Australasian Shorebird Conference
Hobart, Tasmania, AUSTRALIA
26 – 29 October 2018

Conference program and abstracts of keynotes, oral and poster presentations
(alphabetical listing based on senior author)

Acknowledgements

BirdLife Tasmania gratefully acknowledges the University of Tasmania for providing the venue.

Conference catering by Pickled Pear https://www.pickledpear.com.au/; our thanks to Christine Delpero and her staff.

Conference dinner venue sponsored by Lotek and Sirtrack; our thanks to Catalina Amaya-Perilla

Excursions provided by Inala Nature Tours https://www.inalanaturetours.com.au/; our thanks to Tonia Cochran and her staff.

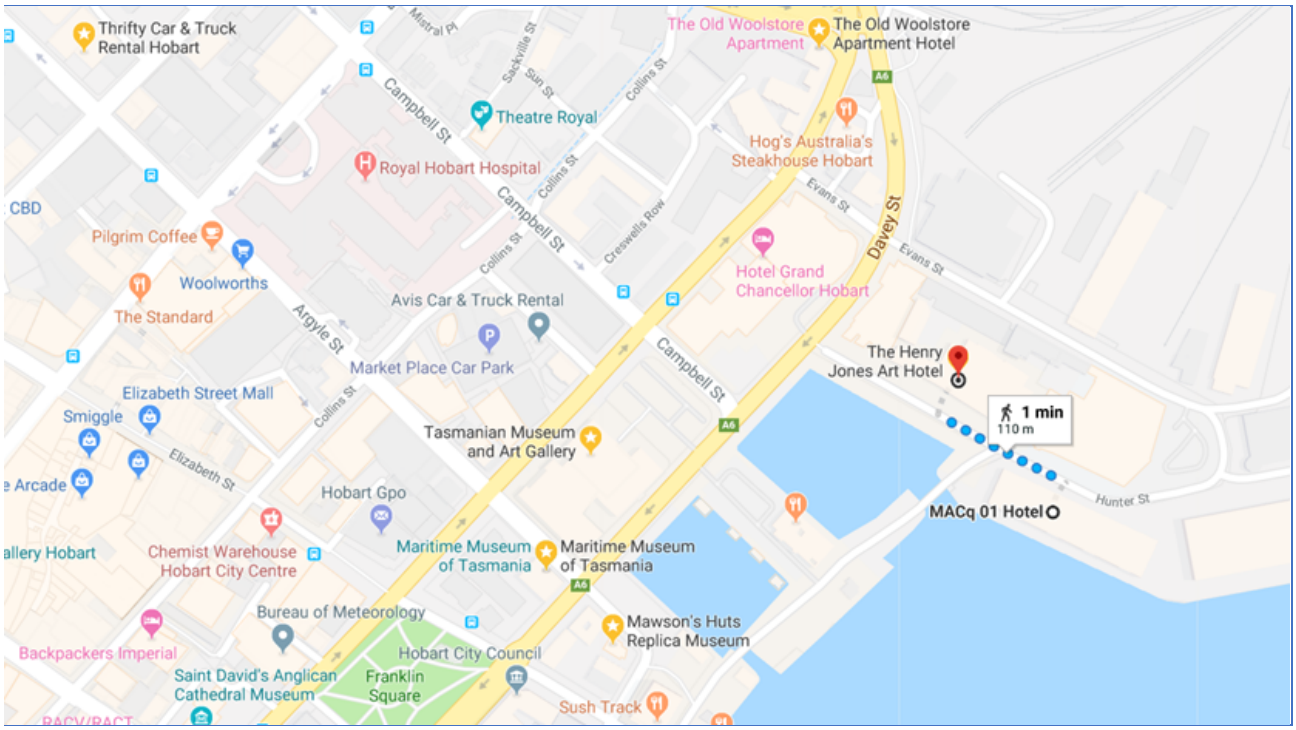
BirdLife Tasmania acknowledges the palawa and pakana people upon whose lands the University of Tasmania stands.

Conference program

Friday 26 October

09:00 - 5:00pm AWSG Committee meeting [members and invited attendees only]
Alan Bray Room, University Club, Sandy Bay campus.

10:00 – 4:00pm Excursion to PittWater Orielton Lagoon Ramsar Site and Lauderdale. Meet at Hunter Street between the Henry Jones Art Hotel and MAC1 Hotel – see map below or https://www.google.com/maps/dir/MACq+01+Hotel,+Hunter+Street,+Hobart+TAS/The+Henry+Jones+Art+Hotel,+25+Hunter+St,+Hobart+TAS+7000/@-42.881722,147.3336547,17z/data=!3m1!4b1!4m13!4m12!1m5!1m1!1s0xaa6e7580fc7d2e29:0x726fbcfb915ca9bf!2m2!1d147.3363136!2d-42.8821712!1m5!1m1!1s0xaa6e75815ff3d5bf:0xd2a205d74eee2fd2!2m2!1d147.3354376!2d-42.8812807



Map showing area where the excursion bus will be parked (subject to restrictions on the day). The blue dotted line is approximately 100m. The bus will be a 12-seater bus and the AWSG logo will be prominent.

The bus will depart promptly at 10:00am, so please do not be late.

Lunch, fruit and drinks provided. The bus will return to the same site by 4pm to allow everyone to get to the icebreaker by 6pm.

6:00 – 8:00 pm **Conference icebreaker and welcome reception**, in conjunction with the official opening of the *Overwintering Project* at the Moonah Arts Centre, 23 – 27 Albert Rd, Moonah.
See www.theoverwinteringproject.com for details of the project and http://www.moonahartscentre.org.au/ for details of the venue.

Saturday 27 October

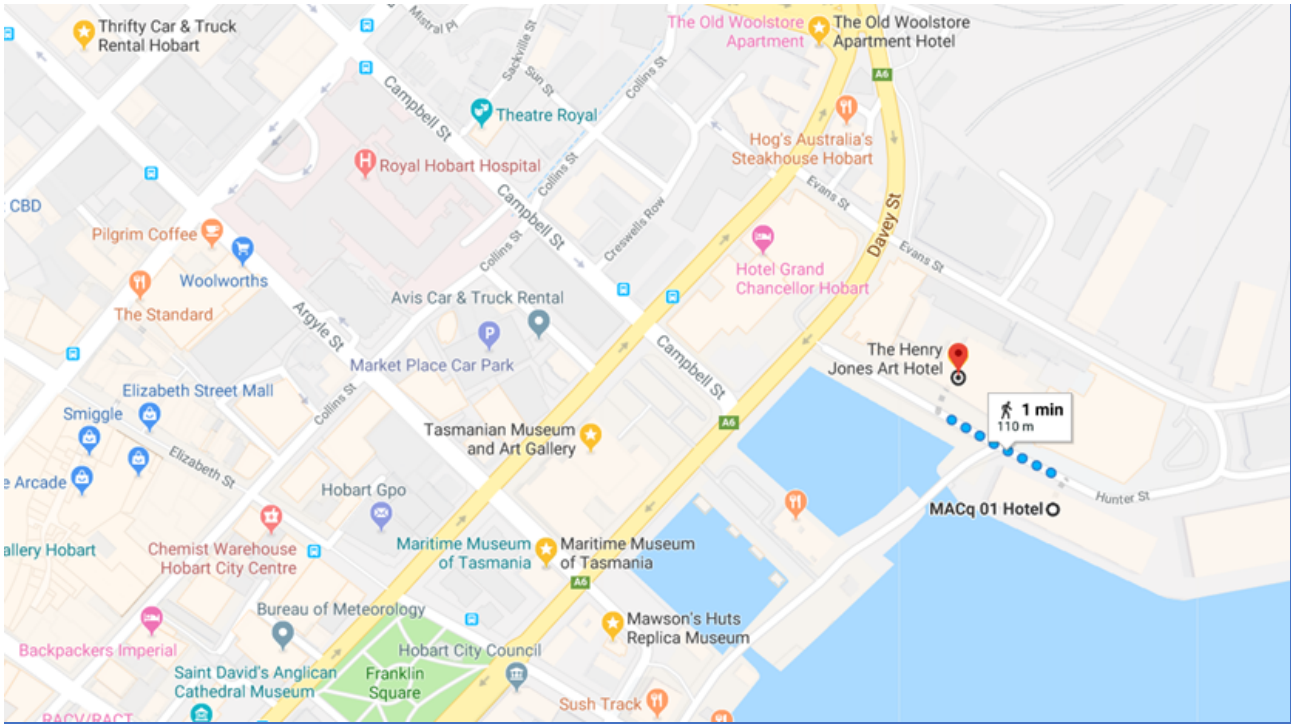
08:00 – 08:45	Registration
08:45 – 09:00	Opening, welcome, announcements
09:00 - 09:30	**Keynote – Richard Fuller** – Science for saving shorebirds: Where next?
09:30 – 09:50	**Grace Maglio** - A comparison study of the feeding ecology of Pacific Golden Plover and Grey Plover on Roebuck Bay, Broome, Western Australia
09:50 – 10:10	**Chi-Yeong Choi** - Migratory shorebird carrying capacity at the Gladstone region in Queensland
10:10 – 10:30	**Adam Leavesley** - Migratory shorebirds and the LNG boom: eight years of monitoring and research
10:30 – 11:00	Morning Tea
11:00 – 11:20	**Sora Estrella** - Invertebrate daily vertical distribution: implications for shorebirds activity when food is always available
11:20 – 11:40	**Micha Jackson** - Artificial coastal wetlands are an integral part of habitat conservation for the migratory shorebirds of the EAAF
11:40 – 12:00	**Tony Flaherty** - Trials at a decommissioned saltfield to provide shorebird habitat values
12:00 – 12:20	**Gregory Kerr** - Plugging a Gap: Restoring Wetlands in the southwest of Victoria and southeast South Australia
12:20 – 1:30	Lunch
1:30 – 2:00	**Ken Gosbell** - Insights from geolocator studies in Australia, 2009 – 2017
2:00 – 2:20	**Robert Bush** - From Field Observation to Tracking Shorebirds with Transmitters: How changes in field science shapes shorebird conservation management in Moreton Bay
2:20 – 2:40	**Tony Flaherty** - Insights from Tracking Grey Plover
2:40 – 3:00	**Clive Minton** - Some insights into Red-necked Stint migration obtained from geolocators
3:00 – 3:20	**Fenliang Kuang** - Northward migration routes and habitat use of non-breeding Whimbrels in Australia as revealed by satellite tracking
3:20 – 3:40	Afternoon Tea
3:40 – 4:00	**Kate Gorringe-Smith** - Using art to engage audiences with shorebird conservation
4:00 – 4:20	**Jackie Kerin** - Getting the Artists on Board
4:20 – 5:10	Video presentation: "*The Secret North Korea Stopover: Following the world's migratory shorebirds*" Introduced by Ken Gosbell (details at https://www.miranda-shorebird.org.nz/)
6:30 - 7:00	Pre-dinner drinks [University Club] building 18 on campus map, Page 7) https://sisfm.admin.utas.edu.au/sisfmdata/sisfm/Campus_Maps/Sandy_Bay_Building_Map_CAD.pdf Access via Dobson Road entrance (lower level)
7:00 - 10:00	Conference Dinner [University Club] Conference dinner venue sponsored by Lotek and Sirtrack.

Sunday 28 October

08:30 - 09:00	Registration
09:00 - 09:30	**Keynote - Mike Newman** - Accountability for shorebird population losses in south-east Tasmania
09:30 – 09:50	**Mark Carey** - Mid-term review of the wildlife conservation plan for migratory shorebirds
09:50 – 10:10	**Doug Watkins** – Title TBA
10:10 – 10:30	**Dan Weller** - National Directory of Important Migratory Shorebird Habitat
10:30 – 11:00	Morning Tea
11:00 – 11:20	**Margaret Bennett** - Assessing the shorebird habitat on King Island using a range of information sources
11:20 – 11:40	**Aleisa Lamanna** - Birds n' Bickies
11:40 – 12:00	**Birgita Hansen** - The Latham's Snipe Project national surveys
12:00 – 12:20	**Meg Cullen** - Overcoming the odds: a seven-year recovery effort to improve Hooded Plover breeding success on the Fleurieu Peninsula, South Australia
12:20 – 1:30	Lunch
1:30 – 1:50	**Marcel Klaassen** - Ruddy Turnstones in times of change
1:50 – 2:10	**Amanda Lilleyman** - Local movements of the Far Eastern Curlew on the non-breeding grounds of Australia - preliminary results from GPS tracking
2:10 – 2:30	**Meijuan Zhao** - Migration phenology and stopover site use of SE Australian Ruddy Turnstones – a multi-population assessment using a network analysis approach
2:30 – 2:50	**Birgita Hansen** - Lessons from deployment of migration tracking devices on Latham's Snipe
2:50 – 3:10	**Marcel Klaassen** – Tracking synthesis
3:10 – 3:30	**Danielle Madden-Hallett** - Waders and gold mining cyanide-bearing tailings dams: The good, the bad and the ugly
3:30 – 3:50	Afternoon Tea
3:50 – 4:10	**Catalina Amaya-Perilla** - Tracking shorebird migration: What technology is out there and what can we do with it
4:10 – 4:30	**Amellia Formby** - Wing Threads: Flight Around Oz
4:30 – 4:50	**Bradley Woodworth** - Local drivers of migratory shorebird abundance and population trends in the Great Sandy Strait
4:50 – 5:00	**Eric Woehler** – closure and thanks

Monday 29 October

09:00 – 4:30pm Excursion to Bruny Island. Meet at Hunter Street between the Henry Jones Art Hotel and MAC1 Hotel – see map below or https://www.google.com/maps/dir/MACq+01+Hotel,+Hunter+Street,+Hobart+TAS/The+Henry+Jones+Art+Hotel,+25+Hunter+St,+Hobart+TAS+7000/@-42.881722,147.3336547,17z/data=!3m1!4b1!4m13!4m12!1m5!1m1!1s0xaa6e7580fc7d2e29:0x726fbcfb915ca9bf!2m2!1d147.3363136!2d-42.8821712!1m5!1m1!1s0xaa6e75815ff3d5bf:0xd2a205d74eee2fd2!2m2!1d147.3354376!2d-42.8812807



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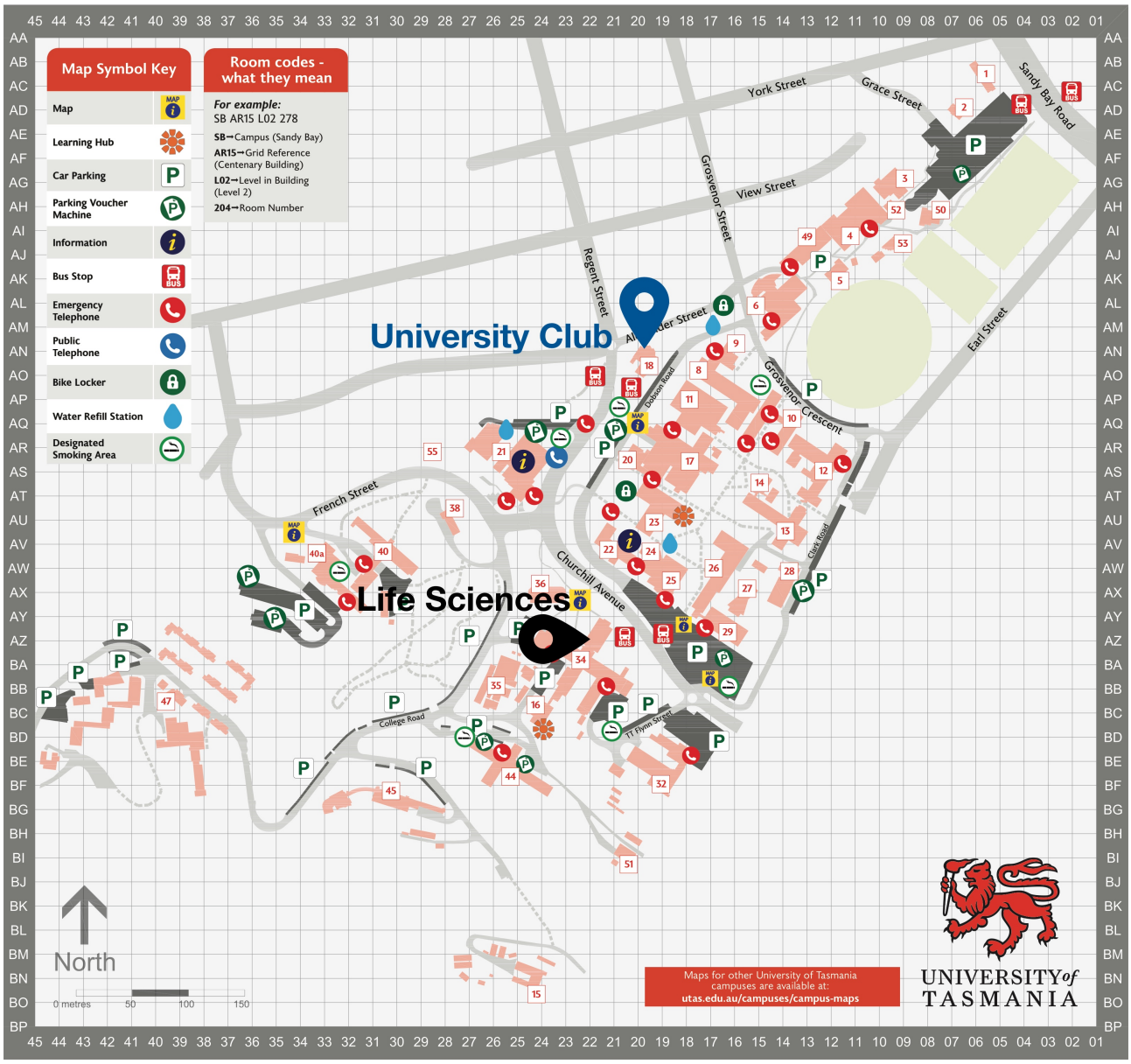

Map showing the locations of the Life Sciences building (talks, posters and breaks: black pointer) and the University Club (pre-dinner drinks and Conference dinner, blue pointer)

Tracking shorebird migration:
What technology is out there and what can we do with it
Catalina Amaya-Perilla, Lotek Wireless

For four decades VHF radio tracking has offered a much deeper insight into avifauna than binoculars and a notebook can offer. Since the turn of the century, new technologies have reduced in size and power consumption to the extent that they are becoming suitable for use on progressively smaller species. Tracking highly-migratory or dispersing species becomes a reality where it was difficult-to-impossible using beeper radio tracking. Improved location accuracy and reduced power consumption allow much finer spatial and temporal scale studies to be conducted. For small migratory shorebird species, the Motus Wildlife Tracking System provides an international collaborative research network that uses a coordinated array of automated logging radio-receivers to track the movement and behaviour of small flying organisms. Geolocators and Store on Board GPS provide a solution for small migratory shorebirds that can be recaptured after a long-term study. For bigger migratory shorebirds, GPS with remote download and PTT Satellite tags can provide a solution. However, the challenge of a wider range of options can make the selection of the most appropriate technology difficult. In this talk we look at the different technologies and discuss how they can be used for shorebirds no matter what their size.

Assessing the shorebird habitat on King Island using a range of information sources
Margaret Bennett, BirdLife Tasmania, King Island

King Island, on the extreme western edge of Bass Strait, is near to the southernmost extent of the East Asian - Australasian Flyway. Overall, a decrease in migratory and resident shorebirds has occurred on the island; however, this can be difficult to quantify as the records, post-settlement in 1888, are highly variable. Some initial counts were made c.1970 and then from 1980 on, but there are significant gaps in the available data. To identify the role of the island's habitats are a reason for the observed decreases, I sought information from long term residents, local industry involved with kelp harvesting and PWS rangers. An assessment of the information indicates that the island's various shorebird foraging habitats are unlikely to be responsible for the observed decreases on the island. However, there are several local threats involving humans and feral animals that require more management and control to minimise their effects on the remaining shorebird populations.

Mid-term review of the wildlife conservation plan for migratory shorebirds
Mark J. Carey, Migratory Species Section, Department of the Environment and Energy

The Australian Government's *Wildlife Conservation Plan for Migratory Shorebirds* covers 35 species of migratory shorebird that regularly visit Australia. The plan provides a national framework identifying research and management actions to protect migratory shorebirds in Australia. Approved in December 2015, the plan outlines actions to support migratory shorebird conservation, and is used to ensure activities are integrated and remain focused on the long-term survival of these birds and their habitats. As we approach three years of the Plan being in place, the Department has undertaken a mid-term stocktake to track and understand progress towards meeting the various performance criteria contained in the plan. To date, the plan has been used to engage with relevant countries on how threats in the Yellow Sea region can be managed through practical action and community participation. The plan has also facilitated an update of shorebird population estimates and a new Directory of Important Habitats for Migratory Shorebirds. Over the next two years, focus will be given to actions that have received less attention, such as identifying knowledge gaps, reducing the levels of disturbance at important sites and surveying important habitats. A formal review will occur in 2020.

Migratory shorebird carrying capacity at the Gladstone region in Queensland

Choi C.-Y.[1,2], Coleman, J.[3], Klaassen, M.[1], Moffitt, D.J.[2], Rogers, D.[4], Skilleter, G.[2]and Fuller, R.A.[2]
[1] Centre for Integrative Ecology, School of Life and Environmental Sciences, Deakin University, Geelong, Vic. 3220, Australia
[2] School of Biological Sciences, The University of Queensland, Brisbane, Qld 4072, Australia
[3] Queensland Wader Study Group, 336 Prout Road, Burbank, Qld 4156, Australia
[4] Arthur Rylah Institute for Environmental Research, 123 Brown Street, Heidelberg, Vic. 3084, Australia

The large tidal flats around Gladstone on Queensland's coast support an impressive array of migratory shorebirds, serving both as a "stopover" site and a non-breeding destination. We estimated the capacity of this region to support migratory shorebirds by conducting shorebird and benthic surveys during the non-breeding season in 2015. We discovered that the region is operating close to its carrying capacity, with 1.2 - 2.4 times more food available for most bird species than currently required. This signals a system that is potentially vulnerable to any future threats that may impact on the quality or quantity of shorebird foraging habitat. Moreover, spatial heterogeneity in food availability was high, with much of the highest quality intertidal foraging habitat available for a limited time only; only 10%–25% of the suitable intertidal habitat was exposed at half tide. Our analyses highlight the importance of identifying high quality foraging habitats for conservation and management actions.

From Field Observation to Tracking Shorebirds with Transmitters: How changes in field science shapes shorebird conservation management in Moreton Bay

Jon Coleman and Robert Bush, QWSG

Queensland Wader Study Group members began observing shorebirds around Moreton Bay 26 years ago and quickly discovered and commenced regular counting of high tide roosting sites around its shorelines. Urban expansion has threatened several of these significant roosts along the urban coastal corridor. Toorbul in the north of Moreton Bay, the Port of Brisbane at the mouth of the Brisbane River and Manly Harbour to the south, among others, became sites where artificial roosts were established to protect shorebirds from urban intrusion and industrial development. The significance of these sites, spaced out across the length of the Bay, became clear as count data supported their importance to shorebirds. The use of engraved leg flags in Moreton Bay has helped observers to establish how different shorebird flocks used specific areas of the Bay, highlighting the parochial nature of many species. However, conclusions from analysis of leg flag data like this are limited to observer site selection, observer effort and many other factors. More recent studies involving the placement of Platform Terminal Transmitters on Pacific Golden-plover (*Pluvialis fulva*), Eastern Curlew (*Numenius madagascariensis*) and Whimbrel (*Numenius phaeopus*) from sites in the north and south of Moreton Bay has led to discoveries about how different species use the low tide mudflats and shorelines during different tide cycles, at night and through the day, providing new understanding of their localized behavioural ecology. The paper describes this transition in fieldwork technologies and the potential impact on changes in approach to conservation management.

Overcoming the odds: a seven-year recovery effort to improve Hooded Plover breeding success on the Fleurieu Peninsula, South Australia

M. Cullen, R. Mead, E. Stephens, G. Maguire, BirdLife Australia

Beach-nesting shorebirds are under increasing pressure from habitat loss, predation and recreational beach use. The Fleurieu Peninsula, south of Adelaide, is the most heavily populated coastal area in South Australia and experiences the highest levels of recreational beach use in the state. Many of these beaches are also critical habitat of the threatened Hooded Plover, leading to a human-wildlife

conflict. Since 2009, the breeding success of Hooded Plover on the Fleurieu Peninsula has been monitored by citizen scientists. Over seven consecutive breeding seasons (2009/10 – 2015/16), a total of 232 breeding attempts have been monitored at 44 sites. Approximately 75% of nests and/or chicks were managed, via temporary rope fencing and signage, to mitigate the impacts of beach recreation. We explored variation in survival rates during egg and chick phases, and of site threat profiles over time. Results highlight the importance of management to improve breeding success of these threatened birds, with managed breeding pairs being 25% more likely to produce fledglings than unmanaged.

Invertebrate daily vertical distribution: implications for shorebirds activity when food is always available

Sora M. Estrella, Robert A. Davis and Pierre Horwitz
Centre for Ecosystem Management, School of Science, Edith Cowan University

The vertical distribution of benthic invertebrates in the sediment can limit prey availability for shorebirds. Several studies have found a daily change in this distribution: an increase in benthic invertebrate activity closer to the surface at night in intertidal habitats, attributed to anti-predator behaviour. This has been hypothesised as one of the two reasons why shorebirds feed at night. We studied the diel vertical distribution of benthic invertebrates in two non-tidal habitats, a salt lake and a saltpan. In contrast to intertidal habitats, polychaetes, amphipods and bivalves were continuously available for shorebirds. The highest densities were found in the first 5 cm of the sediment, independent of the time of the day. The implications of this finding for shorebirds foraging activity as well as the role of non-tidal habitats for shorebird conservation, are discussed.

Insights from Tracking Grey Plover

Tony Flaherty[1], Clive Minton[2], Maureen Christie[3], Grace Maglio[4,] Katherine Leung[4], Ken Gosbell[4], Inka Veltheim[4], Reece Pedler[3], Chris Hassell[6]
[1]Natural Resources Adelaide and Mt Lofty Ranges, [2]VWSG, [3] FoSSE
[4] AWSG, [6]Global Flyway Network

Satellite telemetry of Grey Plovers from Australia has been undertaken using 5 gram solar powered Platform Terminal Transmitters, attached using 'leg-loop harnesses'. Ten PTTs were deployed on Grey Plover north of Adelaide, South Australia between 2015 and 2018. This was undertaken by the Victorian Wader Study Group and Friends of Shorebirds SE, supported by Adelaide Mt Lofty Ranges Natural Resources Management Board and the Australian Government. Five PTTs were deployed on Grey Plover at Roebuck Bay, north-western Australia in February 2016, through the Australasian Wader Studies Group, and BirdLife Australia. In 2016 two WA and two SA birds were tracked on northward migration to Arctic Siberia with initial observations presented at the 10th Australasian Shorebird Conference. This presentation will outline some observations on austral summer site fidelity and habitat use, Sino-Russian and south-east Asian stopover sites, and possible weather influences. The presentation will probably pose more questions than answers.

Trials at a decommissioned saltfield to provide shorebird habitat values

Tony Flaherty[1], Chris Purnell[2], Luke Moseley[3], Jason Quinn[4], Graham Carpenter, Golo Maurer[2], Kasun Ekanayake[2], Aleisa Lamanna[2], Greg Ingleton[5]
[1]Natural Resources Adelaide and Mt Lofty Ranges, [2]BirdLIfe Australia, [3]University of Adelaide, [4]Department of Environment and Water, [5]SA Water

Globally, coastal saltworks support significant numbers of shorebirds and waterbirds. The Dry Creek saltfields north of Adelaide have provided feeding and roosting habitat for significant numbers of

shorebirds and a significant proportion of the total Gulf St Vincent shorebird population. With the decommissioning of the Dry Creek saltfields, South Australia, a state government, NGO and research collaboration initiated reconnection of a disused pond to reinstate tidal flows. This aimed to provide conditions for saltmarsh restoration provide shorebird habitat opportunities. Additionally, shorebird counts have been undertaken at nearby saltfield gypsum ponds where water managers have trialled discharge of treated wastewater for evaporation, with shorebird habitat benefits. This presentation will provide an overview of the tidal trial and preliminary observations of potential shorebird habitat benefit.

Wing Threads: Flight Around Oz

Amellia Formby, Independent researcher

From March to September 2019, zoologist turned pilot, Amellia Formby will be flying a microlight around Australia for shorebird conservation. Departing from Broome when the shorebirds begin their northward migration, Amellia will attempt to do a lap of Australia in the same amount of time it take a group of satellite-tagged shorebirds to fly to the Arctic and back. Along the way, she will stop at major shorebird sites around the coast to run shorebird training workshops with indigenous ranger groups and visit schools to introduce students to migratory shorebirds in collaboration with BirdLife Australia. Join Amellia as she shares the life-changing events and challenges she has faced over the past three years on the road to becoming a pilot in bringing this dream to life.

Science for Saving Shorebirds: Where next?

Richard A. Fuller, School of Biological Sciences, University of Queensland

Since the pivotal last ASC meeting in Hobart in 2008, our scientific understanding of migratory shorebirds in the East Asian – Australasian Flyway has flourished, made possible by shorebird monitoring data collected by expert volunteers over many decades, and by the work of scientists from around the flyway and beyond. Research is clarifying shorebird migrations, revealing how their habitat is being lost, and showing that Yellow Sea-dependent species are decreasing the fastest. The science often makes for depressing reading, but demonstrates the crisis facing our birds, and starts to frame conservation solutions. Shorebird conservation in the EAAF is rightly focused on intertidal habitat protection. Yet there are many other threats, some maybe more severe than intertidal habitat loss. These include overharvesting, climate change, reduced food supply, disturbance, pollution, and supratidal habitat losses. We need to know how these threats operate, how they interact with each other, and they can be addressed. Shorebird researchers won't be out of a job for quite some time to come.

Using art to engage audiences with shorebird conservation

Kate Gorringe-Smith

Over the past 10 years, I have initiated three major art projects that engage artists and audiences with migratory shorebirds. The first, the *Flyway Print Exchange*, involved 20 artists from 9 EAAF countries, the second used migratory shorebirds as a unifying theme for works by migrant and refugee artists. The third, the current and ongoing *Overwintering Project*, links artists around Australia and New Zealand with their local shorebird habitat and each other. I have found artists and audiences engage readily with the stories of migratory shorebirds and the idea of the Flyway. I have also found that government and volunteer bodies trying to raise awareness of their local shorebirds and shorebird habitat leap at the opportunity to exhibit a tool such as the *Flyway Print Exchange* to help engage the public. Art provides a rich opportunity to engage communities with migratory shorebirds and their habitat.

Insights from geolocator studies in Australia, 2009 – 2017

Ken Gosbell[1], Clive Minton[1], Simeon Lisovski[2], Maureen Christie[3], Chris Hassell[4], Marcel Klaassen[5]
[1] Victorian Wader Study Group, Australasian Wader Studies Group
[2] Victorian Wader Study Group and Swiss Ornithological Institute
[3] Victorian Wader Study Group, FoSSE, Carpenter Rocks, SA
[4] Global Flyway Network, Broome, WA
[5] Centre for Integrative Ecology, School of Life and Environmental Sciences, Deakin University

Australia was one of the first countries to utilise light-level geolocators for tracking the movements of migratory shorebirds. Since 2009, we have deployed these instruments on a range of species at non-breeding locations around the country. This extensive program has gathered a wealth of information on the movements of nine of Australia's long-distance migratory species. The migratory tracks obtained, including an increasing number of multi-year tracks, allowed us to detail routes and strategies used along the East-Asian Australasian Flyway. Critically, this information has contributed to understanding the relative importance of stopover sites along the flyway - fundamental to developing conservation strategies. More recent studies have enabled assessment of breeding locations and incubation strategies, many of which were unknown given the remote, low density breeding sites used by these species. These insights have informed conservation measures flyway-wide and on a local scale. Recognising the constraints of light-level geolocators we go on to discuss the possible future use of light-level geolocation.

The Latham's Snipe Project national surveys

Birgita Hansen [1], Lori Gould [2], Chris Davey [3], Jodie Honan [4], Richard Chamberlain [4], Don Stewart [4]
1 Centre for eResearch and Digital Innovation, Federation University Australia, Ballarat, Victoria 3353
2 Woodlands and Wetlands Trust (Jerrabomberra Wetlands), Fyshwick, ACT 2609
3 Canberra Ornithologists Group, Civic Square, ACT 2608
4 South Beach Wetlands and Landcare Group, Port Fairy, Victoria 3284

The Latham's Snipe Project was initiated in 2014 to investigate the ecology and migration of the species in Australia. A substantial part of that project, which is ongoing, was the establishment of systematic surveys to collect baseline data on distribution and abundance, intended to underpin future trends analyses. Specific survey techniques were co-developed with experienced community group members, designed to enable a more robust comparison of population counts than is currently available in any other Australian monitoring program (including Shorebirds2020). In Canberra, monitoring has followed these protocols and delivered important insights about the population there. These include the discovery that the Jerrabomberra wetlands complex supports more than 0.05% of the population (18 birds, the national threshold for important sites). In addition, Jerrabomberra wetlands is a terminus for migrating snipe and hosts a "resident" population throughout the spring-summer season. Most importantly, volunteer monitoring has been critical to obtaining these insights.

Lessons from deployment of migration tracking devices on Latham's Snipe

Birgita Hansen [1,5], Lori Gould [2], Chris Davey [3], Jodie Honan [4], Richard Chamberlain [4],
Don Stewart [4], David Wilson [5]
1 Centre for eResearch and Digital Innovation, Federation University Australia, Ballarat, Victoria 3353
2 Woodlands and Wetlands Trust (Jerrabomberra Wetlands), Fyshwick, ACT 2609
3 Canberra Ornithologists Group, Civic Square, ACT 2608
4 South Beach Wetlands and Landcare Group, Port Fairy, Victoria 3284
5 Victorian Wader Study Group, Beaumaris, Victoria 3193

Migration routes of Latham's Snipe are not well understood owing to the cryptic nature of this species,

making observations of wild birds difficult. The Latham's Snipe Project was initiated to investigate the ecology and migration of the species in Australia. Four migration and movement tracking methods have been deployed with varying levels of success. Firstly, all snipe captured during field studies in Port Fairy and Canberra have been fitted with orange engraved leg flags. Secondly, a proportion of those captured birds were fitted with leg flag-mounted 1.0 or 0.7g light-level geolocators. Thirdly, some birds were also fitted with a 1.5g VHF transmitters, which were glued to the back of the bird. Lastly, several birds were fitted with 5g solar-powered PTTs using a backpack harness. Whilst leg flags, geolocators and radio transmitters have revealed important insights, satellite tracking presented some welfare issues and overall, proved to be relatively unsuccessful.

Artificial coastal wetlands are an integral part of habitat conservation for the migratory shorebirds of the EAAF

Micha V. Jackson[1], Chi-Yeung Choi[1,2], Richard A. Fuller[1]
[1]School of Biological Sciences, The University of Queensland, Brisbane, Qld 4072
[2]Centre for Integrative Ecology, Deakin University, Geelong, Vic 3220

Coastal migratory shorebirds have multiple habitat requirements. In non-breeding areas, many use both intertidal mudflats and supratidal wetlands for foraging and roosting. In the East Asian-Australasian Flyway these habitats face enormous development pressure, with habitat loss a key driver of population decreases in multiple species. But a number of prevalent coastal land uses create artificial wetlands that shorebirds can utilise. Large aggregations occur on commercial salt and aquaculture ponds, rice paddies and some industrial areas. But a flyway-scale understanding of the extent of use; functionality as roosting or foraging habitat; species composition; and, relative usefulness to different species of artificial habitats is currently lacking. From literature, count data, and field study we discovered that artificial wetlands in the EAAF are extensively utilised, particularly as roosting habitat in conjunction with intertidal feeding grounds. Extensive land reclamation in some countries has resulted in mudflat foraging grounds abutting long concrete seawalls with almost no natural supratidal wetlands remaining, so shorebirds must often utilise artificial supratidal habitat for roosting at high tide. From accessible count data, at least 31 species have been recorded on artificial habitats in internationally significant numbers across 30 sites in 6 countries, with our dataset unlikely to be exhaustive. But species occurrence is highly variable, with 8 non-vagrant species occurring at more than 70% of studied sites, but 22 appearing at <20%. These results have important conservation implications, suggesting that while artificial habitats should never be considered a replacement, they must be included alongside intertidal flats in the conservation and management of non-breeding areas. There are documented strategies for managing artificial wetlands to benefit shorebirds, and partnerships with local land users present opportunities for their maintenance and improvement.

Getting the Artists on Board

Jackie Kerin

Hobsons Bay, close to the city of Melbourne, on the west side of the Yarra River, is responsible for several small wetlands that are host to many species of resident and migratory shorebirds. The pressure on these habitats is enormous as they are favoured recreational sites. The conservation rangers use many approaches to engage and educate the community but it's only recently that local artists have found a way to collectively get on board. For the past three years, the rangers have run an event marking World Migratory Bird Day supported by a voluntary committee of visual artists, science communicators, the local folk club, a children's music school and two choirs. Leaving the rangers to bring organisations like Birdlife to the day, the artists, bring, activities, stories and songs. This year over 300 people participated. The focus is always: the importance of habitat for the enduring survival of the birds. The artists bring information encoded playfully in story, song, drawing and painting. They

bring people into the space that otherwise would not be there. A children's choir attracts parents, grandparents and friends. Stories bring an audience who are not drawn to lectures and artworks reach out to people who learn through their eyes. This presentation shares the history of our project, the ongoing enthusiasm and projected plans to continue growing the artists network supporting the local rangers. Delivered with the idea that we may inspire others to see the valuable role artists can play in raising awareness.

Plugging a Gap: Restoring Wetlands in the SW of Victoria and SE SA

Gregory D Kerr
Senior Ecologist, Nature Glenelg Trust, 86 Skene St, Dunkeld, Victoria 3294

The wetlands of SW Victoria and SE South Australia have been extensively drained and modified. Drainage, groundwater extraction, irrigation, plantations, cropping, and marked changes in associated terrestrial habitat have all combined to transform a predominantly wet landscape, with most wetlands gone and many of those remaining severely degraded.
Recent work across the region has seen a reversal in this story. Farmers and other land holders are realising they or their predecessors went too far in draining many wetlands. Funding to bring about change is becoming available and innovative restoration methods are being developed and applied. Recent projects are redressing the complexity of past management practices and restoring significant wetland areas. The news is good, the changes in wetlands positive. Community members are starting to realise that healthy productive wetlands can be restored from dry cropped paddocks. Drained wetlands which were rarely productive, can be and are better off, restored. The consequences for biodiversity are very positive.

Ruddy Turnstones in times of change

Marcel Klaassen, Bethany Hoye, Jamie Willey, Ken Gosbell, Margaret Bennett, Meijuan Zhao, Michelle Wille, Penny Johns, Rob Patrick, Robyn Atkinson, Simeon Lisovski, Veerle Jaspers and Clive Minton

A range of global change processes are impacting migratory shorebirds. Starting 2006, Ruddy Turnstones (*Arenaria interpres*) spending the non-breeding season on King island, Tasmania, have been studied intensively by the Victorian Wader Study Group, with support from various international research institutes. Using banding, biometric, blood, cloacal and oropharyngeal swab, and geolocator data, we evaluate the potential threats that rapid Arctic climate change, habitat destruction, pollution and exposure to novel diseases pose to Ruddy Turnstones. The bottom line is that these threats are real and do impact the turnstones in a myriad of ways. However, at the population level the King Island Ruddy Turnstones are apparently still hanging on and are (not yet) being overstretched. At least in part, this result may be due to rapid evolutionary change.

Northward migration routes and habitat use of non-breeding Whimbrels in Australia as revealed by satellite tracking

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To determine the migration routes and habitat use of the Whimbrel (*Numenius phaeopus*) during northward migration period, the non-breeding Whimbrels were captured at east and north-west Australia and tracked using satellite tracking technology. We found that the tracked Whimbrels departed from Australia between April 16 and April 28, and staged at the coast of south China, the Yellow Sea region and the Northeast China Plain. The Whimbrels used various habitats during the migration period, including mudflat, saltmarsh, farmland and grassland. The breeding sites, usually arrived by early June, were spread from eastern Chukotka to northwestern Sakha. Whimbrels that completed northward migration migrated for 41 ± 6 (mean ± SD) days to cover about 10000 ± 326 (mean ± SD) km. Total stopover duration was 26 ± 4 (mean ± SD) days.

Birds n' Bickies

Aleisa Lamanna and Emma Stephens

BirdLife Australia and Natural Resources, Adelaide and Mt Lofty Ranges (NR AMLR)

The Samphire Coast Icon Project engaged a monumental 6,000 people in shorebird and beach-nesting bird conservation during it 5 years of operation. Ending in June 2017, the project transitioned into a new Sharing our Shores with Coastal Wildlife project with an expanded focus and key objective of maintaining momentum for shorebird awareness and conservation. Last summer, a series of engagement sessions were launched known as "Birds n' Bickies". The aim of these sessions were three-fold; 1 - Facilitating and encouraging a comfortable learning environment for those new to shorebirds, 2- provide an opportunity for informal mentoring or knowledge sharing and 3 - up-skill volunteers to be able to confidently undertake shorebird counts. We will share more about this model for engagement and mentoring as an effective engagement strategy for shorebird conservation. We will also share the learnings from a recent survey of targeted participants in shorebird conservation and monitoring programs within the NR AMLR region and Gulf St Vincent area to explore the effectiveness of these programs, including the Birds n' Bickies series.

Migratory shorebirds and the LNG boom: eight years of monitoring and research

Adam Leavesley and Jim Reside, Wildlife Unlimited, Bairnsdale, Victoria

A proposal to construct three LNG export plans and associated marine infrastructure near Gladstone was approved in 2010. One of the conditions of the approval for the dredging work was that an Ecological Research and Monitoring Program be implemented over 10 years in the region. Migratory shorebirds were amongst the target species. Monitoring commenced in 2011 with an intensive program of five surveys per year for the first two years, changing to a single summer survey for the following six years. We report on the monitoring and research results to this point. Total migratory shorebird summer abundance on the Curtis Coast has been stable during the program and is in the

order of 12,000 birds consisting of 19-21 species. Greater than 95% of the records are of 10 species most of which have remained stable, though the last survey returned counts for Eastern Curlew and Great Knot at the bottom of the range. The program has two more years to run.

Local movements of the Far Eastern Curlew on the non-breeding grounds of Australia - preliminary results from GPS tracking

Amanda Lilleyman
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Understanding when animals use specific habitats assists in the direction of management actions. Threatened migratory shorebirds can be assisted through targeted management plans, but a first step towards conserving them is to understand their relationship with the environment. The Far Eastern Curlew is a Critically Endangered shorebird that completes a long-distance migration between the northern and southern hemispheres every year. Migratory shorebirds require high quality habitat on their non-breeding grounds for successful migration and survival. Currently, little is known about their exact habitat requirements on the non-breeding grounds in Australia. Our project aims to understand how curlew use intertidal mudflats and saltpans in an industrialised harbour (Darwin Harbour, Northern Territory), so that we can provide strategic guidance to decision-makers regarding coastal development. In our pilot study, we tracked two curlew during the 2017-2018 austral summer season and found that these birds had restricted home ranges and spent most of their time in saltpans, despite intertidal mudflat being available close by. The daily commute of curlew from their roosting to feeding sites was shorter than local movements in Moreton Bay, Queensland, but similar to the commuting distances of curlew in Gladstone Harbour, Queensland. These preliminary results will help guide ongoing research on curlew habitat use and the preservation of coastal saltpans and mangrove areas.

Waders and gold mining cyanide-bearing tailings dams:
The good, the bad and the ugly

Danielle Madden-Hallett and David Donato
Donato Environmental Services

Cyanide is widely used in the gold extraction process. Mine waste solutions, containing cyanides, are disposed into tailings storage facilities (TSFs). To waders, these structures resemble wetlands and there is no reason to believe that birds can distinguish between TSFs and any other similar sized water body. Cyanide is a fast-acting asphyxiate. Wildlife deaths associated with cyanide-bearing mine waste solutions have plagued the gold mining industries for many years. Waders are the most abundant bird guild on these tailings dams.
The Good: The International Cyanide Management Code requires that gold mining operations protect wildlife that may inhabit tailings systems and that cyanide concentration must not exceed 50 mg/L WAD cyanide concentration.
The Bad: Australian second tier companies are not signatories to the Code.
The Ugly: Migratory and non-migratory waders can suffer considerable numbers of fatalities on TSFs. Deaths on non-Code-signatory operations are typically undetected, not reported, misidentified or grossly underestimated. State regulators do not require operations to protect wildlife on tailings systems.

A comparison study of the feeding ecology of Pacific Golden Plover and Grey Plover on Roebuck Bay, Broome, Western Australia

Grace Maglio, PO BOX 7419, Broome, WA 6725

The vast mudflats of Roebuck Bay, North Western Australia, support 100,000 migratory waders throughout the year. They rely on the abundant and diverse macro invertebrate species of the bay to fuel their northward migration. In this presentation I present foraging and behavioural data for two of the 20 migratory shorebird species that rely on Roebuck Bay during the wintering and pre-migration periods: Grey Plover (*Pluvialis squatarola*) and the Pacific Golden Plover (*Pluvialis fulva*). There have been no previous foraging studies for either of these species in Roebuck Bay. Both Grey Plover and Pacific Golden Plover are visual foragers and feed as solitary birds across the tidal embayment. They are at their highest abundance during October to March and I recorded video footage of these birds during those months. From October 2015 to April 2017 I obtained 39 videos totalling approximately 200 minutes. I also took benthos samples during this period and found approximately 550 invertebrates from at least 75 species. There is currently little published on the foraging behaviours of these plovers, I present findings from this study and compare the foraging behaviour of the two species. Interesting records included the apparent targeting of Sea Cucumbers by Grey Plover.

Some insights into Red-necked Stint migration obtained from geolocators

Clive Minton[1], Ken Gosbell[1] , Simeon Lisovski[2],
[1] Victorian Wader Study Group, Australasian Wader Studies Group,
[2] Victorian Wader Study Group and Swiss Ornithological Institute,

The development by Migrate Technology of a lightweight Intigeo geolocator weighing 0.3g enabled the VWSG to study the migration characteristics of the smallest and most numerous shorebird that spends the non-breeding period in Australia. In 2016, 60 of these geolocators were deployed on this species at Yallock Creek, Westernport Bay. In four subsequent catches a total of 18 loggers were retrieved. Of these there were 11 viable datasets which enabled the northward and southward migration strategies to be determined. We will discuss the timing, tracks and stopover locations derived and their relative importance. Although this small wader makes more stops as expected, it still made a stage of up to 3,500km to the China coast on northward migration. The incubation characteristics indicated a relatively high success rate in this particular year. There is still much to learn about this species but this program has enabled a significant step forward in understanding their movements.

Accountability for shorebird population losses in south-east Tasmania

Mike Newman, Eric Woehler, Sue Drake and Alan Fletcher, BirdLife Tasmania

Catastrophic losses in the migratory shorebirds have occurred in south-east Tasmania during the last 50 years. The Curlew Sandpiper, formerly the second most numerous species, is now a vagrant. Emphasis has been placed on habitat loss external to Australian, particularly at stop-over locations along the flyway, as the primary cause of these losses. However, in south-east Tasmania it is questionable whether our shorebird habitat could support historical levels if populations recovered. At South Arm, shorebird locations high tide roosts have been lost through a combination of rising sea levels, erosion, and disturbance from commercial and recreational activities. Oyster leases have contributed to a loss of intertidal mudflat foraging opportunities. Resident shorebird species, such as the Australian Pied Oystercatcher have also been adversely impacted through loss of breeding sites and increased recreational disturbance.

National Directory of Important Migratory Shorebird Habitat

Dan Weller, BirdLife Australia

The revision of the flyway population estimates by Hansen et al. (2016) has provided the underpinning data to assess the importance of any shorebird habitat throughout Australia. The Directory of Important Habitat for Migratory Shorebirds is, therefore, the next logical step in the implementation of the WCP and is identified as a High priority action. Identification and mapping of important habitat for migratory shorebirds is required to deliver scientifically robust data for the Minister of the Environment in making referral decisions and better targeting of investment under the new National Landcare Program. Important habitats in Australia for migratory shorebirds under the EPBC Act include those recognised as nationally or internationally important. This project identifies all sites in Australia that meet national and significance criteria using species thresholds from the revised population estimates. Previous assessments (Watkins 1993, Bamford et al. 2008) of Australian sites of importance focused on international significance. The Shorebirds 2020 database has provided the main source of data for identifying sites of national and international significance for migratory shorebirds included in this report. The wider Birdata/Atlas database has also been used in this project, which includes data from eBird (up to June 2017), eremaea Birds, the original Birdata database, Atlas record forms and about 15 or so other databases from around the country. A special export query in the Birdata database uses the recently updated flyway population estimates and applies them through the 0.1% and 1% flyway population threshold criteria for each species, as well as the 2000/20000 abundance criteria, and species diversity (>15 species) criteria, and then locates and extracts any surveys meeting these. Like the flyway population estimates revision project, we have had instruction to limit the time period of interest to the last 10 or so years – from November 2005 to now, i.e. contemporary data only. The outcome of this process is c.350 areas/sites meeting one or more of these criteria, which for this project, means that each of these receives a 'site account' and a place in the directory.

Local drivers of migratory shorebird abundance and population trends in the Great Sandy Strait

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Loss of intertidal habitat in the Yellow Sea has largely driven decreases of migratory shorebirds in the East Asian Australasian Flyway, but wetlands in Australia are also threatened by disturbance and habitat degradation. We evaluated how local demographic and environmental factors affect spatial variation in abundance and population trends of migratory shorebirds in the Great Sandy Strait, a 90 km long sand estuary that supports >25,000 shorebirds each summer. Analysis of count data collected by the Queensland Wader Study Group from 1988-2018 revealed strait-wide annual decreases of at least -3.6%/year for 8 species, including Eastern curlew and Curlew sandpiper but not Great knot, whose abundance was stable. Initial results suggest that large roosts have decreased less severely than small roosts and that extent of intertidal habitat near roosts is positively correlated with abundance. These results are being used to prioritize management actions to aid in conserving Queensland's migratory shorebirds.

Migration phenology and stopover site use of SE Australian Ruddy Turnstones – a multi-population assessment using a network analysis approach

Meijuan Zhao, Robyn Atkinson, Margaret Bennett, Maureen Christie, Ken Gosbell, Penny Johns, Marcel Klaassen, Simeon Lisovski, Clive Minton, Rob Patrick and Bethany Hoye

Identification of the chain of stopover sites along the migration route and the migratory timing are important to evaluate the constraints migrants face and to guide their conservation. We obtained

individual tracks of Ruddy Turnstones (*Arenaria interpres*) from three non-breeding (i.e. wintering) populations in south-east Australia. From which, we evaluated the interconnectedness of the chain of stopover sites along the East Asian-Australasian Flyway using network analysis and built a comprehensive understanding of these populations' migratory timing, for both pre- and post-breeding migration separately. We identified a chain of key stopover sites of which the importance of some had previously been underestimated. Notably the southern East Asian coast (mainly along the Taiwan and Fujian coast) connects a high number of other stopovers during pre-breeding migration, indicating that habitat loss at this site would pose a high site constraint for migration. The synchronisation in space and timing use was more pronounced during pre- compared to post-breeding migration, indicating Ruddy Turnstones are under higher time constraint on their way towards the breeding grounds. Although mixed at the breeding grounds and staying there over a similar time period, the three wintering populations significantly differed in migration timing and stopover site use. Our study thus emphasizes that even at relatively small spatial scales (here in terms of distances between non-breeding populations) patterns of migratory connectivity may exist, with each population exhibiting unique migration patterns, potentially requiring different conservation efforts. Such conservation efforts targeting endangered non-breeding and stopover sites should notably be considered for sites used during migration towards the breeding grounds since little tolerance in alternative timing and site use is allowed during this period.

POSTER ABSTRACTS

Alison Ellis

Is lithography applicable to contemporary wildlife illustration? In this study, I seek to explore the potential of the nineteenth century form of printmaking, stone lithography, for making images of the migratory bird species under threat, through practice based studio research. I have chosen an older form of image making which recalls historical scientific illustration to make fine art prints both as individual artworks, and as a starting point for infographics on each of the birds; with an aim to engage the interest of the general viewer with their plight, and tell the fascinating stories of these endangered species.

The importance of North-West Tasmanian estuaries to the Australian Pied Oystercatcher *Haematopus longirostris*

Hazel Britton, BirdLife Tasmania and Cradle Coast NRM

The Australian Pied Oystercatcher has an estimated population of around 11,000, although it is believed to be decreasing in some parts of its range. Tasmania a stronghold for the species. The Duck River Estuary and the Rubicon Estuary support high numbers of this species, estimated to hold up to 8% of the population. Both estuaries occur within two of BirdLife Australia's IBAs, and monitoring suggests that the region is likely to support a further 660 (or 6%) individuals. The total for this region is approaching 14% of the estimated total world population. Under the Ramsar Convention, sites regularly supporting 1% of the population of a wetland species are considered as Internationally Important. This section of the Cradle Coast in North West Tasmania, with a minimum estimated 14% of the world population of Australian Pied Oystercatchers is thus of International Importance.

What the Flock – migrating a NZ shorebird awareness project to Australia

Tony Flaherty[1], Aleisa Lamanna[2]
[1]Natural Resources Adelaide and Mt Lofty Ranges, [2]Sharing Our Shores and BirdLife Australia

In New Zealand, Pūkorokoro Miranda Shorebird Centre created 'The Flock NZ' to help spread the message about the threats facing our resident and migratory shore birds. With their support, the concept migrated to South Australia as part of Natural Resources Adelaide and Mount Lofty Ranges and BirdLife Australia's conservation work. "Flock Oz" involves local community, wood groups, Men's Sheds to produce life size wood cut outs which are then brightly decorated by community groups and schools. The Flocks migrates to raise awareness of shorebird conservation including stopovers at the Adelaide Shorebird Festival, Adelaide Botanic Gardens and the OzAsia Festival. With the help of A Wader's Life, Flock Oz has also migrated to Broome. We hope to assist other groups to initiate flocks across Australia with templates of Australian bird shorebird species, information and advice.

The longer first leg of northward than southward migration suggests the importance of nonbreeding sites for fuel deposition of migratory birds

Mian-Juan Ke[1], Zhijun Ma[1*]

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It is crucial for long-distance migratory birds to accumulate a great deal of fuel before migration. Although both breeding and nonbreeding sites supply abundant food for birds, birds select breeding habitat mainly depend on their special requirement for nesting and rearing chicks, thus the breeding site might be not the best for fuel deposition. To test this hypothesis, we compared the distance, duration and direction of the first leg of flight between north- and southward migration based on the migration tracking of seven shorebirds. Results showed that birds fly longer period and distance during the first bout of northward migration than that of southward migration. The flight direction of the first leg of northward migration is closer to the shortest migration route than southward migration. This study suggests that nonbreeding site contributes more to fuel deposition of migratory birds than breeding site, which could influence the migration strategies between northward and southward migration.

What is driving survival rates in Crested Terns?

Jessica Radford, Deakin University

Our coastal ecosystems are increasingly vulnerable to anthropogenic-induced threats. Pollution, the destruction of habitat, and the effects of climate change are key drivers of biodiversity loss affecting the overall function and health of marine environments and ecosystems. Disturbances to lower levels of the food web can result in bottom-up effects. Therefore seabirds, as top-predators, serve as important ecological indicators of the health of an ecosystem. Crested terns in the Port Philip Bay and Western Port Bay areas may prove an exemplary model for such monitoring research. The Victorian breeding colonies in focus are in proximity to areas of the marine environment that see high levels of both public and commercial use. For more than 30 years the Victorian Wader Study Group (VWSG) has collected mark-recapture banding data of crested terns amongst breeding colonies in Port Phillip Bay and Western Port Bay. For my honours research I am working in conjunction with the VWSG, aiming to address the following questions in analysing the survival rate of crested terns: are there annual variations in survival rates of adult and young crested terns and if so, how do these compare across colonies and relate to (1) population dynamics in other marine life in the region (e.g. little penguins, fisheries statistics) and (2) large scale weather patterns (El Nino Southern Oscillation).