AEDA News

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Applied **E**nvironmental **D**ecision **A**nalysis
A Commonwealth Environment Research Facility

Smart science for wise decisions

Issue 7 (Friday, 24 August 2007)

AEDA News is a fortnightly email for members of the Applied Environmental Decision Analysis CERF Hub.

In this issue

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1. Who runs AEDA?

from the Director

The purpose of AEDA is to carry out, publish and communicate world class science that helps Australia (and the rest of the world) make smart environmental decisions. The three broad topic areas – optimal monitoring, conservation priority setting and novel decision-making methods are well described in the original application, web site and AEDA news. But who runs AEDA, how are decisions made?

AEDA is partly top-down – the thirteen core researchers pursue those issues in which they are world experts with and between research groups. However, it's also bottom-up – every PhD student, researcher and staff member in these groups should be thinking about the big environmental problems and developing ideas from previous workshops to inform their research and drive new proposals for small workshops.

Most importantly, AEDA is also left field, right field and sideways in. We need the policy and management community at all levels to tell us what decision-making problems they have, and work with us to inspire new research directions. For example one of the areas in which we plan to expand our interests is in biodiversity banking, reverse auctions and other market-based instrument solutions to deliver biodiversity outcomes (this is being driven by Sarah Bekessy). This has come from the interaction of AEDA core researchers with state and federal agency staff who actually implement these new forms of conservation delivery.

It's an exciting time in AEDA. We are more than six months old and the next year will cement much of the agenda for the remaining three – get involved.

Hugh Possingham
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2. Engaging with DEW

Make it count

On Thursday, 23 August, four Queenslanders ventured down to chilly Canberra to make a presentation to the Department of Environment and Water Resources (DEW) on conservation and spatial prioritisation. They were reporting on a project undertaken by the University of Queensland to provide a method for assessing conservation priorities at a continental scale

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"I'm all ears," says Hugh at a recent briefing to the Department of Environment and Water Resources in Canberra. AEDA is keen to communicate with DEW. (See item 2.)

The UQ crew discuss their approach to spatial prioritisation with the audience after the presentation at DEW. The presenters were Carissa Klein (seated, second on the left), Josie Carwardine (on Carissa's right) and Kerrie Wilson (next to Josie).

Engaging with DEW (*continued*)

(see AEDA News # 6 for more details).

The four were Carissa Klein, Kerrie Wilson (now with The Nature Conservancy), Josie Carwardine and Hugh Possingham. Hugh gave the final presentation and stressed the importance of factoring cost into the prioritisation process itself, not adding it on afterwards.

"Cost is really important when it comes to spatial prioritisation and conservation planning," he told a large audience of public servants from a number of departments and related agencies. "However, for the past 20 years it's not something that's been heavily factored into the process.

"That's like telling a family to go do their weekly shopping in the supermarket and taking the price labels off everything, and when you get to $150 dollars then someone taps you on the shoulder and tells you that you've just spent your weekly budget. You're half way through the smoked salmon and camembert and you realise that you haven't got rice and corn flakes.

"This idea that conservation should ignore economics is not getting us anywhere."

We'll report at greater length on the project and this presentation in future issues of AEDA News, but the discussion of conservation planning explicitly factoring in 'costs' found favour with many of the people gathered. Clearly there was interest in finding out more about this type of work.

While this specific project was undertaken by the University of Queensland, Hugh explained that the concepts developed for it are now being carried forward under the mantle of the AEDA CERF Hub. He invited DEW and other interested parties to keep in contact with AEDA, and work with us in developing better science-based decision making.

Towards this end we're now more actively communicating with a broader range of people about AEDA and our activities. Many people at DEW (and other agencies) are now receiving notices about each issue of AEDA News. Some of these people may well be following up on what they see. So, AEDAites, here's a challenge for you: if you're contributing anything to our newsletter or website, make sure it carries enough information to make a difference. Don't bury your science in jargon. Make an effort to spell out any policy implications. Keep your stories interesting, and make them relevant with real world examples. And ensure there's some way for interested readers to follow up on what you're sharing with them.

Please contribute, but stop and consider what a difference you might be making if a policy maker was reading your story – and was interested in what he or she saw.

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3. Optimal & robust monitoring at Freycinet

Brendan Wintle reports back on the 'Optimal and robust monitoring for conservation and natural resource management' workshop at Freycinet Peninsula, Tasmania, 6th August - 10th August 2007.

Earlier this month AEDA hosted the first Optimal and robust monitoring for conservation and natural resource management working group. The overall purpose of the working group was to further explore the role of decision theory in monitoring and adaptive management, and to develop some case-studies based on current State and Commonwealth agency research and management needs.

More specifically, the working group aimed to:

1. Address some key questions about monitoring design within a decision theory framework and develop some motivating case studies based on current agency needs.

2. Explore the role of monitoring in dealing with severe uncertainty in decision making.

3. Instigate new, and enrich existing collaborations between agencies, AEDA, and other academy researchers in the area of monitoring and adaptive management.

4. Identify major research priorities arising out of agency monitoring and adaptive management needs.

5. Propose ongoing projects to service agency monitoring needs, improve monitoring practices and contribute to the development of monitoring theory through publication in the scientific literature.

Representatives from a range of State and Commonwealth agencies, AEDA, Australian and international universities, and the Landscape Logic CERF Hub were in attendance at the workshop that was held over a week starting August 6th at Freycinet National Park on Tasmania's east coast. The choice of location reflected one of the major conservation issues facing the Tasmanian government at present; the Tasmanian Devil Facial Tumour Disease (DFTD).

Representatives of Tasmania's DPIW (Dr Menna Jones and Dr Clare Hawkins) were in attendance to present and discuss some of the major monitoring and adaptive management challenges posed by the disease, providing an excellent foundation for discussions about decision making under uncertainty and the role of monitoring in pressing conservation issues. Specific DFTD management and monitoring questions were

A workshop lunch out on the deck of Freycinet Lodge (in the shadow of the remarkable Hazards hills). The workshop advanced several important monitoring themes as well as building some valuable collaborations between researchers and natural resource managers.

Devil Facial Tumour Disease first occurred in devils in North East Tasmania and has since spread over much of the island. The devil population in NE Tasmania is now so low that spotlighting is an unreliable method for monitoring the population. However we still know there are devils present through intensive (and very expensive) monitoring. Is there any value to continuing this investment in monitoring a population which is now almost gone? Yes – if the devil population stabilises at a low level with the disease then this significantly diminishes the urgency for other conservation actions.

tackled including, among others; how much effort should be invested in monitoring NE Tasmanian devils to see if the species can persist with the disease or recover from the disease, how intensively should state-wide population trends be monitored to support management planning, how should the disease front be monitored to ensure that individuals captured for wild-living insurance populations are disease free, and how should the effectiveness of disease control strategies be evaluated?

Other critical conservation and natural resource monitoring and management issues were tackled including, among others; what is the optimal approach to monitoring for marine pest invasions in marine national parks, how much money should Chevron spend on stopping rats from invading Barrow Island, what is the optimal allocation of effort to monitoring and eradicating island populations of feral goats, how much effort should be allocated between loosely defined 'surveillance' monitoring and tightly focussed management performance monitoring, and can ad-hoc species lists such as the Birds Australia database be used to detect trends in bird populations?

The number of specific management and monitoring issues tackled during the first workshop was constrained by the time available. However, a number of other monitoring research priorities were identified that will be the subject of more focussed working groups over the next 24 months. In collaboration with Ted Lefroy's Landscape Logic Hub, AEDA will tackle the challenge of designing monitoring strategies for reporting on the performance of Commonwealth and State investments in native vegetation restoration. Ongoing investment will depend largely on perceived performance of current investments in achieving restoration goals.

Assessing the performance of restoration investments is difficult because there are usually multiple objectives of restoration and those objectives are often poorly defined, or intangible and difficult to measure. In addition, quantifying and attributing vegetation responses to particular action is extremely difficult due to the lag-times in observing benefits and the large natural variation in vegetation dynamics.

The outputs from the workshop deliberations will take the form of improved management and monitoring practices through ongoing collaboration between CERF and agency researchers and managers, and published research findings, based on detailed case-studies that will advance monitoring and adaptive management theory and knowledge. A detailed report on the proceedings of the working group will be available in a future issue of AEDA news.

Overall the optimal and robust monitoring working group was extremely enjoyable and already productive in terms of the increase in Hub-Agency awareness and the number of collaborative links that have emerged.

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4. Keeping ahead of wildlife threats

Bob Pressey and conservation planning in a changing world

One of Australia's greatest conservation challenges in protecting the Great Barrier Reef and other natural assets is staying one jump ahead of both the movement of protected species and the emergence of new and unforeseen threats. Working out ways to give local communities as well as conservation managers the power to do this is the basis of Professor Bob Pressey's research. Bob is part of the ARC Centre of Excellence for Coral Reef Studies, and here's a story recently posted by the Centre on his work. (Bob is also one of AEDA's core researchers.)

Bob specialises in systematic conservation planning - the development of strategies that keep endangered species and habitats going in the long term. His research has been cited by over 3000 scientific publications worldwide.

"We've long known you can't just put a fence round wildlife and expect it to survive. It moves in response to many factors, especially changing climate. And new threats emerge," he says. "We have to find ways of protecting our native species that allow both for movements by the species and changes in the nature of the pressures and threats they face."

Bob has summarised current scientific thinking about these challenges in a review paper titled "Conservation planning in a changing world", soon to be published in the prestigious journal Trends in Ecology and Evolution.

The Great Barrier Reef is a case in point, he says. As climate change advances, scientists expect that its corals will become increasingly stressed and start to migrate towards environments that suit them better, meaning that protected areas may have to shift also.

While we are gaining a good understanding of the range of threats the Reef faces today - rising water temperature, runoff and sediment from the land, man-made toxins, overfishing and development pressures - new ones, such as the gradual acidifying of the world's

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Keeping ahead of wildlife threats (*continued*)

oceans due to CO2, are likely to emerge.

"It means you can't afford to stand still if you want to hand your children the natural wonders you yourself love and value," he says.

Bob has worked in threatened environments worldwide from southern Africa to the Amazon floodplain, and elieves that local people are enormously important to the successful protection of their environment.

"My job is to give them tools to understand the changes that are taking place, both in the protected species or ecosystems themselves and in the threats and pressures they face - and to look into the future to see where these might lead.

"For example, the Green (no-fishing) Zones of the GBR will benefit Fisheries. But what we do on land is also immensely important to their long-term health and survival. You can still harm the Reef in other ways besides overfishing."

The important thing, he argues, is to give local communities choices about how they plan their future - and ways to visualise the results they might achieve from various courses of action.

"If you can see how a certain development or activity might affect native species decades into the future you might decide to explore other options that are just as economically fruitful, but which save more wildlife," he suggested. "Or if you find that one area is absolutely vital to the survival of a particular species, you may ask: where else can we locate our industries or developments?"

Bob's research aims to build practical planning tools that enable local communities to anticipate both movement in native species and take a precautionary approach to the emergence of new risks. Behind these tools there is the sophisticated and complex science of understanding and modelling changes in natural and human systems, and predicting how they affect one another.

He is presently designing a new software system that can be used by local communities, agencies, and non-government organisations to guide decisions about conservation investments, on the land and in the sea. The new system will build on lessons from his C-Plan system that was used extensively in New South Wales in the late 1990s to help stakeholders negotiate new forest reserves. The system has also been used extensively in other countries.

More info: http://www.coralcoe.org.au/

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5. Resources & opportunities

Landmark Scientific Study on Northern Australia

A landmark study titled The Nature of Northern Australia: its natural values, ecological processes and future prospects has been publicly launched this month. Four leading Australian scientists – Dr John Woinarski, Professor Brendan Mackey, Professor Henry Nix, and Dr Barry Traill have produced the book which is largely based on their joint ARC project on connectivity and conservation in this, and other areas of Australia.

The study details the environmental significance of the North, how this tropical environment really works, and shows the pathways forward to develop the North in ways that work for people and country.

Free downloads of the book are available at http://epress.anu.edu.au/nature_na_citation.html

Aust Academy of Science Conservation Award

This award offers support for research on endangered Australian vertebrate species (endangered either locally or nationally) with the objective of understanding the causes of their decline and with a view to instituting, or improving, the management of the conditions necessary for the species' recovery.

A total of $20,000 is available for allocation to one or more than one grant. Grants are GST exempt.

Applications should be limited to five pages and include a curriculum vitae, publications list, a brief outline of the project and a budget. Please attach two referees reports to your application.

Entries close on 30 September 2007.

More info:
www.science.org.au/awards/conservation.htm

2008 Graeme Caughley Travelling Fellowship

This Fellowship commemorates the work of Dr Graeme Caughley, FAA in ecology and wildlife management. Dr Caughley was a chief research scientist with the CSIRO Wildlife and Ecology, Canberra, until his death in February 1994. The Fellowship is financed through the generosity of his friends and colleagues.

The inaugural Fellowship was in 1996. The Fellowship is offered every two years. Up to $5000 (GST exempt) is offered. The purpose of the Fellowship is to enable ecologists resident in Australia or New Zealand to share their expertise by visiting scientific centres and giving lectures in countries other than Australia or New Zealand.

Entries close on 30 September 2007.

More info: www.science.org.au/awards/caughley.htm

Six PhD scholarships in Landscape Logic

The Landscape Logic CERF Research Hub, through the University of Tasmania, is offering 6 PhD scholarships for the October 31 intake across the areas of:
Estuarine Ecology
Freshwater Ecology
GIS and Spatial Analysis
Native Vegetation Condition
Riparian Processes
Landuse Change
River Basin Management

More info: http://www.landscapelogic.org.au/ and go to News and Events

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6. AEDA postdocs in ecological modelling and conservation science

We're currently advertising two exciting Post Doctoral Research Fellowships in Ecological Modelling and Conservation Science (funded through AEDA). These positions are based in Brisbane at the University of Queensland, and may be of interest to PhD students you know who have recently graduated (or are just about to).

The post doc will be working to advance the fundamental theory of conservation decision-making with particular reference to the following problems:
-Optimal Restoration and Revegetation;
-Systematic conservation planning;
-A theory of monitoring.

This is a great opportunity so please spread the word around

Applications close 5 October 2007

More info: http://www.ecology.uq.edu.au/docs/employment/Oct07PostDocPositionDesc.pdf

Or contact AEDA's Business Manager, Karen Hurley k.hurley@uq.edu.au

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7. New publications by AEDA members

Lindenmayer, DB, Cunningham, RB, MacGregor, C, Montague-Drake, R, Crane, M, Michael, D and Lindenmayer, BD. (2007) **Aves, Tumut**, New South Wales, South-eastern Australia. <http://www.checklist.org.br/getpdf?SL001-07>Check List 3(3):168-174.

A large-scale, long-term study of the impacts on vertebrates of landscape change and habitat fragmentation at Tumut in southern NSW. Field surveys focus on counting birds within three broad kinds of sites: (1) in remnants or fragments of native Eucalyptus forest located within the boundaries of the Radiata Pine plantation. (2) Sites dominated by Radiata Pine plantation trees. (3) Sites in the large areas of continuous Eucalyptus forest adjacent to the plantation. A total of 92 species from 34 families was recorded. The list will be useful for workers examining bird responses to fragmented landscapes as well as those interested in the biodiversity values of plantation landscapes.

Lindenmayer, DB, Fischer, J, and Hobbs R (2007) **The need for pluralism in landscape models: a reply to Dunn and Majer**. *Oikos* 116 (8), 1419¬1421.

Dunn and Majer discuss limitations of the continuum model proposed by Fischer and Lindenmayer and describe a new patch-based model. We argue that a range of landscape models are required to solve different problems and meet particular objectives of land management or conservation. The key issue is not whether one type of model is superior to another, but rather: what are the particular strengths and limitations of a particular model? And, given these, under what circumstances will a particular model be most appropriate? The primary value of the continuum model is that it provides a strong theoretical foundation for the management of landscape heterogeneity in addition to the protection of large patches of native vegetation.

McCarthy, MA, Lindenmayer, DB. (2007) **Info-Gap Decision Theory for Assessing the Management of Catchments for Timber Production and Urban Water Supply**, *Environmental Management*, Volume 39, Number 4, pp. 553-562

While previous studies have examined how forest management is influenced by the risk of fire, they rely on probabilistic estimates of the occurrence and impacts of fire. However, non-probabilistic approaches are required for assessing the importance of fire risk when data are poor but risks are appreciable. We explore impacts of fire risk on forest management using as a case study a water catchment in the ACT. In this forested area, urban water supply and timber yields from exotic plantations are potential joint but also competing land uses.

In early 2003 extensive wildfires burned much of the existing exotic pine plantation estate in the water catchment. Following this there was a need to explore the relative economic benefits of revegetating the catchment with exotic plantations or native vegetation. The current mean fire interval in the ACT is approximately 40 years, making the establishment of a pine plantation economically marginal at a 4% discount rate. However, the relative impact on water yield of revegetation with native species and pines is very uncertain, as is the risk of fire under climate change.

We use info-gap decision theory to account for these nonprobabilistic sources of uncertainty, demonstrating that the decision that is most robust to uncertainty is highly sensitive to the cost of native revegetation. If costs of native revegetation are sufficiently small, this option is more robust to uncertainty than revegetation with a commercial pine plantation.

Have you published an article or book recently that other AEDA members might be interested in? If you have, please send us the information so we can list it in the next issue of AEDA news.

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AEDA *News*

8. Workshopping with AEDA

A word from our Business Manager

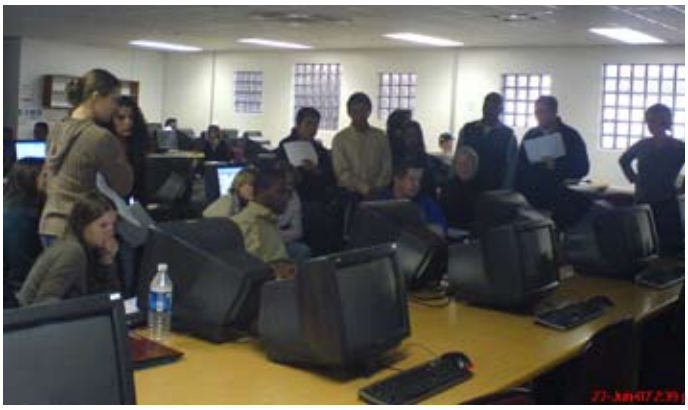
AEDA has put together some excellent workshops in 2007 (eg, pelagic conservation planning, systematic spatial prioritisation, landscape restoration) and we have many more in the pipeline (spatial non-equilibrium models, MBIs & restoration, patch dynamics & conservation planning). At the moment I'm endeavouring to organise up-and-coming events and workshops for AEDA for the remainder of 2007 and the beginning of 2008. So, if you have any ideas, I want to know them.

At present we have a list of proposed events though we're still working through the details on most of these. If you know of something that I don't, even if it is just an idea at this point, can you please send me as much information as possible. At the very least, I'd like to know a title, location, dates, maximum number of people to attend, and who is the core AEDA researcher* associated with the event. I will be in touch with core organisers regarding full details. (*AEDA has 13 core researchers and they're listed on our website.)

We'd like this information as quickly as possible so we can maximise the opportunity for key stakeholders (eg, policy makers at DEW) to be involved.

We hope to have a list of up and coming events on the AEDA website soon (on the events page). Please note that if you only want a limited number of people to see details about any particular workshop, let me know who they are, and this can easily be done. Otherwise, the details we present are visible to the world.

General information surrounding past workshops is posted to show our stakeholders what AEDA is doing and has done. After the AEDA workshop conducted in South Africa (in connection with the SCB2007 conference in July) presenters were happy for their presentations to be loaded to the web for everyone to access. You can access these presentations at http://www.aeda.edu.au/?page=66528&pid=66527 (or simply follow the prompts from our events page). This information is primarily for the benefit of presenters and attendees at the workshop, but it also shows what AEDA members have been up to (and the collaborative links that are being formed). If you run a workshop, you can follow up with this level of detail, something different, or something very brief.



Workshopping in South Africa at SCB2007

This image of our Director in a pink dress appeared in one of the presentations given in South Africa (now available on the AEDA website). If you want to know why, you'll have to trawl the workshop presentations yourself.

If you have any queries or problems, don't hesitate to email me.

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Funny end bits

This issue's funny end bit:

"Very *funny*, Scotty. Now beam down my clothes."

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That ends issue 7 of AEDA News. If you have news or views relating to AEDA or of interest to AEDA members, please send it to the editor, David Salt.

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Want to know more about AEDA?

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