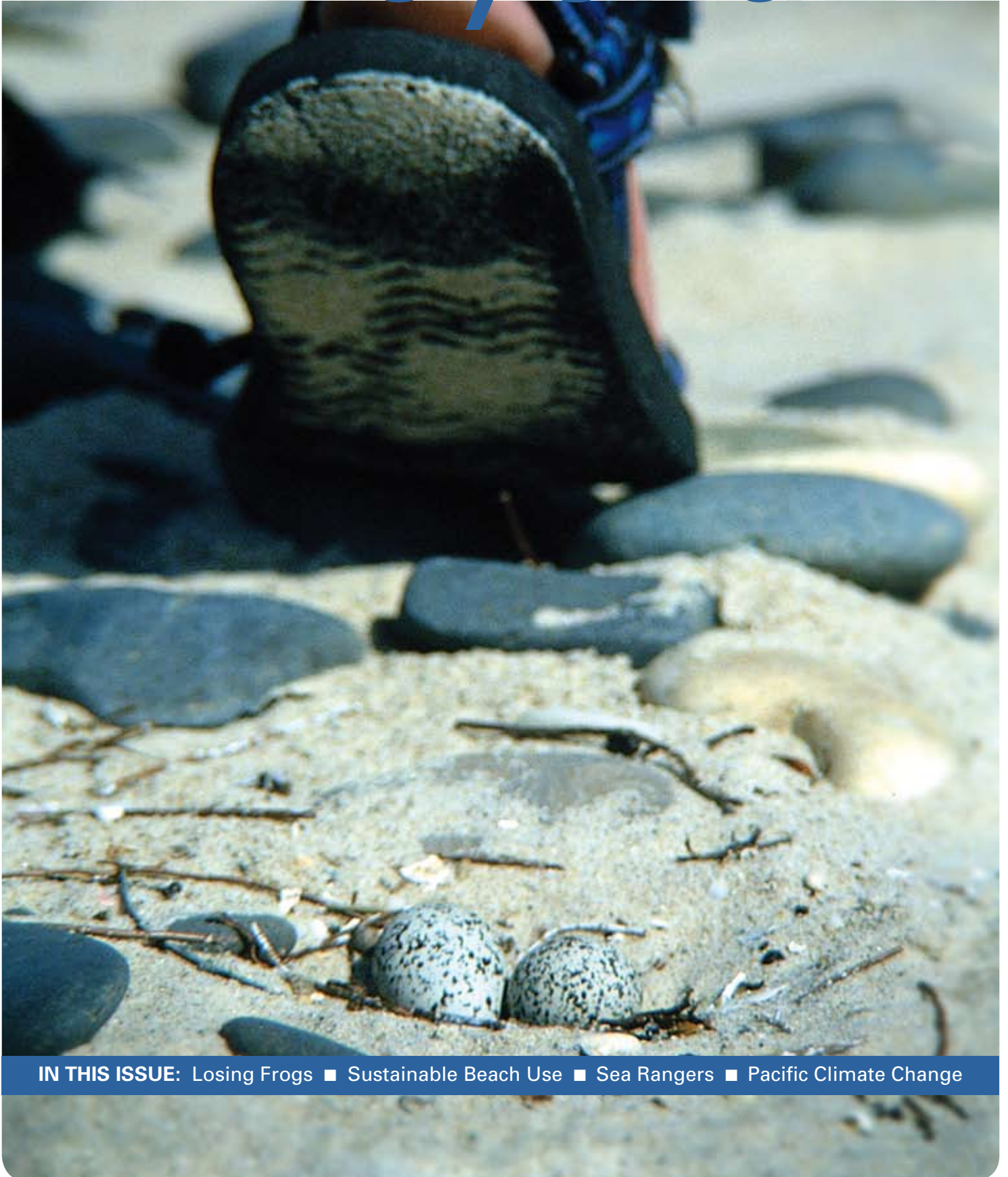




BeyondEP



IN THIS ISSUE: Losing Frogs ■ Sustainable Beach Use ■ Sea Rangers ■ Pacific Climate Change

Knowledge Transfer is the third strand in the triple helix of The University of Melbourne's *raison d'être*.

It is also core business for the Office for Environmental Programs (OEP). In its role in sustainability education, the OEP is responsible not only for the Graduate Environmental Program (GEP) but also for outreach – bringing students, staff, community and industry together. The Community and Industry Advisory Board (CIAB), comprising members of a diverse range of industries and businesses, including not-for-profit organisations and government positions, epitomises links beyond academia. A benchmarking exercise by Ruth Beilin in North America and Canada, and by me in New Zealand, revealed that the CIAB is one of the factors in the OEP that is envied by Directors of other Environmental Programs. Other factors are the pan-Faculty position of the OEP, the support from the Deans of those Faculties, the University's overt commitment to the Talloires Declaration, and the enthusiasm of our student population, shown by increasing enrolments and participation.

The CIAB hosts a seminar series each year – public events which enable learning, understanding and discussion. Towards the end of 2005, speakers in the series were Dr Jim Salinger, Principal Scientist from the National Institute of Atmospheric Research in New Zealand (page 6) and Professor John Fien, Innovation Professor of Sustainability from RMIT University. John was the keynote speaker at the CIAB Academic Forum on Transdisciplinary Thinking and Learning, which is the focus

of the second core subject for the GEP, to be launched next semester.

In 2006 the first seminar was given by Dr David Secord from the University of Portland. The event was chaired by Dr Chris Bell, Environment Protection Authority and a member of the CIAB, and attracted staff from EPA and Parks Victoria as well as staff and students. A workshop followed the seminar, where David's talk was used as an example of transdisciplinary thinking, and discussion centred on how the solutions were identified, what groups were involved, and how they were encouraged to work together.

Kate Noble, from the Australian Conservation Foundation, was the second CIAB speaker and she provided the keynote address in the opening of the core subject, Sustainability, Policy and Management (SPM). She set the scene for the students superbly with the statement that 'Sustainable development creates tension'. She also emphasised the importance of research, and economic considerations, explaining to the students that once the bottom line was shown to the politicians, they tended to understand and might then be persuaded to 'do something about the issue'. (The number of students expressing an interest in completing an environmental economics paper then increased.)

Discussion on sustainable development has continued throughout the year at the Plane Tree Fora (page 7). Several of the speakers during the core subject were invited by the students to come back later in the year to lead a forum – the lecture slot was insufficient to contain all that was needed. I am extremely grateful to all



those academics, community and industry speakers who gave of their time to engage the SPM students so enthusiastically and convincingly.

Australia needs more enthusiasm and conviction, as well as research and education in environmental issues. The Environmental Performance Index (EPI) was released at Davos by the Yale Centre for Environmental Law and Policy in collaboration with the World Economic Forum as a pilot study in February 2006. The index addresses the need for a measure of policy performance in reducing environmental stresses on human health and promoting ecosystem vitality and sound natural resource management. The EPI for the top thirty countries ranks New Zealand number one in 'clean and green' overall. Australia was in 20th position.

Clearly there is room for improvement nationally. Students and staff connected with the OEP are working towards a future that encompasses environmental sustainability; Australia will reap the benefits.

Jacqueline Rowarth
CRSNZ FNZIAS
Associate Professor and Reader
jrowarth@unimelb.edu.au

BeyondEP

MAGAZINE OF THE OFFICE FOR ENVIRONMENTAL PROGRAMS, THE UNIVERSITY OF MELBOURNE



Editor	Jacqueline Rowarth
Sub-editors	Louise Wilson, Felicity Wilmot
Design	Blue Vapours
Photography	Cover and Birds (pg 4) - Grainne Maguire; Wallaby - Andrew Greenfield; Frog - courtesy of Peter Robertson, Wildlife Profiles; Waterway - Caroline Dunn; Climate - Jim Salinger

Further details about research and events described in this magazine are available through the Office for Environmental Programs. Details are correct at the time of printing.

Wallabies Prefer Established Areas

Wallabies, habitat, and the impact of forest management came together in Andrew Greenfield's research in the Pyrenees Ranges State Forest in west-central Victoria.

Swamp wallabies do not fall into any of the categories (species which are small and common, arboreal, or endangered) which are usually investigated when studying the effects of habitat loss and forest fragmentation on mammals. The swamp wallabies are medium in size, terrestrial, and common throughout their range from Cape York in Queensland to south-western Victoria.



By radio-tracking tagged animals with transmitters worn as collars, Andrew found that in selecting habitats, the wallabies showed a preference for old, burnt forest and forest habitat, rather than the harvested area and new burnt forest created by the timber harvesting. Habitat cover and food availability are thought to have been the determining factors in choice. For the wallabies and the area of forest under examination, harvesting did not appear to have an adverse effect. The harvested area was, however, only about 10 ha of the 25 ha coupe; 10 ha is less than the average home-range size of the average swamp wallaby. This in itself is an extremely useful observation as it points to the importance of the interaction between range and harvest – an interaction deserving further investigation.



Saving Water: Losing Frogs

Within the next decade, open-channel water delivery to the agricultural Mallee Wimmera region of north-west Victoria will be replaced by a pumped, reticulated supply.

Environmental advantages are expected to accrue from the resulting decrease in evaporation and seepage (calculated to be up to 90%) as some of the savings will be returned to source rivers. The downside, however, is the potential loss of fauna now adapted to, and dependent upon, the open water in the channel-fed area.

For Lorelle Skewes, the fate of frogs currently living in channels was of concern. The Growling Grass Frog, for instance, has been able to extend its original range into the Mallee Wimmera along the channel system. Removal of the system will decrease range for the frog.

Lorelle reviewed the literature and available data on frog species in the Mallee Wimmera region and came to the conclusion that in an area which is already frog depauperate (dry Mallee country is 8.2 % of the total land mass of Australia, but contains only 3.5 % of the Australian frog fauna) the persistence of frogs in any abundance once the channel water system is decommissioned is doubtful. Her primary recommendation is to survey the area, thoroughly and immediately. Knowledge of what is dependent upon the channel system is sparse; surveys of fauna are required as the first step in implementing a management system to ameliorate the effects of decommissioning.

Volunteering to Make a Difference

Volunteering can be considered as the social glue in a democratic society... or, in a more critical light, as a mechanism for ensuring the *status quo*.

The latter reflects the fact that when volunteers give of their time, government support is not required, and, in natural resource management (NRM), voluntary conservation activities ameliorate environmental degradation (sometimes caused by primary production systems).

Caroline Dunn explored how volunteering contributes to conservation through community-based NRM with Earthwatch and Landcare. Both groups achieve ecological benefits which are characteristically difficult to observe and measure.



The literature suggests that contribution to NRM objectives through volunteerism mostly occurs through social outcomes which include education, social learning, network formation and awareness-raising. Caroline found all this to be true, but also felt that she was assisting in bridging the gap between reduced government involvement and the growing need for solutions to environmental problems – she participated in important research and conservation planting that would not otherwise have been done. For Caroline, volunteering allowed her to make a practical commitment, while exploring the dualism of science versus nature and production versus conservation.

Sustainable Beach Use

Protecting Australia's Beach-nesting Birds

Dr Grainne Maguire

Victoria's coastline attracts more than 70 million visits annually and over 80% of the population now lives near the coast. Unfortunately, the time of year when beaches are most used by people coincides with the breeding period of beach-nesting birds. Several of Australia's resident shorebirds nest directly on the beach, foredune or in the dunes during late spring and summer, and are extremely sensitive to the impacts of beach recreation. Their simple nest scrapes in the sand, and well-camouflaged eggs and chicks, are very difficult to see. People, unleashed dogs, horses and vehicles on beaches not only pose a direct threat, but they also disturb incubating and brooding adults from the nest, exposing eggs and chicks to harsh temperatures, and predators such as ravens, gulls and foxes.



Given the love Australians have for beach recreation, and the strong economy generated from coastal tourism, restricting people from beaches is not a feasible conservation strategy for protecting the needs of our beach-nesting birds. To address this issue, Birds Australia, a non-government organisation dedicated to conservation of, and research on, native birds, has recently established a project

aimed at promoting sustainable beach recreation that ensures the long-term coexistence of beach users and beach-nesting birds. The 'beach-nesting birds and coexistence with recreationists' project is funded by the Natural Heritage Trust under the Regional Catchment Competitive Investment Grant, hosted by Port Phillip and Westernport Catchment Management Authority (PPWCMA). Victoria's four other coastal CMA groups (East Gippsland, West Gippsland, Corangamite and Glenelg Hopkins) are also participants in the project.

The project uses the Hooded Plover *Thinornis rubricollis*, as a 'flagship species' to encompass the needs of other threatened beach-nesting, non-colonial birds, such as the Beach Stone-curlew *Esacus neglectus* and Pied Oystercatcher *Haematopus longirostris*. Hooded Plovers occur as widely-dispersed solitary pairs, and in south-eastern Australia they commonly nest above the high-tide mark on ocean beaches. The species is extremely sensitive to the impacts of beach recreation, due to its long incubation (28 days) and chick-rearing (35 days) phases. Hooded Plover eggs and chicks have only a 20-24% chance of survival. Most of the dangers can be alleviated by changing human behaviour; coexistence through cooperation is likely to be a sustainable option.



During January/February 2006, a group of volunteers surveyed the entire Victorian coastline (800 km) for Hooded Plovers. Data are now being used to map the distribution of Hooded Plovers and threats to their breeding success, and members of the local community will be trained to implement on-ground actions to alleviate these threats. Birds Australia will also support several research projects investigating the effectiveness of different management techniques for the conservation of Hooded Plovers. This presents an opportunity for students of the Graduate Environmental Program to undertake research projects in collaboration with Birds Australia.

Raising awareness and bringing about small changes in the behaviour of visitors to the beach will be the key to successful conservation of beach-nesting birds. People have an impact on beach-nesting birds without even knowing it - please walk your dog on a leash, ride your horse on the sand closest to the water's edge (where nests are unlikely to be), avoid walking in the dunes, and always place your litter (especially used fishing line) in a rubbish bin.

Grainne Maguire worked with the Office for Environmental Programs while undertaking doctoral studies. She is now employed with Birds Australia. For further information about this project, volunteering or research project opportunities, please contact her at

g.maguire@birdsaustralia.com.au



Fisheries Resource Management: Engaging Indigenous People

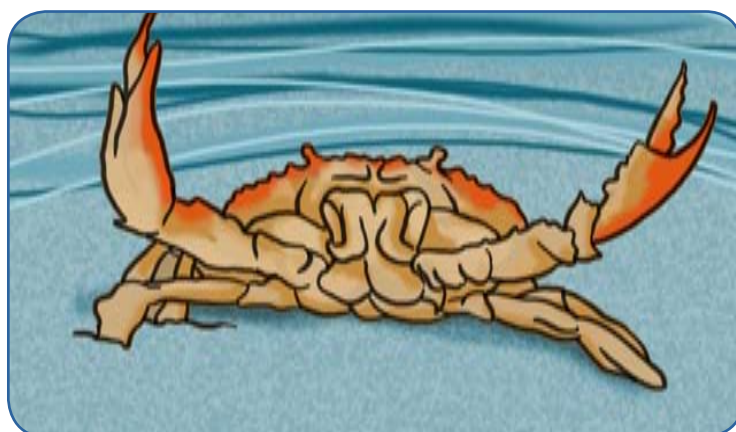
Fisheries resource management in waters adjacent to indigenous-owned land is a complex issue. Tara Howard went to the Northern Territory to examine the complexities at first hand.

The Northern Territory has the largest indigenous population in Australia, with many indigenous people living in remote coastal and inland communities. Indigenous people in these remote areas have a strong connection with their land and sea for food resources, ceremony, livelihood, spiritual kinships and cultural identity. Federal and State-level legislation allows indigenous people to fish within their country (the spiritual, cultural tribal area from which they originate, including both land and sea) for traditional and customary purposes, and, to varying degrees throughout Australia, indigenous people are exempt from most fisheries regulations. However, until relatively recently, many Acts did not prescribe involvement of indigenous people in the management of fisheries resources in waters adjacent to indigenous-owned land. The consequences have been environmental, social, economic and cultural.

Tara's case study involved working with the small coastal community of Maningrida in northwest Arnhem Land. The traditional landholders of the area are the Kunibidji people and the official population of the community of indigenous and non-indigenous people is 3000 people. The actual population, however, varies considerably, depending on the time of year and the cultural commitments of indigenous people.

Recognising the complexities, the advantages to be gained from working together, and in response to traditional owners stating that they would like their community to be more involved in the management of coastal and marine environments, the Northern Territory Government developed the Sea Rangers in Maningrida Program. While wanting the management of resources to be in line with customary management, the traditional owners also recognised that their approach needs to fit within contemporary management structures.

The Sea Ranger Program is funded by the Bawinanga Aboriginal Corporation (BAC) and partially supported by the Government. Five indigenous Sea Rangers are employed, and all are involved in the management of the sea country in the BAC area.



The role of the Sea Rangers is to:

- assist Territory and Federal Government staff in the active surveillance of suspicious illegal fishing activities
- provide a local source of knowledge on indigenous and non-indigenous activities in coastal and marine areas
- survey the health of coastal and marine environments.

In order to do this they are provided with an aeroplane and a boat. They do not have any enforcement power, but provide information to those that have – State or Federal Fisheries Policing Departments. This is regarded as a limitation of the program because of the potential delay in reaction time.

A second initiative of the BAC was the purchase of a commercial licence for a mud crab aquaculture venture in early 2005. The licence provides the BAC with the opportunity to make profits from the aquaculture venture, which can then be used to fund other projects.

For Tara, observing and talking with the indigenous rangers on field trips and visits to the mud crab aquaculture venture provided direct insight into the work, and the difficulties associated with it. A fundamental difficulty arises from the differences in attitude to resources between non-indigenous and indigenous people. Non-indigenous people tend to regard land and sea as separate, and areas of resources are owned by individuals. In contrast, indigenous people tend to regard these resources as part of an inter-connected system, owned by all people within their country.

A further difficulty was apparent in that the rangers were not finding it easy to understand government processes, particularly concerning the filling out of forms and deciphering government terminology.

Yet another issue is the nature of full-time employment, which many indigenous people find does not fit with their cultural commitments. To overcome some of the barriers to involvement, Rangers are employed under various arrangements to allow them to fulfil cultural obligations.

Tara's report included recommendations on co-management and education. She acknowledged from the outset of her research that issues surrounding indigenous cultures are very complex and cannot be solved in a brief examination. However, her work has produced information which contributes to greater understanding, and a set of recommendations which, if instituted, will improve fisheries resource management in the future.

Climate Change in the Pacific

Dr Jim Salinger, Principal Scientist, National Institute of Water and Atmospheric Research, New Zealand, has been involved in research in climatic change since before 1975 – when his seminal letter to the Editor was published in Nature.

He is now a lead author for the United Nations-appointed Intergovernmental Panel on Climate Change (IPCC), a Companion of the Royal Society of New Zealand (recognising pre-eminence in the communication of science and technology), and we were privileged to have him as a CIAB speaker in November. Professor John Zillman, Chair of CIAB and President of the Australian Academy of Technological Science and Engineering, chaired the seminar.

After showing the evidence for climate change, Dr Salinger discussed the fact that although climate is driven by many factors, most warming over the last 50 years appears to be attributable to human activities. The IPCC Special Report on Emissions Scenarios (SRES) identified the main driving forces of the greenhouse gas emissions believed to be bringing about climate change as demographic change, social and economic development, and the rate and direction of technological change.

Whatever the cause, there are few who doubt that global warming is happening. Dr Salinger spent most of his time discussing these effects in the Pacific, concentrating on what we could expect in the future. For the aware, this also means the areas for research so that appropriate preparations can be made and actions taken.

With warming in the South Pacific, Dr Salinger warned the audience to prepare for more hot days, more intense rain, and an increase in natural disasters.

The IPCC SRES has suggested that temperatures will increase between 1.4 and 5.8°C between 1990 and 2100. This will mean that the number of hot days increases – which will have an impact on work rate and productivity. A study by the American Society of Heating, Refrigerating and Air-Conditioning Engineers found that the typical manufacturing plant loses 1% efficiency per man hour for every degree



With warming in the South Pacific, Dr Salinger warned the audience to prepare for more hot days, more intense rain, and an increase in natural disasters.

above 27°C. In an office the comfortable temperature range for sedentary work is between 20 and 24°C (with relative air humidity between 40 and 60%). Either side of this range, work ability decreases in quantity and quality – less is done and mistakes are increased. In order to maintain productivity, workplaces will need to have air-conditioning – but this takes energy, which can mean more impact on the environment.

More intense rain will occur because warm air holds more than cold air. The intense rain will exacerbate the tendency for natural disasters to be more prevalent, and this will be further compounded

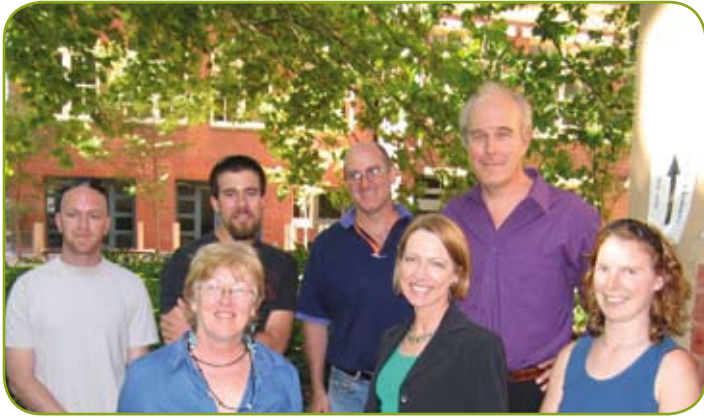
for the Pacific region by sea-level rising – during the 1900s it rose 150-200 mm, resulting in major concerns in low-lying islands and areas. Of further concern is that melting ice and sea ice is affecting the Arctic Tundra and therefore the flora and fauna it supports.

Flora and fauna, both introduced domesticated and native, are also under threat in the Pacific. Reports of coral bleaching are increasing, with concerns about devastation on, for instance, the Great Barrier Reef. Coral bleaching occurs when the coral (a symbiotic relationship between single-celled algae and the coral polyp which provides a safe environment and carbon dioxide) is stressed. Stress can be solar irradiance, pollution, smothering silt, and disease. It can also be changes in sea temperature. Coral species live within a relatively narrow temperature range, and anomalously low and high sea temperatures (even only 1-2°C for 5-10 weeks during the summer) can induce coral stress. The result of stress is that the coral polyps force out the single-celled algae that give coral its colour. Although bleached coral can usually recover in the next cool season, if all the algae are lost, the coral will die and reefs will crumble.

Another issue with sea temperatures is fish movement. Fish follow ocean temperatures and sovereign nations either suffer or experience booms.

Animal and plant health is yet another issue. As temperatures and humidity increase, the range of pests and diseases changes. C4 plants, for instance will be found in new areas, and could affect indigenous species. Border security, especially for Australia, New Zealand, and Hawaii, will become an even greater challenge as the potential for new pests and diseases to establish will be changed.

Dr Salinger's talk was recorded by Bernie Hill, Australian Broadcasting Company, who also interviewed him for the ABC report on Climate Change.



Sustainability Issues

Plane Tree Fora, arranged by the Office for Environmental Programs to give students, staff, industry and community an opportunity to discuss topical issues in environmental sustainability, continued in 2006.

Dr Quentin Farmar-Bowers, an environmental consultant, was the first speaker and facilitator on 'Integration for sustainable development: bringing people and the planet together'. Quentin's premise was that as sentient beings, recognising that we are having a huge impact on the planet, we should be able to integrate people's welfare with the welfare of the planet in order to devise developments that improve both.

In his scene-setting, Quentin discussed the fact that there are many ideas about how people should treat each other – religious commandments, the Universal Declaration of Human Rights, the privacy act, and company law provide some examples. These can be embraced under the concept of inter- and intra-generational equity. There are also many ideas about how people should treat the environment. These are embodied in religious texts (the stewardship parable), in primary resource extraction (hunting, agriculture, forestry, fishing and mining traditions) as well as in environmental protection legislation, national parks and international conventions such as those on biodiversity. Amongst the various ethical systems that people use to justify their actions, Quentin pointed out that the utilitarian ethic probably dominated – which was the topic of the first Forum lead by Associate Professor Janna Thompson last year (*BeyondEP* 1: 7).

Quentin posed the questions:

- Can we succeed if we apply ideas sequentially by fixing the planet then fixing the people (or *vice versa*)?
- If we decide to apply these ideas concomitantly, how can they be integrated?

The conclusions of the forum centred on a needs-based approach. People have physiological and psychological needs. Subsistence, protection, affection, understanding, participation, leisure, creation, identity, and freedom, as well as autonomy, competence, and relatedness, have been proposed. The needs-based approach clearly identifies the dependence of people on the continuing health of the planet; satisfying both physiological and psychological needs involves the availability of such things as clean air and water.

Applying the needs-based approach means that development decisions should be justified on the basis of their ability to preserve and deliver critical resources and processes to people now and in the future. The Forum agreed that this approach would require a big change in thinking – but that, as in the first Forum, the adoption of sustainability as an ethic would assist.

A month later, Dr Raghava Dasika, Principal Scientist with URS, facilitated a forum on 'The imperative of sustainability'. URS is a sponsor of Environment Business Australia (EBA), the peak body representing environment and sustainability for business in Australia. Raghava had just participated in an EBA-State Government workshop focussing on developments in relation to sustainability frameworks in Victoria. Tangible actions that the Government is trying to achieve in the Sustainability framework (which was the focus for assignment two in the core subject Sustainability, Policy and Management this year) include:

- maintaining and restoring natural habitats
- reducing environmental impacts
- improving efficiency of resource use.

The discussion centred on 'what is achievable *versus* what we need to achieve'. Participants agreed very quickly that the answer to the first question was 'a lot more' and then focussed on the issues beneath the high level need for a 'compassionate, balanced, diverse and adaptive society'. For the individual this will require adopting personal responsibility – challenging in a society where 'blame' is increasingly apparent. In the community, leadership is required to show people the way and explain appropriate behaviours. From the Government, effective legislation and constructive discussion fora will be of assistance. In all aspects, participants agreed that there is a problem with timeframes for business and government – they are short because of profit requirements and re-election issues. The media also came in for some flack because of the constant message to consume.

While there was considerable discussion on energy and transport, with all the practical aspects (solar heating, wind, hot rocks, oil pricing, public transport etc.), there was also debate on the role of pessimism and of the baby boomers. Pessimism was seen to be prevalent, which may be because society thinks that environmental deterioration is both inevitable and somebody else's problem. In order to change this it was agreed that government and businesses need to show overt leadership in 'doing something about it'.

The baby boomer issue is also complex. There are some who think that the baby boomers are suppressing the environmentally sustainable lifestyle... this may well become the topic of a future Forum.

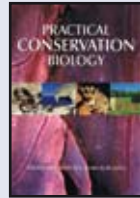
Back Row: GEP students Sagi Aloni and Giordano Fusi; Academic Staff Member: Dr Rob Edis, Guest Speaker: Dr Quentin Farmar-Bowers Front Row: OEP Staff: Ms Louise Wilson, Dr Jacqueline Rowarth and Ms Felicity Wilmot

New Fellow, New Centre, New Book

Professor Mark Burgman, inaugural Director for the Office of Environmental Programs, and now Deputy Director as well as Professor in Botany, has been elected to the Australian Academy of Science in recognition of a career that has significantly advanced, and continues to advance, the world's scientific knowledge. In Mark's case, that knowledge is in the fundamentals of uncertainty in ecology. He has applied new knowledge to a long-standing problem — how to make conservation decisions.

This news in April was followed by an announcement in May that Mark will head the Australian Centre of Excellence for Risk Analysis – a new \$6 million Commonwealth-funded centre with the goal of developing tools, systems, advice, training, methods and guidelines to improve the analysis of risk.

Eventually the Centre hopes to be able to provide services to all levels of government and knowledge transfer to industry. The initial focus is on biosecurity – of vital importance as Australia juggles the requirements of being involved in a global economy.



Almost at the same time, Mark's latest book appeared on the shelves. *Practical Conservation Biology* written with David Lindenmayer from ANU, covers the topics that are central to conservation biology and natural resource management. It reflects the latest thinking on key topics, and although it deals primarily with the

Australian context it also includes many overseas case studies. The book has been described as the most comprehensive assessment of conservation topics in Australia and one of the most comprehensive worldwide.

More new books

Australia, New Zealand and the Pacific – An Environmental History is a new book in the series produced by Nature and Human Societies. The fact that Don Garden, Department of History and Environmental Science, was asked to write it by the series editor (Mark Stoll from the Department of History at Texas Tech University) is testament to Don's international reputation for research in this area.

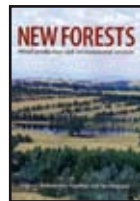
The series provides insights into how the natural world has been transformed by human civilisation. Each volume concentrates on a different geographical region, focussing on the key trends and events that have shaped its history. Don's volume examines how humanity and nature have inter-twined 'Downunder'.



As Don puts it "a large, arid landmass; an elongated archipelago with volcanoes, thermal pools, and glaciers; the world's biggest body of water with thousands of islands....what could they possibly have in common?"

It is the contrasts and similarities that are fascinating. Don has shown that while the places and peoples of Australia, New Zealand and Oceania are diverse, there are observable patterns in their environmental histories, and lessons that can and should be learned - by everybody.

Australia, New Zealand and the Pacific – An Environmental History
Don Garden. ABC-CLIO inc, Santa Barbara, California, 2005.



Forests feature in the Australian consciousness and landscape, frequently in the tension between production and conservation. Ian Ferguson, Professor Emeritus with the School of Forest and Ecosystem Science, has recently published a book (with co-author Sadananda Nambiar from CSIRO) that shows how wood production systems can provide environmental services.

'New Forests' discusses how agricultural landscapes affected by salinity and with a rainfall of less than 650 mm a year, can be revitalised with appropriate technology and species. Beyond planting, it considers how productivity can be improved with management, what mix of environmental services and commercial goods is optimum, and whether the likely net benefits justify the change in land use and requisite investment. The importance of community-based activity to restore tree cover in Australia through movements such as the 'Billion Trees', Landcare, and Greening Australia is acknowledged, and the lessons learned from co-operative research discussed.

New Forests are for new landscapes, and may well provide some solutions for the future.

New Forests: Wood Production and Environmental Services,
Sadanandan Nambiar and Ian Ferguson, CSIRO Publishing, 2005.

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Contact details: phone 03 8344 4773 / 5073 or query-environment@unimelb.edu.au

