shellfish, crabs and worms living on and in the sediment. Fellow scientist Dr Abraham Passmore has been helping them take samples. They will take their final samples next month and will compile the results, which will be made available at the end of the year through a Natural Resource Management public report.

Sampling our waters: University of Tasmania scientists Dr Abraham Passmore, Steven McGowan and Jason Beard have been taking water and sediment samples from the Montagu, Duck, Black and Detention Rivers over the past 12 months to determine the impact land use has on estuaries. Picture: Tanya Hill.

Fenner Conference a great success

Co-sponsored by Landscape Logic and the AEDA (Applied Environmental Decision Analysis) CERF hubs, the 2009 Fenner Conference on the Environment high-quality research, thoughtful questions and important ideas to ponder.

Held at the Australian Academy of Science Shine Dome in Canberra, 10–12 March, the conference focussed on the basics of good environmental decision-making, with an emphasis on relationship between science and policy, prioritisation, adaptive management and effective monitoring.

It brought together environmental scientists from around Australia and international speakers to meet with senior environmental managers from regional, state and Commonwealth agencies to discuss ways to improve decision-making on environmental investments and priorities.

Keynote speakers were:

- Dr Hamish Cresswell (CSIRO) on monitoring catchments for managing water quality
- Professor Tony Jakeman (ANU) on integrated assessment of options for improving resource condition.
- Professor David Lindemayer (ANU) on lessons on 25 years working with adaptive management.
- Professor Marc Mangel (University of California) on policy-relevant science.
- Professor Jim Nichols (US Geological Survey) on the how, what and why of monitoring for conservation.
- Professor Bob Pressey (JCU) on some of the mis-measures of conservation planning.

AEDA and Landscape Logic were delighted with the make up of the audience and the lively discussions happening around sessions. Of the 240 delegates in attendance, 110 were from federal and state agencies, 90 were researchers and 40 came form regional bodies, local government, NGOs and environmental consultancies.

"We attracted a diverse audience of researchers, policy-makers and environmental managers," said Ted Lefroy, Director of Landscape Logic. "That's significant because these groups usually meet to talk amongst themselves, and don't necessarily understand the different worlds of science, policy development and environmental management. I'm confident this Fenner Conference has built many bridges that will serve as an enduring legacy of the event."

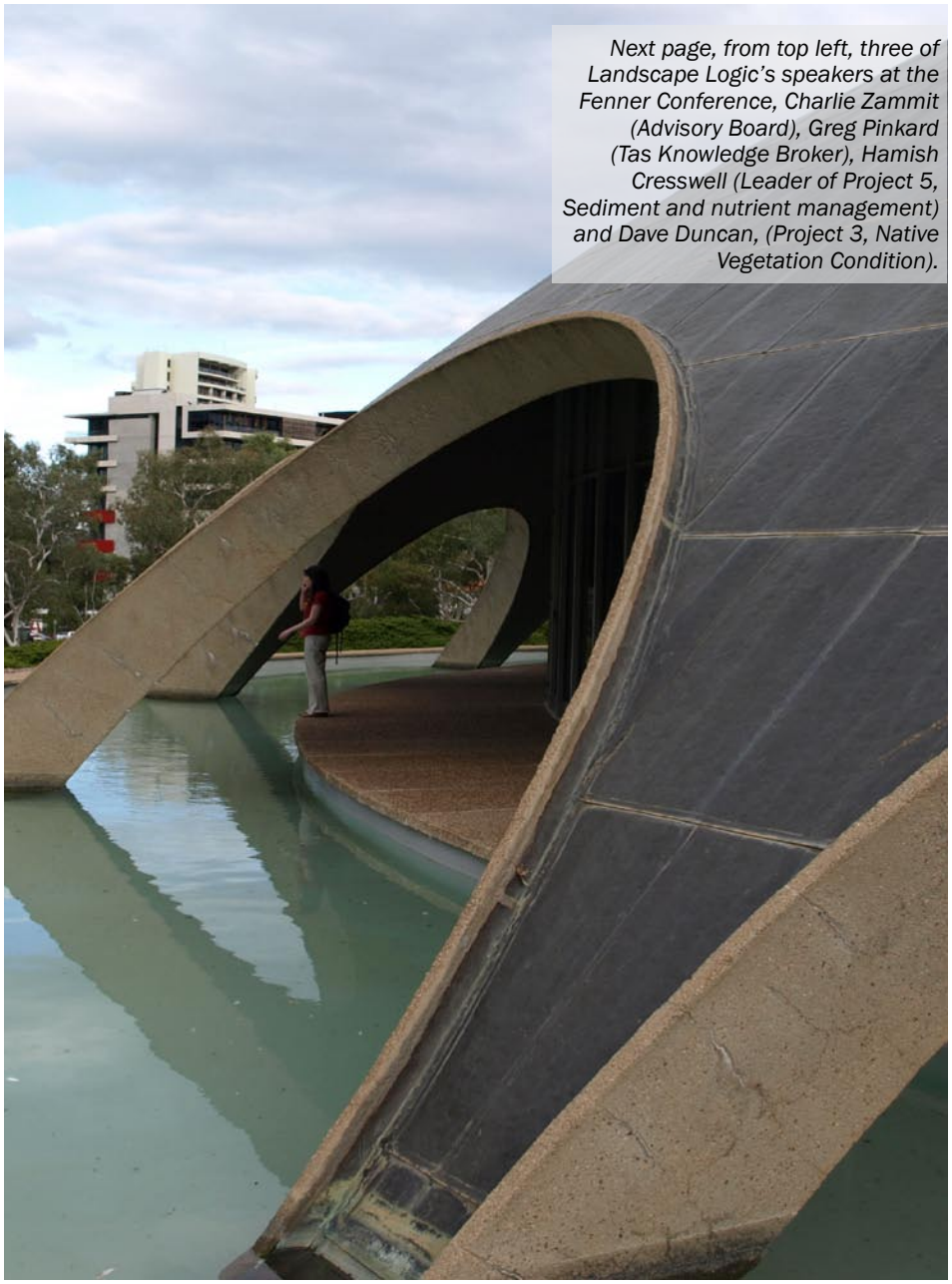
Initial feedback from the event suggests it was well received, with many opportunities created for follow up collaborations. And the theme of good environmental decision making has been given an important boost – not about time according to many delegates.

"As a nation we – researchers, environmental managers and policy makers alike – are failing hopelessly to secure our most precious and unique natural asset, Australia's biodiversity," said Professor Hugh Possingham, Director of the AEDA. "Since 1990, we've seen seven major natural resource programs collectively worth $6.5 billion. Yet the National Audit Office has repeatedly said it struggles to clearly identify their impact. We can do much better.

"Researchers, governments and environmental managers need to break down barriers between their professions to ensure that Australia's environmental practices are being informed by the best research available. This Fenner Conference on the Environment has allowed us to make a significant step in that direction."

We extend our thanks to The Australian Academy of Science for providing the venue and additional funds to support the conference.

[For an analysis of feedback about the conference **click here**]



Next page, from top left, three of Landscape Logic's speakers at the Fenner Conference, Charlie Zammit (Advisory Board), Greg Pinkard (Tas Knowledge Broker), Hamish Cresswell (Leader of Project 5, Sediment and nutrient management) and Dave Duncan, (Project 3, Native Vegetation Condition).

Australian Academy of Science

2009
Fenner Conference
presentations available at
www.landscapelogic.org.au

Regina Magierowksi and Tim Cole look for macroinvertibrates in the Great Forester River, north-east Tasmania.

Landscape Logic 2009 Annual Meeting

October 14-15 – Tamar Resort, Launceston Tasmania

Landscape Logic – www.landscapelogic.org.au

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