

Annual Report for CRES - 2004

1 Key Achievements

CRES has an international and national reputation for high quality research on important natural resource and environmental issues, developing leading-edge research methods, promoting inter- and trans-disciplinary research, and linking research to policy formulation.

The highlights of CRES research during 2004 are listed under our main research themes:

Water Resources

- Publication of an analysis of the impact of Canberra's 2003 bushfire on water quality in Canberra's main water supply dam.
- Publication of a major study on collaborative learning and coastal stewardship in estuarine floodplains.
- Publication of reports and studies on groundwater management in atolls and small islands and the use of multi agent systems in equitable groundwater use.
- Determined regions where the groundwater and river systems are in hydraulic connection within the Namoi Catchment, NSW.
- Completion of a major research project on biodiversity of Channel Country rivers.
- Established a Bayesian decision network approach for assessing the ecological impacts of salinity management.
- Measured fluxes of nitrogen oxide gases, methane sulfur dioxide and hydrogen sulfide from acidified coastal sulfidic soils as a new, significant, non-anthropomorphic source of these gases.

Conservation / Landscapes

- Completion of an eight year ARC funded research project on the evolutionary/conservation biology of eclectus parrots on Cape York Peninsula.
- Major breakthroughs were made in assessing the value of restored and remnant woodland vegetation for biodiversity in south-eastern Australia.
- Completion of major field studies of selected fauna in Bolivia, Western Australia and New South Wales.
- Publication of a major paper on salvage harvesting.
- Completed a major research project on biodiversity of Channel Country rivers.

Spatio-temporal Analysis

- Completion of an analysis of high resolution airborne laser scanned data to produce a new high resolution digital elevation model (DEM) for the Cotter catchment of the ACT.

- Development of a new biquadratic smoothing spline method for very large spatial data sets.
- Development of a new multivariate spatial analysis method for analyzing spatially varying dependences of surface climate data.
- Publication of the first laboratory verification of chemical stabilization mechanism first proposed for Venus' atmosphere in early 1980s.
- Production of a new stream and catchment reference system for Australia.
- Published a major contribution on terrestrial climate data assimilation for the synthesis of Biospheric Aspects of the Hydrological Cycle (BAHC), a Core Project of the International Geosphere-Biosphere Programme (IGBP).
- Established spatial patterns of trends in pan evaporation over the Australian continent over the last 50 years.
- Published intercomparison of stratospheric aerosol properties derived from satellite measurements for years following Mt Pinatubo eruption.

Economics of the Environment

- Completed a major research project on flexible targets for controlling greenhouse gas emissions, funded by Hewlett Foundation through Stanford University, USA.
- Completed survey of water policy makers and interest groups.
- Published three articles on the theory of sustainability economics, which should become significant reference points in literature.

Public Policy and Institutions

- Produced maps of natural resource management (NRM) problems and capacity by local government (LG) area – nationwide and by state. Used these to identify 28 LGs (four from each state) facing multiple, serious NRM problems, and to recruit those LG into a project to improve rural LG NRM capacity.
- Completed a major international study of noteworthy whole-of-government and -society responses to the emerging sustainability policy agenda.
- Published a major study of forest policy for sustainable commodity production in Australia.

Ecological Humanities

- Launched 'Ecological Humanities Corner' section of the Australian Humanities Review, a peer-reviewed interdisciplinary electronic journal.

A number of major books by CRES researchers were published in 2004:

- *"Understanding the Environment: Bridging the Disciplinary Divides"* (UNSW Press, Sydney), R.Quentin Grafton, Libby Robin and Robert J. Wasson. A major collaborative, interdisciplinary work that brings together the deliberations of four major workshops over three years. Chapters were written by twelve CRES members and two other ANU contributors. The Foreword was contributed by Dr Will Steffen, Executive Director of the International Geosphere-Biosphere Program, Stockholm. The book was

formally launched by the ACT Commissioner for the Environment, Dr Rosemary Purdie, and the Vice Chancellor in December.

- "*Institutional change for sustainable development*" (Edward Elgar Publishing, Cheltenham), R. Connor and S. Dovers (2004). A major international study of noteworthy whole-of-government and -society responses to the emerging sustainability policy agenda.
- "*Trees and Biodiversity: a Guide for Australian Farm Forestry*", D. Salt, D. Lindenmayer and R. Hobbs. This book focuses on how farm forestry might be applied to protect and enhance biodiversity in agricultural landscapes.
- "*Strata: Deserts past present and future*", Mandy Martin, Libby Robin and Mike Smith. A major collaborative environmental art project on Australian desert knowledge with the financial support of Land and Water Australia and the Australian Research Council.
- "*Reports from a Wild Country: Ethics for Decolonisation*" (UNSW Press, Sydney), D.B. Rose. Explores some of Australia's major ethical challenges. The focus is on reconciliation between Indigenous and 'Settler' peoples, and with nature.

A number of CRES researchers were appointed as honorary fellows, or awarded visiting fellowships, at international institutions including:

- University of Glasgow, Scotland;
- Scott Polar Research Institute, St John's College, Cambridge, UK; and
- A visit sponsored by the National Science Council of Taiwan to two of Taiwan's National Universities.

CRES maintained our commitment to undergraduate education through contributions to 12 courses in areas as diverse as environmental history, water resource management and hydrology, and human and urban ecology.

2 Honours and awards

Professor David Lindenmayer won the Australian Natural History Gold Medal.

Professor David Lindenmayer was recognized as the 2004 Outstanding Principal Investigator by the Earthwatch Institute.

Dr Libby Robin was appointed to the Australian Academy of Science National Committee for the History and Philosophy of Science.

Dr. Su Wild River won a University Medal for outstanding service to the campus community as a member of ANU Green Team.

3 Significant Outreach Activities

ANU

- CRES public lunchtime seminar series.
- Convenorship of Environment and Resource Management Graduate Studies Field.
- National PhD workshop in Environmental History (Co-convenor with Dr Tom Griffiths), CRES, Canberra, October 25-29 2004. (Brought together PhD students from all over Australia, with support of the National Institute for Environment, CRES and RISS (History)).
- Active participation in National Institute for Environment activities.
- Membership of various ANU committees including: Academic Board, University Scholarship Committee, University Audit Committee, University and Divisional Research Committees, Divisional Education, Information and Planning Committees, and Environment Management Planning Committee.

Media

- Local and national radio and television interviews on issues ranging from privatization of NSW softwood plantations, Antarctica history, water and sustainability, to conservation of endangered birds, forest wildlife management and nature conservation.
- Local and national print media articles on issues ranging from research on dugongs, waterbirds in desert wetlands to sustainability and institutional reform issues.

Interaction with Policy Makers

- Produced a video for Dept Environment and Conservation for use by Australian and international communities dealing with issues of land/water degradation and waste management
- Evidence given to the Senate Rural and Regional Affairs and Transport References Committee, subsequent report, Australian Forest Plantations: A Review of Plantations for Australia: The 2020 Vision, September 2004.
- Seminar: Bureau of Rural Sciences (BRS), 'Science for Decision Makers' seminar series, "Linking Our Rivers and Aquifers: Case Studies from Australia".
- Seminar: Dept of Environment and Heritage, Bunker Briefing Series, "Institutional and policy change for sustainable development".
- Presentation to ACT Chief Health Office staff, "Emergency management, sustainability and public health: cognate policy fields?".
- Presentation to Department of Environment and Heritage staff, "Landscape restoration – and opportunities for future woodland biodiversity conservation".

- Presentations to the Wreck Bay Board, Jervis Bay, "Field progress on a large-scale fire experiment" and "Large-scale fire and ecological monitoring".
- Seminar: ACT Department of Urban Services, "The potential for water trade between the ACT and NSW in the Murrumbidgee catchment".
- Liaison, recruitment, interviews, information exchange with 28 Local Governments across Australia, and the agencies they work with, on Natural Resource Management issues.
- Field workshop for logging contractors, Victorian Government staff, conservationists in Marysville, Victoria, "Implementation of a Variable Retention Harvest System in Victoria's Mountain Ash forest".
- Presentation to Parks Victoria executives, "Long-term monitoring and ways forward in sustainable management of Victorian forests".
- Seminar: AusAID, "Water Issues in the Pacific: Challenges for Small Islands".

Community Engagement

- Collaborative work with the Ikuntji Arts Centre, Haasts Bluff and environmental artist, Mandy Martin, has brought the history of ideas about Australian deserts to a wider popular audience. "Strata" is part of the program offered at the National Museum of Australia in association with its major exhibition: Extremes: Survival in the Great Deserts of the Southern Hemisphere. There is also an exhibition of the artwork scheduled for the Araluen Art Centre, Alice Springs in 2005.
- Various Earthwatch field camps at Jervis Bay, NSW and Maryville and the Central Highlands of Victoria.
- Presentations to National Landcare Council and talks with Landcare groups in rural NSW on issues such as new visions of landscape restoration in agricultural landscapes and Conservation in farm and plantation landscapes.
- Various interactions with Birds Australia and the Canberra Ornithological Group from specific presentations on birds including the Swift Parrot and the Superb Parrot to implications of large scale landscape restoration projects.

CRES staff and students continue to be sought as speakers at national and international events.

- Seminar: Institute of Bolivian Forestry Research and visiting staff and students from three US universities, Santa Cruz, Bolivia.
- Presentation: Annual meeting of the Society for Conservation Biology, New York, USA
- Seminars: California Institute of Technology, USA

- Presentation: International Society for Ecological Economics, Montreal, Canada
- Invited participant: Rosenberg International Forum on Water Policy, Ankara, Turkey.
- Presentation: Asia Pacific Association of Hydrology and Water Resources, Singapore.
- Lecture: National Committee for Earth System Science of the Academy of Science, Canberra.
- Presentation: Canberra Press Club.

CRES members are active participants in a range of government and non-government research groups, committees and boards, these include:

Professor Michael Hutchinson

- Chair, Reference Group for the Australian Water Availability Project for the Department of Agriculture, Fisheries and Forestry.
- Member, Scientific Oversight and Access Committee (SOAC) for the Arafura Timor Research Facility (ATRF).

Professor Tony Jakeman

- President, Modelling and Simulation Society of Australia and New Zealand
- President, International Institute of Environmental Sciences and Environmental Computing

Professor Henry Nix

- President, Birds Australia
- Co-Chair, Science Council for Wild Country
- Visitor, Cooperative Research Centres (Coastal Zone, Rainforest, Cotton)

Adjunct Professor Paul Perkins

- Chairman, Cooperative Research Centre – Contamination Assessment and Remediation of the Environment (CRC-CARE)
- Project Director, of AusIndustry's Water Roadmap Project.
- Chairman, National Environmental Education Council.
- Chairman, the Barton Group (Environment Industry Action Agenda)
- Member, ACT Sustainability Expert Reference Group (SERG)
- Member, ACT Natural Resource Management Committee
- Member, Banksia Environmental Foundation Board
- Member, NSW Expert Water Panel (EWP)

Professor I White

- Chairman, Oyster Research Advisory Committee (NSW Fisheries)
- Board Member, Arafura Timor Research Facility
- Member, Ministerial Scientific Advisory Council, NSW Department of Primary Industries
- Member, National Committee for Coastal Acid Sulfate Soils (Environment Australia)
- Member, UNESCO World Commission on Ethics in Science and Technology Sub-Committee on the Ethics of Water Use.

- Member, UNESCO International Hydrologic Programme VI, Technical Advisory Board, Water and Society
- Member, Editorial Board UNESCO-Cambridge University Press International Hydrology Series
- Member, STAR Water Working Group, South Pacific Applied Geoscience Council, Fiji
- ARC Reviewer

Key directions for 2005

A significant contribution will be required from CRES to the establishment of the ANU Institute for the Environment. The aim of the new Institute is to develop and enhance the ANU's environmental research and education programs and to increase their national and international impact. CRES will undertake an audit of current environmental and educational activities to inform the activities of the new Institute and to provide a baseline for assessing its success. It is already making the major contributions to a survey of water related research and education across the ANU

In addition, CRES will continue to foster cross campus collaboration through research initiatives including:

- research on biogeochemistry of inland sulphidic sediments with the Department of Earth and Marine Science and CRC LEME
- a bid for an ARC Centre of Excellence in Earth System Science with RSES, RSBS and SRES, with external partners AFFA, CSIRO and Macquarie University and
- jointly organizing with APSEG the 2nd Economics and Environment Network Annual Workshop to be held at the ANU in May 2005.

Major new research initiatives for 2005 include:

- A major new project - a joint research and policy learning exercise - in collaboration with agencies in all Australian jurisdictions, reviewing mechanisms for integration of environmental, social and economic concerns in public policy.
- A new research program on climate change and sociality in Australian Birds.
- The development of new insights and key new knowledge for temperate woodland management and large-scale vegetation restoration in eastern Australia.
- The development of a major woodland management experiment in north-eastern ACT.
- A new research program for recovery planning for endangered Cocos Buff-banded Rail.
- A new research program on photochemistry of the middle atmosphere of Venus.
- A new research program to assess sustainability of coastal catchments

CRES researchers will also continue with established research efforts on:

- Restoring hydrological connectivity of surface and groundwaters: biogeochemical processes and environmental benefits for river landscapes (Widden Catchment, NSW)

- Titi monkey conservation, Crimson and Star finch conservation, primate behavioral ecology and the impact of Chytrid fungus on microhylid frogs in Bolivia.
- An “ecological synthesis” to integrate and synthesise existing data and information resulting from various existing projects.
- Acid sulfate soil and sulfur reduction research, modelling and quantifying salinity within the Hunter Valley.
- Restoring hydrological connectivity of surface and ground waters: Biogeochemical processes and environmental benefits for river landscapes.
- Surface-ground water interactions and increasing salinity in the upper Hunter River.
- The history of people, science and the Australian environment.