Australasian Shorebird Conference
Darwin, Northern Territory 2014

20th – 21st
September 2014
Charles Darwin University

ASC 2014 Sponsors

AWSG
Australasian Wader Studies Group

Mark Barter Memorial Award

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David Seay Student Awards

Welcome

Welcome to Darwin. We are very much looking forward to the forthcoming few days dedicated to shorebirds. I find two things extraordinary about shorebirds. One is their migration – the more we learn about it, the more extraordinary and fascinating is the story that emerges. The second is the depth of passion that these birds engender in those who study and watch them. The world could be divided between those who can instantly relate to the words 'Terek' and 'Dowitcher', and those for whom they mean nothing. We are fortunate to have such passionate people joining us at Charles Darwin University to discuss the research. We have some great speakers – not least Judit Szabo and Richard Fuller, our two keynotes. We also have some great birds. I can think of no other place in the country that can boast a shorebird species that you cannot guarantee seeing anywhere else – Leanyer's Little Ringed Plovers also look forward to meeting you.

Warmest regards

Professor Stephen Garnett

Chair – ASC Organising Committee

Organising Committee Members

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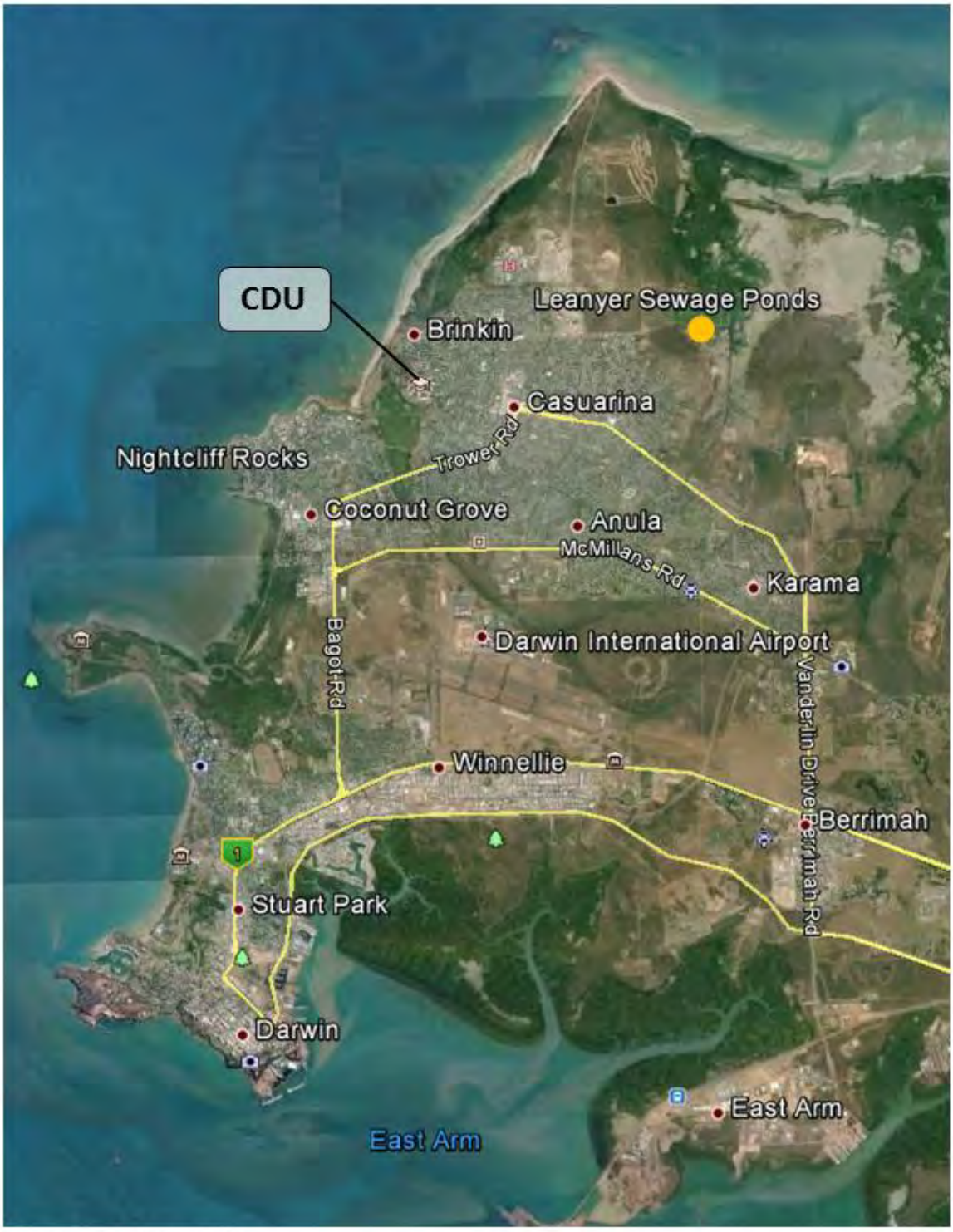
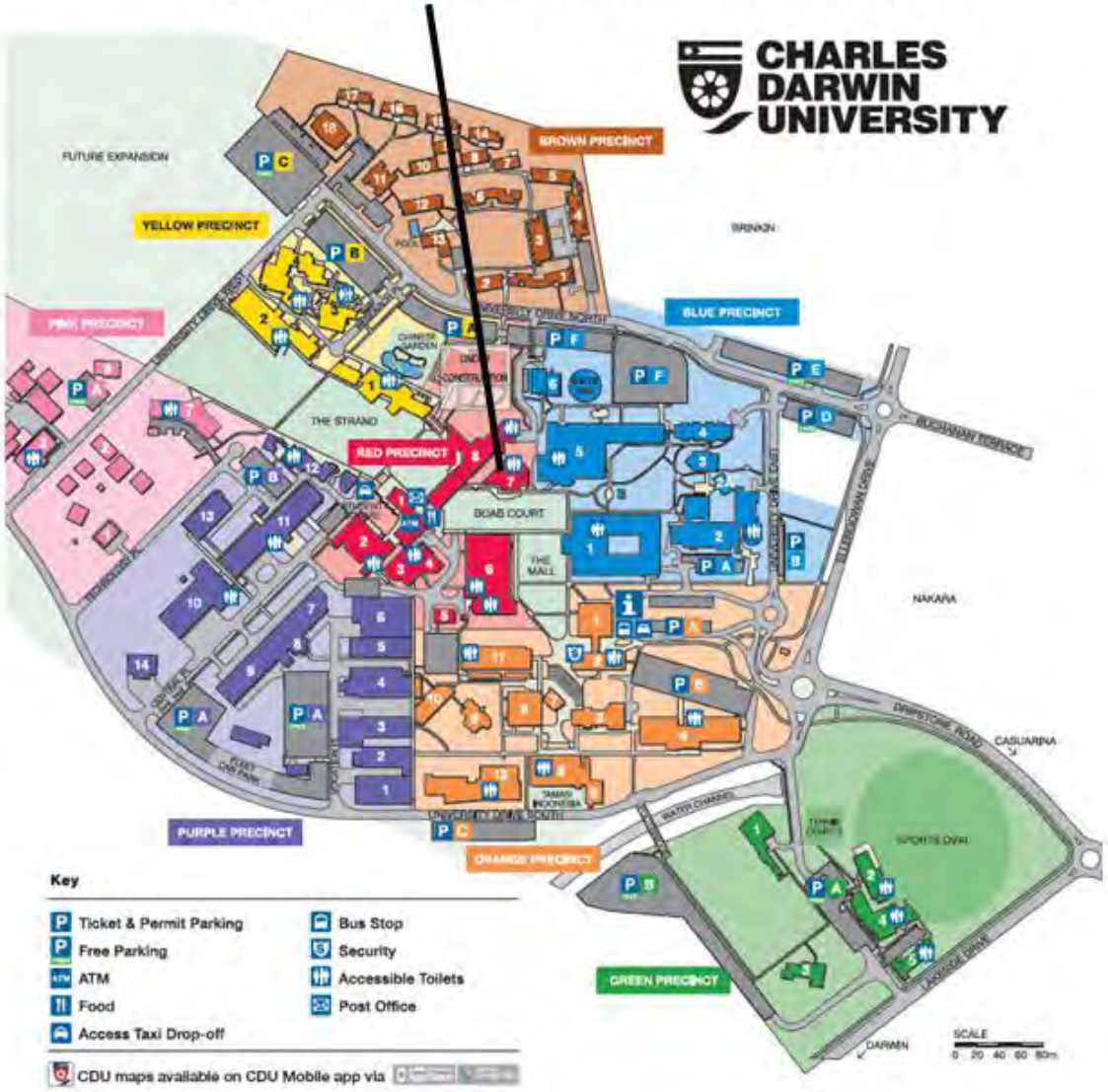


Google Earth Inc. 2014

Conference 'Mal Nairn' auditorium – Building Red 7

Faculty & Information Centres	Building	Car Park
Information Centre	1 ORANGE	A ORANGE
Library	6 RED	F BLUE
Security	2 ORANGE	A ORANGE
Australian Centre for Indigenous Knowledges and Education	2 BLUE	A BLUE
Engineering, Health, Science & the Environment	5 BLUE	F BLUE
Law, Education, Business & Arts	5 BLUE	F BLUE
Vocational Education & Training	4 RED	A PURPLE

Key Facilities	Building	Car Park
Art Gallery	12 ORANGE	C ORANGE
Bookshop	1 RED	F BLUE
Centre for Youth & Community Music	9 ORANGE	R ORANGE
Childcare Centre	3 GREEN	A GREEN
Chinese Garden - adjacent	1 YELLOW	A YELLOW
Essington International Senior College	4 ORANGE	D ORANGE
Executive, Administration & Corporate Offices	12 ORANGE	C ORANGE
Taman Indonesia - adjacent	6 ORANGE	C ORANGE
Information Technology & Management Support	3 RED	A PURPLE
Mal Nairn Auditorium	7 RED	F BLUE
Menzies School of Health Research	9 RED	A YELLOW
Nan Giese Gallery	10 ORANGE	A PURPLE
Navitas	3 ORANGE	A ORANGE
North Australian Centre for Oil and Gas	7 PINK	B PURPLE
Northern Editions	0 ORANGE	C ORANGE
Northern Territory Medical Program	4 YELLOW	B YELLOW
International House Darwin Reception	1 BROWN	F BLUE
Post Office	1 RED	F BLUE
Printery	1 GREEN	A GREEN
Student Square & Basketball Court	2 RED	A PURPLE
Territory FM 104.1	6 ORANGE	C ORANGE
University Theatre	3 ORANGE	9 ORANGE



Conference arrangements

Venue

The Mal Nairn auditorium is located in building Red 7 at Charles Darwin University, Ellengowan Drive Casuarina. You can enter the Mal Nairn auditorium from University Drive North or Central Place. See the Charles Darwin University campus map on page 4 or go to the electronic link on http://www.awsg.org.au/pdfs/CDU-campus-map.pdf

Registration

Join us for some drinks and nibbles as the sun goes down over roosting shorebirds on the rocks at Nightcliff foreshore. **Registration will open from 5pm on Friday 19th September** where you can collect your conference pack.

Nightcliff Rocks is situated at Sunset Park, between Nightcliff Jetty and the western end of Aralia Street, Nightcliff.

Catering

Morning tea, lunch and afternoon tea will be provided in the foyer of the Mal Nairn auditorium during the conference.

Conference dinner

The conference dinner will be held at the Darwin Sailing Club from 6pm on Saturday 20th September. The dinner costs $60 and bookings can be made at http://store.birdlife.org.au/?page_id=1259

The Darwin Sailing Club is located at the end of Atkins Drive, Fannie Bay, Northern Territory.

Awards

This year, there will be three awards presented for the best presentations in three different categories. A judging panel will award the best presenters on Sunday afternoon at the conference close. Award recipients will receive a certificate and a prize.

Birding field trips

- Pre- and post-conference bird tours on Friday 19th and Monday 22nd – please contact Phil Straw philip.straw@awsg.org.au or 02 9567 9743
- For those that registered, there will be fieldtrip to the Leanyer Sewage Ponds in search of Little Ringed Plover and other Darwin specialities. This trip will be on Saturday 20th from 6:30 – 8:00 AM.
- Early morning bird walk on Sunday 21st at Charles Darwin University. Meet at 7:30 outside Red 7 (the conference venue) for a 1 hour walk around campus. CDU has a good variety of birds and habitats with interesting species including Bush Stone-curlew, Osprey, Black Butcherbird, Bar-breasted Honeyeater and Long-tailed Finch.

Kakadu Bird Week

Kakadu National Park invites participants at the Australasian Shorebird Conference to participate in the park's inaugural bird week.

This is being held the week following the ASC from Monday 22nd to Friday 26th September in association with BirdLife Australia. The bird week will commence with a BBQ meal and induction on the evening of Monday 22nd at Kakadu Park Headquarters in Jabiru. Jabiru is approximately 300 km from Darwin, which is a 2.5 to 3 hour drive. Each morning there will be targeted bird surveys to gather general information on Kakadu's birds, and in particular some of the park's threatened species. There will also be a training and evaluation session each day, most likely in the early afternoon.

To register your interest and obtain further detail please contact either Steve Winderlich steve.winderlich@environment.gov.au or Anne O'Dea anne.o'dea@environment.gov.au

Shorebird catching in Darwin

The Australasian Wader Studies Group will be catching shorebirds in Darwin using cannon and mist nets from 22nd to 29th September. People are still welcome – please contact Clive Minton to express your interest mintons@ozemail.com.au.

Exhibitors

The Threatened Bird Network from BirdLife Australia will have a stand in the foyer of the Mal Nairn auditorium during the conference. Meghan Cullen from the Threatened Bird Network will be available to talk about the program and sign up new members.

Acknowledgements

The ASC Organising Committee would like to thank Angela Choi from the East Asian-Australasian Flyway Partnership (EAAFP) for designing the ASC 2014 logo. Thanks also to the local volunteers and hosts of our international guests. The ASC Organising Committee would like to acknowledge the Larrakia People, whose land on which we meet for this biennial conference. And finally, special thanks to Emma Single and the RIEL administrative team from Charles Darwin University, who assisted with the final bookings for conference guests and in-house administration.

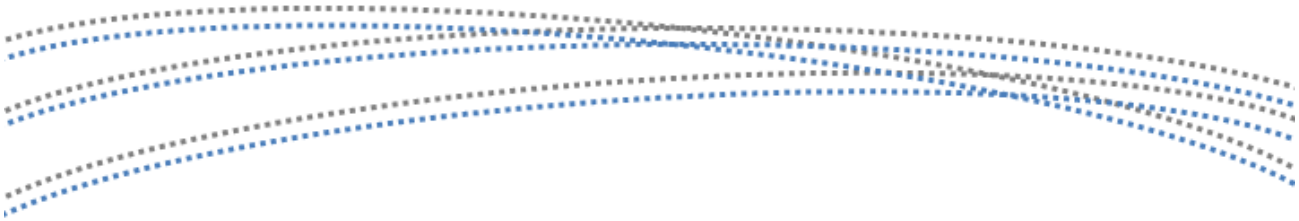
Programme

Day 1 – Saturday 20th September

0800 - 0845	Registration	
0845 - 0900	Alison Russell-French	Welcome
0900 - 0915	Nadine Lees	Welcome to country
0915 - 1015	Plenary: Richard Fuller	Why are Australia's shorebirds disappearing?
1015 - 1045	Morning tea	
1045 - 1100	Amanda Lilleyman	The role of modified roost sites for migratory shorebirds in Darwin Harbour
1100 - 1115	Judy Harrington	Successful return of shorebirds to Sydney Olympic Park
1115 - 1130	Michael Linde	The port of Brisbane shorebird roost: monitoring and management
1130 - 1145	Petra Hanke	Rehabilitation of Penrhyn Estuary: seven years of shorebird monitoring
1145 - 1300	Time to chat & lunch	
1300 - 1315	Phil Straw	Lessons learned from 50 years of wetland habitat remediation and management for waterbirds
1315 - 1330	Sora Estrella	Shorebird foraging ecology in salt works of Western Australia: management implications
1330 - 1345	Chris Purnell	A Saline Solution - management planning for shorebird habitat at decommissioned saltfields
1345 - 1400	Siriya Sripanomyom	Conserving shorebird roost sites in a human dominated landscape: an ecological and economic perspective from Thailand
1400 - 1415	William Steele	Shorebird habitat management at the Western Treatment Plant, Victoria: the challenges and opportunities of managing a large shorebird site with multiple values
1415 - 1430	Eduardo Gallo-Cajiao	Characterisation and analysis of the international conservation regime for migratory shorebirds in the East Asian-Australasian Flyway
1430 - 1445	Mark Carey	Developing a new wildlife conservation plan for Australia's migratory shorebirds
1445 - 1500	Kiran Dhanjal-Adams	Optimizing disturbance management of migratory shorebirds in Moreton Bay, Australia
1500 - 1530	Afternoon tea	
1530 - 1545	Ray Chatto	Northern Territory migratory shorebirds - are we bucking the trend?
1545 - 1600	Eric Woehler	Status and conservation of migratory shorebirds in Tasmania
1600 - 1615	Keith Woodley	Sharing the margins: populations and conservation status of New Zealand shorebirds.
1615 - 1630	David Melville	The reclamation on the tidal wetlands along the Chinese Yellow Sea coast from 1980-2013
1630 - 1645	Danny Rogers	What effect did the destruction of the Saemanguem tidal flats have on the Great Knot?
1645 - 1700	Adam Leavesley	Migratory shorebirds and the LNG boom: four years of surveys in Gladstone Harbour and the Curtis Coast, Queensland
1700 - 1715	Chris Hassell	Industrialisation threatens northwest Australian migratory shorebirds on the Luannan Coast of the northern Yellow Sea, China.
1715 - 1730	David Melville	DDT and other POPs - a continuing threat to waders in the Yellow Sea?
1800 - 2200	Dinner – Darwin Sailing Club	

Day 2 – Sunday 21st September

0830 - 0845	Welcome, sit down	
0845 - 0945	Plenary: Judit Szabo	What are we doing to halt declines in migratory shorebirds in the EAAF?
0945 - 1015	Morning tea	
1015 - 1030	Dan Weller	Shorebirds 2020: seven years on and counting
1030 - 1100	Micha Jackson	Shorebird monitoring by Indigenous communities of the Gulf of Carpentaria region
1100 - 1115	Preston Manado	Researching the shorebirds of Yawuru Country
1115 - 1130	Grainne Maguire	Dogs and leashes, birds and beaches
1130 - 1145	Eric Woehler	Status and conservation of resident shorebirds in Tasmania
1145 - 1200	Aleisa Lamanna	Shorebirds – key to the future of the Samphire Coast?
1200 - 1215	Lin Zhang	Observations on waders in Rudong and Lianyungang, Jiangsu, China
1215 - 1315	Lunch	
1315 - 1330	Adrian Riegen	Shorebird surveys in the southeast Gulf of Carpentaria, 1999 and 2012-2013
1330 - 1345	Eduardo Gallo-Cajiao	Shorebirds also live on rocks: a case study from a reef in eastern Australia
1345 - 1400	Renee Mead	Dune-nesting plovers select nest sites to minimise the risk of clutch depredation
1400 - 1415	Alan Stuart	Grey-tailed Tattlers – a fresh look at a common shorebird
1415 - 1430	Marcel Klaassen	Latitudinal trend in deposition of migratory fuel as driver of trans-equatorial long distance migration in shorebirds
1430 - 1445	Sung-Ryong Kang	Suitability of coastal wetlands as waterbird habitat in Republic of Korea
1445 - 1500	Hebo Peng	A perfect storm? – the decrease of Great Knot food at Yalu Jiang coastal wetland in the northern Yellow Sea, China
1500 - 1530	Afternoon tea	
1530 - 1545	Liz Crawford	The Hunter Estuary - a significant stopover/staging site for Red Knot on southward migration
1545 - 1600	Adrian Riegen	The importance of Yalu Jiang wetland national nature reserve for shorebirds during northward migration
1600 - 1615	Simeon Lisovski	Insights into migration pattern of Sanderlings using geolocators: from raw light data to ecological insights
1615 - 1630	Ken Gosbell	5 Years on – What have we learned from geolocators deployed in Australia?
1630 - 1645	Inka Veltheim	Tracking Little Curlew from Roebuck Plains to Siberia
1645 - 1700	Conference close and awards	



Plenary Speaker

Dr Richard A. Fuller

ARC Future Fellow
School of Biological Science, Faculty of Science
University of Queensland
Room 522, Goddard Building 8
St Lucia, Queensland, Australia
r.fuller@uq.edu.au

Richard Fuller is a Senior Lecturer at the University of Queensland in Brisbane, Australia. He works on pure and applied questions in biodiversity and conservation, spanning the fields of biogeography, conservation planning, conservation psychology and urban ecology. For the last few years he has been running a major project on Australia's migratory shorebirds, with a team of researchers analysing population trends, patterns of habitat loss, and impacts of climate change on the birds. This work has resulted in two species being nominated for addition to the national threatened species list. The challenge now is to implement action to stop further decline, and restore lost habitat. Check out his lab's work at www.fullerlab.org or follow them on http://www.facebook.com/fullerlab

Plenary abstract

Why are Australia's migratory shorebirds disappearing?

Millions of migratory shorebirds migrate from Arctic Russia and Alaska to Australia and New Zealand. There are population declines in our flyway of staggering severity and rapidity, with some populations crashing by 80% in 20 years. Data from Moreton Bay in Eastern Australia show that migratory shorebirds are declining while resident species are not, and there is huge spatial heterogeneity in population declines across the continent, suggesting that the causes might lie outside Australasia. Using satellite data we have documented rapid loss of intertidal wetlands in eastern Asia, a region known to be of critical importance as stopover habitat for many migratory shorebirds. Our modelling work suggests that habitat loss in this region could have profound implications for shorebird populations at a flyway level, and comprehensive analysis of Australasian shorebird data indicate severe declines in several species dependent on East Asian stopover sites.

Plenary Speaker

Dr Judit K. Szabo

Science Officer
East Asian – Australasian Flyway Partnership Secretariat (EAAFP Secretariat)
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science@eaaflyway.net

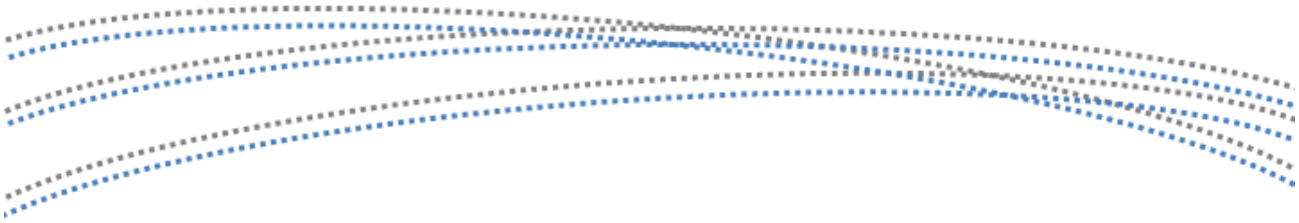
Judit Szabo is currently the Science Officer of the East Asian – Australasian Flyway Partnership in Incheon, Republic of Korea. She works with scientists, site managers and governments of the 22 countries of the flyway on migratory shorebird monitoring, conservation and management. Her previous work included collating data on threatened Australian birds for the Action Plan and analysing citizen science bird monitoring data.

Plenary abstract

What are we doing to halt declines in migratory shorebirds in the East Asian-Australasian Flyway?

Migratory waterbirds connect far-away countries by covering immense distances during their annual migration. This mobility makes their conservation especially challenging, particularly when the same individual has to cope with various pressures at breeding, staging and wintering sites. There is an urgent need to identify robust and workable conservation solutions. The East Asian – Australasian Flyway Partnership brings together 30 governmental and non-governmental partners to address this issue of habitat loss and species declines and is working to develop solutions. One initiative is creating Flyway Network Sites along the Flyway. All of the current 113 sites and 900 potential sites host migratory waterbirds in internationally important numbers, but only some of these are protected. After an overview of monitoring and management of Flyway Network Sites, I will give examples of conservation work and government involvement and discuss current activities in different countries in Communication, Education, and Public Awareness, as well as our efforts to influence policy in China and South Korea.

Abstracts



Latitudinal trend in deposition of migratory fuel as driver of trans-equatorial long distance migration in shorebirds

Yaara Aharon-Rotman[1]*, Clive Minton[2], Ken Gosbell[3] & Marcel Klaassen[1]

[1]Centre for Integrative Ecology, Deakin University, Waurn Ponds, Vic 3216, Australia; [2]165 Dalgetty Rd, Beaumaris Vic 3193, Australia; [3]1/19 Baldwin Rd, Blackburn, Vic 3130, Australia. *Email: yaara.rotman@deakin.edu.au

Migration has evolved as an adaptation towards avoiding problems (unfavourable thermal conditions, food shortage, predation, disease) and seizing opportunities where and when they arise. For many high latitude breeders, cold and food shortage are important drivers to migrate towards the equator during winter. Some, however, surpass the equator, often involving extremely long migrations. The suggested prime reason for these trans-equatorial migrations is that migrants will thus be using equivalent habitats (to which they are specialised) at both sides of the equator during the most productive season. But in some cases, such as in the case of many Arctic-breeding, long-distance migratory shorebirds, apparently suitable and similar habitat is passed or used and next left, for more southern destinations. We here build a case that, possibly counter-intuitively, these trans-equatorial flights, the flying of the extra mile, may actually enhance the chances of a successful, speedy and timely migration back to the breeding grounds. To support our hypothesis we comprehensively investigated (a) the effect of latitude on fuelling rates in different migratory shorebirds on a global scale; (b) the potential underlying factors to such a pattern with latitude; and, (c) whether these patterns explain migratory strategy of some long distance cross-equatorial migratory shorebirds.

Developing a new wildlife conservation plan for Australia's migratory shorebirds

Mark J. Carey* & Paul O'Neill

Migratory Species Section, Department of the Environment, Australian Government, 33 Allara St, Canberra, ACT 2601, Australia. *Email: mark.carey@environment.gov.au

Listed migratory species which visit Australia received national protection as a matter of national environmental significance when the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) took effect in July 2000. Under the EPBC Act, wildlife conservation plans may be prepared for the purposes of protection, conservation and management of listed migratory, marine, cetacean or conservation dependant species. In February 2006, the Wildlife Conservation Plan for Migratory Shorebirds came into effect, the first wildlife conservation plan developed under the EPBC Act. A mandatory review of the plan in 2013 recommended that, given the contemporary and likely future threats to migratory shorebirds in Australia and the East Asian-Australasian Flyway (EAAF), the 36 listed species still required a national framework identifying research and management actions. The review further recommended that the wildlife conservation plan required updating to remove completed actions and include new, focused conservation priorities. The draft plan builds upon the previous plan's achievements and was made in consultation with representatives from Commonwealth, state and territory governments, NGOs, industry and research agencies. The revised Wildlife Conservation Plan for Migratory Shorebirds will provide a framework to guide conservation of migratory shorebirds and their habitat in Australia over the next 5–10 years. In recognition of their migratory habits, it outlines national activities to support their appreciation and conservation throughout the EAAF. The draft plan contains clarification of statutory elements of the EPBC Act by addressing topics relevant to the conservation of migratory shorebirds, including a summary of Australia's commitments under international conventions and agreements, and identification of important habitat. It also outlines national actions to support flyway shorebird conservation, and should be used to ensure these activities are integrated and remain focused on the long-term survival of Australia's migratory shorebird populations and their habitats.

Northern territory migratory shorebirds – are we bucking the trend?

Ray Chatto*

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*Email: ray.chatto@nt.gov.au

Recent research has suggested large decreases in migratory shorebird numbers over recent years in eastern Australia. Surveys of coastal shorebird sites along the western and northern coasts of the Northern Territory were undertaken between 2010 and 2012, in both March and December, and then compared to counts using similar methods from the same sites between 1991 and 1999. Overall, the results indicate little or no change in total abundance of shorebirds between the pre-2000 and post-2009 periods. Six sites showed increased abundances of total shorebirds between the two periods, while five showed decreases in abundance. Detecting change for individual migratory species is difficult because of variability in roost location and tidal conditions on the day of survey. Nonetheless, Great Knots showed increases in proportional abundance at seven sites and a decrease at one site. Bar-tailed Godwits showed increases in proportional abundance at four sites, decreases at three sites and remained similar at one site. Eastern Curlews showed increases in proportional abundance at three sites, decreases at two sites and remained similar at two sites (although only small numbers were usually available for comparisons). The availability of large areas of habitat, combined with continued low levels of human disturbance, may mean that global decreases in shorebird numbers are being offset in the Northern Territory by more shorebirds choosing to stay in the north when they arrive in Australia, rather than continuing their migration to their previous over-wintering grounds further south. Previous surveys done outside the scope of this project have also indicated the possibility of some shorebirds migrating from southern Australia to the Northern Territory but remaining there during the breeding season rather than continuing on to northern hemisphere breeding grounds. An increase in shorebird banding and flagging around the Northern Territory coast may provide some confirmation along these lines.

The reclamation on the tidal wetlands along the Chinese Yellow Sea coast from 1980-2013

Ying Chen[1], Zhijun Ma[1]*, David Mellville[2] & Kun Tan[1]

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The extensive tidal flats of the Yellow Sea Region (YSR) provide important migratory stopovers for many shorebird species of the East Asian-Australasian Flyway. During the 20th century, the area of Chinese tidal wetlands decreased by around 51%, of which 82% resulted from land reclamation. Based on Landsat satellite images from 1980 to 2013 analyzed in 5-yr intervals, utilizing visual interpretation and change detection technique, the total area of reclamation in the Chinese part of the YSR in the past 30 years was about 8,000 km^2. The reclamation rate showed a sudden upward trend around 2005, which has been maintained subsequently. The claimed lands were classified into five land use types: farmland, open waters (saltpans or aquaculture ponds), construction, oil fields and unused land. Over the past 30 years, the area of oil fields showed a downward trend, open waters continued to rise substantially, farmland increased slightly, and the construction and unused land categories rapidly increased corresponding with large-scale reclamation during the past decade. Current provincial reclamation plans include further extensive loss of tidal lands, with Jiangsu Province alone planning to reclaim 1,800 km^2 between 2010 and 2020. Moreover, with sea level rise, reduction of river runoff and sediment deposition, rapid expansion of invasive species like *Spartina alterniflora*, the threats facing the remaining tidal wetland ecosystems of the Chinese YSR will continue to intensify. This region is in urgent need of national macro-control policies to safeguard ecosystem functions.

The Hunter Estuary - a significant stopover/staging site for Red Knot on southward migration

Liz Crawford* & Chris Herbert

17 the Quarterdeck, Carey Bay, NSW 2283, Australia. *Email chrisliz@internode.on.net

Red Knot are considered 'birds of passage' in the Hunter Estuary in New South Wales as they generally stay for only a short period while on southward migration to their preferred non-breeding grounds in Victoria and New Zealand. Between September 2011 and March 2014, Red Knot were observed at high-tide roosts in the Hunter Estuary during three successive non-breeding seasons. The flocks were searched for leg flags and colour bands every two to three days during their peak migration period from mid-September to late October, then weekly for the remainder of the non-breeding season. Of 88 flagged Red Knot seen during the study period, 50 were individually marked with engraved leg flags or colour bands. Since flagging, most have been seen in New Zealand, but none have been seen in Victoria. It is likely that the majority of mature Red Knot passing through the Hunter Estuary fly directly across the Tasman Sea to New Zealand and not via Victoria. Only seven of the 50 individually marked birds made repeat visits, suggesting that the estuary is an opportunistic stopover location for Red Knot on southward migration. For birds flying south from a stopover in the Gulf of Carpentaria, a stopover in the Hunter Estuary breaks the journey to New Zealand into two flights of approximately 2,000km rather than one longer 4,000km flight. During southward migration there is evidence for at least two waves of Red Knot passing through the Hunter Estuary, in addition to minor arrivals and departures. Prior to this study, flocks of up to 2,000 Red Knot have been seen in the Hunter Estuary, making it a very significant stopover/staging site for Red Knot with, at times, up to 5% of the *rogersi* population in southeastern Australia and New Zealand passing through.

Optimizing disturbance management of migratory shorebirds in Moreton Bay, Australia

Kiran L. Dhanjal-Adams[1]*, Karen Mustin[1], Hugh P. Possingham[1,2] & Richard A. Fuller[1]

[1]School of Biological Sciences, The University of Queensland, Brisbane, Qld 4072, Australia; [2]Division of Ecology and Evolution, Imperial College London, Silwood Park Campus, Berks, United Kingdom. *Email: kiran.dhanjaladams@uq.net.au

In Moreton Bay Marine Park, Australia, disturbance is a major threat to declining migratory shorebirds and impacts individual species differently. On some tidal flats, disturbance from dogs, people or horses illegally causing feeding or roosting birds to take flight is almost continuous. Marine Park personnel therefore enforce regulations through patrols, yet have limited resources with which to carry out enforcement. We therefore determine how Moreton Bay Marine Park personnel can spatially allocate their patrol effort between sites to identify which combinations deliver the greatest reduction in disturbance to the largest number of birds for the least cost. We find that the management of sites with low disturbance rates provide little return on investment compared to sites with high disturbance rates, regardless of bird numbers. All in all, the sites which provide the greatest management benefit are those which are cheap, have high disturbance rates and large numbers of birds. For migratory species such as shorebirds, local scale management solutions can therefore play an important role in helping reverse international scale declines.

Shorebird foraging ecology in salt works of Western Australia: management implications

Sora M. Estrella*, Robert Davis & Pierre Horwitz

School of Natural Sciences, Faculty of Health, Engineering and Science, Edith Cowan University, Joondalup, WA 6027, Australia. *Email: s.marin-estrella@ecu.edu.au

Many species of shorebird undertake long distance migrations, which impose extremely high energetic demands upon them. During these migrations, they depend on a limited number of specific habitats as stop-over points, which make them extremely vulnerable to the loss or degradation of these habitats. The East Asia-Australasia Flyway has experienced rapid shorebird population declines that appear to be related to ongoing major habitat loss. However, some species of shorebirds have the capacity to use alternative anthropogenic habitats such as salt works (salt production sites) as feeding grounds. Although numerous studies on the utilisation of salt works by shorebirds have occurred in other regions of the world, there is a lack of knowledge about shorebird foraging ecology and utilisation of salt works in Australia. Here we outline the abiotic (i.e. water depth) and biotic (i.e. prey availability) parameters determining shorebird use of two salt works in northwestern Australia, Port Hedland and Dampier, and examine the management implications of our findings.

Shorebirds also live on rocks: a case study from a reef in eastern Australia

Eduardo Gallo-Cajiao[1,2]* & Ricky Coughlan[3]

[1]Department of Biological Sciences, Macquarie University, North Ryde, NSW 2109, Australia; [2]School of Biological Sciences, The University of Queensland, St Lucia, Qld 4072, Australia; [3]Redtail Avian Consultancy, Avalon, NSW 2107, Australia. *Email eduardo.gallo-cajiao@mq.edu.au

Shorebirds in habitats other than intertidal mudflats are not as frequently studied. Rock platforms are not uncommon along Australia's coastline, but little is known about the ecology of shorebirds living on them. Thus, a shorebird monitoring project was implemented at Long Reef, a rock platform on Australia's east coast, with the aims to determine the community composition and estimate species' seasonality. Volunteers collected data from January 2008 to December 2013. A total of 17 species were recorded, 11 of which were vagrant and six were regular visitors. Amongst the latter, there were northern hemisphere breeders, with Ruddy Turnstone and Red-necked Stint staying during winter on a regular basis, Pacific Golden Plover not staying during winter at all, and Grey-tailed Tattler presenting an erratic pattern with lower numbers than any other regular visitor. Double-banded Plover visited the reef exclusively during the winter months, returning to New Zealand during summer. Finally, Sooty Oystercatcher, even though a resident species to Australia, was more abundant during summer. Although this site is not of international significance, its conservation value within the Sydney region is paramount as it contributes to the gamma diversity. This site is one of the regional strongholds for Red-necked Stint, Ruddy Turnstone, and Pacific Golden Plover. This study demonstrates the importance of monitoring habitats besides intertidal mudflats.

Characterisation and analysis of the international conservation regime for migratory shorebirds in the East Asian-Australasian Flyway

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International regimes are cross-boundary arrangements to tackle specific issues, such as migratory species conservation. Within the East Asian-Australasian Flyway, an international regime has emerged to promote conservation of migratory shorebirds. Understanding the policy instruments comprising such a regime is paramount to ensure they are used to their full potential and that weaknesses are rectified. Here we identify the international policy instruments relevant to shorebird conservation in this flyway, and analyse their spatial coverage and provisions. We reviewed policy documents and interviewed key stakeholders. We located 15 instruments that have had significant involvement by Australia and northern hemisphere countries at mid and high latitudes. The regime covers most of the regions that shorebirds require for their life cycle, especially for breeding and migration. The weakest link of the regime is Southeast Asia, which constitutes important non-breeding grounds for several species. The instruments' provisions in combination address the main threats to shorebirds, namely habitat loss and hunting. The decline of migratory shorebirds despite the existence of what may seem to be a comprehensive international regime could be related to lag effects, misfits, or implementation gaps. Consequently, it is imperative to further appraise this regime to try to ensure its objectives are actually met.

Rehabilitation of Penrhyn Estuary: seven years of shorebird monitoring

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Penrhyn Estuary is the only significant shorebird habitat remaining on the northern side of Botany Bay (Sydney) today. The small estuary was artificially created during the reclamation of the Botany foreshore between 1975 and 1978, and has been utilised by a diverse group of migratory birds. When Port Botany was expanded adjacent to Penrhyn in 2008, Sydney Ports Corporation rehabilitated the estuary, and enlarged the size of primary foraging habitat from 2.5 ha to over 16 ha. To measure the success of habitat enhancement works, the abundance of key species is monitored and compared with target numbers derived from pre-construction data, as well as counts at reference sites. We have monitored the shorebirds that use Penrhyn Estuary since the pre-construction phase in 2006, and now have accumulated seven full years of data, including three years during and three years post construction. Six key species were selected to indicate the success of the rehabilitation project: Bar-tailed Godwit, Red-necked Stint, Double-banded Plover, Curlew Sandpiper, Red Knot and Pacific Golden Plover. The 2013-2014 peak period, September 2013 to March 2014, marked the first season during which, for the first time since pre-construction records, all six key species were observed in Penrhyn Estuary. The diversity of migratory species has increased in post-construction years, approaching pre-construction conditions. The target count for three species was met or exceeded, indicating a positive result. Future research will look at implications for remaining species and constraints of constructed habitats of this nature. In this paper, we will discuss our findings in detail.

Industrialisation threatens northwest Australian migratory shorebirds on the Luannan Coast of the northern Yellow Sea, China

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Global Flyway Network's colour-banding project has been running for 8 years and is now producing survival rate data for the populations of Bar-tailed Godwits, Red Knots and Great Knots that live, predominately, in Roebuck Bay, northwest Australia. These results show an alarming drop in survival over the last two years. We argue that this decline is linked to habitat loss in the Yellow Sea as our models show that survival is very high in Roebuck Bay and on migration but the birds 'disappear' between the Yellow Sea and their return (or non-return) to Roebuck Bay. We present details on a small area of mudflat in the northwest of Bohai Bay, China where up to 75% of both the *piersmai* and *rogersi* subspecies of Red Knot stage on northward migration. This staging site is bordered on all sides by industrial development and there are plans for development of this site as well. Numbers of Red Knot at our study site are increasing but this is not positive. This is due to the loss of other areas of mudflat in Bohai Bay. The *rogersi* and *piersmai* subspecies of Red Knot can be reliably separated on plumage characteristics when they are in full breeding plumage. We have shown the different timing of migration through the site by separating birds on plumage and by using field observations of birds abdominal profiles (a visual score of fat stores). We discuss an on-going research programme on the staging of Red Knots in NW Bohai Bay and the work of the Global Flyway Network. The majority of the funding for this project comes from outside Australia; indeed the bulk of funding comes from Europe and China (BirdLife-Netherlands, World Wildlife Fund-Netherlands, University of Groningen, Beijing Normal University, WWF-China) with further support from AWSG in 2014.

Shorebird monitoring by Indigenous communities of the Gulf of Carpentaria region

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Australia provides overwintering habitat for many of the five million migratory shorebirds in the East Asian-Australasian Flyway, and is also home to important populations of resident shorebird species. Much of the important shorebird habitat in Australia is on Indigenous land, particularly in remote northern Australia, where beach and mudflat habitat is assumed to be more pristine than in more heavily populated areas. In these same remote areas, however, shorebird data are often scarce. The growing workforce of professional Indigenous land and sea managers is well placed to play a key role in shorebird management, including the critical task of collecting accurate data on shorebird numbers and distribution, as well as implementing on-ground management actions and education of local communities and visitors to protect shorebird feeding, roosting and nesting habitat. In 2012-13, BirdLife Australia, the North Australian Indigenous Land and Sea Management Alliance Limited (NAILSMA) and the Indigenous land and sea ranger groups of Mapoon, Nanum Wungthim (Napranum), Pormpuraaw and Ii-Anthawirriyarra (Borroloola) partnered to establish regular monitoring of shorebirds in the Gulf of Carpentaria. This included a program of ranger training, a custom-designed electronic identification and monitoring tool (I-Tracker) and a series of bird counts. Through this collaborative project, 18 shorebird count sites were established and registered with BirdLife Australia. Twenty-six counts were completed during the 2012-13 overwintering season with 19,032 birds counted including 10,941 migratory shorebirds. Indigenous Ranger groups are regularly completing shorebird counts in these key areas, as well as implementing management strategies to protect nesting shorebirds and Little Tern nesting colonies (Mapoon). Through a partnership approach, these data are being put into a regional and global context, as well as informing local management priorities articulated through community-based planning.

This abstract encompasses the following four presentations:

1. A presentation from NAILSMA on the I-Tracker data collection and mapping platform developed to support shorebird, tern and wetland bird counts by Indigenous ranger groups;
2. A presentation from the Mapoon Land and Sea Rangers on shorebird and Little Tern management and conservation around Mapoon, Cape York, Queensland;
3. A presentation from the Nanum Wungthim Land and Sea Rangers on shorebird management and conservation around Napranum, Cape York, Queensland; and,
4. A presentation from BirdLife Australia on its engagement with Indigenous ranger programs.

Suitability of coastal wetlands as waterbird habitat in Republic of Korea

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Management and conservation of animal populations requires information on where they are, why they are there, and where else they could be. Spatial and temporal variation in habitat conditions thus generate strong selective pressure for habitat selection, which in turn affects survival and reproduction of individual birds, and contributes to the regulation of bird populations. Thus, increased energy availability in potential and current foraging habitats may support a higher foraging capacity for a bird population than areas with less available energy. The objectives of this study are 1) to determine whether different microhabitat types in wetlands can support enough daily digestible energy density for waterbird populations; and 2) to develop indicator metrics of habitat suitability in different wetland and microhabitat types based on time and energy budgets, seasonal water depth, prey biomass, and digestible energy density. A clear understanding of habitat characteristics found on prey assemblages and vulnerability, and digestible energy density in different wetland systems would help the long-term implementation of habitat monitoring, management, and conservation planning.

Shorebirds – key to the future of the Samphire Coast?

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The Upper Gulf St. Vincent in South Australia is widely recognized as internationally significant for shorebirds. At least 52 shorebird species have been recorded in this area commonly referred to as the 'Samphire Coast', including 11 resident species and 26 which migrate here annually. Thirteen species occur in internationally significant numbers and five in nationally significant numbers, reinforcing the importance of protecting and actively managing the area for shorebirds. The shorebird species diversity and abundance stems from the mosaic of saline and freshwater habitats, natural and artificial, available along this coast. These include extensive tidal mudflats, samphire saltmarshes, claypans and mangrove forests which are augmented by artificial wetlands, effluent treatment ponds and salt evaporation ponds. Collectively, these habitats provide shorebirds with a diverse range of food resources, roosting areas, high tide feeding options and breeding sites for some resident species. Recently, the SA Government committed to establishing an International Bird Sanctuary to protect shorebird habitat along the Samphire Coast. Still, native species and remnant habitats are subject to a variety of threats including invasive species, urban development and human impacts, particularly from off-road vehicles. Climate change and sea level rise also have potential to impact and significantly change the nature of the Samphire Coast. The Adelaide and Mount Lofty Ranges Natural Resources Management Board's *Samphire Coast Icon Project* provides a framework for strategic efforts across agency, local government, community and industry partners to better protect and manage this area for the future. Supported by the Australian Government, the project is being delivered in partnership with the SA Department of Environment, Water and Natural Resources and BirdLife Australia. We outline approaches the project is taking to retain the natural values of the Samphire Coast, giving examples of achievements to date and future activities. Shorebird conservation is a major focus and may just be the key to the region's future.

Migratory shorebirds and the LNG boom: four years of surveys in Gladstone Harbour and the Curtis Coast, Queensland

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Gladstone Ports Corporation (GPC) obtained approval for a major port development, the Western Basin Dredging and Disposal Project in July 2010. The project involved dredging of new shipping channels and berths in Port Curtis (Gladstone Harbour) and construction of a 265ha land reclamation on an adjacent mud flat. A condition of the approval was that GPC establish a 10 year Environmental Research and Monitoring Program (ERMP) on the Curtis Coast, which included a focus on migratory shorebirds. Migratory shorebird monitoring commenced in January 2011 with an intensive phase involving two summer surveys in January and February, a northward migration survey in March, a winter survey in August and a southward migration survey in October. This was to take place for two years followed by six years of annual summer surveys and a further two years of intensive surveying. The data have been collected by three contractors following the same method. Here, we present the results of the first four years of surveys. Migratory shorebird abundance on the Curtis Coast in summer has been relatively stable during the study (11,856 ± 837). Abundance in October and March appeared to be slightly greater than summer suggesting that the Curtis Coast may be an important site during migration. Winter abundance was 4,293 ± 148, which is 36 percent of the summer abundance. The apparent stability in the total abundance of migratory shorebirds hides considerable variation in species abundance and distribution – e.g. summer abundance of Red-necked Stints ranged from 860 to 3023. A total of 24 migratory shorebird species have been recorded. Of these, the abundance of four (Eastern Curlew, Grey-tailed Tattler, Whimbrel and Terek Sandpiper) has been consistently >1 percent of the East Asian-Australasian Flyway population estimates, suggesting that the region is of international importance for them.

The role of modified roost sites for migratory shorebirds in Darwin Harbour

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Coastal development can displace migratory shorebirds from natural habitat and alter population assemblages. Darwin in the Northern Territory is one region where important migratory shorebird habitats are progressively coming into conflict with rapidly expanding urban and industrial developments. However, not all developments appear to be detrimental to shorebirds, with one developed site in the Darwin area showing increased species diversity and high abundances of shorebirds. Increasingly, developers are capitalizing on this positive dynamic to offset habitat destruction with artificial habitat creation; however, the causes and longer-term consequences of this practice remain understudied. Understanding habitat use by shorebirds can provide insights into the potential responses of species to various habitat change scenarios associated with development. This is particularly important where shorebirds use a network of foraging and roosting sites on a daily basis and habitat may need to be preserved to maintain connectivity. From 2013 to 2014 natural and modified roost sites were monitored in Darwin to examine shorebird community dynamics. Natural roosts regularly supported high abundances of various species during the austral summer, while the modified roost supported the highest species richness but the lowest species abundances observed across sites. Species composition varied according to habitat type, with similar community structure observed for the sandy beaches and the rocky outcrop sites. While the use of artificial habitat by migratory shorebirds appears to be a valuable management tool, the creation of artificial sites should not be prioritised over the protection of natural sites. Importantly, habitat offsetting for roosting shorebirds may be the only viable option in the face of rapid development in Darwin.

The Port of Brisbane shorebird roost: monitoring and management

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Ports are critical to the economic well-being of Australia. National population and consumption growth will inevitably lead to the need for additional port infrastructure. Ports, along with other forms of coastal development, are generally considered to be a threat to shorebirds. As such environmental groups tend to view port development in a negative light. However, experience at Port of Brisbane, supported by an extensive monitoring program, has shown that port development can lead to positive outcomes for shorebirds. The Port of Brisbane Pty Ltd (PBPL) is currently undertaking a long term land reclamation project of 230 hectares of sea through the progressive placement of dredge material in constructed bunds to form usable land. Central to PBPL's strategy to manage impacts on shorebirds is a purpose built 12 hectare shorebird roost. The roost was voluntarily constructed in 2005. Ongoing monitoring demonstrated declines in shorebird utilisation of the roost commencing in 2010. It was identified that excessive vegetation growth in the roost was inhibiting usage. Improvement works were undertaken and monitoring has demonstrated substantially increased bird numbers and species diversity. It is concluded that adaptive management is necessary to maximise the ecological values of constructed shorebird roosts.

Insights into migration pattern of Sanderlings using geolocators: from raw light data to ecological insights

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Reconstructing animal migration paths using light intensity loggers has been done for about 20 years but recent developments towards smaller and cheaper tags with even higher resolution has increased the usage and applicability of this technique enabling small and medium shorebirds to be tracked. However, the complexity of the data analysis and the problems in handling the major drawbacks of this technique, including the accuracy and limitations inherent in the technique such as positions within the Arctic circle, still give the majority of users a headache. Here we review and evaluate the different methodologies and tools in relation to the questions one might potentially tackle with the retrieved data. Furthermore, we will present results from a two-year geolocator dataset of Sanderlings from South Australia (14 individual tracks) and discuss how newly developed techniques will extend the capability to make ecological insights and identify key parameters of migration and breeding which are essential for conservation management.

Dogs and leashes, birds and beaches

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Domestic dogs and coastal open spaces go hand in hand, as do shorebirds and coastal habitats. When the two overlap there is potential for significant impacts on shorebird populations, particularly beach-nesting species. Coastal zoning and regulations are often poorly planned in relation to the presence of important shorebird sites, more often focusing on providing dog free spaces where there are heavy concentrations of beach users, in particular families. This can result in off leash dog areas commonly designated at key shorebird sites. Furthermore, while regulations exist on beaches for the benefit of wildlife, i.e. dogs must be on a lead, compliance with leashing is incredibly low, resulting in a loss of coexistence opportunities. Via the Beach-nesting Birds project at BirdLife Australia we have been involved in several research projects to investigate (a) barriers toward leashing on Victorian beaches via social surveys; (b) space use by dogs on beaches using GPS loggers; and, (c) the effectiveness of different dog regulations on Victorian beaches via observations of dogs at beaches across six different regulation types. Key findings will be discussed including observed levels of compliance as low as 10-30%, variation in compliance according to the severity of restrictions in place, and barriers to compliance including social norms and lack of awareness of dog-shorebird interactions and impacts.

Researching the shorebirds of Yawuru Country

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The Broome region is regarded as the most significant site in Australia for shorebirds as well as being of high significance among other locations for shorebirds across the world. Roebuck Bay has the greatest diversity of shorebird species of any site on the planet and around 150,000 of these birds visit annually. The Australasian Wader Studies Group (AWSG) have been conducting research on migratory and resident shorebirds at Roebuck Bay and Eighty Mile Beach since 1981. The studies involve both catching and population monitoring. Community involvement is a core component of the shorebird studies at Roebuck Bay with a strong network of volunteers and open support from local organisations such as the Broome Bird Observatory and Environs Kimberley. In addition, the WA State Government (through the Department of Parks and Wildlife WA) has maintained logistical and funding support to AWSG since the project began 33years ago. More recently since 2006, the AWSG work has been complemented with the migratory shorebird studies conducted by the Global Flyway Network. Indigenous involvement in shorebird research within the West Kimberley has increased since the formalisation of the Yawuru, Karajarri and Nyangumarta Native Title Agreements and the establishment of the Yawuru Conservation Estate and the Eighty Mile Beach Marine Park. The Yawuru Joint Management Team at the Department of Parks and Wildlife WA assists with Roebuck Bay shorebird research on a seasonal basis providing in-kind logistical support and participating in the catching projects. Concurrently to this, the Yawuru team coordinates (with assistance from the Broome Bird Observatory) monthly benthic sample collection under the MONROEB program. This fourteen year old sample set will help to provide key insights into the local shorebird food source.

Dune-nesting plovers select nest sites to minimise the risk of clutch depredation

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Birds choose nest sites for a variety of reasons, including the avoidance of egg depredation. This study deployed artificial clutches in dunes to examine factors which were correlated with the risk of clutch depredation. Clutches further from dead objects (e.g. sticks) were at greater risk of depredation, however vegetation cover around the nest did not influence likelihood of depredation. These randomly placed dune nests were then compared with real Hooded Plover dune nests to examine whether plovers place their nests to minimise clutch depredation. Real nests were closer to dead objects (perhaps improving egg crypsis) than random nests, suggesting that real nest placement is at least partly driven by predator avoidance. Real nests were also in less grassy areas and closer to the beach than artificially placed nests, which occurred further into the dunes. This could explain the significant difference in the occurrence of rodent depredation between real and artificial nest observations. Results suggest that maintaining open areas in dunes which are not dominated by grass, and not removing dead objects such as beach and dune debris, will help maintain or improve the low reproductive success experienced by this species.

DDT and other POPs – a continuing threat to waders in the Yellow Sea?

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Dichlorodiphenyltrichloroethane (DDT) continued to be manufactured in China until 2011, being widely used in anti-fouling paint, especially for the 330,000 strong fleet of wooden-hulled fishing vessels. Some 250 tonnes of DDT was used in paints annually and is thought to be largely responsible for the continuing high levels found in coastal sediments and marine life. Waders staging at sites in the Yellow Sea may accumulate lipid-soluble organochlorine pollutants in fat deposits, these then being released into the blood as fat stores are used during migration. We review the potential impacts on waders from Persistent Organic Pollutants (POPs) along the Chinese coast and consider actions being taken to improve the situation.

Tracking Little Curlew from Roebuck Plains to Siberia

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Nearly 11,000 Little Curlew have been colour flagged in northwest Australia. However, none have been reported overseas and few Little Curlew have ever been recorded on migration in Asia. Knowledge on the Little Curlew migration along the flyway is therefore very poor. The main objective of this study is a preliminary attempt to document migratory paths and strategies of Little Curlew, their habitat use on migration, eventual breeding site locations and habitat use and movements at the non-breeding grounds in northwest Australia. The Australasian Wader Studies Group captured 23 Little Curlew on Roebuck Plains in November 2013. We fitted 5 g solar powered satellite transmitters on five birds, using a 'leg-loop harness', programmed on a 10 hrs ON/48 hrs OFF duty cycle. Weekly movements of Little Curlew around Roebuck Plains and Roebuck Bay ranged 5-10 km between November and January. We lost two transmitters in January, either due to them being shed or from birds dying. The other three Little Curlew moved 200 km to Anna Plains, and one continued 230 km further to Port Hedland. All three returned to Roebuck Plains in March. The first Little Curlew departed on migration in late-April and reached Siberian breeding grounds in late May. It stopped over in the Philippines and several times in China. The other two departed Roebuck Plains in mid-May, with one stopping over in Taiwan and China and the other diverting from its migratory path and turning back south to Indonesia. This is the first study to reveal information about Little Curlew migration and will help identify key areas for future work and conservation efforts.

5 Years on – What have we learned from geolocators deployed in Australia?

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From the experimental deployment of six geolocators on Ruddy Turnstone in March 2009, we have now deployed 422 geolocators on six wader species; three in southeast Australia and three in northwest Australia. The overall retrieval rates have been good (20% to 40%) on five of the species but lower on Red Knot. These have provided excellent information on migration routes and stopover locations; in some species this is markedly different from the information derived from recoveries and flag sightings. In some species, migration routes of individuals are similar on both northward and southward migration while in other species there are wide variations. The importance of the Yellow Sea as a key stopover location, particularly on northward migration, is even more emphasised. Novel analytical techniques are now being employed to determine breeding locations in the Arctic. Temperature data as well as light level variation is also being used to study breeding activities in detail. Plans for future geolocator deployment and limitations thereof will be discussed.

Successful return of shorebirds to Sydney Olympic Park

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Sydney Olympic Park includes a diverse range of wetlands that had previously been lost or degraded, a process halted only after the initiation of the staging of the Sydney 2000 Olympic Games at Homebush Bay. Since then, many initiatives have been taken for the reconstruction and restoration of wetland habitats for waterbirds including migratory shorebirds. Measures included the complete reconstruction and regeneration of a freshwater wetland corridor from a rubbish tip and the reinstatement of a natural regime of daily tidal exchange of dredge spoil reclamation ponds to provide feeding and roosting habitat for shorebirds. Additional works included the creation of more mudflats for shorebirds, the restoration of degraded freshwater ecosystems and the design and construction of new freshwater wetlands while at the same time providing active education and training initiatives to enhance the capacity of conservation management personnel from a wide range of agencies. In the context of regional and national declines in shorebird abundance and diversity, the combination of the above initiatives have resulted in not only the return of shorebirds to the Park but an increase in relative abundance and diversity not seen for many decades.

A perfect storm? – the decrease of Great Knot food at Yalu Jiang coastal wetland in the northern Yellow Sea, China

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Yalu Jiang coastal wetland in the northern Yellow Sea, China supports over 250,000 waders annually and is internationally important for at least 14 species of waders during northward migration. The intertidal clam *Potamaocorbula laevis* has been super abundant and is the principal food source for Great Knots and an important item in the diets of Bar-tailed Godwits and Eurasian Oystercatchers. The density of *P. laevis* decreased from 2012, and the percentage and number of young *P. laevis* (less than 5mm) were far less in 2012–2014 compared to 2011; we even found no *P. laevis* in some of the transects in May 2014. The collapse of the *P. laevis* population that appears to have been initiated by a major mortality event from spring 2012, coinciding with the behaviour of *P. laevis* and the variation of environment, parasites and pollution were considered to be the most possible reasons. We explore and forecast the future of *P. laevis* by distribution of size and density, and consider what the future holds for waders at this site. Waders using the ever diminishing area of intertidal flats around the Yellow Sea are increasingly at risk of stochastic events such as those that appear to be occurring at Yalu Jiang coastal wetland, highlighting the need for a precautionary approach to future land use planning.

A Saline Solution - management planning for shorebird habitat at decommissioned saltfields

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South Australia's Dry Creek Saltfields have long been recognised as internationally significant for shorebirds and waterbirds. Records of over 50,000 shorebirds of have been documented during the operation's 60 year history. By maintaining a consistent flow regime throughout the 4,000ha of salinas, commercial salt operators have provided a mosaic of reliable feeding and roosting habitats which are available year to year and throughout the tide cycle thus providing higher ecological service than neighbouring natural habitats. However the recent decommissioning of the operation has jeopardised the established salinity gradient and the communities which have come to rely upon them. With the backing of the state government, local land managers are now working towards a long term solution for the site which is to be incorporated into the newly proclaimed Adelaide International Bird Sanctuary.

Shorebird surveys in the southeast Gulf of Carpentaria, 1999 and 2012-2013

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The southeast Gulf of Carpentaria in northern Queensland is a major site for Arctic and resident shorebirds but is one of the least studied sites in Australia. Reasons include its remoteness, limited vehicular access, a wet season when maximum numbers of shorebirds are present and a one high tide a day regime. Some years there are several weeks in April and May when surveys can be undertaken and again a brief period in September. Otherwise large parts of the year are unconducive to high tide counts. Extensive surveys were undertaken in March–April 1999, however, from 1999 to 2012 almost no survey work was undertaken. A brief, mostly aerial, survey of 300+km of the Gulf coast in September 2012 was undertaken ahead of a bigger survey using boats, a light plane and helicopters. Over two tide cycles in March and April 2013 aerial counts of the coastline and ground counts at roosts were conducted, with most roosts counted several times. Twenty-three species of shorebird were recorded with Great Knot and Black-tailed Godwit being the most abundant species present, with estimated numbers in 2013 of ~40,000 Great Knot and ~14,000 Black-tailed Godwit. Other important species included Red Knot (~10,000), Red-necked Stint (~6,000) and Greater Sand Plover (~6,000). The nearby Karumba Plains wetlands are also important for shorebirds and other waterbirds, in particular Little Curlew and Sharp-tailed Sandpiper. The year 2013 was a dry 'wet' season, which may have contributed to the lower numbers on the plains than in 1999.

The importance of Yalu Jiang Wetland National Nature Reserve for shorebirds during northward migration

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The 101,000ha Yalu Jiang Estuary Wetland National Nature Reserve stretches 60km westwards from the North Korean border along the shores of the Chinese part of the Yellow Sea. The reserve includes approximately 9,000ha of aquaculture ponds and mudflats extend several kilometres south from the seawall. The first shorebird survey in May 1999 found over 152,000 shorebirds of 26 species. A survey in late May 2000 found over 92,000 shorebirds. The Miranda Naturalists' Trust became involved in 2004 and surveys of the reserve continued annually in April or May until 2010. The findings were published in a report in March 2014. The results show the Yalu Jiang Reserve and a nearby river estuary supported at least 250,000 shorebirds annually on northward migration during the survey periods. Forty-one species were recorded, of which 15 occurred annually or regularly in internationally important numbers, including Bar-tailed Godwit (>90,000), Great Knot (>55,000), Dunlin (>45,000), Eurasian Curlew (>13,000), Grey Plover (>9,000), Eastern Curlew (>6,000), Far Eastern Oystercatcher (>1,000) and the Critically Endangered Spotted Greenshank (24). Over 1,000 banded and other marked shorebirds from 19 regions in 8 countries were identified in the region to 2010. Since the demise in 2006 of Saemangeum in South Korea, Yalu Jiang has become the most important shorebird staging site in East Asia. However, the area is coming under increasing threat from reclamation, industrial development, habitat loss and changed hydrology, which are all likely to affect the number of shorebirds able to refuel at Yalu Jiang in the coming years.

What effect did the destruction of the Saemanguem tidal flats have on the Great Knot?

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Saemangeum, a tidal flat system on the west coast of South Korea, used to be the single most important staging site for migratory shorebirds in the East Asian-Australasian Flyway. It was of particular importance to Great Knot, with 20-30% of the flyway population staging there on northwards migration. Saemangeum has been largely lost to shorebirds through a huge ongoing 'reclamation' project in which tidal flats are converted to dry land and permanent lakes. Most of this habitat loss occurred following completion of a 33 km sea-wall in 2006, causing a dramatic decline in the numbers of Great Knots staging in Saemangeum. A Korea-wide survey in 2008 showed that few Great Knots relocated to other Korean staging sites, and that some 80,000 were 'missing'. We argue that most of these birds must have perished, because sea-wall closure at Saemangeum coincided with (1) declines in numbers of non-breeding Great Knots reaching Australia in the austral summer; and, (2) declines in apparent annual survival of adult Great Knots colour-marked in north-western Australia (demonstrated by mark-recapture studies). There has been some subsequent recovery in numbers of Great Knot in north-western Australia, but this appears to have been driven by fortuitous high breeding success in several consecutive years; annual adult survival has not returned to its previous levels, and population recovery has not occurred in southern Australia. Our study supports several indicating that tidal flat reclamation projects are responsible for serious ongoing declines in many species of migratory shorebird.

Conserving shorebird roost sites in a human dominated landscape: an ecological and economic perspective from Thailand

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The coastal fringe of the Inner Gulf of Thailand, between the shoreline and seaward expanding urbanization, has been heavily used for salt production and aquaculture. Whilst saltpans have long been recognized for their value to shorebirds, little is known about how the birds actually use this anthropogenic habitat and, more importantly, whether the increased rates of conversion of saltpans to aquaculture pose a serious threat to the birds. To address these issues, we undertook over 200 surveys of shorebird diversity and abundance in saltpans and aquaculture ponds. We also recorded behavior and foraging success in saltpans, aquaculture, natural mangrove clearings and intertidal mudflats. In addition, we administered questionnaires to landowners to elucidate the economic incentives behind conversion of saltpans to aquaculture. Our results indicated that aquaculture is indeed bad for some shorebirds, but not all. Bigger shorebirds, together with other waterbirds, held the largest proportion of the birds found using aquaculture ponds (90%). Conversely, saltpans were dominated by medium-sized shorebirds (56%). Smaller shorebirds spent 87% of their time in saltpans feeding, while medium-sized shorebirds spent around 53% (compared to 11% in aquaculture). Bigger shorebirds spent similar amounts of time feeding in saltpans and aquaculture (49% and 44%, respectively), but their roosting time almost doubled in saltpans. Our analyses of socioeconomic data indicate that median yearly net benefits of saltpans and aquaculture were similar, although greater variability was observed in aquaculture. Aquaculture demanded greater chemical and biological inputs whilst saltpans were more labor intensive. There are important differences in the distribution of benefits among land uses, and we discuss some of the policy options available to conservationists, including ways in which aquaculture can be managed to minimize its negative impacts on shorebird populations.

Shorebird habitat management at the Western Treatment Plant, Victoria: the challenges and opportunities of managing a large shorebird site with multiple values

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The Western Treatment Plant (WTP) is a large – 10,500 ha – coastal sewage treatment facility outside Melbourne, Victoria. With around 190 wetlands, including 181 constructed ponds, the Plant is well known as an important site for waterfowl and shorebirds and was included as a major component of the Port Phillip Ramsar Site in 1982. But the site is unusually complex in that it supports numerous other biodiversity values associated with coastal wetlands, coastal saltmarsh or temperate grasslands such as the Critically Endangered Orange-bellied Parrot and Spiny Rice-flower, the Endangered Growling Grass Frog, Australasian Bittern and Australian Painted Snipe, and the Vulnerable Striped Legless Lizard. In addition, the site has public health infrastructure of critical importance, servicing almost 10% of Australia's population, and significant agricultural and resource recovery assets. For many years certain constructed ponds have been managed to provide high tide foraging/roosting habitat for migratory shorebirds through water level manipulation and vegetation management. Managing ponds for migratory shorebirds while simultaneously maintaining summer habitat for endangered species of frog, waterfowl and cryptic marsh birds can be challenging. Extended drought, occasional floods and sewage treatment operational requirements have all complicated shorebird habitat management at times. But the extensive WTP has also provided unique opportunities to manage shorebird habitat on a large scale. Initiatives have included trialing multiple, 'trickle' discharges of effluent to nourish intertidal mudflats at reduced volumes and concentration of effluent, and returning ~12 ha of sewage treatment ponds to tidally inundated coastal saltmarsh. Close monitoring of shorebird populations and intertidal invertebrate prey resources by the Arthur Rylah Institute and GHD Pty Ltd has enabled regular evaluation of our management and led to significant improvements over time.

Lessons learned from 50 years of wetland habitat remediation and management for waterbirds

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Wetlands as habitat for waterbirds are facing increasing pressure from human impact, whether directly as a result of development or indirectly through degradation or increasing disturbance. To halt or reverse this trend it is necessary to restore or manage what is left, or in extreme cases to rebuild wetlands from scratch, to provide the functions that have been lost. We will be showing some examples of attempts to restore, construct and manage wetland habitats over the past 50 years and some of the reasons for successes and failures of these case study sites. It goes without saying that it is essential to have an understanding of habitat needs of wildlife occupying a wetland and to prioritise wetland species in order of importance to the wetland managers. However, the lack of these basics is probably the result of most failures. There are few specialist environmental engineers, and in their absence it is essential that engineers recognise the limitations of computer modelling and work closely with experienced wetland biologists. Although huge machines have taken over from the shovel and wheelbarrow, the basic principles of wetland design haven't changed, and neither has the need for ongoing commitment to manage wetlands effectively in the long term. Many shorebirds have become dependent on constructed wetlands as natural systems have been lost. It therefore stands to reason that these artificial systems need to be retained and managed as much as any other wetland of similar carrying capacity.

Grey-tailed Tattlers – a fresh look at a common shorebird

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The presence of a small population of Grey-tailed Tattlers in Port Stephens on the central coast of New South Wales is providing opportunities to carefully observe the behaviour of this common, but much under-studied species. Typically, 100–120 birds are present in Port Stephens in the austral summer; 10–15 non-breeding birds in winter. The authors have been monitoring the population since 2012, conducting extended observations during periods of foraging and roosting. In May 2014 the program was extended to include observations at some well-known Japanese staging areas. Also, contact was established with local Japanese shorebird surveyors who agreed to an exchange of information. Certain behavioural aspects among both the Port Stephens study population and migrating Grey-tailed Tattlers staging in Japan appear to differ from previously published reports. The differences observed in both groups will be discussed, including previously unreported agonistic episodes and two instances suggestive of pair-bonding.

Shorebirds 2020: seven years on and counting

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The *Shorebirds 2020* program commenced in 2007 to reinvigorate the volunteer-driven national shorebird population monitoring program started by the Australasian Wader Studies Group (AWSG) in 1981. Subsequent to the recent discontinuation of external funding, the program is managed and supported wholly by BirdLife Australia and the AWSG. The agenda set for the program under the previous Caring for our Country (CFOC) funding scenarios has had to be adjusted to the new funding situation, however the program continues to collect shorebird population count data through its 1400-strong volunteer network at 320 shorebird areas around Australia forming a nationwide network of increasingly important shorebird sites. The continued development and implementation of a practical model for community-based shorebird monitoring is imperative in identifying shorebird population trends around the country. While overall objectives of the *Shorebirds 2020* program remain essentially unchanged, the program has been subject to some adjustments following the cessation of significant external funding. These adjustments are ultimately aimed at maintaining effective and timely identification of shorebird population trends and the provision of this information to guide best-practice management and conservation outcomes for shorebirds and their habitats in Australia. This presentation provides an update on the Shorebirds 2020 program, an overview of the last three population reports prepared for the journal *Stilt* (in prep), as well as a brief outline of recent preliminary analyses of the national dataset on shorebird population trends in Australia, which continue to show population decline in a number of resident and migratory shorebird species.

Status and conservation of migratory shorebirds in Tasmania

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Tasmania is the southernmost destination for migratory shorebirds (waders) in Australia using the East Asian-Australasian Flyway (EAAF), which extends from Siberia and Alaska to Australia and New Zealand. Approximately 30 species of migratory shorebirds in Tasmania have been monitored during ongoing summer and winter months since the early 1960s. The counts are coordinated and undertaken at fixed sites used by the birds to roost (rest) during high tides. At least seven sites in Tasmania meet the criteria for international significance, based on the numbers of shorebirds present during the year. Analyses of these data indicate decreases in the numbers present in Tasmania for most species at the major roosts around the state. Numbers of Eastern Curlew, the largest migratory shorebird in the EAAF, have decreased by approximately 75%, while numbers of Curlew Sandpipers, one of the smaller migratory species have decreased by more than 95%. In addition, the species diversity at roosts around Tasmania is decreasing. The observed decreases in Tasmania are also being observed elsewhere in Australia, but the Tasmanian data have typically been of greater magnitude and earlier than elsewhere, suggesting Tasmania is serving as an early warning indicator for migratory shorebirds in Australia and the EAAF.

Status and conservation of resident shorebirds in Tasmania

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Extensive surveys of beach-nesting shorebirds (for example Hooded Plovers and Pied Oystercatchers) on sandy beaches around Tasmania have been undertaken over the past decade. These surveys have mapped more than 4000 nest sites and breeding territories on more than 250 beaches in Tasmania. Early surveys in the 1980s provide baseline data for comparison with contemporary data. Analyses of breeding population data of resident shorebirds in Tasmania suggest decreases for Hooded and Red-capped Plovers around the state, with substantial losses in the southeast and east. Human activities such as 4WDs, dogs and horses disturb nesting birds and result in breeding failure by them. Breeding by shorebirds inside National Parks and other reserves does not afford greater protection, as population decreases inside reserves are similar to those outside reserves. The surveys have enabled estimates of state-wide populations, and the break-down by Natural Resource Management (NRM) regions and by coastal Councils. Conservation efforts directed towards resident species could also contribute to an improvement in the conservation status of migratory shorebirds, given the extensive overlap of habitat use. Sea-level rises and concurrent habitat loss will exacerbate existing threats to coastal shorebirds.

Sharing the Margins: populations and conservation status of New Zealand shorebirds

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Twenty-seven taxa of Charadriiformes breed in New Zealand and offshore islands (excluding the Kermadecs). Of these 20 are endemic. Under current threat rankings, 7 taxa are classified as Nationally Critical, 1 Nationally Endangered, 7 Nationally Vulnerable, and 4 At Risk: Declining. Only one taxa is classed as Recovering while 2 are Not Threatened. A further 5 taxa, confined to offshore islands, are classified as Naturally Uncommon. Up to 15 species of Arctic migrants occur annually in New Zealand, three of them in internationally important numbers. Two of these, Bar-tailed Godwit and Red Knot, were recently reclassified as being native to New Zealand and given a threat ranking, one as Nationally Vulnerable and one as Declining. Population trends for the third taxa, Ruddy Turnstone, indicate it should be reclassified as Nationally Vulnerable as well. A review of the population and conservation status for each taxa is given. Habitat loss or degradation is a common thread, but the most potent threat for NZ breeding shorebirds comes from introduced mammalian predators. For migratory species, habitat loss in East Asia appears the primary driver of population declines.

Observations on waders in Rudong and Lianyungang, Jiangsu, China

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Rudong and Lianyungang, both in Jiangsu Province, west coast of Southern Yellow Sea, have intertidal flats important for many shorebird and waterbird species, including some threatened species. Lianyungang is at the northern end of Jiangsu coastline, and supports large numbers of threatened or noteworthy birds, including Asian Dowitcher, Red Knot, Curlew Sandpiper, Sharp-tailed Sandpiper and Eurasian Oystercatcher. Rudong is near the southern end of Jiangsu coastline, and supports almost the whole world's population of Spoon-billed Sandpiper and Nordmann's Greenshank, and large numbers of Eurasian Oystercatcher and other species. The southernmost population of Saunders's Gull breeds here. Both sites are monitored regularly by China Coastal Waterbird Census (once a month). Rudong is also frequently monitored especially for Spoon-billed Sandpiper in spring and autumn in recent years. Spoon-billed Sandpiper and Nordmann's Greenshank finish their flight feather moult in autumn in Rudong, but the role of these sites for Spoon-billed Sandpiper as either a stopover or a staging site in spring is not very clear yet. Here we will share some of our counts, observations on moulting, and resightings of colour-marked birds, especially from Australia, that connects the two parts of the East Asian-Australasian Flyway.

Notes