

EDITORIAL

Sue Murray-Jones, Hon. Bulletin Editor

'May you live in interesting times' is said to be an old Chinese curse—and for ecologists, these certainly are interesting times! A recent Pew Research survey¹ showed a sharp decline in the proportion of the public believing global warming. In 2009, 57% of people thought there was solid evidence that the average temperature has been getting warmer over the past few decades, down from 71% in April 2008. There seem to be three alternatives offered: the concept of climate change is a huge conspiracy by scientists; humans can't really cause harm on such a scale; or, more worrying, there is as much or more evidence 'on the other side'—as if it was a debate. If there is a conspiracy, it's not us conspiring to get more research funding for their work! There are some well-organised media campaigns attacking the concept of global warming—really, all very reminiscent of the so-called debate between creationists (oh, sorry, intelligent design...) and the scientific community.

I say the belief that there is evidence against warming trends is more worrying, as it shows that most of the population don't have the ability to discriminate between peer-reviewed information, and blogs from anyone who feels like posting one. I remember from uni teaching days just how hard it is to teach students that

internet sites do not provide a substitute for a proper literature review, and to look at the quality of the information. We have to get that message out there. For ecologists, bombarded by information and data showing already-occurring changes, both predicted and not predicted, the decrease in the number of people accepting so much evidence is both mystifying and depressing.

On a lighter note, a recent letter to the editor of our local rag² suggested that we need new words to help us meet the challenge of discussing climate change more rationally, and helpfully suggested the following: plimering (verb)—the wilful misrepresentation of facts particularly when undertaken in a bellicose and bullying manner.

Welcome to all new committee members, and thanks to those outgoing for (mostly) making my editorial deadlines during their time of service! My apologies to all for this issue, the ESA server went down for about 10 days, making notification of Bulletin deadlines impossible, then I put March instead of Feb in one email. And because I am off to NZ in the middle of the printing phase, I couldn't delay deadlines.

¹<http://people-press.org/report/556/global-warming>

²Adelaide Advertiser, Letters. Paul Downton. 16/12/09

Copy Deadlines

Material for the **June 2010 issue** should be sent to the Editor, Dr Sue Murray-Jones (Coastal Management Branch, Dept for Environment and Heritage, GPO Box 1047 Adelaide 5001; ph. (08) 8124 4895, email: Bulletin@ecolosc.org.au) by **Friday 14 May 2010**. Material for 'Ecology around Australia' should go directly to Regional Councillors, not the Editor. Contact details inside back cover.

Instructions to authors

Please avoid sending copy as text within email messages. Attachment file names should include the author's family name and the issue for which copy is intended. Please do not use names such as 'abstract.doc' or 'bulletin.doc'.

Please:

- use single font (Times New Roman 12 point)
- give the full wording of acronyms for organisations, agreements etc. on first mention
- keep formatting to a minimum
- no extra lines between paragraphs
- use single spacing

Advertising

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Full page \$150 \$400

Loose inserts and pamphlets can be included in a mail-out; heavy items incur a higher rate to meet Australia Post charges. Inserts must not project beyond the covers of the *Bulletin*; inserts requiring folding will attract an additional fee. Prices for inclusions on request. *Loose advertising material will need to be delivered by Friday 14 May 2010. Details to be arranged with Executive Officer, contact details inside front cover.*

General guidelines for Bulletin deadlines: Second Friday of February, May, August, and November.

SOCIETY NEWS

PRESIDENT'S REPORT

Carla Catterall

Welcome to the new decade

With an early Bulletin deadline this February I expect that many reports will be brief. The New Year and the grant-writing season are both upon us.

The December Symposium on 'Ecology & Environmental Policy: Never the Two Shall Meet?' took place very successfully on December 4, 2009, at the Shine Dome in Canberra. Many thanks to Jason Cummings, Steve Dovers and other members of the Organising Committee for organising this stimulating event.

The Symposium was opened by Australia's Chief Scientist, Penny Sackett, who reminded us that 2010 would be the International Year of Biodiversity.

It's clear from the presentations and workshop discussions that the point of creative tension is alive and well between, on the one hand, ecological scientists who feel the frustration of watching their clear and rational recommendations being ignored by policy makers, and on the other, policy makers who feel the frustration of receiving confusing information from ecologists at unhelpful times. Nevertheless, it does seem to me that net progress has been made during the past decade in the direction of better ecological input into environmental policy-making. This is a work in progress to which the ESA's Public Liaison Working group will do its best to contribute (if you are interested in playing a role in this, please contact VP Paula Peters who convenes the group). It would of course also be nice to see more policy input into ensuring that ecological science in Australia has improved capacity and resources to develop and transmit good advice. This is a matter of improving the budget for environmental research, for science and for education.

Our fiftieth anniversary year

2010 will also mark the 50th anniversary of ESA's formation. This will be celebrated with events during the year, and in particular with an anniversary focus at ESA10 to be held this year in Canberra. If you have any ideas or suggestions about ways in which ESA can mark or celebrate this significant year, please contact either myself:

president@ecolsoc.org.au;

or ESA Executive Officer, Gail Spina:

executiveofficer@ecolsoc.org.au.

Council news

Combined with the Environmental Policy Symposium, ESA's Annual General Meeting also took place on December 4 in Canberra. And on December 5 Council held its annual Planning Day—a lively meeting which canvassed a number of issues and decisions relating to activities in the coming year. These include a revision of our package of support opportunities for students, such as research grants and conference awards (see details pages 12-14, and page 17).

Welcome aboard to our incoming President-elect, Kristine French, and to our new Secretary, Raghu Sathyamurthy. Thanks and best wishes to outgoing Councillors: Petina Pert and Past-President Peter Fairweather.

And thanks to Sue Murray-Jones and Jann Williams who have agreed to continue during 2010 in their respective roles as Bulletin Editor and Chair of the Ecological Management and Restoration Board.

Carla Catterall
5 February 2010

EXECUTIVE OFFICER'S REPORT

Gail Spina

It's business as usual in 2010 with ESA, with the added excitement of the 50th anniversary celebrations and events. We welcome our new President-elect, Kris French, and Secretary, Raghu Sathyamurthy, and look forward to a year of consolidating the many new initiatives already implemented during 2009 and building on these achievements with new and expanded strategies aimed at improving the services and value of ESA membership.

In our 50th anniversary year, we are looking to focus on membership, seeking to actively engage as many ecologists, practitioners, students, and related disciplines as we can to ensure ESA remains a truly representative and relevant society into the future. Current membership sits at around 1600 with all states represented, a growing overseas contingent, and membership groups spanning undergraduate students to retired ecologists. However, as with any Society, over the years there has been a significant number of lapsed memberships which we would very much like to see reactivated, as well as new sectors developing an interest in ecology which may not be aware of potential membership and what ESA has to offer. I would urge all current members to let their friends and colleagues know of the benefits of joining ESA and, if anyone would like brochures or other information flyers to distribute or have available in the workplace or university, please contact me via email executiveofficer@ecolsoc.org.au.

A primary focus of ESA activity has always been our student membership and we will be running the full suite of student grants and awards in 2010, worth over \$30,000 each

year. Application success rates have traditionally been high for those students who have taken the time to apply, particularly in the research grant category which has now been increased to a maximum of \$1500. A significant new award—The Wiley-Blackwell Student Fellowship—will be introduced supporting student attendance at our Annual General Meeting and Conference. Details will be posted on the website and announced via e-news later in the year so keep an eye on the website www.ecolsoc.org.au/prizes.html.

And finally, speaking of the Annual Conference, ESA10 will be held December 6-10, 2010, in Canberra—where the Society was originally formed all those years ago. This promises to be a truly significant event, built around a 50th anniversary theme looking at how far we have come and at the challenges of the next 50 years.

As part of the event, ESA is planning a 'retrospective exhibition'—a display of memorabilia, photographs, and equipment that outlines the people, places, partnerships, and practices that have shaped both ESA and Australian ecology over time, and those that our members identify as most significant in their own professional or research experiences. Anyone wishing to contribute photos or items, or with ideas for the exhibition should contact Eddie van Etten (wa@ecolsoc.org.au) or myself.

Gail Spina
February 2010

SECRETARY'S REPORT

Raghu Sathyamurthy

Ecological Society of Australia Council Meetings

Meeting – 12th June 2009 (Meeting #3)

Teleconference: commencing 11am in Qld, NSW, ACT, Vic and Tas, and 10:30am in SA and the NT, 9:00 in WA. Agenda papers were circulated in advance to Executive members by Petina Pert and are available on request from Petina Pert, the Secretary. Actions identified in these papers and agreed to by the Council are also included in these minutes.

1 Welcome and apologies

1.1 Chairperson's Welcome and Introduction
Meeting opened at 11.00 am EST.

Present: Carla Catterall, Gail Spina, Lyn McCormick, Petina Pert, Ian Williamson, Peter Fairweather, Eddie Van Etten, Jason Cummings, Sue Murray-Jones, Glenda Wardle, Nerissa Haby.

Apology: Nigel Andrew, Mike Bull, Andrew Hayes, Paula Peeters, Sarah Bekessey, Debbie Saunders, Liz Tasker, Jan Williams, Christine Schlesinger, Kerry Bridle.

1.2 Apologies: Recorded above

1.3 Unratified Minutes of Previous Council Meeting (April)

ACTION: Petina to re circulate minutes and ask people to respond to ratify. Complete. Members responding, all in favour, were: Carla, Jason, Eddie, Paula, Peter, Nigel, Nerissa. Minor edits were recommended by Paula and have now been included. Correct wording and motion provided below.

Motion (Item 3.2 of April 2009 Council minutes): That Council delegates authority to the nominated panel of two Councillors and the Executive Officer to assess the final draft of the ESA National Biodiversity Strategy submission and approve submission on behalf of the Society, with caveat that some ESA members may disagree. Motion carried.

Motion: That the minutes of previous council meeting be accepted as a true and correct record. Proposed: Ian Williamson, 2nd Carla Catterall. Motion carried.

1.4 Draft Minutes of Previous Executive Meeting (May). Provided for noting.

2 Action items arising from previous meetings

2008 Council

6.6.2 Nigel and Lyn to revisit the financial aspects of the Business Plan in April or May each year and report to Executive, April or May 2009. Ongoing.

6.6.4 Council to review Business Plan and investment strategy at 2009 Planning Day. Ongoing.

6.8.2 Glenda to bring AERA procedures manual to Council for ratification. Ongoing.

October Council

5.15.2 Kerry and Jann to seek interest from Tas members for 2010 or 2011. List compiled of interested people. Complete.

Last Council (Apr 09)

CounApr09_3.4.2 AWARDS. Glenda to discuss with Mike award time slots, especially AERA. Recommended five minutes more. Glenda, Complete.

CounApr09_4.1.2 AWARDS. Carla to discuss with Mike taking 1-2 minutes off each talk (ESA TNC and ESA JLTF). Carla, Complete.

CounApr09_4.1.3 TRADE BOOTH. Gail to prepare a series of options and a two page strategy (membership initiatives, target, longevity etc) and revised motion. Gail, Complete.

STUDENT GRANTS. Gail to collate applications and provide information of costs and present at next executive meeting. Gail, Complete.

CounApr09_4.2.1 WELL DONE. Gail/Liz to let Lyn know not to pay WellDone and to find out the status of final accounts for conference.

Need to identify any outstanding payment issues. Gail/Liz, Complete.

CounApr09_4.2.3 FIRE SYMP. Gail to Email to All ESA Members Preliminary Text for Communications and Soliciting Support for the Symposium Working Group. Gail, Complete.

FIRE SYMP. Coordinate flying minute and send to Petina to distribute to executive council before next executive meeting. Jason, Complete.

FIRE SYMP. Email flying minutes to Executive committee before next executive meeting. Petina, Complete.

FIRE SYMP . To bring forward a more formal budget to June ESA council. Jason, Complete – See Item 4.1.

FIRE SYMP. Email Jason indigenous contacts or suggested speakers. Jann, Complete.

FIRE SYMP. Report back progress on symposium organization and act as conduit between LOC and council. Jason, Ongoing.

CounApr09_4.2.4 ESA10. Liaise between 50th anniversary group and LOC. Gail, Ongoing.

CounApr09_4.4.1 GRN. Bring to May executive meeting – launch of GRN to discuss. Jann, Complete.

CounApr09_4.4.3 EMR. Email Gail when on-line survey goes live. Jann, May.

EMR. Email membership advising of on-line survey. Gail, May.

EMR . Discuss with W-B editorial board the idea of a prize for completing the online survey (e.g. one year free subscription). Jann, Complete.

CounApr09_4.4.5 SERI. Bring W-B contract update report. Jann, Complete.

CounApr09_4.7.1 SA DAY. Ask Dawn for a history of previous registration fees. Nerissa, Complete.

SA DAY. Revised budget and report. Nerissa, Complete.

CounApr09_4.8.1 FUTURE CONF. Prepare a one page proposal including content of presentations to circulate for discussion to Gail, Liz and Glenda by August council meeting, and forward to Canberra LOC. Liz, August Council.

CounApr09_4.9.1 TERN. To attend first steering group meeting. Sue Murray-Jones. Complete.

TERN. Send Sue background information in preparation for meeting. Jann, Complete.

TERN/LTER. Finalise ESA working group membership. Glenda, August.

Matters arising from Executive meetings

Executive 2008

5.15.2 Kerry and Jann to seek interest from Tas members for 2010 or 2011. List compiled of interested people. Kerry/Jann, Complete – see Item 4.1.3.

March Exec

ExecMar09_1.4.1. Lyn to send ESA07 to Patrick Smith (via Eddie). Cross check audited accounts figures with WellDone sheets cc: Nigel. Lyn, Complete.

ExecMar09_1.4.2. Eddie to liaise with Patrick with regards to any discrepancies with audited account figures. Patrick and Eddie have examined audited accounts for 2007 and confirmed they are consistent with local organising committee records for that meeting. Eddie, Complete.

ExecMar09_1.4.3. Lyn and Nigel to investigate similar options (term deposits) when it matures. Lyn/Nigel, November.

ExecMar09_2.1.1. Lyn and Nigel to get together on-line to go through budget together in next couple of weeks – training with software. Review at next executive meeting. Lyn/Nigel, July Exec.

ExecMar09_2.1.4. INTECOL student grants: Lyn to create a template form for student entry of bank details and send to Ian/Gail. Have sent email with Excel for students to enter their bank details. Payment of INTECOL student travel grants by end of May. Lyn, Complete.

ExecMar09_3.3.1. Lyn to liaise with Gail and Petina to help them learn to fully access and use the server. Lyn (with Gail and Petina), July executive.

3 Reports

3.1 Treasurer and Finance Report – Nigel/Lyn

3.1.1 Income Statement – April 2009

3.1.2 Balance Sheet – April 2009

3.1.3 Cash movement – April 2009

Lyn/Nigel tabled three reports above. Council noted that the April 2009 financials were broadly consistent with expectations, with no items of particular concern. Lyn asked for feedback on Income statement report produced, which included comparative data from 2008. The format was discussed. Peter raised the issue of whether the GFC is impacting on ESA's financials; conclusion was that it's too early to tell. A membership boost is anticipated from INTECOL. Lyn noted that we have set up separate account for INTECOL; there was discussion about possible financial outcomes.

CounJun09_3.1.1 FINANCE REPORT. Lyn to include previous year and actuals and budget for each month. Keep to 4 columns. Lyn, Ongoing.

3.2 Vice President (Public Liaison) Update Report – Paula

Paula tabled written report. Principle items discussed:

Public Liaison Working Group (PLWG)

The second meeting of the PLWG took place on 18 May 2009 and was attended by Gail S, Liz T, Dawn H-J, Jason C, and chaired by PP. Items discussed and actions arising included:

- Publicity at INTECOL and SERI, including the format and content of a public liaison brochure (GS to follow up);
- Opportunities to connect with public liaison reps from other Societies at INTECOL and learn from what others are doing (British Ecol Soc confirmed, others being followed up by Gail);
- Expert list being compiled for ESA public liaison and for FASTs (invitations for comment / input by members are being repeated by Gail after no response the first time);
- Potential Marine Protected Areas position statement is being investigated by PLWG members;
- Public Liaison principles were proposed and are being drafted by Jason;

- 'ESA Bridging the Gap' proposal to improve skills for science-policy interface among members was proposed and is being drafted by Jason;

- A communication, education and engagement strategy was proposed and is being drafted by Dawn H-J.

Minutes are available from PP on request. Next meeting will be held on Monday 20 July at 2pm Brisbane time.

Promotion of the top Australian Global Restoration Network projects

Media releases were completed for two projects by Paula and were used in conjunction with other media releases prepared by Tein McDonald. Paula noted a useful website with media outlets.

http://www.ourcommunity.com.au/advocacy/advocacy_article.jsp?articleId=1423

ESA submission on the National Biodiversity Strategy

Paula completed and submitted the final submission following input from members, comment by Carla C, and approval by Gail S and Dawn H-J. Gail is arranging for the final submission to be made available on the ESA website, and for notification of this to be sent to members via the weekly e-news. Council thanked Paula for her work/contribution.

EIANZ Ecological Impact Assessment guidelines and ESA position statement

EIANZ is preparing Ecological Impact Assessment guidelines and has invited ESA to consider updating its position statement on the same topic concurrently. Paula has volunteered to be the ESA contact for this. PLWG and ESA members will be invited to comment at a suitable stage.

GVEHO funding application

Still no news from Canberra!

3.3 Vice President (Student Affairs) Update Report – Ian

Ian tabled a written report. Principle items discussed below.

The Jill Landsberg Trust Fund and Nature Conservancy grants for 2009 have been decided. There were 14 applications for the JLTF grant, with the winner being Amy Davidson from ANU for a project on: 'the role of phenotypic plasticity in plant invasions and its implications for biodiversity under climate change'.

There were 10 applicants for the TNC award. The grant was awarded to Vanessa Adams from James Cook University for a project titled: 'Planning for multiple conservation actions to maximise conservation outcomes'. The panel for the JLTF award comprised David Gillieson, Craig James and Ian Williamson. Christine Schlesinger, James Fitzsimons (TNC) and Ian Williamson judged the TNC applications. Both panels were expertly guided by Gail Spina. Gail is also fine-tuning assessment guidelines for both awards given that we have now had a few goes at judging applications.

ESA Student Research Awards.

Applications for the April round of the general ESA Student Research Awards closed at the end of April, and there were nine applications. These are being reviewed and will be sorted within the next week. Note the slight improvement on the three applications we had in April 2008. Ian noted that there will be another round of Student Grants in October.

INTECOL travel grants

There were 44 applicants for INTECOL travel grants. Gail has collated the applications by point of departure (city / state), and the total cost will be \$9,175. Subsequently, two of those applicants have been awarded the TNC and JLTF awards, which will cover their travel costs. This reduces the number of recipients to 42 and the costs to \$8,775. This is well short of the budgeted \$40,000 for up to 200 students. However, the travel grants were well advertised, and this is about double the number of applications we normally get for travel assistance to annual conferences. The issue of offering a second round of applications for travel grants was discussed briefly in the context of the low potential number of applicants.

In the early days of INTECOL organization it was decided that no student prize judging would take place, and Ian was asked to contact prize donors to convert prizes over to travel grants. Of the three donors concerned, The Society for Conservation Biology (SCB) and the Australian Flora Foundation (AFF) agreed to the general idea, though it was likely that some judging of applications (abstracts) would be needed to target a recipient for a travel grant. The other donor, Blackwell-Wiley were already a significant conference sponsor, and the agreement was that the prize would not be offered in 2009.

Given that the number of travel grant applicants is well within the budgeted 200, the Executive (May meeting) agreed that we do not offer the other two prizes (SCB and AFF) in 2009. Ian has emailed Peter Goodwin (AFF) and James Watson (SCB) to ask that we do not offer the prizes (in any form) in 2009, and we hope to be able to resume the sponsorship arrangements in 2010.

3.4 Vice President (Research) Update Report – Glenda

3.4.1 Outcome of AERA lecture selection process: 10 AERA nominations in total were received (with 1 ineligible). The 2009 AERA (Australian Ecology Research Award) Lecture will be delivered at the INTECOL Congress by Prof David Lindemayer (ANU). Topics – David suggested a title relating to Victorian fires in relation to long term research. Carla has emailed David asking him to provide an abstract ASAP.

Glenda report on discussion within the AERA panel – further guidance required on distinction between Gold Medal and AERA award, what stage of career. Carla suggested to be discussed further at the Planning Day. Peter noted it has been articulated at a previous Planning Day – Gold Medal awarded for lifetime contribution by an ESA member to Australian ecology; AERA lecturer selected on the basis of an excellent recent body of ecological research relating to Australia (ESA membership irrelevant). Carla volunteered to put together a table summarising the characteristics of ESA's three awards: Gold medal, AERA, Member Service Prize.

Council noted that AERA provides recognition through the invited Lecture at ESA conference rather than by a physical award. Need to use the word 'AERA Lecture' not 'AERA award' in documentation. There was discussion about the desirability of encouraging AERA awardees to publish a related paper in *Austral Ecology* – it was agreed that this could be considered in future once the award is established.

CounJun09_3.4.1 AERA. A paragraph is required to acknowledge our awards in INTECOL conference booklet. Carla, August council.

CounJun09_3.4.2 AERA. Carla to provide a comparative ESA awards table, consulting with Glenda and Peter. Carla/Glenda/Peter, August council.

CounJun09_3.4.3 AERA. Glenda to provide sentences to Gail regarding announcement of AERA. Glenda, ASAP.

CounJun09_3.4.4 AERA. Gail to publicise/electronic announcement AERA awardee to membership, website and in *Austral Ecology* and *EMR*. Gail, ASAP.

CounJun09_3.4.5 AERA. Gail to check with Rose (Wiley-Blackwell) space for announcing awards. Gail, ASAP.

3.5 Executive Officer Report – Gail

Gail tabled a report outlining her recent activities; summarised below.

- Science meets Parliament - registrations and travel arrangements for delegates; coordinating responses.
- Student Affairs - support to assessment panels for TNC and JLTF award; notification to applicants re outcome of awards; coordinating the INTECOL student travel grants.
- PCO Working Group - Support to the PCO working Group in calling for Expressions of Interest, fielding enquiries from potential applicants and collating applications.
- Bulletin - Submitting articles to the June bulletin and providing proof reading support; preparing e-bulletin for distribution.
- 50th Anniversary Working Group - Providing support to this group in

development of proposals and coordinating call to members for participation and comment.

- Public Liaison Working Group - Participating in meetings, contributing to strategy development and providing support through assisting VP with call for comment. Developing ESA E-news initiative (see attached document for comment).
- Web Review Group - Convening Web review group and commencing implementation of strategies proposed; developing draft member survey and seeking sponsorship for membership prize.
- INTECOL - Developing INTECOL promotional strategy for discussion.
- Coordinating registration and travel for ESA delegates and award winners.
- Website - Updating information as required; adding new sections eg Employment Opportunities, Latest News.
- JLTF - Updated application forms and FAQ sheet prepared and posted on Web; preliminary work done developing Bequest strategy.

4 General business

4.1 ESA Conferences

4.1.1 Professional Conference Organiser Working Group - Glenda

Glenda tabled a report. Expressions of Interest were called on May 6. The EOI document was distributed through ESA news, the Professional Conference Organisers association, and forwarded directly to conference organizers who had been recommended to ESA from members or peer organisations. Applications closed May 29 and fifteen applications were received, from a cross section of PCOs across the country and both large and small organizations are represented. All applicants have had some experience working with non-profit organizations and most in the science or academic sector the working group feels this is a good outcome to the EOI process. A process is now in place to shortlist and commence the more detailed assessment process. Glenda will provide an update for July executive and announce final applicant.

Move to contract negotiation phase by August.

CounJun09_4.1.1 PCO_SELECTION.

Provide report back to council meeting on PCO. Glenda, August Council.

4.1.2 AGM and Fire Symposium 2009 update – Jason/Gail

Jason tabled a report on progress with planning. Committee was happy with the preliminary program provided by Jason. Registration to open September. Draft budget – estimated loss of \$2065 to ESA, based on 60 attendees. Carla suggested we consider charging separately for dinner/evening. Perhaps charge \$70 for registration rather than \$50. Jason has booked venue for Planning Day, but no catering as yet.

CounJun09_4.1.2 AGM/Fire Symp. Gail to circulate flyer to be circulated in Bulletin, e-news and publicise. Gail, ASAP.

CounJun09_4.1.3 AGM/Fire Symp. Jason to revise budget. Jason, August.

4.1.3 ESA11 – Kerry

Kerry reported plenty of interest (18 responses - wide ranging in skills and subject areas). Council was very pleased to confirm that ESA11 can be held in Tasmania. It was noted we will need a convenor to help move the LOC forward, and decide on dates and venue.

CounJun09_4.1.4 ESA11. Kerry to report back to Council in August – name of convenor, prelim LOC - committee, likely dates and venue. Kerry, August Council.

4.2 AGM preparation timetable – Gail

Hold over to next council meeting – August. Council reporting responsibilities for AGM.

CounJun09_4.2.1 AGM Timetable. Gail – to reminder councillors reports due in September. Gail, ASAP.

4.3 INTECOL10

4.3.1 Overall ESA exposure at INTECOL – Carla

Carla tabled report. The Table provided a summary of components of ESA exposure, as submitted to the INTECOL organizing committee (27 May meeting). Additionally, Gail has drawn attention to the desirability of having a banner(s) strategically placed. – For information.

4.3.2 Booth promotional strategy - Gail

Gail tabled a draft promotional strategy for ESA and sought advice from council. A range of possible costings were provided, depending on choice of different options. It was noted that the items will be useful for INTECOL, SERI, and also future ESA or other conferences.

CounJun09_4.3.1 ESA BOOTH. Gail to email council members and ask for their feedback on promotional material and options. Gail, ASAP.

MOTION: proposed by Sue Murray-Jones. Seconded: Petina Pert. All in favour. Motion carried. That Council supports the strategy as proposed by Gail for promotion of ESA at INTECOL and other conferences and we allocate an amount of \$15,000 as a budget for Gail to support a combination of items (to be determined by Gail with feedback from council member).

4.4 ESA promotion at SERI conference – Eddie

Eddie tabled an application/budget of \$2100 to ESA council for expenses for an ESA booth at SERI2009 Conference. The ESA booth will promote the ESA to an audience of restoration scientists and practitioners; to increase awareness, subscriptions and submissions to our journals, particularly EMR; to increase ESA membership, particularly from local delegates. Council discussed logistical issues of SERI conference following INTECOL, courier fees. Eddie noted that approximately 800 attendees were anticipated (300 papers submitted to date). Jann and Tein may be able to help staff booth so could reduce labour costs.

CounJun09_4.4.1 ESA AT SERI. Eddie to confirm whether Wiley-Blackwell will be at

conference by next council. Eddie, next council.

CounJun09_4.4.2 ESA AT SERI. Eddie to ask Jann and Tein of their availability to staff booth. Eddie, next council.

MOTION: Proposed: Eddie van Etten
Seconded: Ian Williamson. All in favour.
Motion carried. That Council supports Eddie proposal to promote ESA at the SERI conference through a staffed booth and agrees to allocate \$2100 towards this.

4.5 Bulletin printer – Sue

A report was tabled which represented the outcome of Gail's seeking comparative quotes for printing the ESA bulletin according to a standard specification. The current printer (Bluestar) was one of the cheapest options. Council supported the use of Bluestar for printing the Bulletin in 2009. Future options (including 'green' printers) to be considered at Planning Day.

CounJun09_4.5.1 BULLETIN – to discuss Bulletin printing at Planning Day including green options. Sue, Planning Day.

CounJun09_4.5.2 AGENDA. Add ESA's green strategy to agenda for Planning Day. Petina, Planning Day.

4.6 Website review group report – Gail
Gail to provide sentence.

4.7 ESA Gold Medal – Carla

The Gold Medal awardee for 2009 will be Professor Jamie Kirkpatrick, School of Geography and Environmental Studies, University of Tasmania, in recognition of his contributions to knowledge of the ecology and conservation of Australian plants, and his role as educator, advocate and promoter of ecological science. Jamie will give an address at the INTECOL conference in the ESA Awards session.

4.8 Succession planning – Carla

Carla reminded council members that we need to begin looking at who is standing down and who will replace them; decisions for when AGM papers are sent out (in September). Sue would be happy if a new

Bulletin Editor came forward, but can continue if needed. Carla cannot stand beyond 2010 – need to start looking at future presidents. Petina noted that Sarah had not attended meetings or responded to emails from council.

CounJun09_4.8.1 SUCCESSION
PLANNING. Carla to contact Sarah to discuss her role as Victorian regional councillor. Carla, August.

4.9 Working groups 'Terms of Reference' –
For noting – Gail
All working groups have TOR.

CounJun09_4.9.1 WORKING GROUP TOR.
Gail to send around TOR to all members for noting. Gail, ASAP.

4.10 Science Meets Parliament reports. For noting – Gail

This year ESA sent three delegates: Debbie Saunders, Don Driscoll, both from the Fenner School, ANU, Canberra, and PhD candidate Tiffanie Nelson from UNSW. Their reports were tabled and available from Petina Pert by request.

4.11 SERI Conference – conference support
Jann submitted a proposal for consideration by the ESA Council. See Item 5.3 below.

4.12 GRN project Report – Jann
See Item 5.2 below.

4.13 EMR Contract update – Jann

Progress report prepared for the ESA Council by Jann Williams was tabled. The revised draft of the EMR contract was received from Rose Williams of Wiley-Blackwell on Friday, May 29. The EMR Contract Working Group will meet on June 19 to discuss the draft, once Mike Bull is back from a two week absence in early June (and assuming that June 19 suits him for the phone hook-up). A report on progress will be provided to Council after the next meeting, either out-of-session or at the next Council meeting, depending on what's preferred.

5 Other business

5.1 Post Graduate Day update – Ecology Day – Nerissa

Nerissa provided an update on plans for the SA regional 'Ecology Day'- 30 September 2009. Dawn Hawthorne-Jackson now co-opted to LOC. Sponsorship has been sought and received, but \$3430 catering costs greater than originally planned; \$1700 estimated net cost to ESA (less sponsorship). SA group considered it desirable to have no registration charge in order to encourage broad attendance. Council was impressed by success in obtaining sponsorship, but felt that non-members should be charged (say \$20), and also provided with the option of joining ESA.

CounJun09_5.1.1 ECOLOGY DAY. Nerissa to include charge of non-members \$20, add to promotional material, and provide an update for noting for August council. Nerissa, ASAP.

5.2 GRN project report

Jann tabled a report prepared by Tein McDonald, detailing the operation of the GRN (Global Restoration Network) website project. Council would like to thank Jann and Tein for their report and effort for promoting EMR and ESA through the GRN initiative. Tein noted that the reporting standard was very satisfactory in the vast majority of cases. The reports, which are to be maintained by the project organizers, provide a good resource for virtual field trips, particularly for students and teachers.

5.3 SERI Conference support

A request was received from Jann Williams and Tein McDonald for \$600 for each of them to attend SERI. This amount would partially cover registration fee and travel. This conference is particularly relevant to the journal *Ecological Management & Restoration* (EMR) and both Jann Williams (in her role as Chair of the Editorial Board of EMR) and Tein McDonald (partially in her role as Editor of EMR) are paying to attend the conference out of their personal finances.

MOTION: Council agrees to support the attendance of Jann and Tein at the SERI conference and will allocate \$600 to each of

them and we understand that they will liaise with Eddie to contribute to staffing of ESA booth, contingent on Wiley-Blackwell not providing funding.

Proposed: Ian Williamson. Seconded: Peter Fairweather. All in favour.

5.4 Passing of Barbara Rice

Council noted the recent passing of Barbara Rice, a longstanding and active ESA member, and Council members agreed to offer their condolences to her partner Mark Westoby.

CounJun09_5.4.1 Passing of Barbara Rice. Gail to place an article in e-Bulletin and send Minute extract to Mark Westoby. Gail, July.

5.5 E-Bulletin

Gail tabled a draft version of a proposed weekly email (E-news) document, whose aim is to consolidate ESA news and current issues into a summary newsletter. Proposal to start from Monday and to go to all members.

CounJun09_5.5.1 E-Bulletin. Gail to email current draft to council members for their comments and to receive feedback with a couple of days. Gail ASAP

6 Next meetings

Next Executive Meeting – Friday 10 July 2009

Next Council Meeting - Friday 7 August 2009

Meeting closed 1.30pm

OTHER ESA NEWS

NEW MEMBERS

A very warm welcome to the following new members: Karen Watson; Anita Lyons; Jim Hone; Sarina Macfadyen; Bruce Kendall; Peter Scogings; Colin Beale; Jack Lennon; Guy Midgley; Andrew John Wright; Noni Dowsett; Maurizio Rossetto; Ceiwen Pease; Suzy Tsaprounis; Tyge Dahl Hermansen; Abigail Cabrelli; Paul Burcher; Judith Upston; Judith Klein; Tiffanie Nelson; Kenny Travouillon; Alexa Seal; Paul OConnor; Christina Birnbaum; Paul McDonald; Bettina Hartinger-Pitman; Sandra Penman; Ayesha Tulloch; Christopher Ewing; Helen Vickers; Lisa Galbraith; Kristin Keane; Jennifer Gibson; michael price; Mathew Warren; Natalie Ban; Dario Rivera; Graeme Breen; Nancy Schellhorn; Louise Ashton; Stephen Hayes; Tracy Adams; Matt Barwick; Daniel Joyce; Kimberley Millers; Charles Cheers; Gwendolyn David; Joel Williams; Leili Shamiminoori; Amy Macken; Elise Marchant; Mike Wouters; Ken Clarke; Alisha Dahlstrom; Laura Parsley; Bronwyn Fancourt; Alistair Hobday; Drew King; Carl Larsen; Gregory Ashby; Julie Atkinson; Jill Lancaster; Peter Morison; Sandra Weller; Joab Wilson; Emily Willocks; Katrina Mazurek; Pheona Anderson; Keren Gila Raiter; Rebecca Thomas; Sarah Dalglish; Kimberly Van Niel; Ladislav Mucina; Katherine Downes (Baker); Mark Wallace; Cory Fletcher; Rebbekah Lamont; Julia Mattner; Prue Dufty; and Louise Beames.

ESA BIRTHDAY

ESA TURNS 50! HELP US REMEMBER HOW FAR WE'VE COME!

ESA celebrates its 50th anniversary this year and we thought it would be fun, and interesting, to look back at how far both the society and ecology have come in that time.

A 'Retrospective Exhibition' is planned at ESA10 looking back at the people, places, partnerships and research that have

shaped Australian ecology and the Society over the last 50 years.

A lot has changed in ecology over half a century—both for the Society, which has grown from a starting membership of 70 to over 1600, and for Australian ecology. We are now asking all members (current and past) to please search through their photo albums, research cupboards, and filing cabinets to pull out memories of the people, places and events that stick in your mind as pivotal moments for in your professional or research lives, or maybe just to highlight how people and places and research practices have changed. We are looking for memories in categories such as:

- 'Faces and Places': photos of significant people and events—those that made you laugh and cry (or embarrassed! great opportunity for students to dig out those awkward supervisor piccies!), photos of research partnerships and mentors...
- 'ESA - 50 Years'—past ESA memorabilia such as conference bags & t-shirts, mugs or programs, workshops and field trips, as well as key people who have helped guide ESA over the years.
- 'Out with the Old – In with the New'—old research equipment, field practices, field equipment and clothing

And we welcome ideas for displays or significant areas of focus that could be featured as part of the exhibition. All contributions and ideas are welcome—for more information please contact Eddie van Etten (wa@ecolsoc.org.au) or Gail Spina: (executiveofficer@ecolsoc.org.au).

STUDENT NEWS

2010 Student Grants, Awards

Changes to student conference prizes and research and travel grants: At the December ESA Council meeting a number of changes were made to ESA student research awards, student conference travel grants, and conference prizes. The changes significantly

increase the amounts available for student awards and prizes.

ESA Student Research Awards

The total annual funding for ESA Student Research Awards has been increased from \$10,000 to \$15,000, and the maximum amount per grant has increased from \$1,000 to \$1,500. The timelines for these awards will remain the same; two rounds of grants each year with closing dates at the end of April and the end of October.

Conference Travel Grants

Thanks to sponsorship from Wiley-Blackwell there will be an additional \$2,500 available for conference travel grants in the form of Wiley-Blackwell Student Fellowships. The Wiley-Blackwell Fellowships will be allocated to up to five students who apply for conference travel grants and they will be awarded to individuals from the pool of applicants who would have the highest travel costs.

Student Conference Prizes

From the 2010 annual conference there will no longer be ESA-sponsored best and runner-up prizes for spoken and poster presentations. Instead three awards will be given for outstanding spoken presentations and two awards will be given for outstanding poster presentations. The awards will be jointly funded by ESA and Wiley-Blackwell and will be known as the ESA Wiley-Blackwell Student prizes. The value of all five awards will be \$300 cash plus a \$440 John Wiley voucher. The value of the Blackwell EMR management awards (best spoken and poster presentations on a management theme) will also be increased to \$300 in vouchers from Wiley-Blackwell. The Marilyn Fox award for the best inaugural spoken presentation will remain the same (\$500 cash), as will prizes sponsored by other organizations.

Jill Landsberg Trust Fund Award and The Nature Conservancy Award

The closing dates for applications for the Jill Landsberg Trust Fund award and The Nature Conservancy Award have been set for 2010:

Jill Landsberg Trust Fund Award: Friday May 31, 2010 (see below).

The Nature Conservancy Award: Friday August 27, 2010.

The 2010 Jill Landsberg Trust Fund Scholarship

The Ecological Society of Australia through the Jill Landsberg Trust Fund is pleased to call for applications for the 2010 Jill Landsberg Trust Fund Scholarship, a **\$6000** postgraduate scholarship in the field of Applied Ecology. **Closing Date – May 31st 2010.**

A grant of \$6,000 will be awarded to support the field-based research of a postgraduate student working in applied ecology. The scope of research is open to terrestrial, marine and freshwater ecology. The scholarship is open to any student who is enrolled in postgraduate research at an Australian University and is a member of the Ecological Society of Australia.

A condition of the award is that the winner must be able to attend ESA10 in Canberra (Dec 6-10, 2010), to accept the grant, and the following year at ESA11 to present their work as the 'Jill Landsberg Applied Ecology Student Paper'. To assist with attendance at these conferences, registration will be complimentary and the Trust will provide a travel and accommodation support grant of up to **\$4,000**.

A subcommittee of the Jill Landsberg Trust will decide on the award of the grant. A decision will be announced in early July 2010 and the decision of the sub-committee is final.

Applications must be submitted in one pdf document to the Executive Officer of the Society (ExecutiveOfficer@ecolsoc.org.au) by close of business Monday May 31 2010.

For more information on how to apply or to become a member of the Ecological Society of Australia visit www.ecolsoc.org.au and follow the links.

The Jill Landsberg Trust Fund was established in 2005 to honour Jill's outstanding contributions to ecology extending back 25 years.

Information on all these awards and prizes will be posted on the ESA web page.

ESA Student Research Awards

There were 15 applications for the October 2009 ESA Student Research Awards with funds being allocated to the following six applicants:

- Ben Barth (UQ), Effects of urbanisation on dung beetle species composition;
- Isobel Booksmythe (ANU), Territorial behaviour in fiddler crabs;
- Mathieu Russell (UTas), Sperm storage duration and consequences on offspring phenotypes in cold climate reptiles;
- Daniel Hancox (UQ), Habitat variability and phenotypic frequency in rainbow fish;
- Tyge Hermansen (Wollongong), Pollination in mangroves;
- Vincent van Uitregt (UQ), Acid tolerance in the invasive fish, *Gambusia holbrooki*.

Congratulations to the recipients, and thanks to Grant Hamilton and Raghu Sathyamurthy for assisting with judging of the applications.

From Ian Williamson (Student Research and Travel Grants Coordinator).

ESA Student Research Award: Final Reports

Ecosystem Impacts of Tasmanian devil decline as a consequence of devil facial tumour disease (DFTD).

Tracey Hollings, University of Tasmania.

Money was sought from the ESA to help buy equipment for a study into the ecosystem impacts of Tasmanian devil (*Sarcophilus harrisi*) decline. Many people are aware of the plight of the Tasmanian devils, which are facing possible extinction from a transmissible cancer termed devil facial tumour disease (DFTD). This disease has caused population declines in some areas of the state of well over 90% of pre-disease levels. As the top predator in Tasmania since the extinction of the Thylacine, the devil plays a major role in ecosystem stability and function. Other studies have revealed that

losing a top order carnivore can have major impacts on lower order carnivores, often termed mesopredators in the literature, prey species of both the top order carnivore and mesopredators, and an unknown number of cascading effects down the system. This study therefore aims to identify some of these impacts in the Tasmanian ecosystem, measure the changes and develop management plans to overcome some of these impacts as it is likely that devils will continue to decline over the long-term even despite the best efforts of those developing pre-clinical diagnostic tests and vaccines.

Remote camera traps are a relatively recent tool developed for conservation biologists for measuring animal abundances and population densities. For this study remote camera traps are being employed to gather data on any changes in relative abundance across the island state of both introduced and native carnivores such as the spotted-tailed quoll (*Dasyurus maculates*), eastern quoll (*Dasyurus viverrinus*) and feral cat (*Felis catus*); prey species including the brush-tailed possum (*Trichosurus vulpecular*) and pademelons (*Thylogale billardierii*); and smaller species such as the long-nosed potoroo (*Potorous tridactylus*), Tasmanian bettong (*Bettongia gaimadi*) and both the southern brown (*Isoodon obesulus*) and eastern-barred (*Perameles gunnii*) bandicoots as these species may become more susceptible to population level declines if mesopredators increase. With money from the ESA we were able to purchase three cameras to add to the 16 we purchased from another grant. These cameras have been used across 48 field-sites in Tasmania in areas of long-term disease, mid-term disease and areas which to date still remain disease free. One round of fieldwork was completed in November 2009 with another three remaining for next year at the conclusion of which results can then be analysed. The cameras provided by ESA have been a valuable addition to our set and have allowed us to cover a larger number of field-sites in a shorter period of time than would otherwise have been possible. They have also been used to look at the efficacy of animal traps, hair tubes and hair snares.

Population and Evolutionary Dynamics with respect to Behavioural Variation in a social lizard species- *Egernia whitii*. Jo McEvoy, University of Tasmania, jmcevoy@utas.edu.au.

Background: Population dynamics and evolutionary processes are driven by behaviour, and more specifically, the behaviour of individuals and the behavioural interaction of individuals within a population. Behaviour is central to mate choice, dispersal, parental care, social systems, predator-prey interactions, communication and other life history decisions. However, traditional studies of evolutionary and behavioural ecology have ignored individual variation in behaviour to instead focus on the adaptive mean. A recent surge of interest in a field of study known as behavioural syndromes advocates the importance of considering individual variation in behaviour (i.e. behavioural phenotypes) and the impact that behavioural phenotypes (personality), and the mix of phenotypes within a population, may have on population dynamics and the shaping of evolutionary trajectories.

A key aspect of behavioural phenotypes is the make-up of the phenotypes itself. There are thought to be five axes of personality (shyness-boldness, exploration-avoidance, activity, sociability and aggressiveness), that should interrelate and shape an individual's interaction with its environment. However, these five axes have never been examined in a single species or population, and the links between the axes, as well as their influence on population dynamics, is not yet understood.

Methods and Results: In the past year of my PhD project (to which this grant applied), I examined the five axis of personality on a known natural population of *Egernia whitii*. At present, we have found that all five axes of personality are consistent over short-term time periods (and we know from previous data that this consistency is likely to hold over longer periods, i.e. over years). Data analysis is still ongoing, but we expect to find that these axes intercorrelate to some extent, and influence key aspects of population dynamics

(such as home range size). Additionally, genetic samples have been collected from all individuals within the known study site, and this analysis is currently underway.

Discussion and Future Directions:

Characterising the five axes of personality within a single species/population has not been conducted before, and this study will contribute a great deal to the current behavioural phenotypes literature, especially as the links between personality and population dynamics are not yet fully understood. We expect the above study to be published in an international journal over the next 12 months. We greatly appreciate the support provided by the ESA (and this will be acknowledged in any future publications stemming from this work), as without the society's support the field work aspect of this project could not have been achieved. In addition to the above project, there have been a number of publications related to this field work which have been published or submitted in the last 12 months, the ESA has been acknowledged in these.

While GM, Uller T, McEvoy J and Wapstra E. 2009. Long-lasting effects of among- but not within-litter timing of birth in a viviparous lizard. *Evolutionary Ecology Research*, 11: 1–12.

While, G. M., Isakkson, C., McEvoy, J., Sinn, D. L., Komdeur, J., Wapstra, E. & Groothuis, T. G. G. (in review). Consistency in plasma testosterone concentration and its sex-specific link to aggression in a social lizard. *Hormones and Behaviour*

Isakkson, C., While, G. M., McEvoy, J., van de Crommenacker, J., Olsson, M., Groothuis, T. G. G., Komdeur, J., and Wapstra, E., (in review). Oxidative status within a free-living lizard species: the role of body mass, aggression, and testosterone. *Functional Ecology*

Landscape ecology of the Tasmanian spotted-tailed quoll.

Shannon Troy, University of Tasmania.

The spotted-tailed quoll is a nationally threatened, forest dependent marsupial carnivore that occurs along Australia's eastern seaboard from Queensland to Victoria, and in Tasmania. Timber harvesting has been implicated in localised spotted-tailed quoll population declines on mainland Australia, and, in Tasmania, at least 50% of the spotted tailed quoll's predicted core distribution has

been cleared for farmland and forestry over the last 35 years (Mansergh 1984; Jones and Rose 1996; Belcher 2000). A lack of information on the impacts of forest practices has been identified as an important knowledge gap preventing effective conservation management of Tasmanian spotted-tailed quoll populations. The initial objective of my PhD research was to investigate the ecology of the Tasmanian spotted-tailed quoll in production forest landscapes. I obtained an ESA Student Research Award to explore the relationship among quoll occupancy, forest age, and resource availability.

A major aim of my research was to test the hypothesis that landscapes containing a high proportion of younger, less structurally diverse forest stands support fewer spotted-tailed quolls than landscapes containing a high proportion of mature forest. To investigate this hypothesis, I selected seven-25km² study landscapes in northwest Tasmania, which were primarily comprised of wet eucalypt forest, and represented a continuum of forest ages, from 'oldest' to 'youngest'. Within each study landscape, I sub-sampled nine 50-80ha stand sites that were classified as young, regenerating, or mature forest.

Initially, I planned to use hair snares to detect spotted-tailed quolls. Hair snares are remote hair collection devices that are deactivated after a single animal has triggered them (described in Long *et al.* 2008). The resulting hair can then be analysed to provide information on the species, individual identity and sex of sampled individuals by genetically typing the hairs. As hair snares had never previously been used to detect spotted-tailed quolls, I conducted a brief pilot study at Narawntapu NP in March 2009 to compare the efficacy of hair tubes to trapping. I used 40 traps a night for seven nights to determine the trap sites that spotted-tailed quolls occurred at most frequently, and detected five individual spotted-tailed quolls. I then set five hair snares at each of ten of the trap sites for seven nights, and detected no spotted-tailed quolls. Due to the low detection success of hair snares, I decided to revert to trapping as

my method of detecting quolls in production forest landscapes.

I undertook the first of four planned field trips to my northwest Tasmanian forest sites from late April until late June 2009. For this trip, my aims were to: (i) trap spotted-tailed quolls to collect data on their presence at the stand scale, and abundance at the landscape scale; (ii) conduct microhabitat surveys to assess habitat complexity, and (iii) collect scats from trapped spotted-tailed quoll for future comparison of prey use of quolls among study landscapes. Over 2205 trap nights, just 15 individual quolls were captured on 18 occasions from four of the seven landscapes, giving a trap success of 0.8%. Although I also conducted microhabitat surveys and collected scats from trapped quolls, too few quolls were trapped for a quantitative comparison of microhabitat or prey resource use among study landscapes.

Given that my study landscapes were situated in what has been described as the core distribution of the Tasmanian spotted-tailed quoll, were thought to contain high density spotted-tailed quoll populations, and were within what is believed to be the species preferred wet eucalypt forest habitat, the low trap rates in this study were unexpected. Currently, it appears that our limited knowledge of basic aspects of the ecology of the Tasmanian spotted-tailed quoll precludes detailed investigations of the impacts of threatening factors on the species ongoing persistence. The focus of my research has now shifted from the ecology of quolls in production forest landscapes to broader investigations into the ecology of the species in Tasmania, including a comparison of potential survey methods and protocols designed to detect spotted-tailed quolls; analysis of broadscale habitat and environmental associations; and an examination of statewide genetic diversity and population structure.

ESA is offering the following range of student awards and grants in 2010. The 2010 timetable and closing dates are listed below. Don't miss out! Keep an eye on the website www.ecolsoc.org.au/prizes.html for details and application forms.

AWARD	SUMMARY	CLOSING DATE
<i>Jill Landsberg Trust Fund Scholarship</i>	<i>PhD scholarship, \$6000 award plus travel assistance to attend ESA10 to accept award and then ESA11 to present research paper.</i>	<i>May 31, 2010</i>
<i>The Nature Conservancy Applied Conservation Award</i>	<i>PhD Scholarship, \$6000 award plus travel assistance to attend INTECOL10 to accept award and then ESA10 to present research paper.</i>	<i>August 27, 2010</i>
<i>Student Research Grants</i>	Support for Postgraduate Students in contributing to research project funding. Up to \$1500.	<i>Round 1 April 30, 2010</i> <i>Round 2 October 31, 2010</i>
<i>Student Travel Grants</i>	Support for Postgraduate Students undertaking field work or other research-related travel. Up to \$1000.	<i>Round 1 April 30, 2010</i> <i>Round 2 October 31, 2010</i>

ESA TURNS 50!!



**IT'S OUR
ANNIVERSARY**

IN 2010!!

BE A PART OF THE CELEBRATIONS!

Starting in Canberra in 1960 as a small group of people with a big idea, the Ecological Society of Australia has emerged half a century later as the peak group of ecologists in Australia with over 1500 members from every state and territory. We want to hear your ideas on the best way to recognise this significant milestone in the history of Australian ecology. Call in to the ESA booth or email Gail at executiveofficer@ecolsoc.org.au and share your ideas and memories.



The 2010 Annual Conference of the Ecological Society of Australia

Invitation for December 6-10 Canberra

We would like to invite you to the 2010 Annual Conference of the Ecological Society of Australia. The theme of this Conference is 'Sustaining biodiversity - the next 50 years'.

The 50th anniversary of the founding of the Ecological Society of Australia provides a timely platform for retrospective and prospective considerations of ecology in Australia. A series of themes will focus on the challenges that will be faced by Australian ecosystems over the next 50 years, and the way that our science will need to adapt to meet these challenges. We will take a long term perspective of ecology in Australia and

engender a sense of urgency to consider how ecologists can provide solutions to those problems with which we are now familiar, and those on the horizon.

The aims of this Conference—to be held in the International Year of Biodiversity, and on the 50th anniversary of the formation of the Ecological Society of Australia—are to challenge ecologists, and to inspire them. We will challenge them with speakers who will set the achievements of the past 50 years of ecology in Australia against the biodiversity challenges that still face us. We will inspire them with speakers who are developing new knowledge and innovative ways of bringing biodiversity science closer to where solutions can be applied on the ground and in shaping biodiversity policy.

Mark Lonsdale
Conference Committee Chair

About the Conference Logo

The logo for the 2010 annual Conference of the ESA depicts *Acacia pycnantha*, the golden wattle and the nation's floral emblem with the Brindabella Mountains in the background. The 'golden' wattle symbolises the 50th anniversary of the Society and with the Society's ACT origins and the upcoming Conference there, provides a neat 'marriage' of themes.

Symbolic of the challenges facing ecologists today and those that will be addressed at the Conference, *A. pycnantha* is a treasured endemic in the ACT, but has become a 'weed' in other parts of Australia and further afield. The logo is by Frank Knight.

'Sustaining biodiversity—the next 50 years'

More about the golden wattle:

<http://www.anbg.gov.au/emblems/aust.emblem.html>

More about the annual conference:

<http://www.esa2010.org.au>

MISCELLANEOUS

Outcome of EPBC Act Review

In December 2009, the Minister for the Environment, Heritage and the Arts presented the Final Report for the Independent Review of the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act)—The Australian Environment Act: Report of the Independent review of the Environment Protection and Biodiversity Conservation Act 1999 to Parliament. This Report was prepared by Dr Allan Hawke.

The aim of the Report is to review the performance of the Act and, consistent with the objective of protecting the environment and biological diversity and maintain ecological processes, to recommend reforms that:

- promote the sustainability of Australia's economic development;
- reduce and simplify the regulatory burden;
- ensure activities under the Act represent the most efficient and effective ways of achieving desired environmental outcomes, and are based on an effective federal arrangement.

The Report proposes an integrated reform plan revolving around the following nine core elements:

- redraft the Act to better reflect the Australian Government's role, streamline its arrangements and rename it the Australian Environment Act;
- establish an independent Environment Commission to advise the government on project approvals, strategic assessments, bioregional plans and other statutory decisions;
- invest in the building blocks of a better regulatory system such as national environmental accounts, skills development, policy guidance, and acquisition of critical spatial information;
- streamline approvals through earlier engagement in planning processes and provide for more effective use and greater reliance on strategic assessments, bioregional planning and approvals of bilateral agreements;

- set up an Environment Reparation Fund and national 'biobanking' scheme;
- provide for environmental performance audits and inquiries;
- create a new matter of national environmental significance for 'ecosystems of national importance' and introduce an interim greenhouse trigger;
- improve transparency in decision-making and provide greater access to the courts for public interest litigation; and
- mandate the development of foresight reports to help government manage emerging environmental threats.

The Report's 71 recommendations are aimed at implementing this plan. The Australian Government is now giving consideration to its response. The Report addresses a broad range of issues across the entirety of the EPBC Act's operation. Dr Hawke has also prepared a series of fact sheets outlining key recommendations and reforms, available with the report on the Review's website:

<http://www.environment.gov.au/epbc/review/index.html>.

Nutrient enrichment can cut off energy flow in aquatic food webs

Increased nitrogen and phosphorus entering streams can boost the number of 'predator-resistant prey', preventing energy from flowing to the top of the food web. Because of human activities, ecosystems are receiving more and more nutrients. Some studies suggest that this enrichment will increase the production of both predator and prey species. But other research has raised the possibility that some of those added resources will never make it to the food web's upper levels. When extra nitrogen and phosphorus were added to a stream for five years, there were surprising results. At first, the nutrients seemed to benefit predators as well as prey. But in the fourth and fifth years, the production of predators dropped off while prey production kept rising. The break appears to be due to an increase in large prey organisms, the authors say. The predators ate mainly smaller prey and were less likely to consume these bigger

specimens. Thus, some of the energy provided by the increased nutrients didn't reach predator species, making the food web less efficient, the researchers say. They note that the escaped prey might eventually be snapped up by downstream or terrestrial predators. The results could apply to similar streams around the world, the authors write, and show that higher nutrient levels can have unexpected effects on freshwater ecosystems.

http://journalwatch.conservationmagazine.org/2009/12/21/broken-links/?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+journalwatch+%28Journal+Watch+Online%29

Impacts of plastic debris on Australian marine wildlife

Plastic debris is a pervasive problem throughout the world's oceans. This study compiles available data on interactions between plastic debris and marine wildlife in Australian waters. The types of impacts from plastic debris are primarily entanglement and ingestions. This report provides an indication of the frequency, geographic extent, and general magnitude of these interactions and presents a summary of the impacts of plastic debris (including lost or discarded fishing equipment) on Australian marine wildlife. This study used information from available publications, raw data and database extracts, media reports and anecdotal evidence wherever available. However, there is a paucity of information in Australia and an absence of any national, standardised database, data recording or reporting system that allows a comprehensive assessment of the interactions between plastic debris and marine wildlife. As a consequence, the magnitude of impacts of plastic debris on marine wildlife is difficult to determine. Report available at:

<http://www.environment.gov.au/biodiversity/threatened/publications/pubs/marine-debris-consulting.pdf>

Species distribution models of limited value for predicting distributions

Judging by the large differences in climate niches even for closely related species, mammals seem to adapt fast to changing

climatic conditions. This in turn makes predictions based on current distributions unreliable. Researchers produced distribution models for European mammals and calculated the climate niche overlap. These show under which climate conditions a species currently occurs. Then they compared the climate niche distance and the phylogenetic distance to the species' closest relative. The niche overlap was much less than one would have expected from the phylogenetic information. For example, some species may be closely related, but occupy different climate niches. This indicated a high degree of climate flexibility—regardless of phylogenetic distance. Mammals can occupy broader fundamental climate niches than insects or plants because, as endotherms, they are better able to buffer variations in climate. The niche overlap was lower among lagomorphs, rodents and insectivores than among bats and carnivores. This indicates that mobile species are better able to avoid competition from related species.

<http://www.sciencedaily.com/releases/2009/12/091215102113.htm>

The first high seas Marine Protected Area

At just under 94,000 sq km, the South Orkneys MPA is of a significant size, and its declaration increased the global area of protected waters by 4% overnight, to 0.92% of the world's oceans—still far behind the land (c.12% protected). The formal protection becomes effective in May 2010. No fishing activities and no discharge or refuse disposal from fishing vessels will be allowed.

http://www.wdcs.org/news_int.php?select=497

Lizard changes diet to avoid predators

The presence of predators has been shown to affect the behaviour of *Acanthodactylus beershebenensis*, a lizard species from the Negev Desert in Israel. The reptiles move less and catch less mobile and different prey if they are under pressure from predators. Many theoretical models had predicted this result, but until now there had been very few experimental trials and none in the case of saurians. When there was greater pressure from predators, the individuals tended to

move less and catch more mobile prey from somewhat different groups. The lizards' diet and food-seeking behaviour changed significantly when predation pressure was experimentally increased.

<http://www.sciencedaily.com/releases/2009/12/091202101745.htm>

Forests affected by habitat fragmentation store less biomass

The combined biomass of a large number of small forest fragments left over after habitat fragmentation can be up to 40% less than in a continuous natural forest of the same size. This is the conclusion from a simulation model on data from the Atlantic Forest, a coastal rain forest in the state of São Paulo, Brazil, around 88% of which has already been cleared. The remaining forest fragments are smaller, so the ratio between area and edge is less favourable. The reason for the reduction in biomass is the higher mortality rate of trees at the edges of forest fragments. This reduces the number of big old trees, which contain a disproportionately high amount of biomass. Altered wind conditions and light climate lead to a general change in the microclimate at the forest edges. Big old trees are particularly vulnerable to these factors. With the help of FORMIND, a forest simulation software, researchers modelled different sizes of forest patches left over after landscape fragmentation. The smaller a patch of forest is, the worse the ratio between edge and area. In terms of carbon storage, it may better to protect 100 continuous hectares than to protect 100 one-hectare patches.

<http://www.sciencedaily.com/releases/2009/12/091209113840.htm>

How to detect newly introduced species

Australian Museum scientists compared two strategies to predict the whereabouts of an introduced bee—one using climate suitability data and the other habitat preference. In 2004, researchers found an unfamiliar bee species during a series of surveys along the Upper Hunter River in NSW. The species was identified as the Emerald Furrow Bee (*Halictus smaragdulus*), native to the Mediterranean and Middle East. Specimen records from the bee's native range were

overlaid with climate data to determine the most favourable climatic conditions for the bee. This information was then used to produce a climate suitability map for *Halictus*. Almost 300 sites were subsequently surveyed to include locations that were either in close proximity to the Hunter Valley (where they were first found), or had high climatic suitability. *Halictus* was found at only 3% of sites, with only one new location outside the Hunter Valley. These surveys extended the known occurrence of the species 170km westward to Wellington, and 20km south and east to the lower Hunter region.

In the second approach, to improve their encounter rate with the bee, the researchers reviewed the data and field notes of all previous surveys. This provided new insights on the ecology of the species, which suggested that *Halictus* favoured habitat patches with exposed sandy deposits near creeks and rivers, and abundant flowering weed species. Further surveys targeted areas of apparently favourable habitat, and detected *Halictus* at 22% of sites, extending the known range to between Sydney, Tamworth, and Wellington, and providing a more complete picture of the distribution by detecting the species at 12 sites outside the Hunter Valley.

A comparison between the two approaches showed that climate matching provides an indication of the range that is climatically suitable for a species, but is of limited use in determining where a species exists within that range. Surveying areas with favourable habitat, however, significantly increases the chance of detecting a species.

<http://australianmuseum.net.au/blogpost/How-to-detect-newly-introduced-species>

Feeding birds changes evolutionary fate

Feeding birds in winter can have profound effects on the evolutionary future of a species, and those changes can be seen in the very short term. What was once a single population of birds known as blackcaps has been split into two reproductively isolated groups in fewer than 30 generations, despite the fact that they continue to breed side by side in the very same forests. The reproductive isolation between these populations, which live together for part of the year, is now stronger

than that of other blackcaps that are always separated from one another by distances of 800 km or more. The split followed the recent establishment of a migratory divide between southwest- and northwest-migrating blackcap (*Sylvia atricapilla*) populations in Central Europe after humans began offering food to them in the winter. The two groups began to follow distinct migratory routes—wintering in Spain and the United Kingdom—and faced distinct selective pressures. Under that pressure, the two groups have since become locally-adapted ecotypes. It had been contentious whether selection could act strongly and consistently enough in sympatry to separate a united gene pool. The results now show that the initial steps of speciation can occur very quickly in a highly mobile, migratory bird, because divergent selection during the overwintering phase leads to the evolution of reproductive isolation.

<http://www.sciencedaily.com/releases/2009/12/091203132144.htm>

Carbon = biodiversity

A paper published in Conservation Letters on ‘Global congruence of carbon storage and biodiversity in terrestrial ecosystems’ provides a useful answer to a very basic question. If natural habitats were protected based on their carbon storage potential, would this also be protecting the most biodiversity (and of course, vice versa)? Turns out, it would. Using a global dataset of ~ 20,000 species of mammal, bird and amphibian, three indices of biodiversity distribution (species richness, species threat & range-size rarity) were compared to a new global above- and below-ground carbon biomass dataset. It turns out that at least for species richness, the correlations were fairly strong; for threat and rarity indices, the correlations were weaker. This indicates that biodiversity hotspots have some of the greatest potential to store carbon as well as guard against extinctions.

<http://conservationbytes.com/>

Isotopes in tree rings reveal past climate

Scientists have long looked at the width of tree rings to estimate temperature levels of past years. Larger rings indicate more tree growth in a season, which translates into

warmer summer temperatures. But the analysis of carbon and oxygen isotopes in tree rings can also provide accurate data on past climate events. Researchers compared temperature data collected in Inuvik, Northwest Territories (NT) since 1957 with their own analysis of isotopes found in white spruce trees in the Mackenzie Delta region of the NT. They found a strong correlation between the two data sets and temperatures. Isotope analysis allows researchers to conduct their work using a smaller sample size than needed when trying to re-construct temperature records using tree ring width. Porter explains that the width of rings can vary considerably between trees even when they are growing in the same stand. This variation can complicate reconstructions of past climate. Isotope signals, on the other hand, are often very similar between trees. This means researchers can gather accurate data from three or four trees instead of the 20 they might need for tree ring width analysis.

<http://www.sciencedaily.com/releases/2009/12/091203141935.htm>

Thoreau’s records reveal plant responses

Thoreau, one of America’s best-known nature lovers, monitored the flowering of hundreds of plant species in Concord, Massachusetts during the 1850s. His work was continued by an amateur botanist, a landscape designer, and most recently, researchers at Boston University. Now, this long-running dataset has been used to see whether Concord’s native and non-native plants have dealt differently with climate change. Non-native species were more successful than native species at altering their flowering times in response to temperature shifts. Between 1900 and 2006, invasive plants changed their growth schedules to flower an average of 11 days before native plants. Species that carried out these adjustments have also greatly increased in abundance.

http://journalwatch.conservationmagazine.org/2010/01/27/flower-power/?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+journalwatch+%28Journal+Watch+Online%29

Challenge of assumptions about soil hydrology

A new study shows that soil clings tenaciously to the first precipitation after a dry summer, and holds it so tightly that it almost never mixes with other water. This could affect our understanding of how pollutants move through soils, how nutrients get transported from soils to streams, how streams function and even how vegetation might respond to climate change. The small pores around plant roots fill with water that gets held there until it's eventually used up in plant transpiration back to the atmosphere. Then new water becomes available with the return of fall rains, replenishes these small localized reservoirs near the plants and repeats the process. But all the other water moving through larger pores is essentially separate and almost never intermingles with that used by plants during the dry summer.

<http://www.sciencedaily.com/releases/2010/01/100121173452.htm>

Review - biodiversity and climate change

The Intergovernmental Panel on Climate Change 4th Assessment Report (IPCC AR4; IPCC 2007) concluded that climate change will have significant impacts on many aspects of biological diversity; ecosystems, species, genetic diversity within species, and ecological interactions. The implications of these impacts are significant for the long-term stability of the natural world and for the many benefits and services that humans derive from it. Because of the importance of these impacts and of climate change itself, there has been a great deal of recent research, which has added to the evidence base. This report reviews the literature since the AR4 and before October 2008. It draws on recent research to summarise advances in our understanding of the impacts of climate change on biodiversity. Report available at: <http://www.unep-wcmc.org/climate/pdf/copenhagen/CBD%20TS42%20Web.pdf>

Big social plant-eating birds on islands live longest

Large, social, vegetarian, island-dwelling birds live longer than other birds, reports a new study that examined the relationships between evolution and life spans in birds. By computerizing maximum life spans and body masses for 936 bird species, researchers found that body mass, diet, sociality and whether they nested on the mainland or an island significantly affect maximum life spans. Bigger birds have fewer predators; herbivorous birds avoid risks that carnivorous birds may face, such as getting hurt or picking up parasites and pathogens when attacking prey, and compared to carnivores, may find food more readily available; social species can mob and warn of predators, and may find safety or may hide in numbers; and island breeders face fewer predators, pathogens and parasites. Such variables as breeding latitude, breeding habitat, nest-site location and migratory behaviour did not have significant effects on longevity

<http://www.sciencedaily.com/releases/2010/01/100118231148.htm>

Research, protection from fisheries help wildlife on Great Barrier Reef

Research and management measures such as zoning have enabled Australia's Great Barrier Reef to remain one of the healthiest reef ecosystems in the world. Coral trout have undergone a spectacular recovery in areas of the GBR where they have been protected from commercial fishing. On a majority of reefs that were closed to fishing, coral trout numbers rebounded by between 31 and 75% after as little as 18 months to two years. Such zoning measures, and the research that informed them, have been crucial in protecting and building the resilience of the GBR system, even when the hottest decade on record accentuated the growing pressures reef systems face. See the Great Barrier Reef Outlook Report 2009, a summary of the past and present condition of the environmental, economic and social values of the Great Barrier Reef and a presentation of its possible future. Available at:

www.gbrmpa.gov.au/corp_site/about_us/great_barrier_reef_outlook_report

Public cameras capture data on plant growth

Images taken by public cameras connected to the Internet could offer a rich source of data to researchers studying the effects of climate change on plant growing seasons. A recent study investigated the possible use of cameras originally set up for purposes such as monitoring air quality or traffic. In the past, scientists have typically tracked the timing of the seasons with laborious ground surveys, which can only cover a small area, or low-resolution satellite observations. The researchers pinpointed the locations of 1,141 public cameras in North America and captured two images per day from 2008-09. They then compared photos from 30 cameras to satellite images of the same areas. The camera data had fewer low-quality days than satellite data, and sometimes led to more accurate estimates of spring's arrival. The photos also allowed researchers to distinguish different types of vegetation, which are hard to tell apart on satellite images. Internet-connected cameras could provide a relatively untapped and freely available resource for supporting large-scale ecological and environmental monitoring.

http://journalwatch.conservationmagazine.org/2010/01/13/science-in-a-snap/?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+journalwatch+%28Journal+Watch+Online%29

Impacts of ocean acidification on marine biodiversity

Ocean acidity has increased by 30% since the beginning of the Industrial Revolution 250 years ago. Atmospheric CO₂ concentrations are predicted to increase by 0.5%-1.0% per year throughout the 21st century. It is predicted that by 2050 ocean acidity could increase by 150%. This significant increase is 100 times faster than any change in acidity experienced in the marine environment over the last 20 million years, giving little time for evolutionary adaptation within biological systems. Carbonate ion concentrations are now lower than at any other time during the last 800,000 years. Furthermore, given current emission rates, it is predicted that the surface waters of the highly productive Arctic Ocean

will become under-saturated with respect to essential carbonate minerals by the year 2032, and the Southern Ocean by 2050, with disruptions to large components of the marine food web. Many of the effects of ocean acidification on marine organisms and ecosystems will be variable and complex, impacting developmental and adult phases differently across species depending on genetics, pre-adaptive mechanisms, and synergistic environmental factors. Evidence from naturally-acidified locations confirms, however, that although some species may benefit, biological communities under acidified seawater conditions are less diverse and calcifying species absent. In order to accurately predict the consequences, the ecological effects must be considered alongside other environmental changes associated with global climate change. Ocean acidification is irreversible on timescales of at least tens of thousands of years. See:

<http://www.cbd.int/doc/publications/cbd-ts-46-en.pdf>

Secretariat of the Convention on Biological Diversity. 2009. Scientific Synthesis of the Impacts of Ocean Acidification on Marine Biodiversity. Technical Series No. 46. Montreal. 61pp.

Antisocial fish more likely to invade

What makes an animal inclined to stake out new territory, leading biological invasions that can harm native wildlife? Researchers administered personality tests to mosquitofish (*Gambusia affinis*), a species currently ranked as one of the worst invaders in the world. Each fish was scored on its sociability, measured by how long it spent swimming close to a group of fellow fish in an aquarium. Researchers also scored traits such as boldness, or how quickly the fish emerged from a refuge to explore a new environment. After assessing each fish's personality, the researchers placed groups of fish into one end of an artificial stream containing five connected pools. Individuals that had scored low on sociability swam farther, often reaching the fourth or fifth pools. In contrast, most other fish remained in the first pool, the team found. A mosquitofish's personality therefore may influence whether it will lead an invasion. And having multiple personality types within a species could allow an invasion

to spread faster. Social individuals might eventually follow the leaders to their new territory, increasing the population density and prompting the loners to strike out on their own again.

http://journalwatch.conservationmagazine.org/2010/01/12/character-study/?utm_source=feedburner&utm_medium=email&utm_campaign=Feed%3A+journalwatch+%28Journal+Watch+Online%29

How grasslands respond to climate change

Researchers studying the reactions of trees to rising CO₂ concentration can take core samples from tree trunks; however, grassland vegetation is grazed or dies off in a matter of months and decomposes. Using the Alpine ibex horn collection at the Museum of Natural History in Bern (1938 to 2006), researchers removed tiny samples from the horns. They were able to use the annual rings in the horns to draw conclusions about temporal changes in the grassland vegetation of the Bernese Alps where the ibex had grazed. They then looked at some hay samples, archived in Rothamsted since 1857 as part of a very long-term ecological grassland experiment. Scientists were able to analyse the isotope signature of the archived hay to infer how the English grassland vegetation had utilized water over the years. The researchers thus determined the individual isotope composition of the grassland vegetation in both the Bernese Alps and in the British lowlands over extended periods of time: 69 years based on the horns, and 150 years using the hay specimens. In a second step this data was lined up with climate data, e.g. air temperature and aridity, of the respective region. In both locations the intrinsic water-use efficiency of the grassland vegetation rose over the years, although there were differences in location. This implies that the plants improved their water storage potential as temperatures rose and the level of CO₂ in the atmosphere increased.

<http://www.sciencedaily.com/releases/2009/12/091210000849.htm>

The past matters to plants

Researchers modelled four years of population fluctuations in four species

common to the Michigan dry sand prairie to determine how plants interacted with each other. Plants tended to compete, or negatively affect one another, over the summer, fall, and spring; but interestingly, the more crowded together plants were in one growing season, the more their growth was enhanced the following year. These time-lagged interactions may be due to effects from plant litter. After plants die back over the winter, the dead plant material starts to decompose, releasing nutrients that encourage plant growth. The litter layer also holds in soil moisture, a boon to plants struggling to survive in the dry environment. The positive effect also may be due to the fact that the plants are perennial and can bank resources in below-ground roots and rhizomes until the following year, when they can be drawn upon to boost growth. With the use of detailed population censuses and complex mathematical models, researchers showed that lagged interactions do occur, can be measured, and can have significant impacts on plant population growth.

<http://www.sciencedaily.com/releases/2009/12/091222105439.htm>

Fisheries and aquaculture: multiple risks from climate change

Marine capture fisheries already facing multiple challenges due to overfishing, habitat loss and weak management are poorly positioned to cope with new problems stemming from climate change. Inland fisheries—90% percent of which are found in Africa and Asia—are also at risk. Warming in Africa and central Asia is expected to be above the global mean, and predictions suggest that by 2100 significant negative impacts will be felt across 25% of Africa's inland aquatic ecosystems. Aquaculture is likely to be affected as well. Nearly 65% of aquaculture is inland and concentrated mostly in the tropical and subtropical regions of Asia, often in the delta areas of major rivers at the mid- to upper levels of tidal ranges. Sea level rise over the next decades will increase upstream salinity, affecting fish farms.

Increasing temperatures will have impacts on the physiology of fish due to limited oxygen transport to tissues at higher

temperatures. This will result in changes in distributions of both freshwater and marine species. Changes in temperature can have significant influences on the reproductive cycles of fish, including the speed at which they reach sexual maturity, the timing of spawning and the size of the eggs they lay. Antarctic krill have declined between 38-75 % per decade since 1976 probably as a result of the reduction in winter sea ice around the western Antarctic Peninsula. This has significant implications for the Southern Ocean food web. The FAO study, 'Climate change implications for fisheries and aquaculture,' is available at:

<ftp://ftp.fao.org/docrep/fao/012/i0994e/i0994e.pdf>

Time of day matters to thirsty trees

Researchers examined how poplars use their 45,000 genes to respond to drought. The combination of genes that trees use in response to a stress, like drought, determines whether the tree can survive this stress or not. In the past, researchers examined drought-responsive gene programs at a single time point—normally in the middle of the day when most researchers work in the lab or the field. In these experiments, researchers found that trees used different drought response gene programs at different times of day. Rather than one program, trees use multiple programs, each of which runs at a different time of day. Previous research may have overemphasised the importance of some genes in helping trees to contend with drought, and totally missed others that are important.

<http://www.sciencedaily.com/releases/2009/11/091123114815.htm>

New solution for monitoring cryptic species

Ecologists have worked out a way of using recordings of birdsong to accurately measure the size of bird populations. The technique is an innovative combination of sound recording with spatially explicit capture-recapture. Biologists have long counted bird calls to get an index of bird abundance. But it is much harder to work out the actual density of a population because existing methods need observers to measure either the distance to

each bird, or whether they are within a set distance from the observer. This is straightforward if birds are seen, but difficult when birds are heard but not seen. In this approach, sound information from several microphones is coordinated. A sound spreading through a forest or other habitat leaves a 'footprint'. The size of the footprint depends on how quickly the sound attenuates. Mathematically, there is a unique combination of population density and attenuation rate that best matches the number and 'size' of the recorded sounds. Computer methods find the best match, and thereby allow an estimate of density. Field trials indicated that the acoustic technique gave a more accurate estimate of bird numbers than using nets to capture birds. As well as helping assess populations of cryptic bird species such as the ovenbird, the new technique might be applied to measuring hard-to-reach populations of marine mammals, such as whales and dolphins. Recording the sounds has other benefits, too. Sound intensity and other characteristics can be measured from the spectrogram to improve density estimates. Archiving the sounds also makes it possible to re-examine them, or to extract additional information as analytical methods evolve.

<http://www.sciencedaily.com/releases/2009/11/091127101040.htm>

Dynamics and vulnerability of deltas

Deltas are recognized as critically important habitats for threatened terrestrial and marine species, and act as filters, repositories, and reactors for a suite of continental materials, including carbon, on their way to the coastal ocean. Due to their low topography, high productivity, rich biodiversity, and easy transport along abundant waterways, deltas are preferred locales of human habitation as well. Deltas comprise 5% of the land area, but over 500 million people live on them. Deltas are fragile geomorphic features, and can change dramatically with modest modifications in environmental conditions. Already, thirty-three major deltas collectively include significant area (~26,000 km²) below local mean sea level and another ~70,000 km² of vulnerable area below 2m. This vulnerable area may increase by 50% with sea level rise.

Given current trends including shifts in climate, upstream changes in water quantity and quality, and population pressure, many deltas are in danger of collapse. This may include complete loss of wetlands and concomitant biodiversity, cities and villages and the associated infrastructure flooded, permanent loss of fishing areas, farming lands, and valuable forests, and rapid shoreline retreat. The report below discusses the changes and vulnerabilities of world deltas resulting from anthropogenic alteration of upstream freshwater and sediment inflows, anthropogenic alteration of sediment and water routing through deltas, hydrocarbon and groundwater extraction from deltas, sea-level change, and the increased frequency of extreme climate events.

http://www.loicz.org/imperia/md/content/loicz/print/rsreports/loicz_report_35.pdf

Overeem, I. and Syvitski, J.P.M. (eds.) 2009. Dynamics and Vulnerability of Delta Systems. LOICZ Reports and Studies No. 35. GKSS Research Center, Geesthacht, Germany. 54pp.

Blue carbon

The ocean's vegetated habitats, in particular mangroves, salt marshes and seagrasses, cover <0.5% of the sea bed. They form earth's 'blue carbon' sinks and account for more than 50% of all carbon storage in ocean sediments. They comprise only 0.05% of the plant biomass on land, but store a comparable amount of carbon per year, and thus rank among the most intense carbon sinks on the planet. Blue carbon sinks and estuaries capture and store between 235–450 Tg C every year—or the equivalent of up to half of the emissions from the entire global transport sector. If managed properly, blue carbon sinks have the potential to play an important role in mitigating climate change. The rate of loss of these marine ecosystems is much higher than any other ecosystem on the planet—in some instances up to four times that of rainforests. Currently, on average, between 2–7% of our blue carbon sinks are lost annually.

<http://grida.no/publications/rr/blue%2Dcarbon/>

Nellemann, C., Corcoran, E., Duarte, C.M., Valdés, L., DeYoung, C., Fonseca, L. and Grimsditch, G. (Eds). 2009. Blue Carbon. A Rapid Response Assessment. United Nations Environment Programme, GRID-Arendal, Norway. 79pp.

Climate Wizard for climate information

Climate Wizard is a tool meant for both scientists and non-scientists, designed to make it easier to explore climate data in an interactive way. It makes the data accessible in ways that are more intuitive, visual and understandable. It lets users focus on states, countries or regions and apply different scenarios to generate colour-coded maps of changes in temperature and precipitation that can, in turn, be used to consider such things as moisture stress in vegetation and freshwater supplies. Users can choose from a number of parameters e.g. the climate of the past 50 years or projections for mid-century, or toward the end of the century, and include projections from each of 16 individual climate models or an ensemble of some or all of the models. Climate Wizard was funded by and initially developed for The Nature Conservancy for planners and scientists wanting climate change information when considering such things as priorities for habitat protection. See:

<http://www.climatewizard.org/>.

<http://www.sciencedaily.com/releases/2009/12/091215145050.htm>

Measuring snow or vegetation moisture with GPS

Researchers have developed a technique that uses interference patterns created when GPS signals that reflect off of the ground—multipath signals—are combined with signals that arrive at the antenna directly from the satellite. Since such multipath signals arrive at GPS receivers 'late', they have generally been viewed as noise and largely ignored. Researchers were able to correlate changes in the multipath signals to snow depth by using data collected at a field site just south of Boulder, Colorado. The snowpack study built on a project to measure soil moisture using GPS receivers. The technique uses traditional GPS receivers—designed for surveyors and scientists to measure plate tectonics and geological processes—to assess snowpack, soil moisture and vegetation moisture. The team hopes to apply the technique to data collected from an existing network of more than 1,000 GPS receivers in place around the

West known as the Plate Boundary Observatory, a component of NSF's Earthscope science program. Another experiment is designed to analyze how the GPS signals travelling through alfalfa, corn and grass correlate with the amount of water in the vegetation. With this system, the GPS antenna 'sees' across a whole field, unlike individual moisture sensors that are sometimes set up to measure only small, specific areas. If a farmer relied on data from only a single soil moisture sensor that happened to be in a particularly dry pocket of his crop field, for example, it could have a negative effect on the timing and quality of the harvest.

<http://www.sciencedaily.com/releases/2009/11/091120135212.htm>

Free Transactions of the Royal Society

Many of you may have already seen the announcement about the freely available special issue of the Philosophical Transactions of the Royal Society B to mark their 350th anniversary (available at <http://rstb.royalsocietypublishing.org/seeferth>). Some articles of special interest for ecologists include: Partha Dasgupta: Nature's Role in Sustainable Economic Development; Simon Levin: Crossing scales, crossing disciplines: collective motion and collective action in the Global Commons; Martin Nowak: Evolutionary dynamics in structured populations; Harold Mooney: The Ecosystem-Service Chain and the Biological Diversity Crisis; Robert May: Ecological science and tomorrow's world; Michel Loreau: Linking biodiversity and ecosystems: toward a unifying ecological theory; William Hill: Understanding and utilising quantitative genetic variation; Graham Bell: Fluctuating selection: the perpetual renewal of adaptation in variable environments; Professor Spencer Barrett: Understanding Plant Reproductive Diversity; Simon Conway-Morris: Evolution: Like any other science it is predictable; and Taras Oleksyk, Michel Smith and Stephen O'Brien: Genome wide scans for footprints of natural selection.

This has relevance to the 50th anniversary of the ESA (particularly to the special symposium (and potential

publication). While the Royal Society has been around somewhat longer than the ESA, it's interesting to see how they've approached the Anniversary and the topics covered in the special issue.

***AoB PLANTS* – a new open access journal for plant biologists**

Authors are turning in increasing numbers to open access journals to publish their work. The attractions of doing so are several. They include having greater control over copyright, the appeal and flexibility of the latest publishing technologies and, above all, having papers made available without charge worldwide and thus freely available to anyone who wishes to read them as soon as they are published. The newly launched journal *AoB PLANTS* offers these and other attractive features. It covers all aspects of plant biology, is owned and managed by plant scientists on a not-for-profit basis and is published by Oxford University Press. *AoB PLANTS* publishes 'Research Articles', 'Points of View', 'Reviews', 'Mini-reviews' and 'Technical Articles'. Submitted papers are evaluated against published minimum criteria for acceptability using a double-blind refereeing system. Papers will appear online within 3-5 days of acceptance and benefit from a full typesetting and proofing service. For an introductory period, there will be NO CHARGE to publish in *AoB PLANTS*. This creates the ideal opportunity for authors to try the new journal and enjoy the benefits of open access publishing at no cost. For further information, contact Mike Jackson, Chief Editor, *AoB PLANTS*. Email: mike.jackson@bristol.ac.uk or visit the web site: <http://aobpla.oxfordjournals.org/>.

Monitoring peatland

A team of UK scientists has developed a new technique for monitoring the condition of peatlands. The team used a combination of images captured from Earth and space to measure spatial patterning in peatland surfaces as an indicator of their condition. This new method uses a novel coupled approach, using satellite images from space and airborne laser scanning data, and has resulted in improved peatland mapping

products. Airborne laser scanning instruments are capable of measuring fine-scale peatland structures such as hummocks and hollows that typically measure less than four meters in size. Lowland rain-fed peatlands are recognized as being a globally important environmental resource because they absorb and store carbon. Their unique plant communities and their inherent wetness control their ability to act as carbon stores, but when human disturbance disrupts their surface structure, greenhouse gases are released instead. Many peatlands across the world are affected by drainage, peat removal and ecological disturbance so scientists have been working to develop a robust spatial method for monitoring peatland condition. Remote sensing techniques (where images from satellites in space are analyzed) provide a likely route for this. The research team used data from an airborne "LiDAR," a laser-scanning instrument, alongside data from the IKONOS satellite. They showed that when LiDAR data were combined with optical images collected from satellites, a powerful method for spatial mapping of peatland quality could be achieved.

<http://www.sciencedaily.com/releases/2010/01/100125173456.htm>

Better food makes high-latitude animals bigger

New research suggests that animals living at high latitudes grow better than their counterparts closer to the equator because higher-latitude vegetation is more nutritious. Ever since Christian Bergmann made his observation about latitude and size in 1847, scientists have been trying to explain it. The traditional explanation is that body temperature is the driving force. Because larger animals have less surface area compared to overall body mass, they don't lose heat as readily as smaller animals. That would give big animals an advantage at high latitudes where temperatures are generally colder. However, when researchers raised several groups of juvenile planthoppers on a diet of cordgrass, which was collected from high to low latitudes, they found that planthoppers fed the high-latitude grass grew larger than those fed low-latitude grass.

Similar experiments using grasshoppers and sea snails showed the same result, indicating that plants from high latitudes are better food than plants from low latitudes. Although this explanation applies only to herbivores, predators might also grow larger as a consequence of eating larger herbivores. It's not known why the higher-latitude plants might be more nutritious. But plants at low latitudes may suffer more damage from herbivores than those at higher latitudes. Lower nutrition and increased chemical defenses may be a response to higher pressure from herbivores.

<http://www.sciencedaily.com/releases/2010/01/100128105708.htm>

Waves larger in the Pacific Northwest

Researchers in Oregon have discovered that the average height of waves in the Pacific Northwest is increasing, with the height of the largest waves increasing most of all. They conclude that the increases are "likely due to Earth's changing climate" generating more intense wind and storm patterns. Using data from deep-water buoys off the coast of Oregon and Washington, the researchers found that significant wave height (the height of the highest one-third of waves) has been increasing by approximately 1.5 cm a year since the mid-1970s. The average height of the largest waves recorded each year has increased by 9.5 cm. Their conclusions raise particular concerns for flooding, coastal erosion and structural damage.

<http://www.seaweb.org/news/oceanupdate.php>

FASTS news

For those of you who don't know about Fasts (of which ESA is a member society), FASTS' ongoing contribution to Australian science includes:

- Science meets Parliament – FASTS' annual flagship event, where more than 200 scientists have face-to-face meetings with Federal Parliamentarians on science issues
- Highlighting science with the Prime Minister and the Cabinet
- Organising forums and workshops on significant science issues
- Developing science policy at a high level and providing input to Parliamentary Committees, Government Departments and Government reviews and inquiries
- Assisting Member Societies to raise and develop issues
- Distributing information to Member Societies regularly and responding to feedback

2009 highlights include:

- Roll out of FASTS Heads Up Program including presentations on Quantum Cryptography, and Emissions Reduction Targets and the Great Barrier Reef
- National roadshow to gather responses to the Government's: Powering Ideas: An Innovation Agenda for the 21st Century
- Provision of examples of science success stories from members to the Prime Minister
- Launch of major document in Parliament on Women in Science in Australia: Maximising Productivity, Diversity and Innovation
- Release of major reference document When is Science Valid? – a Short Guide on How Science Works and When to Believe it
- Formation of the Great Barrier Reef Climate Change Alliance and briefing to politicians, the media and the bureaucracy on the impact of climate change on the GBR
- Release of Policy Discussion Paper: Giving Preparedness a Central Role in Science and Innovation Policy

- Commissioned a study to investigate the changing nature of scientific and technological work

Submissions to reviews including ARC Centres of Excellence and NHMRC Fellowship Consultation Paper

Projects for 2010

- Support FASTS' Members in building sustainable societies
- Ongoing action to implement the Women in Science Report
- Contribute to the development of the Federal Government's Research Workforce Strategy
- Ongoing work on the changing nature of scientific and technological work
- Provide FASTS' Members with practical resources such as Guidelines to Running Conferences
- Publish a policy document addressing Impediments to Collaboration
- Publish a paper on the Governance of Science
- Investigate links between science education and industry-readiness
- Present further briefings under the FASTS Heads Up Program– contact FASTS with your ideas
- Hold Science meets Parliament in March

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For more information and to access the documents above please visit the FASTS' website: www.fasts.org

AGM wrap up

FASTS held its AGM on 24 November, at which time Dr Cathy Foley took the reins as FASTS President and several new executive members were elected. It's an exciting new era for FASTS as they embark on their 25th year in 2010.

ECOLOGY AROUND AUSTRALIA

SOUTH AUSTRALIA

Nerissa Haby, Regional Councillor

It's one of those mild summer days, perfect for any outdoor activity that helps recharge SA professional or student ecologists for another working week and autumn surveys. This year looks like being another whirlwind of activity. Most of the people I bump into are tired, overworked and battling away on ... well... heaps of stuff! But we're not hearing about it. Yet.

The seasonal ESA bulletin is a great place to share information about research programs in the State. Recently several professional researchers committed to contributing local articles to the next bulletin. But we want more. To increase our number of contributors we are offering a free ESA water bottle or stubby holder to the first 5 people that contribute to the Winter bulletin (deadline 7 May). Just send us 1-2 paragraphs on a project that you're working on (it can be a copy of an abstract for a conference, grant application, thesis).

The importance of communicating current findings accurately to the community was recently highlighted during a debate: 'Should we consider nuclear power as a response to climate change?' by the Australian Solar Energy Society (AuSES), Sustainable Populations Australia (SPA) and The Zero Carbon Network. Two speakers for the affirmative, Tom Bless and Barry Brook, brought up information regarding our increasing demand for power, the history of research on nuclear power in the US and issues regarding the mechanics of nuclear generators. They also presented a solution they are working toward, to gain support of several countries (financial and a signed agreement) to build a standardised nuclear power plant for commercial production. The two speakers for the negative, David Noonan

and Mark Diesendorf, proceeded to present information from the anti-uranium mining debate (I know because I joined in the protest for Jabiluka over 10 years ago), presented emotive thoughts that they failed to provide justification for and futuristic charts and interpretations on the value of renewable energy while recognising the dependency on political will. The style the latter blokes adopted was appreciated by many in the audience. However, it left me confused about the capacity of renewable energy to match growing energy demands and the replacement of fossil fuel.

But poor communication doesn't just reflect style; it's about maintaining a respectable calibre of work. In science we use a system of publishing work through peer review. During this process the foundation of the information presented is interrogated. Depending on whether the work meets the standard of the journal, the work is either published or rejected. However, during a debate, there is no peer review in force. While this may reflect the flexibility of the discussion to facilitate a healthy debate, the lack of boundaries also allows a lack of scientific standard or quality. For example, no one appears fussed by the misrepresentation of statistical information (also produced by a great range of popular analytical methods used by ecologists). A simple illustration was a statistic that Denmark currently produces about 20 % of its electricity needs from wind turbines by the speakers for the negative. The speakers for the affirmative then offered clarity of that statistic, highlighting that the electricity produced is not during a period of demand by the population, causing most to be transferred to other countries. Hence, Denmark may produce about 20%, but it only uses a fraction of this. Unfortunately, there was no further clarity or discussion provided by the speakers for the negative, but I took from the absence of their denial, that the new information must be correct.

Perhaps a debate where people enjoy a bit of argy bargy in the name of 'sceptical thinking' isn't the best place to acquire real information. But the issues facing a participant in a debate are faced by every researcher presenting new information to the community using open media. We can all learn from this experience by considering how we can better communicate our findings effectively and efficiently.

1. Know the conditions surrounding your facts well

2. Be prepared to discuss new findings. These two points are the most important for maintaining the integrity of scientific work. So don't forget the standards we work to in our field, irrespective of the media you are trying to communicate through.

3. Be brave enough to give it a go. We've been aware of potential impacts of climate change on ecosystems for decades. Yet the debate still rages on, taking tangents down the path of population sustainability, nuclear power, weapon generation and terrorism. Imagine if someone with information to contribute stepped down from the challenge of trying to be heard? How much research would underpin decisions made by our society?

4. Avoid giving in to personal attack

If you're presenting scientific information on an important issue, people can easily become emotional or use confronting off-topic questions to disarm your entire argument. One example was Mark questioning Barry's authority in the field of nuclear energy when he started his career as a biologist. At face value there's nothing wrong with asking this question. Except I've provided a bridged version of a biting question that Mark asked over more than one minute, prompting a warning from the chair to allow Barry time to respond. When he did, Barry calmly disregarded Mark's opinion of his CV and invited him to let him know what's wrong with the information he'd presented.

If anyone has additional advice to share, such as ongoing opportunities for field work, calls for volunteers, or spring activities you want some money for (!), please feel free to email it through to me. I'll leave you with a

few suggested sites for field programs and working bees.

Field Naturalists Society of South Australia
http://www.environment.sa.gov.au/parks/involed/field_naturalists.html

Nature Conservation Society of SA
http://www.ncssa.asn.au/index.php?option=com_content&task=view&id=122&Itemid=265

Aldgate Valley Landcare Group, Valley of the Bandicoot (contact David for working bees):

http://www.amlnrm.sa.gov.au/Land_and_Biodiversity_Services/Biodiversity/Valley_of_the_Bandicoot.aspx

NRM Community Groups (pick a region and navigate through all the community groups available):

http://www.amlnrm.sa.gov.au/Community_Environmental_Groups.aspx

TASMANIA

Kerry Bridle, Regional Councillor

I am sorry to say that there is nothing much to report from Tasmania for this edition of the Bull. I think we are all just coming out of holiday mode and easing ourselves back in to work (*and please blame me for the lack of notice and deadline stuff up, Ed.*).

The Tasmanian Land Conservancy is running surveys using volunteers for threatened grassland flora and Ptunarra brown butterflies at the very spectacular Vale of Belvoir, near Cradle Mountain, from Feb-Apr. Anyone interested in volunteering for these surveys should contact Denna Kingdom -dkingdom@tasland.org.au or (03) 6225 1399.

We'll have a lot more to say in the next edition!

QUEENSLAND

Andrew Hayes, Regional Councillor

Not very many reports this time, primarily due to a short turn-around time between my request and the copy deadline. I am still working on the possibility of two regional events in Queensland this year (to make up for their complete lack last year), one in Brisbane and one in or around Cairns. Keep your eyes open for advertising closer to the date, and I hope that as many of us as possible can get along to one of these events. As usual I'd love to hear from you if you would be willing to collate some information about ongoing research where you are. It really is not a lot of work, just sending me something four times a year (or even once a year if that is all you can manage). If you think you are up for the challenge please drop me an email at: QLD@ecolosc.org.au.

Until next time...

Australian Wildlife Conservancy (North-east Australia)

John Kanowski, local contact

As 2010 begins, AWC's ecologists in north-east Australia are commencing a round of field surveys aimed at

- (i) providing data on the species that occur on the six sanctuaries in our remit; and
- (ii) monitoring the response of plants and animals to management actions (fire management, feral animal control, etc).

We've just been joined by Eri Mulder, a zoologist with a herpetological bent and a PhD in rodent and snake parasitology.

At a more strategic level, we are working with other AWC ecologists to devise a scientifically credible approach to prioritising our acquisition and reintroduction programs, based on an assessment of the distribution of vertebrate species, the population sizes of these species on AWC's current sanctuaries, and ranking of species in terms of threats, potential response to management and other logistical considerations.

AWC is also a partner in an ARC funded research project led by Chris Johnson from James Cook University examining

factors leading to the decline of small mammals in northern Australia. Some of this research will be conducted on AWC's north-east sanctuaries, and the outcomes of the research will inform future conservation management on those sanctuaries. AWC is particularly well placed to contribute to this research given our active management of grazing, fire and feral animals, often in an experimental context (e.g. on many sanctuaries, grazing continues on part of the property, while the rest has or will be destocked).

Other research projects AWC is involved in as collaborators, or host, in north-east Australia include:

- dingo-cat-small mammals interactions (with Chris Johnson, Euan Ritchie and students from JCU)
- taxonomy of *Elseya* turtles in the Calvert River (with Alistair Freeman Qld DERM and Dane Trembath from NT Museum)
- response of vertebrates to destocking (with Alex Kutt and colleagues, CSIRO)
- distribution of Carpentarian grasswrens (led by Graham Harrington, Birds Australia)
- hydrological studies in the wet-dry tropics (Marc LeBlanc, JCU)
- climate change impacts on rainforest biodiversity (Steve Williams JCU)
- physiology of Northern quolls (Carol Esson, Murdoch)
- dynamics of Bunya pine (Andrew Piccone, JCU)
- distribution of microbats on Cape York Peninsula (Terry Reardon, SA Museum).

As mentioned in the last bulletin, AWC welcomes external research proposals, particularly those that contribute to our core conservation mission. Ecologists interested in collaborating with AWC or conducting research on our sanctuaries are invited to contact Dr Sarah Legge, National Science and Conservation Manager or myself specifically in relation to the north-east Australian sanctuaries.

(Sarah.Legge@australianwildlife.org)

(John.Kanowski@australianwildlife.org)

Spatial Ecology Lab, University of Queensland

Ayesha Tulloch, local contact

New appointments

- Dr Richard Fuller started a joint University of Queensland and CSIRO Sustainable Ecosystems lectureship in January 2010. Broadly, his work aims to understand how humans have disrupted ecosystems and what we can do to arrest and reverse the damage.
- Dr Eve McDonald-Madden was awarded a post-doctoral research position (quantitative ecologist) at CSIRO Sustainable Ecosystems in 2009 to continue her work on optimal monitoring and evaluation in conservation. Eve is interested in the use of a decision theory framework for evaluating the ecological and economic costs and benefits of pest animal control and harvesting.
- Dr Lochran Traill has commenced as a post-doctoral research fellow to work with Dr Kerrie Wilson and Dr Jonathan Rhodes on a climate change adaptation project in south-east Queensland.

News and Events

Dr Kerrie Wilson was recently awarded an Australian Academy of Science, International Science Linkages—Science Academies Program Award. Dr Wilson is an Australian Research Council Research Fellow, and Senior Lecturer at The University of Queensland, as well as a visiting professor at The University of Copenhagen and a European Commission Erasmus Fellow. Kerrie has a particular interest in applied conservation resource allocation problems, such as where to invest limited resources to protect biodiversity, to restore habitat, or manage systems. Check out her lab website for more information about her research (<http://wilsonconservationecology.com/>).

Visitors

Michelle Lee (WildCRU, Oxford Centre for Tropical Forests) is visiting from Gabon from February to June 2010. She is pairing an evaluation of terrestrial vertebrates and habitat types with economic and development factors to find cost- and area-efficient options

for allocating land to both protect biodiversity and consider economic development.

Ana Ruiz is visiting from Bangor University, Wales in April 2010. She is carrying out a PhD entitled ‘Socio-cultural and economic valuation of marine biodiversity’, with an aim to identify and quantify the value of marine biodiversity around the Welsh coast to different stakeholders.

Dr Salit Kark is visiting from the Department of Ecology, Systematics and Evolution at the Hebrew University of Jerusalem from June to August. She will continue her collaboration on spatial prioritisation with various members of the Spatial Ecology Lab.

Recent PhD submissions:

Josie Carwardine: ‘Cost-effective conservation planning’. The limited funds available for conservation must be used wisely in the face of high rates of biodiversity loss, both in Australia and globally. Many approaches for prioritising conservation funds are hindered by a lack of defined objectives and the omission of data on conservation costs. Josie’s PhD addresses these two limitations, which often co-occur, in spatial conservation planning. She reviewed the most commonly used spatial approach, target-based systematic conservation planning, then compared this with congruence metrics. Congruence metrics solve, and then compare, separate objectives for each species or other conservation feature and are sub-optimal when a planner seeks to identify integrated priorities that conserve multiple features. She demonstrates an integrated conservation planning approach by identifying, on a global scale, conservation areas for all mammal species whilst minimising overall opportunity costs. These priorities are different to recent spending patterns by international conservation agencies, and under-funded and important global priority areas are identified. This thesis shows the importance of clearly defining actions and costs in conservation planning, by using three different cost surrogates to plan in Australia: the area of a site, its predicted acquisition cost, and its predicted stewardship cost. The priorities

differ depending on the cost data used. Finally, a method is presented for planning with uncertain cost data, and show that concerns about the inaccuracies of cost data may be unfounded, because the conservation priority of most sites is overwhelming driven by their importance for biodiversity. Josie's thesis shows that using properly defined objectives and economic data – including its uncertainties – greatly improves efficiency and allows improved use of conservation funds.

Danielle Shanahan: 'Predictive models in landscape ecology: Understanding the effects of landscape pattern on the avifauna of South East Queensland.' Human land-use has a profound influence on wildlife populations; habitat loss can directly decrease population size and carrying capacity, and isolation of the remaining populations can increase their extinction probability. Landscape ecology as a discipline has worked towards creating general rules for the way species respond to landscape change. These rules include, for example, estimates of threshold responses of populations to landscape level variables, or general theories as to which species will respond in a more severe fashion to landscape change. The demand for these generalisations is driven by the need for inexpensive, rapid and effective methods to plan for and manage these problems. The question as to whether general rules are accurate or useful solicits mixed responses from scientists and conservation managers. Inconsistencies in the way species appear to respond to landscape change is the most cited reason for this mixed response. In this thesis I suggest that general rules must be tested in an *a priori* fashion to directly assess their utility and assist in their translation from theory to practical tool. My primary aim is to test general rules in landscape ecology through creating *a priori* models; these models are based on ecological theories and existing species and landscape information. My secondary aim is to enhance the understanding of landscape level habitat fragmentation problems for birds in South-east Queensland. I address these aims within four main data chapters as summarised below, Chapter 1 being a broad introduction to the

topic. Chapter 2 asks the question: can general rules and threshold theory be used to predict bird species patch occupancy in a fragmented landscape? I create a simple decision tree model based on threshold theories in landscape ecology, and use this to predict presence or absence of 17 forest bird species in a largely agricultural landscape. This decision tree is broadly based on theoretical patch area and connectivity threshold estimates, and incorporates some basic species specific information (such as habitat suitability and mobility). I test this model using a presence/absence survey data set. The process of assessing for which species the model did not work is revealing: I show that the accuracy of 'present' predictions is somewhat compromised for habitat specialist species and 'absent' predictions are compromised for generalist species. Through creating the 'optimal' decision tree models for these species I show that these inaccuracies are likely to arise from vegetation mapping problems, including the lack of a 'habitat quality' measure. The study therefore highlights the need for high quality vegetation maps to carry out effective planning. For the majority of species I achieve reasonable predictive success. This study provides hope that general rules have some predictive ability in landscape ecology, and highlights the value of testing models to assess why, and for which species general rules may or may not work.

In Chapter 3, I assess the utility of basic ecological principles for predicting the relative value of vegetation patches for specific bird species, focusing on highly altered urban landscapes. I create a model based on the mechanisms expected to be driving species abundance within highly altered landscapes where most sensitive bird species are likely to be already lost. The model states that in a highly altered landscape, the more closely the vegetation structure matches a species foraging height requirements the more suitable the patch is for the species; however, this effect will be moderated by the landscape context of the patch. From this model I create an index to quantify and rank the predicted value of patches for 30 species of interest in

unmanaged and revegetated urban sites, in Brisbane city, South East Queensland. I test the model using bird abundance data, and show that it achieved a reasonable level of predictive accuracy. The model presented within this study is significant as it has relatively low complexity and limited data requirements, yet provides a means to assess how altering the landscape context and vegetation structure within a patch may enhance the abundance of bird species of interest. With further development, the relative simplicity of the model should make it easy to use for land managers.

In Chapter 4 I aim to examine how landscape features influence spatial genetic relatedness patterns at a fine, within-population scale on bird species with different life-history traits. I argue that individual level movement characteristics (particularly dispersal routes) in a variable landscape will drive these spatial genetic patterns, and thus create an a priori model based on this theory to make more specific quantifiable predictions of relatedness patterns. I use animal movement theory to deduce these movement characteristics (particularly the strength of avoidance of habitat boundaries) for species with different life-history traits, and apply the model for two closely related passerine bird species which co-occur within a region in South East Queensland (the Yellow-throated scrubwren, *Sericornis citreogularis*, a habitat specialist; and the White-browed scrubwren, *Sericornis frontalis*, a habitat generalist). I test these models using data on pairwise genetic distances between individuals of each species. The key outcome of this study is that the genetic data supports my predictions that individual level movement characteristics are a mechanistic driver of within-population spatial genetic patterns. For the habitat specialist bird species, the genetic data supported a model which incorporated a strong avoidance response to habitat boundaries and for the generalist species no response to habitat boundaries. This study takes a novel approach to an individual-based genetics study, making specific quantifiable predictions of how a species may be impacted by different landscape features. This research

could have significant implications for conservation management, particularly for understanding and managing population responses to a changing landscape, and the early stages of fragmentation.

In Chapter 5 I address the question of whether urban revegetation is more successful if it is used to extend the area of existing vegetation, or enhance connectivity in the landscape. This study is novel; for instead of assessing the factors influencing the extinction of a species in a patch, I assess the factors influencing re-colonisation in urban patches. Using bird survey data and patch area, connectivity and vegetation variables, I use hierarchical partitioning and model selection to determine the relative effect of each of these variables on bird species richness and abundance in revegetated patches. The key finding was that connectivity was a better predictor of bird species richness, and total patch area was the best predictor for total bird abundance. My results suggest that the conservation goals of revegetation efforts, particularly in an urban landscape, must be considered when planning a revegetation program. Using revegetation to enhance patch area may be the most effective approach for ensuring species persistence over time (i.e. abundance). However, to attract more species into an area enhancing connectivity may be a better approach.

In this thesis I explicitly test general rules and theories in landscape ecology within a priori predictive models. Through their generality, the models I develop are potentially suitable for application in other ecosystems. The process of synthesising these models in a simple form, and testing them in a real landscape was revealing. I was able to examine where some general rules do not work, and also where they may not apply or need adjusting. I strived to create models that are easy to use and understand, particularly within Chapters 2 and 4, by trading off simplicity and accuracy. The models produce accurate results to the point that they are arguably valuable tools for landscape managers. This is achieved without compromising their accessibility, and so the research has the potential to transcend the gap between science and real world utility.

NEWS FROM OVERSEAS SOCIETIES

Bernie Masters

The Canadian Society of Ecology and Evolution is only five years old, but it has adopted a leading role in speaking out on behalf of its members. Already, they are one of the largest scientific societies in Canada and over half of its 900 members attend their annual meetings. It also plays a very public role in supporting acceptance of the science behind the theory of evolution. It financially supports the Canadian Institute for Ecology and Evolution which has applied for five years of funding to allow it to provide workshops, thematic programs and graduate short courses. The Society's 6th annual meeting will be held in May 2011 in Calgary and its 7th annual meeting will be a combined society conference in Ottawa in 2012.

The British Ecological Society's December 2009 Bulletin announces a new on-line journal entitled *Methods in Ecology and Evolution* to be launched in April 2010. Librarian access is free for the first two years.

BES has launched a position statement on Halting UK Biodiversity Loss which could apply universally around the planet. It states that threats to biodiversity are so great that policy makers should give the issue their highest attention; and that an informed, professional and science- and evidence-based approach to the conservation and management of biodiversity requires new multi-disciplinary collaborations. A greater dialogue between scientists, policy makers and biodiversity practitioners is needed to ensure that relevant research takes place and to strengthen the translation of research into practice.

The Bulletin has two useful articles on 'R', a new language and environment for statistical computing and graphics. R provides a wide variety of statistical (linear and non-linear modelling, classical statistical tests, time-series analysis, classification, clustering, etc) and graphical techniques. One of R's claimed strengths is the ease with which well designed plots suitable for publication can be produced. R is available as free software and

the BES members seem to be eagerly adopting it.

Books reviewed and recommended by BES members include:

Insect Biodiversity: Science and Society. Edited by R G Foottit and P H Adler (2009). Wiley-Blackwell, Chichester. About A\$150 hardback.

Ecology of Insects (2nd ed). M R Speight *et al* (2008). Wiley-Blackwell, Chichester. About A\$80 hardback.

Living in a Dynamic Tropical Forest Landscape. Edited by N E Stork and S M Turton (2008). Blackwell Publishing, Oxford. About A\$100 hardback.

The Biology of Caves and other Subterranean Habitats. D C Culver and T Pipan (2009). Oxford University Press, Oxford. About A\$120 hardback.

An Introduction to Mathematical Models in Ecology and Evolution: Time and Space (2nd ed). M Gillman (2009). Wiley-Blackwell, Chichester. About A\$60 paperback.

Mathematical Ecology of Populations and ecosystems. J Pastor (2008). Wiley-Blackwell, Chichester. About A\$70 paperback.

Reintroduction of Top-Order Predators. Edited by M T Hayward & M J Somers (2009). Wiley-Blackwell, Chichester. About A\$80 paperback.

Recreational Hunting, Conservation and Rural Livelihoods. Edited by B Dickson *et al* (2009). Wiley-Blackwell, Chichester. About A\$70 paperback.

Quantitative Conservation of Vertebrates. M J Conroy & J P Carroll (2009). Wiley-

Blackwell, Chichester. About A\$70 paperback.

Biodiversity, Ecosystem Functioning and Human Wellbeing: An Ecological and Economic Perspective. Edited by S Naeem et al (2009). About A\$70 paperback.

Conservation Psychology. Understanding and Promoting. S Clayton & G Myers (2009). Wiley-Blackwell, Chichester. About A\$60 paperback.

Participatory Research in Conservation and Rural Livelihoods. Edited by L Fortmann (2008). Wiley-Blackwell, Chichester. About A\$60 paperback.

Invasion Biology. M A Davis (2009). Oxford University Press, Oxford. About A\$65 paperback.

The Ecological Society for Eastern Africa is calling for papers to be presented at its third

annual conference whose theme is Climate Change and Natural Resource use in Eastern Africa: Impacts, adaptations and mitigation. It is to be held in May 2010 in Nairobi, Kenya.

The Ecological Society of America's January Bulletin has an article giving a brief history of data sharing in the US long term ecological research network. The LTER Network began to improve the attitudes of long-term researchers to sharing their data after a meeting in 1990 when concerns over security and integrity of data were resolved.

A short article in the 'Ecology on the Web' section includes details of a website www.ncfaculty.net/fishR where the statistical package R is used for fish ecology.

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NOTICEBOARD & ADVERTISEMENTS

Please help to keep the notice board current and informative. Items to be listed in detail as below, information should be sent to the *Bulletin* Editor *as electronic copy* (preferably email) and in a similar format as those below—see details for copy deadlines in the front of the *Bulletin*. **Please give details rather than just a web address**, it can take ages to access even basic information from some sites.

FORTHCOMING MEETINGS

2010

- March 1, 2010. 1st Int. Conf. on Environmental Pollution, Restoration, and Management. Ho Chi Minh, Viet Nam. <http://vniceporm.com>
- March 3-4, 2010. High Altitude Revegetation Workshop. Fort Collins, Colorado, USA. <http://www.highaltitudereveg.org/>
- March 10-14, 2010. EPC10: 4th Environmental Physics Conf. Hurgada, Egypt. <http://www.physicsegypt.org/epc10/>
- March 24-26, 2010. Int. Drought Symp. Riverside, California, US. <http://cnas.ucr.edu/drought-symposium/>
- March 26-28 2010. Butterfly Conservation's 6th Int. Symp.: The 2010 target and beyond for Lepidoptera. Reading, UK. www.butterfly-conservation.org/symposium
- April 6-10, 2010. Aust. Soc. for the Study of Animal Behaviour Conf. Narrabri, NSW. <http://assab2010.eriophora.com.au/>
- April 7-9, 2010. Mapping Climate: an Environment for Change. ANZMapS 2010 Conf. Adelaide, SA. www.anzmaps.org/
- April 11-16, 2010. Int. Healthy Parks, Healthy People Congress. Melbourne, Vic. <http://www.healthyparkshealthypeoplecongress.org/>
- April 14-16, 2010. The Sustainable City 2010: 6th Int. Conf. on Urban Regeneration and Sustainability. La Coruna, Galicia, Spain. <http://www.wessex.ac.uk/10-conferences/the-sustainable-city-2010.html>
- April 19-21, 2010. Islands 2010: 1st Int. Conf. on Island Sustainability. Bol, Brac Island, Croatia (Hrvatska). <http://www.wessex.ac.uk/10-conferences/islands-2010.html>
- April 26-29, 2010. Int. Symp. Forecasting Climate Change Impacts on Fish and Shellfish ICES, PICES. Sendai, Japan. www.pices.int/meetings/international_symposia/2010
- April 27-29, 2010. Int. Invasive Ant Management Workshop. Darwin, NT. <http://www.terc.csiro.au/iiamw/>
- May 4-6, 2010. 3rd Int. Conf. on Environmental Toxicology. Limassol, Cyprus. <http://www.wessex.ac.uk/10-conferences/environmental-toxicology-2010.html>
- May 5-8, 2010. Conservation and sustainable use of wild plant diversity. Chania, Crete, Greece. <http://www.oac.gr>
- May 20-23, 2010. 5th Ann. Int. Symp. on Environment. Athens, Greece. <http://www.atiner.gr/docs/Environment.htm>
- June 6-11, 2010. Advancing the Science of Limnology and Oceanography. Santa Fe, New Mexico, USA.

<http://www.aslo.org/meetings/aslomeetings.html>

June 13-15, 2010. University of Alberta & Ducks Unlimited. Workshop on Wetlands Management, Economics and Policy. Victoria, BC, Canada.

<http://web.uvic.ca/~wetlands/>

June 20-24, 2010. 3rd Int. Soc. for Seed Science. Seeds and the Environment. Salt Lake City, Utah, USA.

<http://cnas.ucr.edu/drought-symposium/>

June 27-30, 2010. Environment Research Event 2010.

Rockhampton, Qld.

<http://cpws.cqu.edu.au/FCWViewer/view.do?page=10386>

June 29 - July 1, 2010. Int. Climate Change Adaptation Conf: 'Climate Change Adaptation Futures: preparing for the unavoidable impacts of climate change'. Gold Coast, Queensland.

www.nccarf.edu.au/conference2010

July 1-2. World Ecological Forum. Visby, Gotland, Sweden.

<http://www.worldecologicalforum.com>

July 3-7, 2010. 24th Int. Congress for Conservation Biology: Conservation for a Changing Planet. Edmonton, Alberta, Canada.

www.conbio.org/2010

July 4-8, 2010. Australian Marine Sciences Association. Wollongong, NSW.

<http://amsa.asn.au/conference/conf2010>

July 4-8, 2010. 2nd Int. Conf. on Climate Change: Impacts and Responses. Brisbane, Qld.

<http://on-climate.com/conference/>

July 4-9, 2010. Aust. Mammal Soc. Conf. and Rock Wallaby Symposium. Canberra, ACT.

<http://www.australianmammals.org.au/Conference%202010.htm>

July 12-14, 2010. Aust. Soc. Fish Biology. Melbourne, Vic. www.asfb.org.au

July 12-14, 2010. 2010 Healthy Cities Conf. Brisbane, Qld.

<http://www.healthycities.com.au>

July 19-23, 2010. Int. Conf. of the Association for Tropical Biology and Conservation (ATBC). Bali, Indonesia.

<http://atbc2010.org>

July 26-30, 2010. FSBI Fish and Climate Change 2010. Belfast, United Kingdom.

<http://www.fsbi.org.uk/2010>

August 1-6, 2010. 19th World Congress of Soil Science: Soil Solutions for a Changing World. Brisbane, Qld.

<http://www.ccm.com.au/soil/>

August 3-5, 2010. Qld Pest Animal Symp. Gladstone, Qld.

www.pestanimalsymposium.com.au

August 21-25, 2010. SERI 4th World Conf. on Ecological Restoration. Mérida, Mexico.

<http://www.ser2011.org/en/ser2011/>

August 23-27, 2010. 7th SER European Conf. on Ecological Restoration. Avignon, France.

<http://www.seravignon2010.org/>

August 23-28, 2010. IUFRO World Congress. Forests for the Future: Sustaining Society and the Environment. Seoul, Republic of Korea.

<http://www.iufro2010.com>

August 25, 2010. ICEST 2010: Int. Conf. on Ecological Science and Technology. Singapore.

<http://www.waset.org/conferences/2010/singapore/icest/>

September 14-16, 2010. Brownfields 2010: Fifth Int. Conf. on Prevention, Assessment, Rehabilitation and Development of Brownfields. Carvoeiro, Algarve, Portugal.

<http://www.wessex.ac.uk/10-conferences/brownfields-2010.html>

Sept 15-19, 2010. 14th Int. Biotechnology Symp. and Exhibition. Rimini, Italy.

www.ibs2010.org

Sept 28-Oct 1, 2010. Aust. Network for Plant Conservation. Perth, WA.

www.anbg.gov.au/anpc/

Oct 8-12, 2010. 9th Int. Marine Biotechnology Conf. Qingdao, China.

<http://www.imbc2010.org/>

Oct 17-20, 2010. Postgrad. Workshop in Pollination Ecology. Mt Hyland Wilderness Retreat, northern NSW. Contact Caroline Gross via:

<https://www.surveymonkey.com/s/JWTYNXT>

Nov 8–11, 2010 Int. Symp. Ecosystems 2010: Global Progress on Ecosystem-based Fisheries Management. Anchorage, Alaska, USA.

<http://seagrant.uaf.edu/conferences/2010/wakefield-ecosystems/index.php>

Dec 6-10, 2010. ESA10 ‘Sustaining biodiversity – The Next 50 Years’. ESA Annual Conf. Canberra, ACT.

www.esa2010.org.au

Dec 29, 2010. ICEET 2010: Int. Conf. on Environmental Engineering and Technology. Bangkok, Thailand.

<http://www.waset.org/conferences/2010/bangkok/iceet/>

2011

Feb 13-18, 2011. Advancing the Science of Limnology and Oceanography. Aquatic Sciences Meeting. San Juan, Puerto Rico.

<http://www.aslo.org/meetings/aslomeetings.html>

March 14-18, 2011. 5th Int. Zooplankton Production Symp. Pucon, Chile.

http://www.pices.int/meetings/All_events_default.aspx

July 23-30, 2011. XVIII Int. Botanical Congress. Melbourne, Vic.

<http://www.abc2011.com>

August 21-25, 2011. Soc. for Ecological Restoration Int. World Conf. on Ecological Restoration. Yucatán, Mexico.

<http://www.ser2011.org/en/>

Sept 12-16, 2011. 3rd Symposium on Environmental Weeds & Invasive Plants (Intractable Weeds and Plant Invaders). Ticino, Switzerland.

http://www.ewrs.org/coming_events.asp

2012

July 9-13, 2012. 12th Int. Coral Reef Symp. Cairns, Qld. www.icrs2012.com

2013

August 18-23, 2013. INTECOL 11 Congress (Ecology—Into the Next 100 Years). London, UK.

Interesting Websites

Websites

<http://www.triplehelix.com.au/>

Andrew Campbell of Triple Helix Consulting gave a talk at the recent ESA Symposium on Ecology and Environmental Policy entitled: A ‘Provocative’ on the Intersection of Science and Policy (the presentation can be viewed on the ESA website:

http://www.ecolsoc.org.au/documents/0900amAndrewCampbell_000.pdf).

Andrew has been at the cutting edge of natural resource management in Australia for 25 years. He has played influential roles in research (notably as CEO of Land & Water Australia from 2000-2006), in policy as a senior executive in the Australian Government, and in extension with the Victorian Government. His website, Triple Helix Consulting, offers a range of information resources including publications, presentations and projects and is worth a look.

ESA Electronic list

All messages intended for the ESA e.mail list should be sent to: esa_news@ecolsoc.org.au

Administrative commands for the esa_news list

For help and a description of available commands, send a message to: esa_news-help@ecolsoc.org.au

To subscribe to the list, send a message to: esa_news-subscribe@ecolsoc.org.au

To remove your address from the list, just send a message to the address in the 'List-Unsubscribe' header of any list message. If you haven't changed addresses since subscribing, you can also send a message to: esa_news-unsubscribe@ecolsoc.org.au

For addition or removal of addresses, a confirmation message will be sent to that address. When you receive it, simply reply to it to complete the transaction.

ESA Fora

To save overloading all our in-boxes, ESA have moved to a series of on-line fora for discussion. These are worth keeping in mind. Go to the website (www.ecolsoc.org.au/), log in to the member's area and follow the prompts.

The fora are:

- Ecology in Practice—the discussion site for all ecologists in the work force
- Ecology Views—share your opinions on a wide range of ecology issues
- Environment and Conservation discussion site
- Students and Post-graduates—discussion on student issues with your peers

The fora represent a good chance to circulate notification of publications, post docs, information and discussion, but they will only work if people get into the habit of logging on and adding to them.

We want your feedback and input into developing the Society's future strategies and contributions to global climate change issues.

You can get to the forum by logging into your account at www.ecolsoc.org.au.

Click the Forum link on the menu. Open the Environment and Conservation Discussion folder, click the Carbon Offset link—and leave your comment.



MEMBERSHIP APPLICATION FORM

The Ecological Society of Australia is a professional organisation established to promote ecological research and communication. The Society's constitutional objectives are:

- to promote the scientific study of all organisms in relation to their environment
- to promote the application of ecological principles in the development, use and conservation of Australia's natural resources
- to advise governmental and other agencies in matters where the application of ecological principles may be of assistance
- to foster the preservation of natural areas for scientific and recreational purposes and seek to ensure that such areas are soundly managed

The Ecological Society provides the following membership benefits:

- Austral Ecology, a journal of international standing—8 issues per year
- the quarterly ESA Bulletin, a newsletter for members
- an electronic mail discussion list for rapid communications, exchange of views, and advertising jobs or grant application deadlines
- online membership database @ www.ecolsoc.org.au
- annual symposia and open forums, workshops and meetings
- links with international ecological bodies, including INTECOL
- reduced subscription rate to Ecological Management and Restoration journal
- opportunities to apply for grants and scholarships

Category	Australian (incl. GST)	International (excl GST plus \$10 post)
Standard	\$82.50	\$85.00
*Concession (income under \$25 000 p.a)	\$38.50	\$45.00
Family (2 members at same address)	\$110.00	\$120.00
Sustaining Associates (organisations only)	\$231.00	\$220.00
<i>Bulletin</i> subscriber only (no membership)	\$27.50	\$35.00
<i>Ecological Management & Restoration</i> journal (ESA Member subscription rate)	\$66.00	\$64.00

**Please contact ESA if you feel that you are entitled to a reduced membership for reasons other than income*

Membership is for the calendar year, and includes *Austral Ecology* (8 issues/yr), the *Bulletin* (4 issues/yr) and reduced Conference registrations. Membership applications must be supported by a Proposer and Secunder who are current members of the Society. Contact the Membership Manager if you need help identifying suitable nominators. Payments can be made for 1, 2, or 3 years in advance.

ESA MEMBERSHIP APPLICATION FORM

(Prof/A/Prof/Dr/Mr/Mrs/Miss/Ms): _____

first name(s) last name

Postal address:

State: _____ Postcode: _____ Country: _____

Telephone: (W) (_____) _____ (H) (_____) _____

Fax: (_____) _____

email: _____

Institutional affiliation: _____

(indicate affiliation here. It will be used in the Annual Directory. *Not* for posting unless part of the postal address above)

Formal qualification: _____ Current occupation: _____

Proposer: _____ **Seconder:** _____

(PLEASE PRINT) (PLEASE PRINT)

Applicant Signature: _____ **Date:** _____

√	Category (please tick)	Australian (incl. GST)	International (excl. GST & including \$10 postage)
	1. Standard	\$82.50	\$85.00
	2. Family	\$110.00	\$110.00
<i>Concessional rates apply to retirees and members whose income is less than \$25,000 per annum.</i>			
	3.1 Concession (low income)	\$38.50	\$45.00
	3.2 Concession (retired)		
	3.3 Concession (student)		
<i>EMR subscription is additional to ESA Membership. Please add this amount for your membership.</i>			
	Ecological Management & Restoration	\$66.00	\$64.00

To apply for Sustaining Association or Bulletin subscription only, contact the ESA office.

Paying for: 1 2 or 3 years \$ _____

(You will receive back issues of *Austral Ecology* if payment is for the current year)

Total enclosed: \$ _____

I wish to pay by: Cheque Visa Mastercard

Cheques/money orders should be crossed and made out to 'Ecological Society of Australia'.

Card Holder's Name: _____

Card No:

Expiry Date: ____/____ Amount: \$ _____ Card Holder's Signature: _____

Send completed form with payment to:

ESA Membership Manager, PO Box 8250, Alice Springs, NT, 0871, Australia

Ph: 08 8953 7544, Fax: 08 8953 7566, email: membership@ecolsoc.org.au