Stilt

The Journal for the East Asian-Australasian Flyway

Number 77 - July 2024

AWSG
Australasian Wader Studies Group

AWSG WEB SITE: awsg.org.au
Cover Illustration: Adrian Walsh. Nordmann's Greenshank *Tringa guttifer*

MISSION STATEMENT

To ensure the future of waders and their habitats in Australia through research and conservation programmes and to encourage and assist similar programmes in the rest of the East Asian-Australasian Flyway.

OBJECTIVES

- Monitor wader populations through a programme of counting and banding in order to collect data on changes on a local, national and international basis.
- Study the migrations of waders through a programme of counting, banding, colour flagging, collection of biometric data and use of appropriate scientific instruments.
- Instigate and encourage other scientific studies of waders such as feeding and breeding studies.
- Communicate the results of these studies to a wide audience through its journal Stilt and membership newsletter the Tattler, other journals, the internet, the media, conferences and lectures.
- Formulate and promote policies for the conservation of waders and their habitat, and to make available information to local and national governmental conservation bodies and other organisations to encourage and assist them in pursuing this objective.
- Actively participate in flyway wide and international forums to promote sound conservation policies for waders.
- Encourage and promote the involvement of a large band of amateurs, as well as professionals, to achieve these objectives.

OFFICE BEARERS

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OTHER COMMITTEE MEMBERS*

Chris Hassell, Roz Jessop (VWSG representative), Grace Maglio and Tegan Douglas.

QWSG representative: Position to be filled.

BirdLife Australia representatives: To be appointed for 2024/25.

MEMBERSHIP OF THE AUSTRALASIAN WADER STUDIES GROUP

Membership of the AWSG is open to anyone interested in the conservation and research of waders (shorebirds) in the East Asian–Australasian Flyway. Members receive the annual bulletin *Stilt*, and the quarterly newsletter *Tattler*.

Please direct all membership enquiries to the Membership Manager at BirdLife Australia, Suite 2- 05, 60 Leicester St, Carlton Vic 3053, AUSTRALIA. Ph: 1300 730 075, fax: (03) 9347 9323
Email: membership@birdlife.org.au
Annual Subscriptions: Australia & New Zealand A$40.00 Overseas A$40.00
Institutions A$40.00

Stilt **77** (**2024**): 1-2

EDITORIAL

Welcome to another edition of Stilt. I have made it across the ditch from New Zealand and am now travelling Australia watching and photographing birds. As my first stop was Cairns, I had to visit the local celebrity, the Nordmann's Greenshank (*Tringa guttifer*). I must admit to never having heard of this species until I began researching my trip but I became very excited to see such a rare visitor to Australia. And celebrity it was. I often get stopped by people commenting on my camera gear and over and over I was accosted by people asking me if I had seen it. Apparently this is the second year the bird (assuming it is the same bird) has visited Cairns during the summer months and it was being very closely monitored.

Nordmann's Greenshank, *Tringa guttifer*, at Cairns Esplanade, Australia, 16/03/2022 (by Imogen Warren)

On the other hand, people were also at pains to tell me how productive and dreadfully annoying the Masked Lapwing (*Vanellus miles*) were in the same area. Indeed, there seemed to be an awful lot of them and I know they can be very loud and aggressive. I witnessed this when a Brown Goshawk (*Accipiter fasciatus*) swooped in for prey and got too close to them. I was, as everyone else, initially irritated by them but coming to Australia has really made me appreciate every species of bird. We might love seeing the Nordmann's Greenshank in its rarity but with environmental changes (and not many of them good) to the Flyway, it might well be that we will be grateful for seeing, and most definitely hearing, that obnoxious lapwing protecting its family.

Masked Lapwing, *Vanellus miles*, at Hull Heads, Australia, 24/04/2022 (by Imogen Warren)

I would like to introduce Zhijun Ma from Fudan University in Shanghai. He is another valued member of our Editorial Board who are responsible for organising the peer reviewing of the manuscripts submitted to Stilt.

I began to study shorebirds in 2000 when I entered Fudan University for postdoctoral study. Over the past two decades, my study focused on the migration ecology, habitat ecology, and conservation biology of shorebirds in the Yellow Sea, the most important stopover sites for shorebirds along the East Asian-Australasian Flyway. Collaborating with many shorebird researchers along the flyway, our studies exhibited the multiple functions of the Yellow Sea for migratory birds, including refueling for migratory flight, adjusting migration timing, avoiding bad weather, moulting, and depositing fuel for activities in breeding grounds. Meanwhile I witnessed drastic habitat changes occurred on the tidal wetlands in the Yellow Sea, which have seriously impacted on the population maintenance of shorebirds.

As a platform for sharing knowledge and information about shorebirds in the East Asian-Australasian Flyway, Stilt has published many influential papers over the past 40 years. Our first understanding of the importance of the Yellow Sea region to shorebirds was based on more than ten papers published by Mark Barter and his colleagues in Stilt from 1996 to 2005. The recent papers about shorebirds in North Korea explored the status of shorebirds in the less known country. In addition, many survey results from Southeast Asia have been published in Stilt in recent years. These papers provide first-hand information for understanding shorebirds and their habitats along the Flyway, greatly contributing to shorebird conservation. As an Editorial Board member, I am happy to find my first paper on shorebirds was published in Stilt 20 years ago. I hope Stilt continues to play an important role in exchanging shorebird knowledge among shorebirders, including both professionals and amateurs, in the future.

Thanks to Zhijun and all the Editorial Board members for their ongoing voluntary support of Stilt.

This will be my last edition of Stilt. Travelling in Australia is improving my bird knowledge but does not give me the time to dedicate to it. Inka Veltheim, a noted Zoologist will be taking over.

Imogen Warren
Editor, Stilt 73–76

A note from the new Editor

I am excited to be taking over the Editorship of Stilt, to continue supporting contributors and publishing shorebird papers and reports from the East Asian-Australasian Flyway. Stilt continues to be the main vehicle of publishing and disseminating important shorebird study results, observations, reports and communications between the Flyway countries, AWSG members, shorebird enthusiasts and a wider audience. Requests for previous papers published in Stilt also keep coming in, showing the importance of the journal in supporting current shorebird work.

I extend a heartfelt thanks to Imogen Warren for all her hard work, dedication and efforts from 2020 to 2022 (Stilt editions 73–76), which have kept the journal going. In the last two years since the editorship change Stilt has been without a Production Editor resulting in an increased workload in the Stilt publication tasks. My tasks have been to catch up, learn the processes, work the two roles at the same time to finalise Stilt 77 and to prepare the next issue.

These factors have caused some unavoidable delays in getting articles finalised and Stilt published. I thank all the contributors and the AWSG membership for your patience as we work towards a more regular publication schedule into the future. I would like to thank everyone who has helped me get Stilt 77 to publication stage, including Judit Szabo, Alison Russell-French, Chris Hassell and Jeremy Ringma.

Inka Veltheim
Editor

A NOTE FROM THE AWSG CHAIR*

Like many organisations, AWSG has been impacted by COVID 19 with the constraints it imposed on much of the work that we do. We have maintained our quarterly meetings through Zoom which has enabled the Committee to keep in contact and report on activities able to be pursued in periods of lock down and limits on movements nationally and internationally.

Nevertheless, we have maintained a range of activities directed towards the conservation of shorebirds and their habitats. The following matters provide a brief outline of the work and achievements over the last 2 years. Since Stilt 76, we have farewelled former Editor Imogen Warren and thank her for her major contribution to Stilt during her time with the Journal. We now welcome new Editor Inka Veltheim who has produced this 77th edition of Stilt.

Report on the 11th Meeting of the East Asian – Australasian Flyway Partners (EAAFP) – 12-17 March 2023

The 11th EAAFP Meeting of the Partners (MOP) took place in Brisbane Australia in March 2023 after an almost 5 years gap owing largely to COVID.

Dr Ilse Kiessling, Assistant Secretary , Protected Species and Communities Branch, Department of Environment and Water and Professor Martine Maron, President of BirdLife Australia officially opened the meeting. The MOP, co-hosted by the Australian Government and BirdLife Australia, proved to be very successful with about 170 attendees from National Governments, International NGOs and Intergovernmental NGOs in the Flyway as well as a number of local representatives.

As one of the Partners, AWSG is represented on the Shorebird Working Group, the CEPA Working Group and the Finance Sub-committee.

Outcomes from the MOP

It was announced at the MOP that the EAAFP is now the Official Partner to World Migratory Bird Day.

Memorials

Memorial tributes were given for Dr Lew Young, former CE of the EAAFP Secretariat and Dr Evgeny Syroechkovskyi, Russia, both of whom had sadly passed away since MoP10.

New Partners, Flyway Sites and Sister Sites

Two new Partners were welcome to the Partnership and presented with certificates – Hong Kong Bird Watching Society and the Mangrove Foundation. Eleven new Flyway Network Sites were added to the Network from Australia, Cambodia, Japan, Myanmar, China and the Republic of Korea (RoK). Certificates were also presented for new Sister sites between Incheon (RoK) and Hong Kong, and Saga Japan and Alaska.

Decisions from the MoP

Eleven decisions were passed by the MoP including adoption of the CEPA Action Plan; new Guidelines for National and Site and Sister Site Partnerships, Maintaining up to date Population Estimates and Trends of Migratory Waterbird Populations; Youth mainstreaming in the EAAFP, Monitoring and Reducing the Impact of HPAI and other Avian Diseases along the EAAF, and adoption of a Single Species Action Plan for the Christmas Island Frigatebird. A budget for the Secretariat was adopted after considerable effort to get it to a stage that acknowledges available resources but also focuses on the need for national Partners (governments) to do more to support the Strategic Plan and resourcing needs.

Side Events

A number of successful presentations and 11 side events were held as well including the Regional Flyway Initiative sponsored by the ADB, the World Coastal Forum, BirdLife International, and the EAAFP Secretariat; two side events on the revised CEPA Action Plan and the new Guidelines for National, Site and Sister Site partnerships; “Green Energy and Conservation of Migratory Birds”; a session on youth and how youth can better engage with the Partnership; and progress on work on conservation of the Spoon-billed Sandpiper.

Australasian Shorebird Conference (ASC) – October 2022

Since the publication of Stilt 76, one of the major undertakings of AWSG was the organisation of the 12th Australasian Shorebird Conference (ASC) in October 2022 as an on-line conference hosted jointly by the Queensland Wader Studies Group (QWSG) and the AWSG. COVID had resulted in a 2-year postponement of our traditional face-to-face conference format and so to avoid ongoing postponements the QWSG and AWSG resolved to go online with the Conference.

The theme for the ASC was “Global Strategies Local Actions” in the East Asian Australasian Flyway (EAAF) with a particular focus on what has been happening since the 11th Australasian Shorebird Conference held in Hobart in 2018. The Conference Program had 5 key themes: (1) the EAAF Site Network, (2) Conservation and Monitoring, (3) Pollution and Disturbance Impacts, (4) Shorebird Movements, and (5) Communication for Shorebird Outcomes.

Speakers participated from a range of Flyway countries including China, Malaysian Borneo, New Zealand, Japan, the US, and across Australia. As a first-time venture into the on-line world of conferences we were very pleased with the quality and variety of

presentations that did more than justice to the Conference theme.

Papers from the ASC will be produced in forthcoming editions of Stilt.

Monitoring Yellow Sea Migrants in Australia (MYSMA): 2022 update

The Monitoring Yellow Sea Migrants in Australia project (MYMSA) is a joint AWSG and WA Government shorebird count project in North-western Australia, led by Chris Hassell and Danny Rogers and carried out by a 9-person team including both contractors and volunteers.

In 2004, MYSMA started to carry out an annual winter count (late June to early July) and two annual summer counts (November to early December). Each survey involves 5 days of fieldwork plus a day of travel. In 2018, after consultation with the main funders, the Western Australian Department of Biodiversity, Conservation and Attractions (DBCA), the program was reduced to one winter count and one summer count each year, following an analysis by Rogers et al. (2020) that demonstrated that the reduced program would bring costs down by ~40% with little impact on our capacity to detect change. The report by Rogers et al. (2020) provides much additional information on shorebird monitoring in North-western Australia; it is available online at https://www.ari.vic.gov.au/__data/assets/pdf_file/0035/489644/ARI-Technical-Report-313-Review-of-long-term-shorebird-monitoring-in-north-Western-Australia.pdf

The North-West Australian study site, comprising all of Roebuck Bay and the northern 80 km of Eighty Mile Beach, is the premier non-breeding region for shorebirds in the East Asian Australasian Flyway, both in terms of diversity and absolute numbers. Monitoring shorebirds in this region is a vital 'barometer' of the health of shorebird populations in the East Asian Australasian Flyway and provides important data relevant to shorebird conservation in the region.

In summer, MYSMA counts involve counting between 200,000 and 350,000 shorebirds (also gulls and terns) during high tides that seem all too brief! For this reason, the counts are planned carefully, and undertaken in consistent tide conditions by a team of very experienced counters and scribes. In recent years, the counts have been funded by DBCA, an arrangement we hope to maintain long into the future.

The 2022 surveys (in June and early December) went smoothly. Shorebirds are monitored at three separate sites: A 60 km stretch of Eighty Mile Beach, northern Roebuck Bay, and Bush Point. All three sites have been of major importance to shorebirds throughout our survey period. Encouragingly, the overall number of shorebirds has remained reasonably consistent at all three sites since 2004. Trends have differed between species. The most worrying long-term declines have been in Bar-tailed Godwit, ssp. *menzbieri*. On the other hand, the threatened Eastern Curlew (declining in most of its range) has shown little decline in north-western Australia and may even be increasing slightly; and declines in Curlew Sandpiper and Terek Sandpiper in the 2000's seem to have stabilised. Several species have shown periods of both decline and increase, including the Pacific Golden Plover and Great Knot.

The information obtained in MYSMA surveys provides valuable insights into the trends of shorebirds in our flyway. It is also used to inform local site management, including control of roost disturbance and identification of key areas that are accorded high conservation status in marine park zoning.

North-West Western Australia Shorebird and Tern Research Expedition

The annual expeditions AWSG runs in NW WA have been significantly impacted by COVID constraints but an expedition was run in October 2022 and planning is in train for the next one in 2024. Reports on these will be provided in Stilt 78.

Significant Shorebird Awareness Raising Projects

Two major awareness raising projects are actively focused on the story of shorebird migration. They are:

"Wing Threads: Flight Around Oz" Project

Micro flight pilot Milly (Amelia) Formby is undertaking an impressive flying adventure called "Wing Threads: Flight Around Oz" to raise awareness about shorebird migration. Setting off from the shorebird capital, Broome, Western Australia, the first leg of her flight started in May 2022 and will finish next month in Petth. The distance of her entire flight will be about 20,000 kilometres, similar to the shorebirds' annual migration. On her way Milly stopped at schools and libraries to share A Shore bird Flying Adventure with local communities in over 70 towns.

In 2019, CSIRO Publishing commissioned Milly to capture the message of the shorebirds and her dream to follow them on migration through "A "Shorebird Flying Adventure" which is a 32-page, non-fiction story book aimed at mid-primary students. It is written by acclaimed Australian author, Jackie Kerin and illustrated by Milly Formby. The main character, Microlight Milly, takes readers on a flying adventure along the East Asian-Australasian Flyway showing them why shorebirds are so awesome.

Milly's presentation about her flying adventure to the 11th Meeting of the East Asian – Australasian Flyway partnership was received with considerable interest and enthusiasm.

Overwintering Mapping Sanctuary Project

This project coordinated by Kate Gorringe-Smith is about migratory shorebirds that spend a large part of their year on the shores of Australia and NZ To

participate in the project artists from Australia and NZ are asked to respond to the unique nature of their local migratory shorebird habitat and invited to create an intricate and personal map of precious shorebird habitat. To date over 200 artists from around Australia and NZ have joined the project which is expected to continue for at least 3 years. Artists who join the project donate 2 prints from the same edition, one to exhibit in ongoing Overwintering Project Exhibitions and one to sell to raise funds for shorebird conservation.

The project donated to AWSG $10,000 (2019), $13,000 (2020), $14,000 (2021) and $5,000 2022 to date). $10,000 of the funds were allocated to the purchase of satellite trackers for the Oriental Pratincole project. AWSG is immensely grateful to Kate for her great fundraising efforts to assist AWSG research activities.

Information Dissemination on Shorebirds

AWSG produces Tattler, a Newsletter for the Asia Pacific Flyways and the Australian Shorebird Monitoring Program and Stilt, a journal for the East Asian-Australasian Flyway on research and conservation. AWSG/BirdLife Australia websites promote and raise awareness about conservation of migratory shorebirds.

The QWSG in 2021 launched its new website (WWW.waders.org.au). It hosts a successful Social Media Facebook site attaching a weekly national and international audience of between 1000 and 40,000. QWSG members and peak organization receive a quarterly newsletter (available electronically and in paper form) with a focus on citizen science activities. Members of QWSG regularly contribute articles for the press and both national and international shorebird organizations.

The Victorian Wader Studies Group (VWSG) produces the VWSG Bulletin, a Journal of the VWSG. The bulletin is usually published on the date of the Annual General Meeting and contains reports and cumulative records of fieldwork of the Victorian Wader Study Group with articles, field notes and other material. Line illustrations are reproduced from the Australasian Wader Studies Group journal, "Stilt" with permission of the editor unless otherwise indicated.
VWSG also has a Twitter account that is a great way for the VWSG to share its work with the community including a variety of content, all limited to 280 characters. To highlight the VWSG capture program, the account shares short snippets from expeditions and catches including the King Island expedition, South Australia expedition, Cannon net training day, and many other catches. The scientific community is very active on Twitter, sharing and promoting the scientific studies VWSG contributes to, both as journal article but also conference presentations.

Capacity Building

A range of shorebird-related capacity building activities have been conducted around Australia.
VWSG has run training days at least twice annually and AWSG has trained local indigenous rangers that attended annual Field Expeditions to NWA. In January 2023, training in cannon-netting was conducted.

BirdLife Australia regularly deliver workshops and field training session to a variety of stakeholders on Migratory Shorebird Ecology and Identification, and Bird Survey Techniques. As an estimate, they have undertaken at least 5-10 events per year between 2018 and 2022, with participant numbers ranging from small groups (5) to large in person workshops (25-30), and online workshops attracting between 50-100 participants. Coastal and wetland communities across the country have been engaged and upskilled to foster an interest in local conservation efforts while recruiting volunteers for the National Shorebird Monitoring Program and supporting the dedicated efforts of existing volunteers.

Additionally, Migratory Shorebird and Key Biodiversity Area (KBA) teams at BirdLife have engaged traditional owners and indigenous groups towards collection of shorebird data in a series of workshops held in NT/QLD. Training workshops have also been successfully conducted in Esperance (WA) with the Tjaaltrjaak Rangers who were awarded the 2020 BirdLife Indigenous Ranger Grant. On ground training supports their aim of identifying and monitoring waterbirds, including shorebirds, to contribute to the management of regional wetlands.

During the COVID-19 pandemic when in-person events were restricted, online migratory shorebird workshops were delivered with great success- with many participants giving extremely positive feedback and signing up for updates on the National Shorebird Monitoring program. In 2022 BirdLife ran a two-day training course for the Corner Inlet Flyway site that included a range of skills critical to effective and targeted monitoring such as shorebird ID, leg flag reading, nest finding, plant ID, prints/tracks ID, use of GPS units and Birdata.

BirdLife Australia and its affiliates have developed materials towards training and in accordance with the CEPA program to educate a range of audiences, raise awareness, and upskill volunteers with general interest in shorebirds and those taking part in National Monitoring Program. Materials include Bird Identification booklets and posters as well as Wing Thing Educational kids' magazine.

Furthermore, Birdlife Australia implements Site Action Plans (SAPs) for priority internationally and nationally significant habitat for migratory shorebirds where funding has been secured for implementation in Victoria, South Australia, and New South Wales. These action plans are produced in collaboration with land managers and communities to identify threats and key management needs for migratory shorebirds at specific sites.

In 2019, shorebird monitoring and identification training was conducted with community participants at Lee Point beach, Casuarina Coastal Reserve in Darwin with volunteers by Northern Territory Field Naturalists' Club, BirdLife Top End. In 2019-21, Community Care of shorebirds in the Casuarina Coastal Reserve – received a grant of $20,000 from the Communities Environment Program to install educational signage in the Casuarina Coastal Reserve, hold community engagement events, and create an educational book called Living with Migratory Shorebirds at Lee Point book. In 2021, a Birdata workshop was conducted to train volunteers in the use of birdata as a data collection app to be used on shorebird surveys. (BirdLife Top End).

Development of the Birdmark database

A major initiative undertaken by Deakin University and AWSG involved the development of Birdmark, a database that encompasses into one database the banding, leg-flag and tracked data on shorebirds collected over many by AWSG, VWSG and QWSG. Birdmark also includes resightings information.

Counts are held nationally by Bird Life Australia as part of the National Shorebird Monitoring Program; this data is "shared" by downloads to state government conservation agencies. Analysis is carried out under contract with funds from the Commonwealth. VWSG and AWSG have a combined dataset that contributes to the analysis of survival. This data is shared with the Commonwealth.

QWSG provides data from its monthly and other specific site surveys through data sharing agreements with the Queensland State Government through the Wildnet Portal and with Birdlife Australia shorebird data base for use nationally and internationally. Flag sighting at shared with the Birdmark Portal.

The VWSG and AWSG are collecting data on timing of migration in a number of species, also taking morphometric information. These data have shown that some species are migrating at least two days earlier and that body size has decreased over the last 10 years.

Far-Eastern Curlew Project in Darwin Harbour

Prof. Stephen Garnett and Prof. Richard Fuller (Charles Darwin University and the University of Queensland) received funding from the Threatened Species Recovery Hub (National Environment Science Program) and additional funding from Darwin Port to conduct research on understanding the ecological requirements of Far Eastern Curlew in Darwin Harbour alongside coastal development. Amanda Lilleyman has been employed to manage project. https://www.nespthreatenedspecies.edu.au/projects/strategic-planning-for-the-far-eastern-curlew

National Latham's Snipe Project

The Latham's Snipe Project is in its ninth year, having commenced in south-west Victoria in 2014 with local surveying of a range of urban and non-urban sites. The project expanded nationally in the following 2 years and there are now over 300 monitoring sites surveyed three times a year throughout eastern Australia. This monitoring has revealed large fluctuations in population sizes depending on rainfall and climate in each year. It has also identified over 60 sites that meet the Australian Government Environment Protection and Biodiversity Conservation Act threshold for nationally important habitat (18 birds). The majority of these sites occur in urban areas and have no formal protection. It is likely the lack of protection of Latham's Snipe habitat and the continued loss of wetlands in Australia (especially in urban areas), combined with population declines detected in Japan in previous years, that the species may face a conservation crisis in the near future. The IUCN listing was amended to Near Threatened in 2022.

The Latham's Snipe Project has also included a movement research program, aimed at determining migration routes and key stopover sites, as well as understanding local patterns of movement of non-breeding birds in Australia. A combination of light-level geolocators, VHF radio tracking and satellite tagging has revealed direct over-ocean flights between Japan and Australia. Some birds used the Papua New Guinean highlands as a staging site on northward migration, and some use lowland area for stopover on southward migration. The Wild Bird Society of Japan has also been tagging snipe in Hokkaido and has successfully obtained 5 full migration tracks. The terminus locations used by tagged snipe in Australia were highly variable, with some individuals using urban areas (e.g. western Sydney) and others using rural (agricultural), coastal and alpine areas. Key staging sites located in Australia from combined tagging data included Cape York Peninsula, Gwydir wetlands (northern NSW), intensive production areas of the Murrumbidgee and Lachlan regions in NSW, and the Queensland central coast.

A new PhD project commenced in the ACT in 2022 aimed at obtaining a greater understanding of local movement patterns and habitat use by the species. The Latham's Snipe Project is supervised by Dr Birgita Hansen.

Conclusion

As can be seen from the wide range of items covered in this report, AWSG has managed to pursue its goals of shorebird research, monitoring, data collections and action aimed at the conservation of shorebirds and their habitats.

I would like to extend my appreciation to the Committee for all their efforts and dedication over the last two years in contributing to an extensive work

program on shorebirds both in Australia and in the Flyway.

Special recognition is due to Dr Roz Jessop who has been awarded the Hobbs Memorial Medal for 2023 by BirdLife Australia for her significant contribution to shorebird research and to Maureen Christie who was awarded the 2021 **Australian Wildlife Society, Serventy Conservation Award** for over 27 years work in conserving South Australia's shorebirds, the 2023 Australian Natural History Medallion, and an Order of Australia Medal for her dedicated work in shorebird conservation..

I would also like to recognize the tremendous contribution by all the volunteers and supporters who engage in the monitoring and counting of shorebirds and the major contribution they make to the knowledge and understanding about shorebirds.

Alison Russell-French OAM
Chair, Australasian Wader Studies Group

*Editor's note: This note is from the out-going chair of the AWSG. Alison Russell-French finished in the role on 30 June 2024. Robert Bush is the incoming new chair as of 1 July 2024.

MARVELLOUS MAVIS

MAVIS PATRICIA RUSSELL 6TH FEBRUARY 1924 – 19TH SEPTEMBER 2022

Mavis Patricia Russell came to Australia from the United Kingdom and first settled in Glenelg SA. Her teaching specialisms were geography and special needs education.

On retirement Mavis moved to Western Australia and was able to peruse her interests in bird watching and bird research. She became a regular "relief" warden at the then Royal Australasian Ornithologists Union (now BirdLife Australia) bird observatories at Rotamah Island in Victoria, Barren Grounds in NSW, and Broome Bird Observatory in WA. This role involved looking after the observatory while the wardens were on annual leave – up to six weeks in the mid-summer of north western, WA.

Broome soon became Mavis' favourite observatory, and she was a regular attendee from 1991 onwards. As both a guest and an assistant helping to run the observatory's 5-day courses focusing on shorebirds, but not ignoring the terns and passerines!

Mavis (with binoculars) on the July 1991 BBO Wader Course run by founding wardens Bryce Wells and Gail Wells (nee Hooper) (BBO archives).

From 1997 she participated in the Benthic Invertebrate Mapping of Roebuck Bay and 80 Mile Beach 1997, 1999, 2000, 2002 and 2016. These extravaganzas were coordinated by Theunis Piersma and Grant Pearson, great friends of Mavis'.

Mavis taking a ride in the two-person hovercraft used for mud sampling at Roebuck Bay (BBO archives).

Mavis also came on Australasian Wader Studies Group Shorebird and Tern Expeditions in 1998 and attended as a local volunteer in many other years. A true stalwart of our group.

Mavis on AWSG Expedition Broome (BBO Archives).

Mavis described her time at Broome as: "some of the happiest days of my life among the migratory shorebirds and their researchers".

Mavis was also involved in bush bird banding projects near Perth, Broome Bird Observatory, Coconut Wells, and the western desert. Mavis never lost her passion for birds.

Personal recollections from Chris Hassell, Global Flyway Network.

At some stage I started to call Mavis, Marvellous Mavis and, that eventually just became Marvellous.

Some of you in the 'older' bracket will have known of or known Mavis personally. The 'younger' cohort need to buck your ideas up! That is very much something Mavis would have said!

She was 98 years old when she died so, very much from a different generation.

I first met Mavis in 1996 and she was full of life, energy, bossiness (I don't mind that) and if she wasn't birding was trying to wangle a cup of tea and a game of cribbage. I had many cups and games with her over the years. I won every single game of cribbage and don't let Mavis tell you any different! Mavis had a great sense of humour and was as 'sharp as a tack' till near her final months.

When I was first at BBO, with Janet Sparrow, Mavis was a huge help to us in many ways. Mavis single-handedly looked after BBO in the middle of wet season of 199798 when she was already not a young person. The only thing I could mention, if I was that way inclined, was that on the day we returned in late January, Mavis had booked in a fully catered guest (yes, we did use to cook for guests, even a single one!!) and thought the first meal for them should be roast lamb?!?! So. we duly fired up the stove and cooked it in the shade house.

Mavis taught me a lot about passerine banding. And, eventually, I hope I taught Mavis a bit about shorebirds.

I wasn't friends with Mavis for 26 years without the odd cross word but that's no surprise if you know both of us. Those odd words never stopped a deep affection I held for Mavis, and I sincerely hope she held for me.

Mavis was very generous to GFN over the years as a financial donor and cheerleader for what we are trying to achieve.

Marvellous indeed.

Chris Hassell and Roz Jessop

TREASURER'S REPORT FOR 2021

At the end of 2021, the balance of funds for MYSMA was -$2151.18
Other expenses includes EAAFP contribution ($2867.79), and website / leg flag database costs ($5497.97).

Australasian Wader Studies Group
Income and Expenses
1 January 2021 - 31 December 2021

INCOME			EXPENSES		
Item	**2021 $**	**2020 $**	**Item**	**2021 $**	**2020 $**
Balance brought forward	$ 83,318.10	$ 81,336.93	Printing	$ 3,346.82	$ 626.25
Subscriptions	$ 8,048.59	$ 9,835.53	Postage/courier	$ 2,212.27	$ 798.36
Contracts - State Govts.	$ -	$ -	Surveys/reports/monitoring	$ -	$ -
Contracts - Other	$ -	$ -	Travel/accommodation/meals	$ -	$ 294.55
Donations	$ 20,010.00	$ 13,010.00	Conferences	$ -	$ -
Conference/meetings	$ -	$ -	Donations	$ -	$ -
Other income	$ -	$ 205.19	Equipment/consumables	$ 542.72	$ -
			Consultant fees	$ 4,519.87	$ -
			Admin & bank fees	$ 952.88	$ 657.15
			Other expenses	$ 9,416.76	$ 18,693.24
Total income	$ 28,058.59	$ 23,050.72	Total expenses	$ 20,991.32	$ 21,069.55
Total accumulated funds	**$ 111,376.69**	**$ 104,387.65**		**$ 111,376.69**	**$ 147,160.24**
Balance carried forward	**$ 90,385.37**	**$ 83,318.10**			

Membership statistics:

Membership at the end of the year was:	**2021**	**2020**
Australia/New Zealand	181	235
Overseas (excl. NZ)	4	13
Institutions	0	0
Complimentary	71	56
Total	**256**	**304**

This summary of income and expenses for the past year is not an audited statement. It has been prepared for the information of AWSG members from records of transactions provided by BirdLife Australia relating to the Australasian Wader Studies Group.
The AWSG is a special interest group of BirdLife Australia and members who wish to see the audited accounts of BirdLife Australia should refer to the Concise Financial Report included in the BirdLife Australia Annual Report.

TREASURER'S REPORT FOR 2022

At the end of 2022, the balance of funds for MYSMA was -$2151.18
Other expenses includes EAAFP contribution ($2993.38), and website and leg flag database costs ($5200)

Australasian Wader Studies Group
Income and Expenses
1 January 2022 - 31 December 2022

INCOME			EXPENSES		
Item	**2022 $**	**2021 $**	**Item**	**2022 $**	**2021 $**
Balance brought forward	$ 90,385.43	$ 83,318.10	Printing	$ 652.27	$ 3,346.82
Subscriptions	$ 7,894.52	$ 8,048.59	Postage/courier	$ 859.82	$ 2,212.27
Contracts - State Govts.	$ -	$ -	Surveys/reports/monitoring	$ -	$ -
Contracts - Other	$ -	$ -	Travel/accommodation/meals	$ -	$ -
Donations	$ 11,787.52	$ 20,010.00	Conferences	$ 15,270.57	$ -
Conference/meetings	$ 8,079.03	$ -	Donations	$ -	$ -
Other income	$ 163.15	$ -	Equipment/consumables	$ 30,808.64	$ 542.72
			Consultant fees	$ -	$ 4,519.87
			Admin & bank fees	$ 561.32	$ 952.88
			Other expenses	$ 8,726.14	$ 9,416.76
Total income	$ 27,924.22	$ 28,058.59	Total expenses	$ 56,878.76	$ 20,991.32
Total accumulated funds	**$ 118,309.65**	**$ 111,376.69**		**$ 118,309.65**	**$ 147,160.24**
Balance carried forward	**$ 61,430.89**	**$ 90,385.37**			

This summary of income and expenses for the past year is not an audited statement. It has been prepared for the information of AWSG members from records of transactions provided by BirdLife Australia relating to the Australasian Wader Studies Group.
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THE STATUS OF GULL AND TERN SPECIES IN THE HUNTER ESTUARY

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The Hunter Estuary is well known for its importance for migratory and resident shorebirds but its relevance for other species that visit the estuary or that migrate within the East Asian-Australasian Flyway (Flyway) has been less clear. Systematic surveys in the estuary from 1999 to 2021 recorded one gull (Silver Gull *Larus novaehollandiae*) and nine tern species (Little Tern *Sternula albifrons*, Common Gull-billed Tern *Gelochelidon nilotica*, Australian Gull-billed Tern *G. macrotarsa*, Caspian Tern *Hydroprogne caspia*, Whiskered Tern *Chlidonias hybrida*, White-winged Black Tern *C. leucopterus*, White-fronted Tern *Sterna striata*, Common Tern *S. hirundo* and Greater Crested Tern *Thalasseus bergii*). No species was present in significant numbers relative to their estimated total populations. Vagrant species recorded in the same period were Pacific Gull *L. pacificus*, Sooty Tern *Onychoprion fuscatus* and Bridled Tern *O. anaethetus*. Several tern species undertake regular movements either within Australia or over a larger portion of the Flyway. Here, we analyse long-term trends for common species and compare numbers across seasons. We identified a statistically highly significant decrease in Silver Gull numbers and increases in five tern species, three of which, Australian Gull-billed Tern, Caspian Tern and Whiskered Tern, may have benefitted from the expansion of estuarine habitat through recent rehabilitation projects.

INTRODUCTION

The Hunter Estuary is known to be an important site in the East Asian–Australasian Flyway (Flyway) for migratory shorebirds, and the most important in New South Wales (Weller *et al*. 2020). This has been the case for a long time; for example, Lane (1987) named the estuary as a top-20 site Australia-wide for 14 shorebird species including 12 migratory species, while Smith (1991) nominated it as the most important shorebird site in NSW. However, the estuary also hosts many species of gulls and terns, including several that migrate within the Flyway. The use of the estuary by gulls and terns has not been investigated since the short to medium-term monitoring programs in the 1960s and early 1970s.

Since April 1999, members of the Hunter Bird Observers Club Inc. (HBOC) have undertaken monthly surveys of shorebirds and waterbirds in the estuary. Several reviews have addressed aspects of the estuary's shorebird populations based on these monthly surveys (e.g. Stuart *et al*. 2013; Choi *et al*. 2016; Stuart 2017; Stuart 2019; Jackson *et al*. 2020; Lindsey 2021; Stuart & Lindsey 2021). In this report, we present an analysis of gull and tern populations primarily based on the monthly survey results.

Prior literature about Hunter River Estuary gulls and terns

Gosper (1981) provided status reports based on his visits during 1970–73. He recorded nine species: Silver Gull *Larus novaehollandiae*, Little Tern *Sternula albifrons*, Australian Gull-billed Tern *Gelochelidon macrotarsa*, Caspian Tern *Hydroprogne caspia*, Whiskered Tern *Chlidonias hybrida*, White-winged Black Tern *C. leucopterus*, White-fronted Tern *Sterna striata*, Common Tern *S. hirundo* and Greater Crested Tern *Thalasseus bergii*. Little Tern was the only species reported to have any local breeding records – a pair was feeding fledged young at Stockton in January 1973.

The same nine species were recorded by van Gessel and Kendall during their frequent surveys spanning 1969–1977 (Kendall & van Gessel 1972; van Gessel & Kendall 1972a; 1972b; 1974; 2015). Holmes (1970), when reporting his surveys from the late 1960s, also listed the same species, adding two more: Black Tern *C. niger* and Kelp Gull *L. dominicanus*. Black Tern was a vagrant with two records in 1968 (January and March) of what was probably the same bird. Kelp Gull was frequently present (1–2 individuals). At around that time, the Kelp Gull was breeding on Moon Island near Swansea (Gwynne & Gray 1959).

Herbert (2007) summarised the known records for the same nine species as reported by Gosper, with a focus on the data from HBOC's 1999–2007 estuary surveys. His report also included records from non-tidal wetlands in the lower Hunter Valley (e.g. Grahamstown Dam, Woodberry Swamp, Warabrook Wetland). There were no recent breeding records for any of the species.

METHODS

A detailed description of the survey protocols is available in BirdLife Australia (2021). Species nomenclature follows BirdLife Australia Working List of Australian Birds; Version 4.1 (2022).

Of the 264 scheduled surveys in the Hunter estuary in April 1999 to March 2021, only the June 2007 survey

was not conducted due to severe weather conditions. For 19 other surveys, there were access issues to some monitoring zones: 10 times at the Kooragang Dykes, five at Tomago Wetland and four at Hexham Swamp or some of the Kooragang/Stockton locations (Figure 1). Typically, gull and tern numbers at the latter sites were low, hence we included those nine survey dates in the data analysis. However, as gulls and terns often roosted at the Kooragang Dykes at high tide, we excluded data from the 10 survey dates when the dykes had been inaccessible. Thus, in total we analysed 253 survey dates for the estuary.

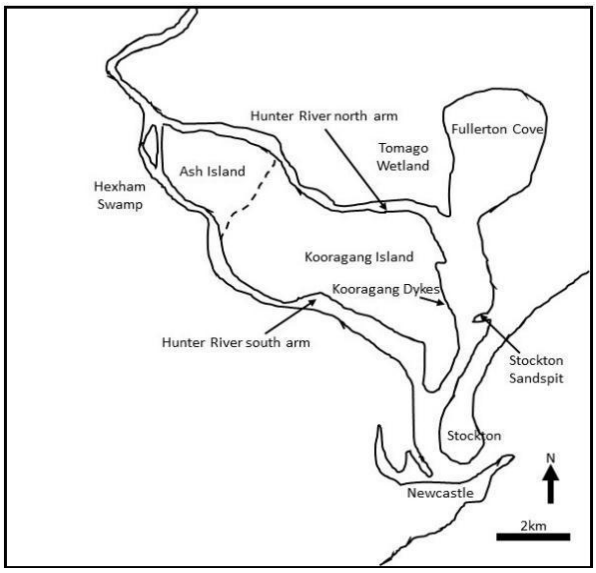

Figure 1. The Hunter Estuary in NSW (centred at 32º 51' S 151º 46' E) and the main zones that were monitored.

We developed a database for the monthly surveys and used standard MS Excel data analysis tools to identify changes. We selected time intervals for analysis and estimated population sizes by calculating means and standard errors with 95% and 99% confidence intervals. We calculated statistical significance using two-tailed t-tests assuming unequal variance, with $p < 0.05$ significant and $p < 0.01$ highly significant.

For seasonal analyses, we defined the seasons for records as: "autumn" (March–May), "winter" (June–August), "spring" (September–November) and "summer" (December–February). To screen assessments of long-term trends, we firstly analysed the combined seasonal results for two 11-year intervals. In case of significant differences we analysed the data for each month.

We reviewed the Hunter Region annual bird report series (e.g. Williams 2020) for records of uncommon and vagrant species. We extracted data about banded or flagged birds from the BirdMark portal (https://vhost2009.hosted-sites.deakin.edu.au/importing/import.php) and obtained supplementary information from Australasian Wader Study Group representatives.

RESULTS

Gull and tern species recorded in 1999–2021

Ten gull and tern species were recorded during the 253 monthly surveys (Table 1). Silver Gull was recorded in every survey and Greater Crested Tern in most surveys. Three tern species (Common Gull-billed Tern *Gelochelidon nilotica*, White-winged Black Tern and White-fronted Tern) each had only 1–5 records.

Table 1. The number of times gull and tern species were recorded in scheduled monthly surveys in the Hunter Estuary in 1999–2021. Reporting Rates (RR) are calculated by dividing the number of records by the number of surveys expressed as a percentage.

Species	No of records	RR (%)
Silver Gull	253	100
Little Tern	44	17.4
Common Gull-billed Tern	3	1.2
Australian Gull-billed Tern	136	53.8
Caspian Tern	214	84.6
Whiskered Tern	30	11.9
White-winged Black Tern	5	2.0
White-fronted Tern	1	0.4
Common Tern	44	17.4
Greater Crested Tern	232	91.7

Three other species were recorded within or on the outskirts of the estuary during 1999–2021 on non-survey dates: Pacific Gull *Larus pacificus*, Sooty Tern *Onychoprion fuscatus* and Bridled Tern *O. anaethetus*, with several records of the first two species (Table 2).

Table 2. Vagrant gull and tern species recorded in the Hunter Estuary in 1999–2021 outside the scheduled monthly surveys.

Species	Details
Pacific Gull	Single individuals in June 2011, Dec 2012, and June 2013. Two individuals in May 2015.
Sooty Tern	1–2 individuals in Feb 2010, Jan 2012, and Jan 2015. Many individuals in Jan–Feb 2013.
Bridled Tern	A single individual in January 2013.

Silver Gull

Based on the monthly counts, the Silver Gull population decreased after 2010 in the estuary (Figure 2). For example, there were several records of over 600 individuals in 1999–2010, but none subsequently.

Table 3. Mean counts for Silver Gull in the Hunter Estuary for different seasons and comparisons between seasons.

	Summer	**Autumn**	**Winter**	**Spring**	***p* winter-summer**	***p* spring-summer**	***p* winter-spring**
First 11 years	345	430	73	181	< 0.001	< 0.001	< 0.001
Second 11 years	206	223	44	84	< 0.001	< 0.001	0.002
p	< 0.001	< 0.001	0.068	< 0.001			

The decrease was consistent across all seasons and was statistically highly significant for summer, autumn and spring (two-tailed t-tests assuming unequal variance). On average, Silver Gull numbers were much lower in July–September than any other time of the year and the average counts peaked in March–April (Figure 3).

Australian Gull-billed Tern

When present in the estuary, typically 5–10 individuals of Australian Gull-billed Tern were recorded, but there were occasional influxes of 30 or more individuals (Figure 2). The population has been increasing. Since 2017, high winter counts included 99 individuals in July 2019 and 76 in June 2020.

The recent winter influxes raised the mean winter counts in 2011–2020 to 15 individuals, compared to 1–5 individuals in other seasons. Numbers were higher in June and July than for any other month, but there was considerable variability in the monthly numbers, particularly for March to September, because of the occasional larger influxes (Figure 3).

Caspian Tern

Caspian Tern was almost always present in the estuary (Figure 2), with seasonal variations, numbers increasing in February–July annually to peak in the autumn (Figure 3). For both 1999–2010 and 2011–2021, the increase in autumn numbers was found to be statistically highly significant when compared to the other seasons (Table 4). The population increase was also highly significant during summer and autumn.

Whiskered Tern

The Whiskered Tern was recorded on 31 surveys with 77% of the records being in the spring. There was one autumn record of two individuals in April 2005 and six summer records spanning five seasons. Although most of the summer records were of 1–3 individuals, 23 were recorded in January 2017 and 155 in December 2013. The latter was during an extended influx; high numbers were present in October–December that year, including 165 individuals in October, which was the highest count for the estuary. There also were 151 individuals present in October 2002, 94 in October 2014 and 103 in October 2017. There were no records in nine years between 1999 and 2011 (Figure 2). The overall numbers since then have increased (means of seven and 12 individuals for spring 1999–2010 and spring 2011–2020, respectively). However, the latter mean was inflated by the 2013 influx of up to 165 birds for three months.

Common Tern

In many years there were few or no Common Tern recorded, but there were several years with 30 or more individuals present with a peak count of 81 in February 2014 (Figure 2). Of the 44 overall records, 12 were in autumn, eight in spring and all the others were in the summer. Seven of the autumn records were in March including five records of 14–36 individuals. The other five autumn records, spanning March–April, were of 1–3 individuals.

Table 4. Mean counts for Caspian Tern in the Hunter Estuary for different time intervals and comparisons with counts from other periods using two-tailed t-test.

	Summer	**Autumn**	**Winter**	**Spring**	***p* autumn-summer**	***p* autumn-winter**	***p* autumn-spring**
First 11 years	2	10	6	3	< 0.001	0.005	< 0.001
Second 11 years	6	16	8	3	< 0.001	0.001	< 0.001
p	0.007	0.006	0.168	0.906			

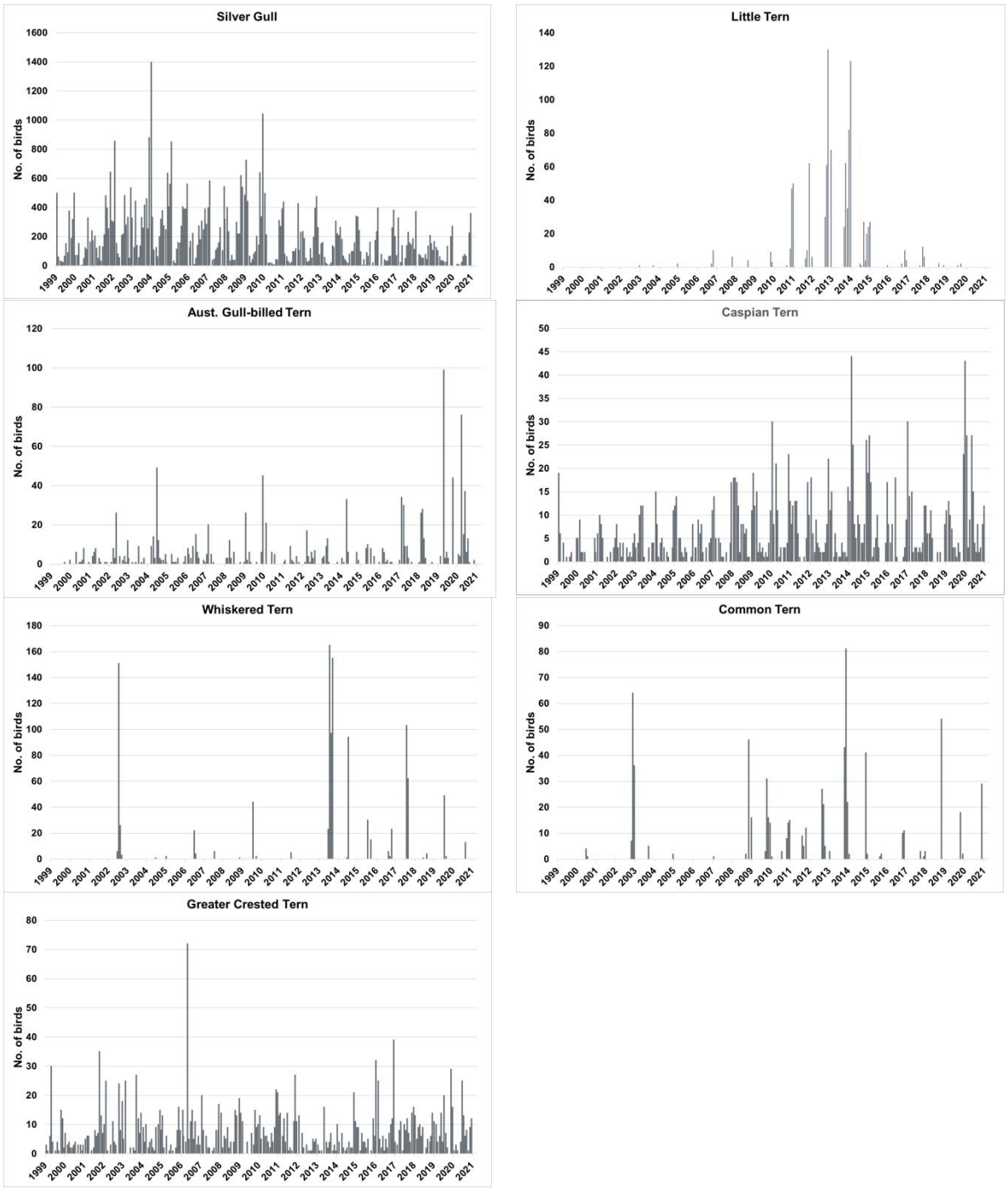

Figure 2. Monthly counts for the seven most-frequently recorded gulls and terns in the Hunter Estuary for the period April 1999 to March 2021.

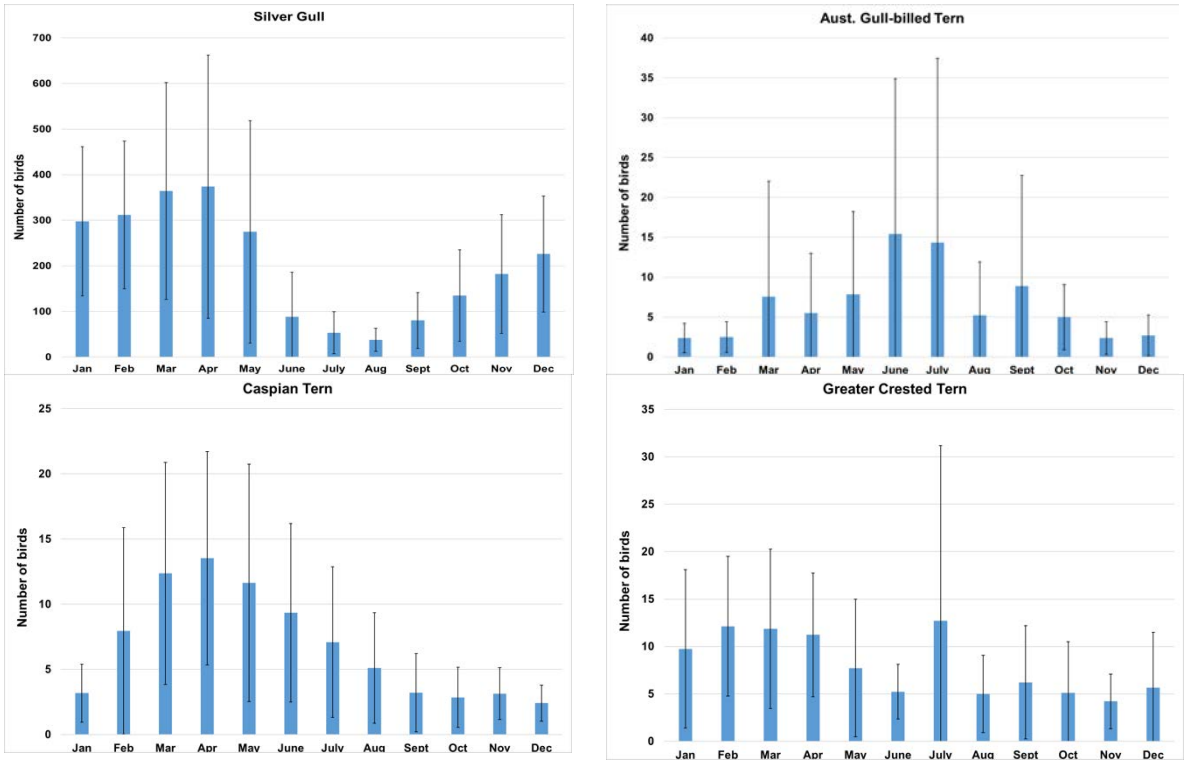

Figure 3. Mean monthly counts for selected gull and tern species. The error bars indicate ± 1 standard deviation.

Little Tern

Coincidentally, there were also 44 records of Little Tern with few or no records in most years and higher numbers in 2011–2015. There was a peak count of 130 individuals in January 2013 (Figure 2).

Seven of the records were in autumn, 12 in spring and all the others in summer. All of the autumn records were in March, sometimes involving high counts (50 individuals in March 2011, 70 in March 2013 and 123 in March 2014). Seven of the spring records were in November including the only two counts in spring of more than six individuals (30 individuals in November 2012 and 27 in November 2014). Thus, Little Tern were predominantly present in the estuary in November–March.

Greater Crested Tern

Greater Crested Tern was present in low numbers most months with occasional larger influxes (Figure 2). We did not detect a long-term trend. The highest count of 72 occurred in July 2006 but usually there were more individuals present in summer and autumn with mean counts of six and five birds, respectively, than in winter or spring with mean counts of six and five birds, respectively (Figure 3).

Infrequent visitors

There were five records of White-winged Black Tern: a single individual and 13 individuals in February and March 2003, respectively, and 1–2 in February 2012, December 2013 and January 2014. The three records of Common Gull-billed Tern during surveys occurred in summer 2020/21, all of a single bird. However, there were many records presumably of the same individual on non-survey dates. The only record of White-fronted Tern within the estuary was in July 2006 and involved a single roosting bird.

Status summaries and trends

Over 1999–2021, three species increased in abundance and the abundance of three other species decreased. The remaining five species either had stable populations or showed no conclusive trend (Table 5).

Table 5. Status in the Hunter Estuary of gull and tern species recorded in 1999–2021.

Species	Status	Seasonal pattern	Trend
Silver Gull	Regularly present	Autumn peak	Decreasing
Sooty Tern	Vagrant	Summer only	-
Little Tern	Regular visitor	Spring/summer peak	Now stable, after a substantial decrease
Common Gull-billed Tern	Uncertain	-	-
Australian Gull-billed Tern	Frequently present	Winter peak	Probably increasing
Caspian Tern	Frequently present	Autumn peak	Increasing
Whiskered Tern	Passage visitor	Spring peak	Probably increasing
White-winged Black Tern	Rare visitor	Summer	Decreasing
White-fronted Tern	Uncommon visitor	Autumn/winter	-
Common Tern	Regular visitor	Summer peak	Decreasing
Greater Crested Tern	Regularly present	Summer/autumn peak	Stable

DISCUSSION

The Hunter Estuary surveys are conducted at high tide driven by the objective of shorebird monitoring. This potentially leads to an incomplete picture for other guilds of birds, such as gulls and terns, because their foraging may be less influenced by tides. In particular, Australian Gull-billed, Caspian and Little Tern are often at Stockton sandspit during low tides (authors' pers. obs.) and could be overlooked during high tide surveys.

Based on our data, Silver Gull and Greater Crested Tern use the estuary consistently which is not unexpected for these common and widespread species. Five other tern species (Little, Australian Gull-billed, Caspian, Whiskered and Common Tern) use the estuary intermittently. Little Tern is listed as Endangered in NSW (*Biodiversity Conservation Act 2016*). No species were present in significant numbers relative to their estimated total global or Flyway populations (Wetlands International 2021).

The expansion of available habitat in the estuary as a result of rehabilitation projects aimed at restoring estuarine habitat at Stockton Sandspit, Ash Island, Hexham Swamp and Tomago Wetland (Stuart & Lindsey 2021) may have benefitted Caspian, Australian Gull-billed and Whiskered Terns.

Silver Gull

The Silver Gull population in NSW rose substantially during the 20th century – this increase was linked to an increased availability of food waste from expanding human populations (Smith & Carlile 1993, Smith 1995). It was suggested at the time that the best long-term solution was reduction of food availability in conjunction with a population reduction program, e.g. at waste management centres (Temby 2000).

During the 1970s, Silver Gull had become very common in the Hunter Estuary with 1,000–2000 individuals present at all times (Gosper 1981). The 1999–2021 surveys indicated a decrease, particularly after 2010, possibly linked to changed waste management practices. A modern waste management centre, Summerhill, was opened in Newcastle in the mid-1990s replacing two older waste centres. Management practices at Summerhill include covering waste during the day as loads are dumped and covering the whole site at night. Although considerable numbers of Silver Gull still forage there (O. Gallagher pers. comm.), the overall food availability has decreased. Inland rainfall patterns may also have affected Silver Gull numbers as fewer gulls visit the Summerhill waste management facility during drought (O. Gallagher pers. comm.).

Greater Crested Tern

This mainly coastal species, which was present in the estuary throughout the year, is widespread in Australia (Higgins & Davies 1996). Although McLeay *et al.* (2010) reported that Greater Crested Terns did not make large-distance movements, banding studies in NSW in the 1950s found that young and adult birds dispersed north and south from colonies mostly within about 400 km but some up to 1,000 km from their colony (Carrick *et al*. 1957). Similarly, Cooper *et al.* (2016) reported movements of over 2,000 km by young birds.

We detected no long-term trend in Greater Crested Tern numbers in the estuary. The population seems to be stable here, unlike in Western Port in Victoria, where their numbers have decreased probably due to reduced food availability. However, these declines may have been due to a redistribution of feeding areas not to a general decrease (Menkhorst *et al.* 2015). Greater Crested Tern breed on off-shore islands and chicks generally fledge in late December and early January (Higgins & Davies 1996). Adults and fledged young returning from island breeding sites e.g. Broughton Island, approximately 60 km north-east of the estuary, may be responsible for higher numbers in summer and autumn.

Australian Gull-billed Tern

Australian Gull-billed Tern breeds in inland Australia and is highly dispersive with movement northwards in winter, although at some sites in southern Australia they appear to be more abundant in winter (Higgins & Davies 1996). During the 1970s, this species was present in the estuary all year roundbut more common in winter (Gosper 1981), similar to our results. Surveys in Port Stephens north of Newcastle (Stuart 2020) and systematic surveys on Worimi Conservation Lands, situated between the estuary and Port Stephens show a similar pattern although numbers at the former site often peak in spring (https://birdata.birdlife.org.au/).

Caspian Tern

Movements of this species in Australia are poorly known and they are considered to be partly resident, dispersive and migratory (Higgins & Davies 1996). In the estuary, surveys indicate that Caspian Tern is more common in autumn and winter than other seasons. In Port Stephens north of Newcastle, it is similarly more common in winter (Stuart 2020).

Banding studies have shown that adults and young move long distances (Higgins & Davies 1996), confirmed by 48 observations of leg-flagged birds in the estuary in the past 22 years. Most of the sightings were from Stockton Sandspit and all birds carried an orange flag from Victoria, over 800 km to the south. Among them were five birds that had been banded as pulli (J. Driessen pers. comm.). The increase in numbers in the autumn may be a consequence of immature birds arriving in the estuary after leaving their natal sites. There is some support for this theory in that two of the five leg-flagged birds were first resighted in autumn in the estuary. The overall increase in population may also be a consequence of the expansion of suitable habitat in the estuary.

Whiskered Tern

The Australian sub-species *javanicus* is described as mostly migratory; it moves north and north-west to northern Australia, New Guinea, Indonesia and Borneo after breeding mostly in southern Australia (Higgins & Davies 1996). The survey results confirm its status in the estuary as a migratory species (Williams 2020). Whiskered Tern visits the estuary in spring presumably on its migration to breeding grounds in southern Australia. During the 1970s, it was irregular on the swamps of the Hunter River floodplain in winter (Gosper 1981). Although there were no winter records during the 253 scheduled monthly surveys between April 1999 and March 2021, single individuals were seen at Hexham Swamp in June 2020 and June 2021 (B. Watts pers. comm.; AL pers. obs.) and there are some eBird records for Hexham Swamp from earlier years (S. Gorta pers. comm.).

Common Tern

This migratory species breeds in the northern hemisphere and usually arrives in NSW in late September (Higgins & Davies 1996). Survey data show that the estuary serves both as a staging site in spring and autumn and a non-breeding destination in summer, with the peak numbers occurring in the summer. The highest count was 81 individuals unlike the reports from the 1970s of 500-plus birds each summer (Gosper 1981). Many large counts came from a roost site on Kooragang Island but these ceased after progressive destruction of the sitewhich was complete by 1972 (Maddock 2008).

Little Tern

The Australian sub-species *sinensis* has three populations (Higgins & Davies 1996; Fraser 2017), two of which could occur in the estuary: the eastern Australian population that breeds as early as September on sandy beaches in spring and summer on the east coast (Higgins & Davies 1996); and the Asian population that breeds in the austral autumn and winter and migrates to Australia in the austral spring and summer (Higgins & Davies 1996). Higher numbers in the estuary in spring and summer may be of migrating individuals and post-breeding individuals. For instance, an adult in breeding plumage that had been flagged in Japan was observed on Stockton Sandspit in October 2011, while in January 2014 adults with two fledged young were observed at Stockton Sandspit (https://birdata.birdlife.org.au). Although there are no records of breeding in the estuary since 1973 (Higgins & Davies 1996), successful breeding events occurred several times on the beach just to the north of the estuary near Fern Bay and on Worimi Conservation Lands along Newcastle Bight between 2009 and 2018 (Stuart 2009–2017, Williams 2019) and in Port Stephens (Fraser 2017, Stuart 2020). The 1973 record should not be treated as a breeding record from within the estuary as the parents were feeding fledged young and thus the natal site may have been elsewhere. Although the population now seems stable, this species has decreased in abundance in the estuary since the 1970s. At that time, it was described as a non-breeding summer visitor and 600-700 birds were recorded in the estuary (Van Gessel & Kendall 1974; Gosper 1981).

Infrequent visitors

There was only one record of White-fronted Tern within the estuary. This species is a regular winter visitor in low numbers to the Newcastle area; however, individuals prefer to roost around the Newcastle Rock Platform rather than inside the estuary (e.g. Williams 2020) and they forage at sea rather than within the estuary.

White-winged Black Tern numbers have substantially decreased in the estuary, as in the 1970s they were regularly recorded in November–March,

with a maximum count of 81 individuals in March 1977 and many records of 10–20 individuals (van Gessel & Kendall 2015). In February 1995, approximately 300 individuals were present in Fullerton Cove (Stuart 1996). However, since 1999 there have been few recordsand none during 2018-2021. All records since 2011 have been of 1–3 and usually they were of single individuals.

The first record of a Common Gull-billed Tern in the estuary occurred in late December 2017 (Stuart 2019). Since then, there have been dozens of records, mostly from non-survey dates. Although most of the subsequent records have been in the summer months, there have been three records in May-August (including one from a nearby beach) which suggest that this species now might be a resident around Newcastle.

Migratory and seasonal movement patterns

Most tern species recorded in the estuary undertake migrations or large-scale movements within the Flyway. The movements of Australian Gull-billed, Caspian and Greater Crested Tern are limited to within Australia, whereas Whiskered, Common, White-fronted, White-winged Black and Common Gull-billed Tern migrate to and from breeding grounds elsewhere in the Flyway (Higgins & Davies 1996, Rogers *et al*. 2005). The non-breeding range of the Little Tern population that breeds in eastern Australia is not completely known (Higgins & Davies 1996). White-fronted Terns breed in New Zealand and in the Furneaux Islands, Whiskered Terns in Indonesia, Borneo and Australia; and the other species breed in the northern hemisphere.

Although Caspian Terns were recorded in most surveys, their numbers peaked in autumn and winter in the estuary, consistent with a northern migration after breeding at southern breeding grounds particularly in Victoria and Tasmania. Also consistent with that post-breeding movement are the observations in the estuary of birds recently banded as pulli in Victoria.

The numbers of Australian Gull-billed Tern in the estuary peaked in winter, mirroring the results from a previous study (Gosper 1981), and numbers from the nearby Port Stephens estuary (Stuart 2020). This seems broadly consistent with the post-breeding dispersal of birds from inland areas. However, the frequent influxes of 30–100+ individuals appear to be linked to a combination of inland and local rainfall patterns. The presence of this species in the estuary might not be associated with a regular migration pattern but instead, might be driven by stochastic events.

Whiskered Tern numbers peaked in spring when birds presumably were migrating to southern breeding grounds. Before 2010, this species was uncommon in the estuary. Since 2010, there have been regular spring records, sometimes of 100 or more individuals, suggesting a more consistent use of the estuary, which appears to be linked to increased foraging opportunities on newly rehabilitated wetlands.

Common Tern was a regular visitor to the estuary in September–March, during the non-breeding season. Although this species breeds in the northern hemisphere, its breeding range is widespread and the natal origin of the individual birds that appear in the estuary is unknown. The only record of a marked bird was of an individual flagged at non-breeding grounds at the Gippsland Lakes in Victoria.

Little Tern was also a regular visitor to the estuary in September–March. The records include four birds that had been marked in Japan (Tokyo Bay), one in China (the Hainan – Guangxi area), and one in north-west Australia.

There were insufficient records of White-fronted Tern or White-winged Black Tern from the estuary to speculate about migration patterns. The former is a regular visitor to the Newcastle area, often in groups of 100–200 individuals, but it rarely uses the estuary, instead preferring to roost at the Newcastle Rock Platform and to forage at sea. They typically arrive at the end of May or early June and remain until early September.

The frequent presence of a single Common Gull-billed Tern since December 2017 is intriguing. This species breeds in Asia and migrates in modest numbers to northern Australia with some immature individuals remaining during the breeding season (Rogers *et al*. 2005).

CONCLUSION

Regular waterbird surveys 1999 to 2021 confirmed that Silver Gull and Greater Crested Tern were regularly present in the Hunter Estuary and that Australian Gull-billed Tern and Caspian Tern were frequent visitors. Little Tern, Common Tern and Whiskered Tern migrated through the estuary and some individuals stayed over the summer. Three other species, Common Gull-billed, White-winged Tern and White-fronted Tern, were each observed on fewer than five occasions.

None of the gull and tern species bred in the estuary nor had significant numbers recorded relative to their estimated total Flyway populations. Several factors may explain trends and seasonal fluctuations. In the case of Silver Gull, the decrease may be linked to improved waste management practices and to coastal and inland rainfall patterns affecting food availability. The latter may similarly have affected movements of Australian Gull-billed Tern. For Australian Gull-billed Tern, Caspian Tern and Whiskered Tern, the expansion of estuarine habitat through recent rehabilitation projects may have been beneficial.

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THE IMPORTANCE OF BINTUNI BAY IN WEST PAPUA, INDONESIA FOR MIGRATORY SHOREBIRDS

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The migratory routes of most shorebirds in the East Asian-Australasian Flyway (EAAF) include Indonesia, but there are many knowledge gaps about areas that are important during migration and in the non-breeding season. The purpose of this study was to report on the composition of migratory shorebird communities in the southern part of Bintuni Bay, West Papua, Indonesia. We conducted surveys in habitats suitable for shorebirds during the migratory season in February–March 2021 along the coast. We identified 2269 individuals of ten migratory shorebird species from the families Scolopacidae and Charadriidae. We also reviewed information from previous published surveys. A total of 16 shorebird species have been documented in Bintuni Bay. Key threatened EAAF species were the Endangered Far Eastern Curlew *Numenius madagascariensis*, and the Near Threatened Grey-tailed Tattler *Tringa brevipes* and Red-necked Stint *Calidris ruficollis*. Common Sandpiper *Actitis hypoleucos* was the most common shorebird species in Bintuni Bay and was estimated to be 1.58% of the EAAF population. Grey-tailed Tattler, Terek Sandpiper *Xenus cinereus* and Whimbrel *Numenius phaeopus* each exceeded 0.7% of their EAAF population. We conclude that Bintuni Bay may be a regionally and internationally important site for shorebirds. Efforts for conservation of the area should be improved to ensure the availability of habitat for these avian communities.

INTRODUCTION

New Guinea is recognised for its megadiversity, not only as the most floristically diverse island in the world (Cámara-Leret *et al.* 2020), but also for the high level of fauna diversity (Flannery 1995, O'Shea 1996, Pratt and Beehler 2014). The region is also important for global bird conservation, due to its central location within the migratory routes of shorebirds breeding in the Arctic (as well as further south) that use the East Asian-Australasian Flyway (EAAF) (Howes *et al.* 2003, Bishop 2006, Withworth *et al.* 2008). Flyways are an important management and conservation concept for migratory shorebirds, as these birds often stopover, rest, recuperate and feed in many countries within a flyway during their migrations between breeding and non-breeding grounds (Bishop 2006).

Bintuni Bay is located in West Papua Province, Republic of Indonesia and provides stopover and foraging habitat for migratory shorebirds in New Guinea (Erftemeijer *et al.* 1991). The bay is covered with large areas of mangrove and is the third largest mangrove forest in the world after the Sundarbans in Bangladesh–India, and Mimika in Indonesia (Gaveau *et al.* 2021), both of which are also characterised by extensive mudflats offering suitable habitat for migratory shorebirds. Mangrove forests in southern Bintuni Bay have been managed for timber extraction since 1988 (PT. BUMWI 2021). These forests can be sustainably used since the bay naturally receives a large amount of allochthonous, nutrient-rich sediment, which supports mangrove regeneration, increases mangrove survival and supplies natural seedlings and growth compared to other harvested tropical mangrove forests (Sillanpää *et al.* 2017, Sasmito *et al.* 2020, Yudha *et al.* 2022).

There have been very few targeted surveys of migratory shorebirds in Bintuni Bay. The first survey was conducted over three decades ago and recorded bird composition in different ecosystem types (Erftemeijer *et al.* 1991). Since then, several similar studies were conducted within the bay, but none specifically targeting shorebird roosting and foraging habitats or during the migratory season (e.g., Wajo 2010, Cita and Budiman 2019). Long-term monitoring of fauna in Bintuni Bay's mangroves was also carried out by Yudha *et al.* (2021), to assess the impact of logging in mangrove forests on flora and fauna communities. However, the survey was more focused on the production zone allocated for timber harvesting as opposed to the coast, where shorebird habitat is found.

Our study aims to determine the composition of the migratory shorebird community in Bintuni Bay during the 2021 northward migration season. We build upon the shorebird surveys conducted by Erftemeijer *et al.* (1991) 30 years ago to provide an updated baseline of migratory shorebird populations in Bintuni Bay. We identify where future site-specific shorebird surveys should occur and provide information to help assess the impact of peripheral timber harvesting activities on shorebird populations in Bintuni Bay.

METHODS

Study area

Bintuni Bay is located in the Bird's Head of New Guinea's big island and contains extensive mangroves of more than 220,000 ha (Gaveau *et al*. 2021). Our study was conducted in southern Bintuni Bay, within the concession area of PT. Bintuni Utama Murni Wood Industries (PT. BUMWI) (Figure 1). We surveyed shorebirds along the coast in the north part of the Forest Management Enterprise (FME) that is designated as a High Conservation Value Forest, intended to provide sufficient habitat for flora and fauna within the concession area (IDEAS Consultancy Services 2015, PT. BUMWI 2021). Surveys targeted three locations in the northern side of the FME (Figure 2), containing suitable habitat suitable for migratory shorebirds in the eastern, central and western sections of the FME. The northern part of the concession area closest to open sea was characterised by large intertidal mudflats extending from the edge of the mangrove forest towards the ocean. Mangrove forests in Bintuni Bay are generally dominated by *Rhizophora apiculata*, *Bruguiera parviflora*, *Bruguiera gymnorhiza*, *Rhizophora mucronata* and *Ceriops tagal*, these five species accounting for 93% of total species composition in primary mangrove forests of Bintuni Bay (Sillanpää *et al*. 2017, Yudha *et al*. 2021, Yudha *et al*. 2022). However, coastal mangrove forests in the northern part of the FME are dominated by *Sonneratia alba* and *Avicennia marina*.

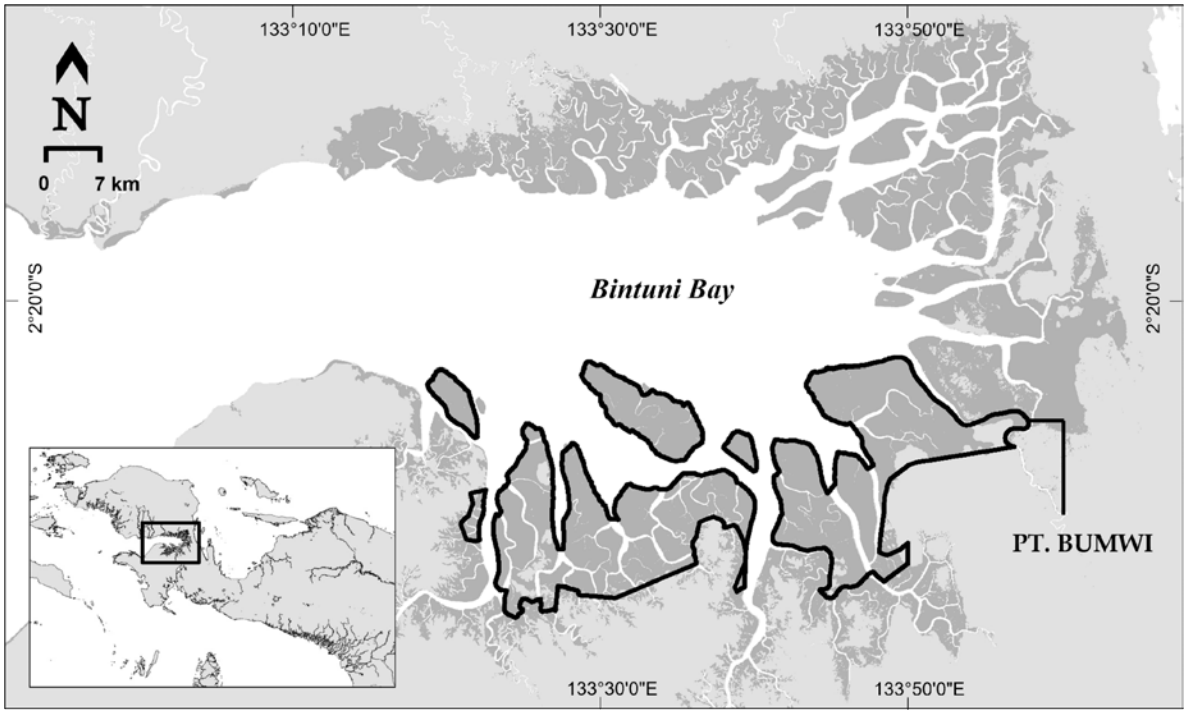

Figure 1. Area of study in Bintuni Bay, West Papua, Indonesia. Bintuni Bay is covered by extensive mangroves (dark grey) over 220,000 ha. Concession area of PT. BUMWI is located in the southern part of the bay, where this study was conducted.

Fieldwork and data compilation

We conducted shorebird surveys from February 25 to March 17, 2021 over 16 days. Based on previous observations, most migratory shorebirds prefer to feed and roost in the northern part of the concession (Yudha and Husein unpubl. data), therefore, we assumed this section was the best potential survey location. We surveyed daily from around 7:00 to 10:00 am from a motor boat, but also conducted additional surveys outside this period. We surveyed lengths of the coastline on consecutive days, with the area varying between days, depending on the distribution of shorebirds along the coast. For areas with smaller populations, we were able to cover up to 20 km in a single day, for instance in the eastern part of the FME (Figure 2). Where the populations were relatively dense, the length of the transect was 3–6 km. Birds within 200 m from the boat were photographed using a Nikon COOLPIX P900 camera. The photographs were used for species identification and to count the number of individuals of each species. Non-shorebirds species were not included. Double counting may have occurred due to undetected movement of birds between survey days. Thus, we estimate that 5–10% of individuals were potentially double counted, especially when counting

large flocks. We also compiled a comprehensive list of migratory shorebird species from published surveys from Bintuni Bay including the study by Erftemeijer *et al.* (1991) in 1989. We used this information to compare our count results to total EAAF population sizes.

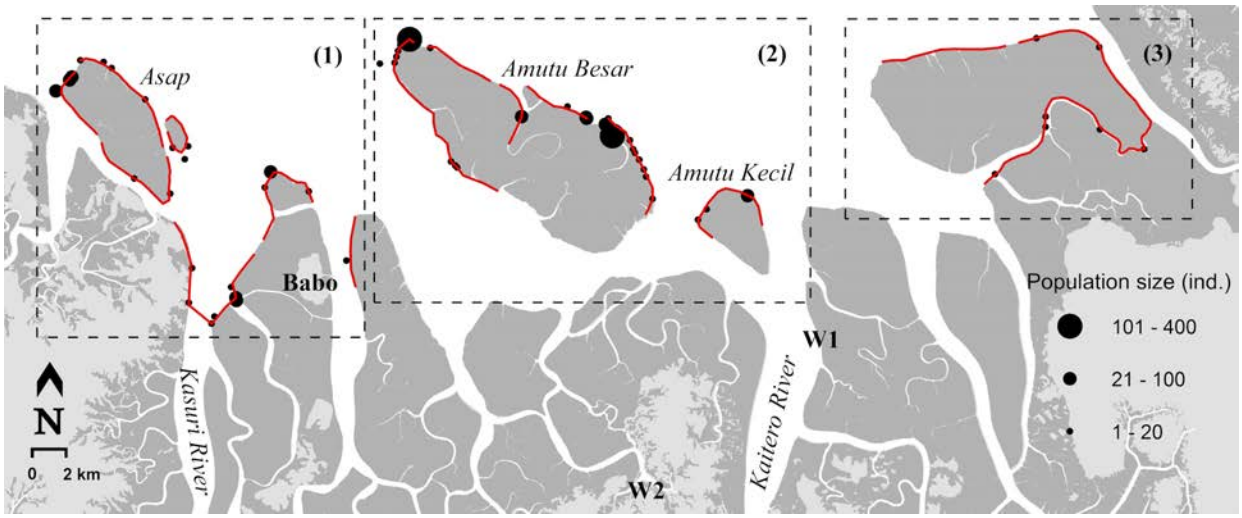

Figure 2. Distribution of shorebirds along the coast in the southern part of Bintuni Bay, West Papua, Indonesia. Darker (red) lines are sections that were surveyed during this study. A single continuous solid line indicates that the coastline was surveyed on a single day. Dash box represents the area of survey covering the western (1), central (2) and eastern section (3) of the concession. Dark grey is mangroves and wetland ecosystems, while light grey is dry land and terrestrial forests.

RESULTS

In 16 days of observations, we recorded 2269 individuals of ten species from the families Scolopacidae and Charadriidae (Table 1). Most individuals were observed in the central section (Amutu Besar Island and Amutu Kecil Island) and in the western section of the FME (Asap Island, downstream of Kasuri River; Figure 2). Common Sandpiper was the most abundant species (n = 790), constituting 35% of all individuals recorded, and exceeding the 1% threshold of their EAAF population (Wetlands International 2012). Three threatened species were recorded during the surveys: Far Eastern Curlew (n = 60), Grey-tailed Tattler (n = 342) and Red-necked Stint (n = 20) (Table 1, Figure 3). The most abundant species were Common Sandpiper, Whimbrel, Terek Sandpiper and Grey-tailed Tattler (all > 0.5% EAAF population; Table 1).

From the literature review we found that Bintuni Bay has long been used by migrating shorebirds. In 1989, Erftemeijer *et al.* (1991) observed an estimated 10,000 individuals of nine shorebird species. Our study combined with previous surveys (Wajo 2010, Cita and Budiman 2019, Yudha *et al.* 2021) identified 16 Scolopacidae and Charadriidae species in Bintuni Bay (Table 1).

Table 1. List of shorebirds in Bintuni Bay, West Papua, Indonesia. Conservation status; NT: Near Threatened, EN: Endangered (IUCN 2021), P: Protected by the Indonesian Government Regulation (Ministry of Environment and Forestry RI 2018). % EAAF: percentage of Flyway population (Wetlands International 2012). References for previous surveys are 1: Erftemeijer *et al.* (1991), 2: Wajo (2010), 3: Cita and Budiman (2019), 4: Yudha *et al.* (2021). Potential double count on a large flock of shorebirds might have occurred around 5–10% of the total count. The total count is reported as the raw, uncorrected abundance.

Species	Status	Total count	% EAAF	Previous surveys
Charadriidae				
Greater Sand-Plover *Charadrius leschenaultii*	-	95	0.10	1
Lesser Sand-Plover *Charadrius mongolus*	-	6	0.00	1
Pacific Golden Plover *Pluvialis fulva*	-	34	0.03	1
Grey Plover *Pluvialis squatarola*	-	26	0.03	-
Oriental Plover *Charadrius veredus*	P	-	-	3
Scolopacidae				
Common Sandpiper *Actitis hypoleucos*	-	790	1.58	1, 3, 4
Red-necked Stint *Calidris ruficollis*	NT	20	0.01	-
Far Eastern Curlew *Numenius madagascariensis*	EN, P	60	0.19	3
Whimbrel *Numenius phaeopus*	P	512	0.93	1, 2, 3, 4
Grey-tailed Tattler *Tringa brevipes*	NT	342	0.78	1
Terek Sandpiper *Xenus cinereus*	-	384	0.77	1
Black-tailed Godwit *Limosa limosa*	NT	-	-	1
Common Greenshank *Tringa nebularia*	-	-	-	1
Bar-tailed Godwit *Limosa lapponica*	NT	-	-	3
Wood Sandpiper *Tringa glareola*	-	-	-	3
Asian Dowitcher *Limnodromus semipalmatus*	NT, P	-	-	3

DISCUSSION

Bishop (2006) recorded 33 migratory shorebirds from the Palearctic that visited New Guinea during the non-breeding season. About half of these species have been documented in Bintuni Bay and 10 of them were observed during this study (Table 1). Observations made during our study showed that shorebirds spent most of their time feeding and roosting on the northern side of the FME, dominated by *A. marina* and *S. alba* at the edge of the forest. Some individuals were also observed further from the open sea in small numbers, for example Whimbrel that was previously found by Wajo (2010) in Kaitero River (W1 in Figure 2) and in the southern section of the concession (W2). Habitats in the northern side of the FME were characterised by large mudflats extending up to 200 m toward the open sea. During the lowest tide, mudflats in some areas could be observed extending as far as 400 m. These mudflats are not only preferred habitat for shorebird feeding due to the abundance of benthic fauna that lives in the mud, but also because they are open, giving birds clear view of any approaching birds of prey (Jackson and Straw 2021). Upper tidal flats are generally important feeding areas (Mu and Wilcove 2020) and shorebirds usually choose roost sites near feeding grounds (Rogers 2003). In our study area, the upper tidal flats near the edge of mangrove forests provide important roosting areas for shorebirds during high tide in the form of dead *A. marina* and *S. alba* trees (Figure 3.d).

Figure 3. Some of the observed shorebirds in Bintuni Bay, West Papua, Indonesia. (a) Far Eastern Curlew walking on the feeding ground in front of *S. alba* roots. (b) Pair of Grey-tailed Tattler. (c) Red-necked Stint, the first record in Bintuni Bay. (d) Terek Sandpiper and Grey-tailed Tattler roosting on a dead *A. marina* tree at the edge of the mangrove forest during high tide. All images © by Agus Sadam Husein (PT. BUMWI).

Around a third of Bintuni Bay's mangroves were managed for timber extraction, which can cause disturbance to migratory shorebirds. Therefore, the High Conservation Value Forest buffer zone along the coast is required to protect feeding and roosting habitats for shorebirds. Survey conducted three decades ago, which also covered the northern and eastern part of Bintuni Bay, concluded that the population size of shorebirds in the bay was an estimated 10,000 individuals (Erftemeijer *et al.* 1991), although no count data were provided as supporting evidence. Our study only covered the southern part of the bay, so we are unable to provide a population estimate for the whole of Bintuni Bay to verify the estimate provided by Erftemeijer *et al*. (1991). Further surveys in the northern and eastern parts of Bintuni Bay, where larger areas of potentially suitable mangrove and mudflat habitats are present, is required to provide an updated baseline of shorebirds population (see Figure 1). Some mangroves and mudflat areas in the eastern part of Bintuni Bay are experiencing increases in area because of long-term sedimentation and accretion (Gandhi *et al.* 2008).

Important species

In this study, we recorded three species in substantial numbers: Far Eastern Curlew, Grey-tailed Tattler and Red-necked Stint. Far Eastern Curlew (EN) is restricted to the EAAF and is a key threatened species because of a rapid population decline (81.7% over three generations), caused primarily due to habitat loss in the Yellow Sea (BirdLife International 2017, EAAFP 2021). A total of 60 birds were recorded in our study, representing 0.19% of the global population in the EAAF of 32,000 (Wetlands International 2012). The environmental survey team of PT. BUMWI found 30 individuals of Far Eastern Curlew in October 2020 in the same general area, when monitoring fauna downstream of the Kasuri River (PT. BUMWI unpubl. data). Subsequent observations by this team identify this location as favourable for Far Eastern Curlew. Specific conservation actions could be targeted to this species, since their feeding areas in the southern Bintuni Bay are known.

The Near Threatened Grey-tailed Tattler (BirdLife International 2016b) has been recorded in Bintuni Bay since 1989 (Erftemeijer *et al.* 1991), suggesting that the bay is a regular migration stopover site for this species. We recorded 342 individuals, 0.78% of their EAAF population. At high tide, groups of Grey-tailed Tattler were observed congregating with other shorebirds, such as Grey Plover, Lesser Sand Plover *Charadrius mongolus* and Terek Sandpiper in coastal border vegetation, especially on dead trees of *A. marina* or *S. alba*.

During our study, we recorded the Near Threatened (BirdLife International 2016a) Red-necked Stint in Bintuni Bay for the first time, although the species is more widespread in other parts of New Guinea (Pratt and Beehler 2015). We recorded 20 individuals during field observations, all in one area of a small island east of Asap Island (west section of the FME). This island was recently formed as a result of sedimentation process that has occurred in prior decades and it is dominated by pioneer mangrove vegetation *A. marina* (Figure 3.c).

CONCLUSION

The results of our study suggest that Bintuni Bay may be an important stopover site for migratory shorebirds. With a high diversity of birds and large areas of suitable habitat, Bishop (2006) recommended Bintuni Bay to be designated as Ramsar site. If this recommendation was successful, Bintuni Bay could be used as an example of sustainable mangrove harvesting (Murdiyarso *et al.* 2021) along with conservation and protection of biodiversity.

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FIRST RECORD OF NORDMANN'S GREENSHANK IN QUEENSLAND, AUSTRALIA

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On 1 January 2021 I observed, video-recorded and photographed a Nordmann's Greenshank *Tringa guttifer* on the Cairns Esplanade. It was the first record of the species in Queensland. The bird remained in the area until 9 May 2021, and was observed by many birdwatchers during its stay. The bird returned on 16 December 2021 to Cairns for a second austral summer and remained until 16 April 2022. This short paper presents notes on the identification, roosting and foraging behaviour of the bird. The great majority of the prey captures observed involved the capture and swallowing of the Mudflat Sentinel Crab *Macrophthalmus setosus*; other prey items observed included a mudskipper and a small sole.

INTRODUCTION

On 1 January 2021 at 07:10, I observed, video-recorded and photographed an unfamiliar wader species on the incoming tide at the Cairns Esplanade tidal mudflats at the southern end of Muddy's playground (16°54'54.8" S 145°46'24.9" E) (Figure 1). The bird was with small numbers of several shorebird species commonly seen on the Cairns Esplanade mudflats: Lesser Sand Plover *Charadrius mongolus*, Bar-tailed Godwit *Limosa lapponica*, Great Knot *Calidris tenuirostris* and Terek Sandpiper *Xenus cinereus*. After six minutes of observation, a Common Greenshank *Tringa nebularia* stood next to the unknown wader in the same profile pose (Figure 2). I noted the morphological similarities and differences between the two birds, which allowed for a tentative identification of a Nordmann's Greenshank *Tringa guttifer*. The observations were logged on the Cornell Lab of Ornithology eBird app in real time (Walsh 2021a).

Subsequent notification to the wider birding community that morning confirmed the identification via published photographs. During the afternoon outgoing tide from 15:00 onwards, the bird was seen again by approximately 40–50 observers, further consolidating the correct identification of the wader as a vagrant Nordmann's Greenshank. It was subsequently discovered that the first confirmed photograph of the bird was taken on 25 December 2020 by Brian Lee at the northern end of Cairns Esplanade, but it was thought to be a Common Greenshank at the time, as it was seen with that species. It was also briefly seen and photographed on 26 December 2020 by Helen and Jeff Larson (Larson 2020), but initially identified as a Terek Sandpiper due to the observed similar behaviour. The bird resided on the Cairns Esplanade mudflats for a known period of 4 months (136 days) until 9 May 2021. A submission was made to the Birdlife Australia Rarities Committee (BARC) on the 2 January 2021 and unanimously accepted on 22 June 2021 (Palliser 2021a).

The Cairns Esplanade Nordmann's Greenshank was a high-profile rarity in the Australian birding community, and was probably seen by hundreds of visiting birdwatchers during its initial stay. There had been five previously accepted BARC records of the species in Australia, but all were from remote high tide roosts on the coast of north-western Australia (Palliser 2021b–f). In contrast, the Cairns individual was in an easily accessed site where it is possible to watch shorebirds through nearly all stages of the tide. I saw the bird on 76 separate occasions between 1 January and 9 May 2021, with further observations from December 2021 to April 2022. I summarise here the observations recorded on identification, plumages, moult, foraging behaviour, and local tide-driven movements. There was a period of nine days between 16–24 April 2021 when there were no known observations made of the Nordmann's Greenshank. During that period, Cairns experienced heavy monsoonal rainfall, which made observations along the Cairns Esplanade particularly difficult.

The bird returned to the Cairns Esplanade later the same year, on 16 December 2021, where it was observed and tentatively identified by Paula Bowler in an eBird log on 18 December 2021 (Bowler 2021). I confirmed the identification in the field on 19 December 2021 (Walsh 2021b), thus alerting the wider birding community. The Nordmann's Greenshank was last seen and photographed on 16 April 2022 (Vaughan 2022), and present at the Cairns Esplanade tidal flats for 4 months (122 days) in the 2021–2022 austral summer.

METHODS

All observations were recorded at the Cairns Esplanade, Queensland, Australia (Figure 1). After becoming aware of the presence of the bird on 1 January 2021, I revisited the site, and relocated and observed the bird every week with the following monthly observation frequency: January, 17 days; February, 12 days; March, 14 days; April, 13 days;

May, 8 days; until the bird was last seen on 9 May 2021. I made 76 observations of the Nordmann's Greenshank during this period, with a break between 14 and 25 April when poor weather made successful observation impossible. My observations during the Nordmann's Greenshank's presence in the second summer in Cairns (from 16 December 2021) were not as frequent due to long periods of absence from the Cairns area, with a total of 17 sightings until 1 May 2022. My monthly observation frequency in December 2021–April 2022 was as follows: December, 2 days; January, 3 days; February, 9 days; April, 3 days. Observations were made with a high-specification bridge camera, the Nikon Coolpix P1000. I frequently photographed the bird and recorded 4K resolution video footage using the inbuilt 3000 mm optical zoom lens. All my observations were logged on the Cornell Lab of Ornithology eBird mobile software application in real time, in the field. It is worth noting that as of 17 April 2022 there were 457 separately logged observations on the eBird platform of the Nordmann's Greenshank, by hundreds of birders over both summers (2020–2021 and 2021–2022). These observations are almost entirely made at three listed hotspots: 'Cairns Esplanade' (294 sightings); 'Cairns Esplanade–Southern End' (37 sightings); 'Cairns Esplanade–Northern End' (105 sightings). The remainder of logged observations were made at random locations along Cairns Esplanade, totalling 21 sightings (Figure 1). It is important to note that a logging of a bird on the 'Cairns Esplanade' eBird hotspot can encompass a sighting at any point along the 2 km length of the foreshore, whereas the other hotspots are more indicative of an exact location. There is only one eBird logged sighting that is not along the Cairns Esplanade, when the bird was seen at a high tide roost at Casuarina Point, 3 km north (Figure 1). It is also thought that these logged sightings on eBird represent a small percentage of the actual observations made, due to many observers not using eBird, nor logging data on other platforms. As the vagrant Nordmann's Greenshank attracted a lot of national attention, many photographs, video, and general observations were posted to social media sites. I will reference some of these observations and media in the 'Results and Discussion' below.

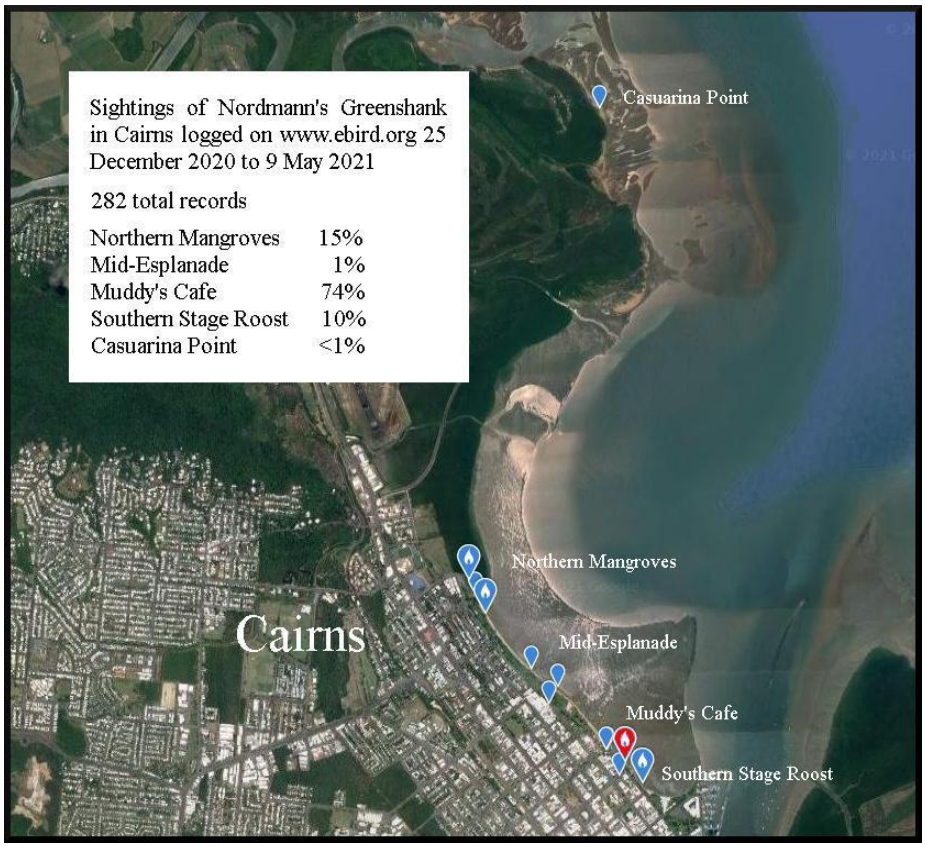

Figure 1. Locations of observations of the Nordmann's Greenshank along the Cairns foreshore, Queensland, Australia, between 25 December 2020 and 9 May 2021 logged on the eBird app (www.eBird.org). First identified sighting by author on 1 January 2021 noted by red marker. There were a further 175 sightings logged on eBird up until 17 April 2022, during the 2021–2022 austral summer at the same locations (from 16 December 2021). Map edited from species map at www.eBird.org.

Figure 2. A vagrant Nordmann's Greenshank stands to the right of a Common Greenshank on 1 January 2021, Cairns Esplanade, Queensland, Australia. This is the first recorded occurrence of a Nordmann's Greenshank in Queensland. The fresh, grey white-fringed scapulars, noticeably larger than the worn surrounding feathers, indicate that the bird was in the early stages of post-juvenile moult. Photo: Adrian Walsh.

RESULTS AND DISCUSSION

Identification

Initial observation of the Nordmann's Greenshank noted a mid-sized wading bird, similar in body size to a Great Knot, but with a stout bill of medium-length, not too dissimilar to the bill of a Grey-tailed Tattler *Tringa brevipes* in relative body to bill thickness, yet slightly upturned and bicoloured. At this early stage of the observations, the base of the bill was only noted as being lighter than the darker distal end, as a result of the dull light, but with a short demarcation between the two shades mid-bill. As I was quite familiar with local Cairns Esplanade mudflat waders, immediate recognition of the potential importance of this bird was noted, and multiple video recordings and still shots were taken, as observations continued to be made. The belly and breast of the wader were noted to be white, with marginal and minor grey-brown flecks on either side of the breast, adjacent to the shoulder. The wing coverts appeared a slaty-grey to brownish colour, but ill-defined due to the overcast lighting. The grey on the coverts appeared a similar colour to the Grey-tailed Tattler. The legs were notably yellow, even in the dull light, and relative leg length appeared slightly longer than a Great Knot. The head was of a similar shape and size to other mid-sized wading birds with smooth feathering and no discernible crest or plumes. A narrow white eye-ring was noted, with greyish lores and a faint white supercilium trailing the eye. Indistinct grey/white mottling was also noted on the crown and nape, with fainter streaks on the side of the neck. The chin was also white.

After six minutes of observation, a Common Greenshank stood next to the Nordmann's Greenshank (Figure 2). The morphological similarities between the two birds were striking, yet it allowed for a direct comparison of features and the realisation that the unknown wader was a different, yet related species. The bill was noted to have the same, slightly upturned shape, but the Nordmann's Greenshank's bill was much stouter. The white-eye ring was common between both birds, together with the streaking on the crown and nape, yet the Common Greenshank's features in this regard were far more pronounced, with a more noticeable eye-ring and marked head-streaking. The Nordmann's Greenshank's legs were now seen to be shorter and thicker than the Common Greenshank's, giving the former a much less dainty appearance. The colour of the Common Greenshank's legs was dull greenish yellow, in contrast to the bold yellow of the Nordmann's Greenshank. They shared the distinctive white rump, exposed between the primary feather edges. Finally, the Nordmann's Greenshank appeared to lack the dark subterminal dots around the edges of the tertials and coverts, which are a distinctive identification feature of a Common Greenshank. At one point, during preening, the Nordmann's Greenshank lifted both wings, allowing for observation of the white underwing coverts without the dark streaking of the Common Greenshank (Menkhorst et al. 2020). The Nordmann's called separately several times with the described nasal *gwaak* (Maleko et al. 2021). Each vocalisation lasted less than half a second and was

performed as the Nordmann's Greenshank looked towards the shore in the direction of other waders (Walsh 2021c). This vocalisation differs from the Common Greenshank which has a frequently heard clear ringing *tew* or *tyu* often heard three times (Van Gils et al. 2020).

During the following weeks and months of continuing observations, it became easier to identify the Nordmann's Greenshank at greater distances, due to becoming more acquainted with its plumage and behavioural idiosyncrasies in reference to the other common wading species found on the Cairns Esplanade. Most notable in winter (basic) plumage are the distinctive white neck, breast and belly, which stand in stark contrast to the grey coverts and upperparts. This is a far more noticeable contrast than the similar Grey-tailed Tattler, a related species of the *Tringa* genus, besides the fact that the Nordmann's Greenshank is categorically larger, noticeable if both species are seen together.

The lack of any clear supercilium behind the eye was another plumage characteristic that distinguished it from the Grey-tailed Tattler. In terms of foraging behaviour, the Nordmann's Greenshank became very noticeable at a distance during its burst-speed foraging phases (described below), as it darted after crustaceans in a Terek Sandpiper-like manner. It distinguished itself from the Terek Sandpiper primarily by its much larger size. The Nordmann's Greenshank has a tendency to zigzag on the mudflats, rather than run in a fast linear fashion, however, the distinctive colour difference in the legs was enough to tell the species apart (the Terek Sandpiper's legs are orange, those of the Nordmann's Greenshank are yellow). The foraging behaviour of the Nordmann's Greenshank also diverged markedly from the related Common Greenshank. Any Common Greenshank seen at a distance that would daintily dart around in channels and rivulets on the mudflats, and turn in quick circles, chasing after small fish, could be quickly discounted as a potential Nordmann's Greenshank on this behavioural difference alone. However, it is worth mentioning that the distinctive physical characteristics of the Nordmann's Greenshank including the bicoloured bill (yellowish at base, dark grey distally) and the yellow legs (Figure 3) are not particularly striking when seen in overcast conditions or at long range. The thickness of the Nordmann's bill in profile in comparison to the Common Greenshank, is a more useful delineation at a distance, or in silhouette.

Moult and age

Unlike most migratory shorebird species in Australia, adult Nordmann's Greenshank carries out most of its primary moult while staging in Asia (Yang et al. 2020). This species therefore has completed primary moult by the time they arrive in Australia, and this has made it difficult to age Nordmann's Greenshanks previously recorded in north-western Australia in November and December. Of the five previously accepted Birdlife Australia Rarities Committee (BARC) cases, some breeding plumage was noted in 2006 and 2009, no visible breeding plumage was noted in 2011 and 2013, and the age and sex of the bird in 2014 could not be determined (Palliser 2021b–f). However, it was possible to watch the Cairns Nordmann's Greenshank at a much closer range, and confirm that it was in its first year of life.

When it was first observed in early January 2021, the Nordmann's Greenshank had plain plumage, greyish brown colour on the upperparts and white on the underparts. Images taken at the time (e.g. Figure 4) showed that the bird was in active post-juvenile moult. Most of the upperparts feathering was worn juvenile plumage with a brownish-grey tinge, but emergent first non-breeding (formative) feathers in the scapulars were broader, colder grey in colour, with narrow white fringes at the tip. The tail, the narrow and brown-tinged tertials and most of the upper wing were also retained juvenile plumage. Age-diagnostic attributes of the juvenile plumage in the upper wing included pale-fringed marginal and lesser upper wing coverts, all small in size with uniform wear. Post-juvenile moult had begun in the inner median coverts; with emergent formative feathers greyer and broader than the surrounding juvenile plumage. There was no primary moult.

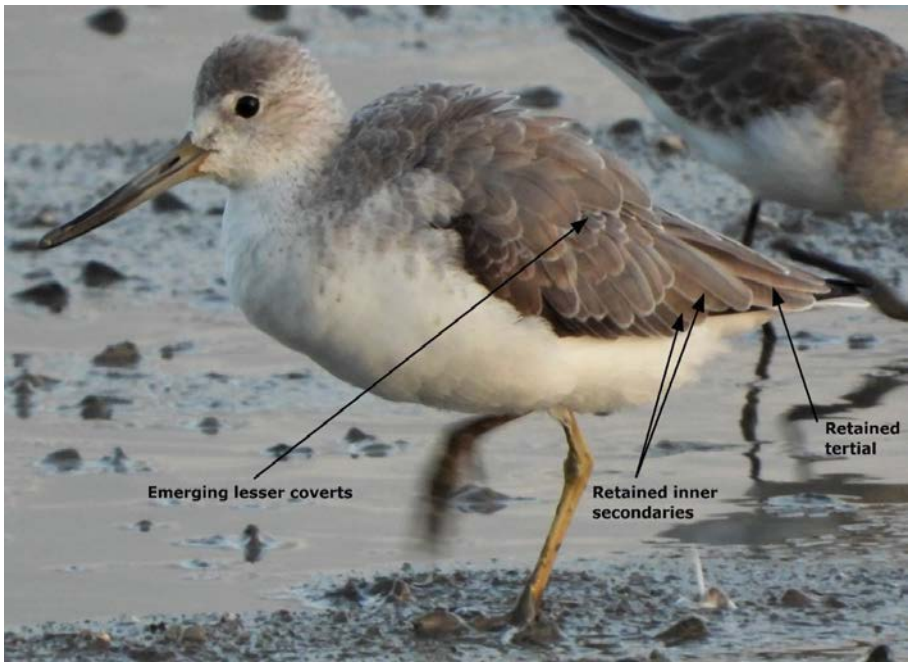

Figure 3. The Nordmann's Greenshank returned to the Cairns Esplanade on 16 December 2021. In this photograph from 19 December 2021, some of the worn non-breeding plumage was being replaced by a fresher non-breeding plumage. Photo: Adrian Walsh.

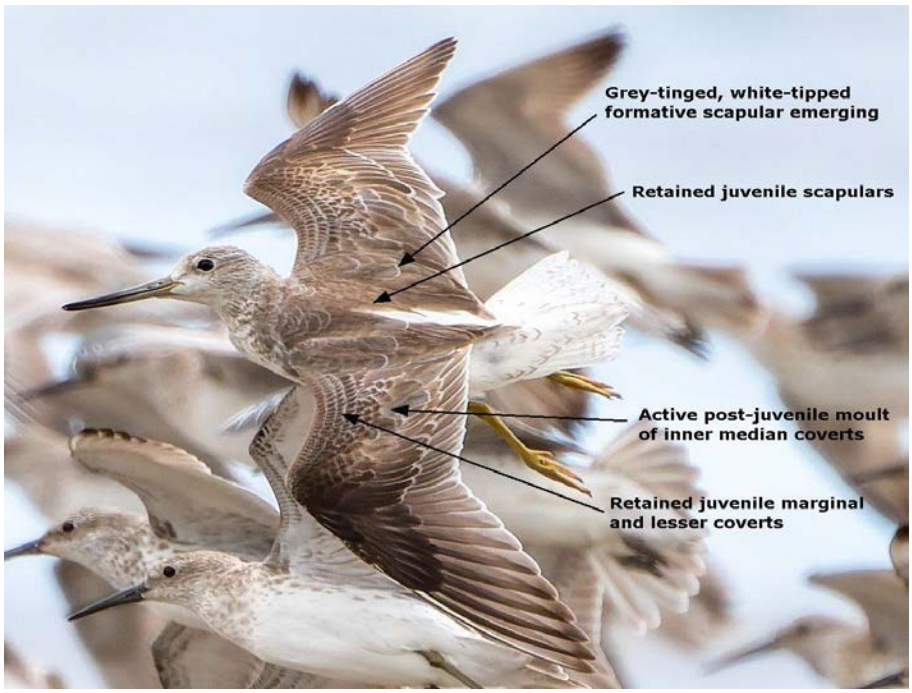

Figure 4. Photograph of Nordmann's Greenshank in flight, on 8 January 2021, showing active post-juvenile moult. Photo: Jun Matsui.

The Nordmann's Greenshank did not moult any flight feathers between early January and 9 May 2021. Post-juvenile moult of its body feathers was still active in late January (Walsh 2021d), but by mid-February, most upperparts plumage had been replaced by fresh grey feathers. A few juvenile wing coverts were still apparent in photographs taken on 21 February (Walsh 2021e) and 6 March (Walsh 2021f) but by late April and early May 2021, these remaining juvenile feathers could not be seen when the bird was on the ground. No traces of breeding plumage were attained before the bird left the site on 9 May 2021.

The departure date of the Nordmann's Greenshank from Cairns is comparable to recorded

movements at a major staging area in Korea (Moores et al. 2008), where Nordmann's Greenshank began to arrive in mid-April, with a mean arrival time of 4 May and mean departure time of 15 May. Photographs indicate that the Nordmann's Greenshank visiting Cairns carried out little or no pre-migratory mass gain, given that the overall bulk of the bird did not obviously increase during its stay. In combination with the lack of breeding plumage, and the long stay of the bird in Cairns (until 9 May 2021), it is unlikely that the bird migrated as far as the breeding grounds. There is no way of knowing if the bird carried out a partial migration, or whether it used other non-breeding areas within Australia before it was next seen on the Cairns foreshore on 16 December 2021.

The Nordmann's Greenshank was in active body moult, presumed to be second prebasic, when rediscovered on 16 December 2021 (Bowler 2021). Worn non-breeding plumage was being replaced by a fresher non-breeding plumage (Figure 3). Body moult was more advanced than it had been in December 2020–January 2021, and by 16 January 2022 most of the body plumage was fresh. The appearance of the bird on 5 February 2022 (Figure 5) was typical of its appearance between 16 January and 19 February 2022. At the start of March 2022, photos posted to eBird (Warren 2022a) showed slightly larger dark flecks on the sides of the breast than had been seen previously, perhaps an attribute of second alternate plumage. On 16 March 2022, the first clear evidence of active pre-alternate moult was photographed (Warren 2022b), including a few large black flecks on the sides of the breast, and some scapulars with dark grey centres. Upperpart feathers continued to be replaced through early April; by 16 April 2022 about half the scapulars had been replaced in pre-alternate moult, while retained basic feathers were beginning to fade and show indications of wear (Figure 6).

Foraging behaviour

Video footage of the foraging behaviours described below was recorded, and can be viewed on YouTube by following the links provided (Walsh 2021g–m).

Burst-speed foraging

The Nordmann's Greenshank commonly utilised a Terek Sandpiper-like behaviour of adopting a fast-running technique, with the body in a low centre of gravity position, while it zig-zagged in search of small crabs on the mudflats on incoming and outgoing tides. The zig-zagging manoeuvre was observed to happen at a burst speed exceeding the straight fast-running. This technique differed slightly from the Terek Sandpiper which has only been observed on the Cairns Esplanade to run quickly in a linear manner, without sharp turns. The head of the Nordmann's Greenshank would also move rapidly back and forth during this foraging technique, and a zigzag sideways move would commonly end with the Nordmann's Greenshank plunging its whole head into a crab hole and extracting the crab via holding its legs. The Nordmann's Greenshank would then shake the legs off the crab with a quick twist-shake of the head, wash the carapace in a small pool, or run to the tideline if close enough to wash, and then swallow the carapace whole (Walsh 2021g). The bird was observed to catch and eat between 4–5 small crabs per hour on occasion. The commonly-caught crab species was identified as a Mudflat Sentinel Crab *Macrophthalmus setosus* (Figure 7). The Nordmann's Greenshank would often eat the dismembered legs, usually after first consuming the carapace, although on occasion the opposite was observed.

Ambush foraging

The Nordmann's Greenshank was observed frequently between burst-speed foraging to stand still for periods of two to five minutes in length, but sometimes as long as 10 minutes. It would stand on both legs (one forward with toes flat, the other behind with toes extended), head relaxed and generally still with the neck in an unextended position, yet alert with eyes open. Most of these types of observations resulted in the Nordmann's Greenshank walking away and returning to other foraging techniques, but it was also discovered to use this as an opportunistic way to ambush a passing crab (Walsh 2021h). As I also observed small crabs in the vicinity of the Nordmann's Greenshank not being ambushed, I suggest that the Nordmann's Greenshank was digesting previously-caught crabs during this 'waiting' period where it did not ambush easy prey.

Detritus foraging

The Nordmann's Greenshank other commonly seen foraging technique was a 'sweeping head' movement, where the bird slowly walked in small, shallow pools in between the exposed mud, moving the head back and forth in a sweeping manner, whilst half the slightly opened bill was submerged in the saline water. Using this technique, the bird was observed to find detached crab legs and other, presumed, biological material—possibly the detritus of deceased invertebrates, or even live, small shrimp (Walsh 2021i).

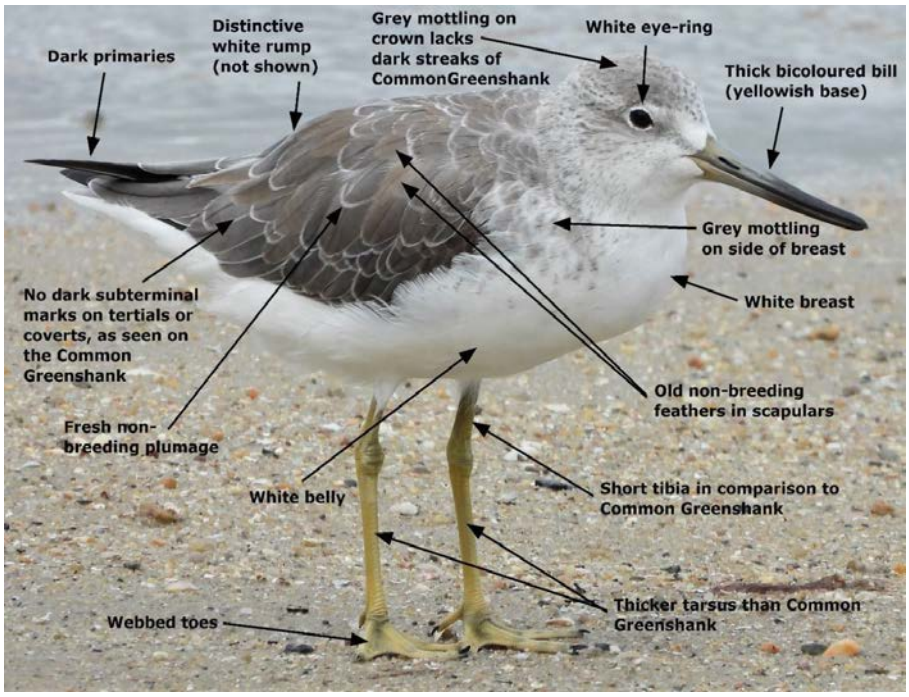

Figure 5. As seen on 5 February 2022, the Nordmann's Greenshank adopted mostly fresh non-breeding (basic) body plumage. This was typical of its appearance from mid-January to mid–March 2022. Here shown in its third calendar year age with some of the distinctive characteristics that are also used to distinguish it from the Common Greenshank. Photo: Adrian Walsh.

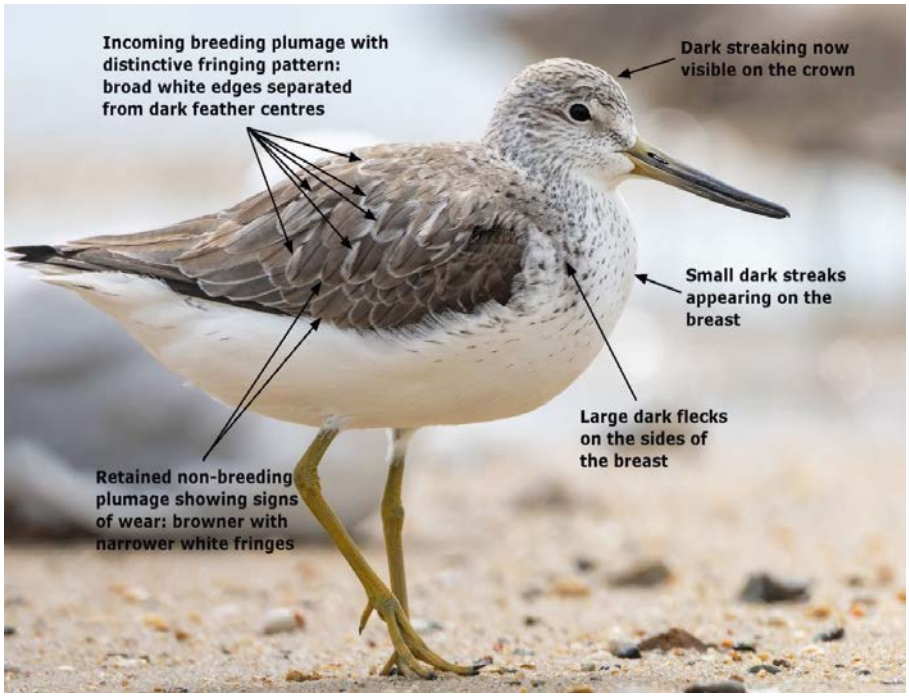

Figure 6. By 16 April 2022, half the Nordmann's Greenshank's scapulars had been replaced in pre-alternate moult. The breast, sides and crown had developed dark spots and streaks, which were first noted to emerge around 16 March 2022. Photo: Jun Matsui.

Figure 7. Nordmann's Greenshank about to swallow the carapace of a dismembered Mudflat Sentinel Crab on 21 February 2021. Photo: Adrian Walsh

Tideline foraging

Once the outgoing tide had receded beyond 1.7 m, the Nordmann's Greenshank could often be found in the company of Great Knots and Bar-tailed Godwits (and Curlew Sandpipers *Calidris ferruginea* and Terek Sandpipers) walking the tideline at a moderate pace between the ocean and the exposed mudflats. It employed a random prodding technique, without the frequency or deep substrate penetration of the 'sewing machine' action of the Great Knot. It is presumed that the Nordmann's Greenshank was searching for small prey items, such as small bivalve molluscs, snails, worms, and crustaceans, as well as drinking the seawater (Walsh 2021j).

Kleptoparasitism

On one notable occasion on 21 February 2021, the Nordmann's Greenshank was observed to shadow a much larger Whimbrel *Numenius phaeopus*, as it was attempting to eat a small crab. The Nordmann's Greenshank encircled the Whimbrel a couple of times, keeping a respectable distance away from the Whimbrel's large bill to avoid injury. After a minute, the Nordmann's Greenshank noticed a discarded carapace nearby, snatched it and ran away. As the Whimbrel was busy with the remains of the crab, it did not give chase (Walsh 2021k). During the Nordmann's Greenshank's second austral summer (2021–2022) there was evidence reported on social media and within eBird reports that the bird's propensity for kleptoparasitic behaviour had increased. It was observed and photographed on 19 and 20 December 2021 stealing from Bar-tailed Godwits (J. Matsui pers. comm., Barratt 2021, Mantle 2021), and also on the 9 March 2022 (J. Matsui pers. comm.). This would tentatively suggest an increase in this behaviour as the bird matures.

Prey and discarded prey

The Nordmann's Greenshank was observed to capture small Mudlfat Sentinel Crabs during the majority of the 76 observations (Figure 7). On two occasions it was seen to capture and eat two different prey items. At 12:40 on 6 March 2021, the Nordmann's Greenshank was foraging on an outgoing tide at the northern end of the Cairns Esplanade. There it was seen to catch a mudskipper of the genus *Periophthalmus*, possibly *P. takita* (Figure 8) (Walsh, 2021f). It dropped the mudskipper at least twice before managing to subdue and swallow it. At 10:30 on 3 May 2021 it caught and ate a small flatfish. This was tentatively identified as most likely to be a sole belonging to the family Soleidae (Figure 9).

On 3 May 2021, the Nordmann's Greenshank spent several minutes attempting to swallow the sole. It appeared to succeed on quite a few occasions, only to regurgitate the sole several times. It eventually succeeded after a few minutes of trying (Walsh 2021l). The Nordmann's Greenshank was also observed to misjudge the size of a crab, failing to swallow the whole shell once it dismembered the crustacean. Despite repeated attempts at swallowing the shell (recorded 18 attempts in a five-minute span on 20 March 2021), and washing in between the attempts, the Nordmann's Greenshank eventually discarded the carapace (Walsh 2021m).

On the breeding grounds the Nordmann's Greenshank diet is mainly small fish (Amur Stickleback *Pungitius sinensis* and Ninespine Stickleback *P. pungitius*) and invertebrates (polychaete and oligochaete worms, small crustaceans, mollusks, and aquatic and terrestrial insects) (Maleko et al. 2021).

Roosting

The waders that frequent the Cairns Esplanade commonly congregate in a pre-roost area at the southern end of the mudflats, as the incoming tide reaches heights of 1.7 m and above. Beyond the 2 m high tide mark, the waders fly off to their high tide roost. The Nordmann's Greenshank was observed at the pre-roost site on multiple occasions particularly in the late afternoon. It would adopt a single-leg stance with the bill and head tucked into the back. Less frequently, and possibly on slower incoming tides, the Nordmann's Greenshank would lie down on the sand with the legs tucked underneath the body, as is frequently seen with Bar-tailed Godwits. It commonly roosted at this site with small numbers of Great Knots (>100) and Bar-tailed Godwits (>10). At high tide during the day, when this pre-roost area was underwater, the Nordmann's Greenshank was found at least five times on the sandy tideline directly in front of Muddy's Café, 500 m north of the pre-roost site. This site is used frequently by similar numbers of Great Knots and Bar-tailed Godwits as occurs at the pre-roost site. During a Queensland Wader Study Group coordinated high tide count on 16 January 2021, I discovered the Nordmann's Greenshank at Casuarina Point on the mouth of the Barron River (about 4 km north of the Cairns Esplanade) with multiple species of waders and terns (Great Knot >200; Lesser/Greater Sand Plover >60) numbering over 300 individuals (Walsh, 2021n). It was presumed that this was the preferred high tide roosting site for the Nordmann's Greenshank. During the 2021–2022 observations, the Nordmann's Greenshank was commonly found roosting at high tide in front of Muddy's Café, much more frequently than in the 2020–2021 season, when it was observed there only a handful of times.

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I would like to thank the local members of the Queensland Wader Study Group for their continued good work in the monitoring and conservation of the critically important East Asian-Australasian Flyway inter-tidal mudflats of Cairns. I'd like to acknowledge and thank Vladimir Pronkevich from the Russian Academy of Sciences, and Philip Maleko from the University of Florida for correspondence, materials and monitoring and conservation efforts of the Nordmann's Greenshank breeding territories around the Sea of Okhotsk, Russia. Thank you to Jun Matsui of Cairns for the use of his photographs. Many thanks to Helen Larson, Research Associate of the Museum of Tropical Queensland, for her assistance in identifying the Nordmann's Greenshank prey items. Thank you to Peter Valentine from Birdlife Northern Queensland for support and encouragement, and all the Cairns-based and interstate birders for the enthusiasm and joy this individual bird provided during its four-month stay. Finally, many thanks to the reviewer, Danny Rogers, for the many invaluable and helpful editing suggestions.

Figure 8. Nordmann's Greenshank with a mudskipper of the genus *Periophthalmus*, northern end of Cairns Esplanade on 6 March 2021. Photo: Adrian Walsh.

Figure 9. Nordmann's Greenshank attempting to eat a sole (Soleidae) of unknown species on Cairns Esplanade on 3 May 2021. Photo: Adrian Walsh.

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SHORT-TERM MOVEMENTS OF ORIENTAL PRATINCOLE (*GLAREOLA MALDIVARUM*) IN RESPONSE TO A TROPICAL LOW SYSTEM IN NORTH-WESTERN AUSTRALIA

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Weather conditions are known to influence the timing and success of migratory shorebirds as they move between breeding and non-breeding areas. Shorebird tracking studies have revealed birds moving in response to extreme weather conditions such as cyclones. In the absence of tracking devices on birds, observational studies of the responses of shorebirds to changing weather conditions can provide some insights into the behaviour and ecology of migratory species. This article details the observations of the Oriental Pratincole in north west of Western Australia in the East Asian-Australasian Flyway in response to a tropical low weather system that moved through the study area. We present survey numbers of birds as well as information on the weather system, and locust plague present at the study site.

INTRODUCTION

Weather conditions are known to influence the timing and success of migration for shorebirds that move between non-breeding and breeding areas (Ma et al. 2011; Gill et al. 2014; Carneiro et al. 2020; Herbert et al. 2022). Shorebirds have been recorded avoiding inclement weather, such as cyclones by moving ahead of the weather front (Minton et al. 2018). To be able to protect migratory shorebirds, we need to understand their ecological requirements and responses to changing environmental conditions across all their life stages. In this short note, we document our observations of Oriental Pratincole (*Glareola maldivarum*) movements in relation to a tropical low weather system in north-western Australia.

The Oriental Pratincole is typically found in the East Asian-Australasian Flyway. It breeds in northern China, southern Siberia, and Mongolia (Department of Environment 2022). After breeding, the species travels through eastern Asia and arrives in Australia from November through to March each year. The Oriental Pratincole is one of the most numerous migratory shorebirds at its Australian non-breeding grounds, where they feed on invertebrates in grassland plains and roost in open areas with conspecifics or on coastal shores, when ambient temperatures are high (BirdLife International 2016).

METHODS

During the 2021 North-West Australia Wader and Tern Expedition, one of the goals was to catch Oriental Pratincoles to attach satellite tracking devices to birds to continue on from our 2019 tracking study. The observations reported in this short note are from Anna Plains Station, a working cattle station in the north west of Western Australia, approximately 150 kms south west of Broome (Figure 1).

Survey methods

We surveyed for Oriental Pratincoles on the Anna Plains Station site in areas suggested by station staff. We drove across most of the property along maintained dirt tracks and actively looked for birds. When we saw birds, we identified species and counted the number of individuals using binoculars and made the records in a notebook and recorded their location using a handheld GPS.

Bird numbers at each site

We started reconnaissance work on 26 and 27 January 2021 and counted approximately 50,000 Oriental Pratincoles at Brolga Dam (Figure 1). Between 28 and 29 January, we counted at least 20,000 birds on the station property, with more birds located at the northern end, towards McPhee's Bore. On 30 January, we observed birds moving from the northeast to the southwest, ahead of the arrival of the tropical low that was predicted. Once again, we travelled to Turkey Bore, but we only observed approximately 200 pratincoles. Between 31 January and 2 February, we observed very few pratincoles across the entire station, with only small flocks of up to ten individuals at a time flying over the dunes and up to ten birds on the beach. On 3 February, we drove to Turkey Bore and counted one pratincole in a puddle and inspected most plains across the station before driving to the Mandora Marshes ~80 km south of the Anna Plains Station turnoff. We also inspected McPhee's Flats and Cape Missiessy to look for pratincoles, but did not record any more for the day. We did not record any pratincoles from 4 to February. We recorded approximately 50 birds flying north and at least 5 of those birds gained height, circled around over the beach and dunes, calling and flew north, similar to the migration preparation

flights that grey waders do. On 7 February, we recorded approximately 50 pratincoles at McPhee's Flats and Turkey Bore flying north east and associating with mixed tern flocks. We then recorded at least 1000 pratincoles on the ground north of Turkey Bore. Station staff were on the lookout for pratincoles and on the 21 February a number were seen in one of the paddocks. An estimate was not possible, but the birds were noticeable during the regular course of station work.

Locusts recorded in the field

Locusts are a favoured prey for Oriental Pratincoles. During our surveys we observed locusts across the plains and roads. In some areas we noted areas of Yellow-winged Locust (*Gastrimargus musicus*) in high density (Figure 1, "Locust site"), with some areas supporting at least 250 individuals m^{-2}.

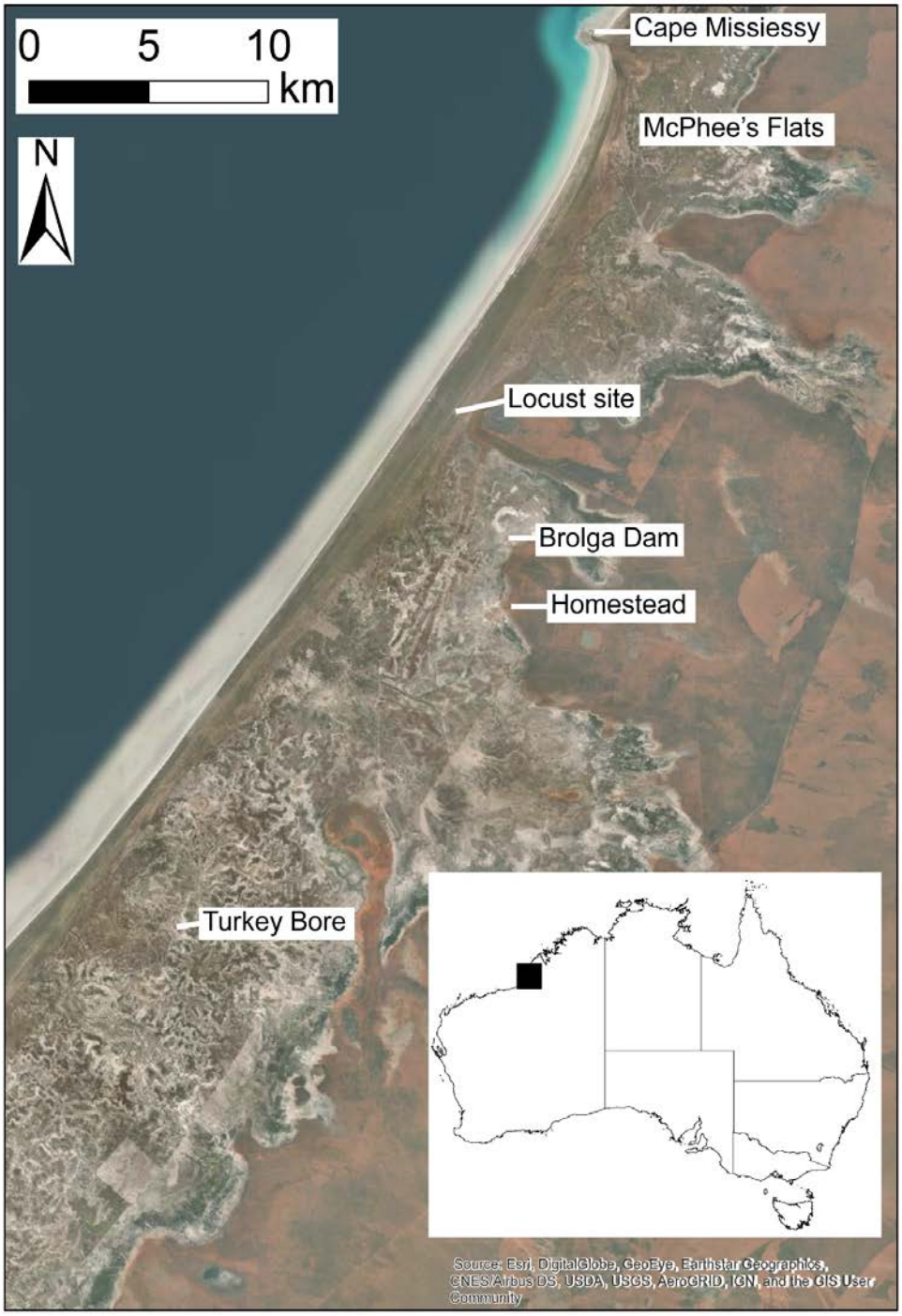

Figure 1. The location of Anna Plains Station and sites of importance during reconnaissance visits looking for Oriental Pratincoles during the 2021 North-West Australia expedition.

Weather and Oriental Pratincoles

Towards the end of January 2021, there was a monsoon trough across northern tropics, with a tropical low in the north Kimberley of Western Australia (Figure 2). The tropical low tracked across the Kimberley and east Pilbara in early February and then travelled down the coast of Western Australia before heading out to the ocean. The tropical low system moved past Anna Plains Station on 31 January with 28.6 mm rain that day, followed by 61.2 mm of rain on 1 February (Bureau of Meteorology 2021).

Between 26 January and 5 February, we observed a substantial reduction in the number of Oriental Pratincoles using the Anna Plains Station, which might be closely related to the weather depression passing through. We observed only 2% of the original number of birds returning to the site once the tropical low system had passed (Figure 2). We also received a notification from a colleague that all pratincoles had departed Roebuck Plains, in the north close to Broome.

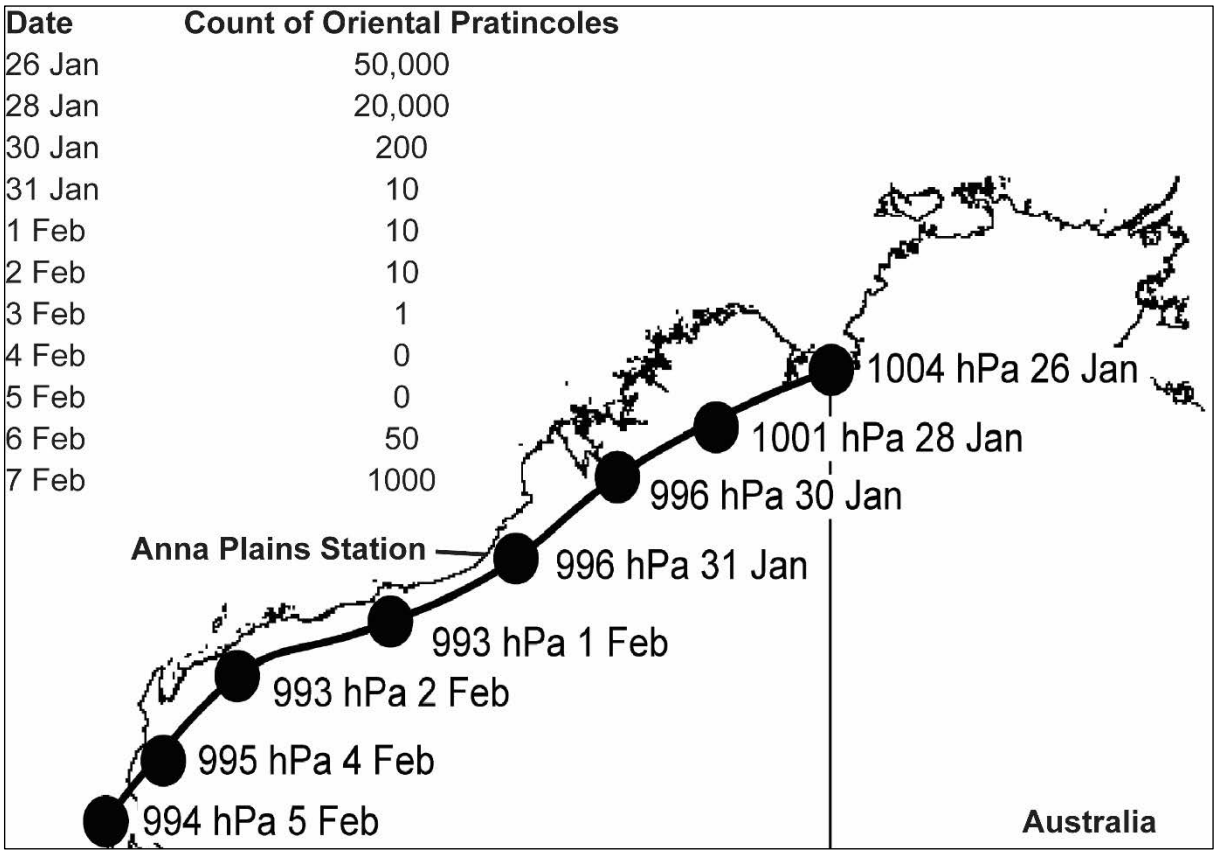

Figure 2. The movement of the tropical low system across North-Western Australia from late-January through early February 2021 and the minimum estimated number of Oriental Pratincoles counted at the Anna Plains Station during that time.

DISCUSSION

Based on our observations, most Oriental Pratincoles that were counted at the Anna Plains Station likely departed the site in the days leading up to the tropical low weather system. While we cannot confirm where the birds went to, we can hypothesise that they left the area and either moved to drier ground or started their migration early. During our surveys looking for pratincoles, we noted high densities of locusts with no signs of dramatic reductions in their numbers, but we think we observed a possible mating event of the locusts during early February.

There is still much to learn about the drivers of short-term movements of pratincoles and other migratory shorebirds, including how the food resources might influence bird behaviour and spatial use.

Figure 3. Yellow-winged Locusts at the "Locust site" on Anna Plains Station, North-Western Australia. Image credit: Amanda Lilleyman.

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We acknowledge and pay our respect to the Traditional Owners from the lands on which we work, the Karajarri People and the Nyangumarta People. We thank the volunteers from the Australasian Wader Studies Group North-Western Australia Expedition that helped us in the field and those that have since contributed information that improved our understanding of these birds. We thank Helen, John and the Stoate Family for supporting our research over many years and for allowing us to access Eighty-mile Beach from their Anna Plains property. We also thank Charles Allen and Doris Graham, for their most generous individual contributions, and to Kate Gorringe-Smith and her team of artists involved in The Overwintering Project made a large, generous donation from funds raised during their various public exhibitions.

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FIRST RECORD OF SILVER GULL *LARUS NOVAEHOLLANDIAE* FOR SUMBAWA AND THE LESSER SUNDAS, INDONESIA

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The Silver Gull *Larus novaehollandiae* is widespread throughout Australia and New Zealand including most outlying islands. It is also an occasional visitor to the northern Torres Strait and west Gulf of Papua (Higgins & Davies 1996). In Australia the species is abundant and widespread, with some populations moving and breeding far inland (Higgins & Davies 1996). It is also considered a pest in Australian urban environments (Smith et al. 1992). Silver Gulls are known to occupy places of human occupation, parks, agricultural areas, harbours, estuaries, coastal areas, wetlands, ocean beaches and rubbish tips (Higgins & Davies 1996). This report documents the first sighting of Silver Gull on Sumbawa Island, Indonesia on 16 November, 2021. This sighting also represents the fourth record of Silver Gull in Indonesia and the first record for The Lesser Sundas.

On 16 November 2021, we visited Sinarjaya village, about 70 km from Sumbawa Besar city on Sumbawa Island, Indonesia (8°43'59.4"S, 117°49'25.4"E), to look for Australian Pelican *Pelecanus conspicillatus*, which are known to regularly visit the area. We were there from about 09:00 until 17:30. This village consists of settlements and wetland on its coastal area. There are many shrimp and fish ponds, wet grassland areas, mudflat, shrubs, and also thin mangrove forests along the shores. Since 2016, local villagers have documented Australian Pelicans visiting the region annually, especially during the rainy season. We found 12 individuals that day and villagers reported there could be up to 60 individuals.

We observed Red-necked Stint *Calidris ruficollis*, Curlew Sandpiper *Calidris ferruginea*, Common Greenshank *Tringa nebularia*, Common Redshank *Tringa totanus*, Pacific Golden Plover *Pluvialis fulva*, Greater Sand Plover *Charadrius leschenaultii*, Ruddy Turnstone *Arenaria interpres*, Gull-billed Tern *Gelochelidon nilotica*, Pied Stilt *Himantopus leucocephalus*, and other shorebirds. At 16:13 ODP spotted a tern-like bird that showed some morphological differences from the surrounding Gull-billed Tern, standing in the middle of an almost dry shrimp pond. The most noticeable feature was that the bird had a red bill and red legs. ODP and YS photographed and recorded video of the bird and its flock (Figure 1, Figure 2). We used Eaton *et.al* (2021) to confirm the identification of the bird and concluded that the characteristics were consistent with Silver Gull.

Figure 1: Silver Gull walking on a small mudflat area between Gull-billed terns in Sinarjaya fishpond on 16 November 2021. Photograph by Oka Dwi Prihatmoko.

We observed the Silver Gull for only about 5 minutes, because the weather conditions at that time indicated incoming rain. We decided to immediately leave the location in order to avoid our motorcycle being trapped and stuck in the mud of fishpond areas. From the videos we got, the bird was standing still with its head looking around. The bird walked a bit, stopped, then preened its breast and wing feathers, walked again with its head looking down before catching a small crab.

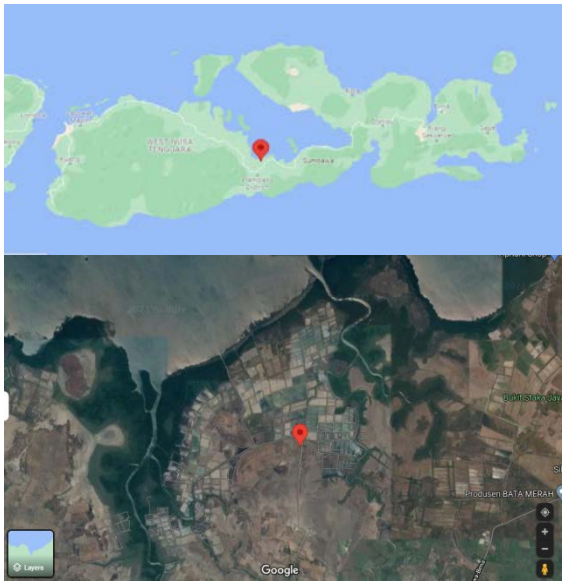

Figure 2: Map and location of Sumbawa and Sinarjaya fishponds, where the Silver Gull was observed on 16 November 2021.

Silver Gull is similar to Black-headed Gull *Larus* (*Chroicocephalus*) *ridibundus* in general shape and proportions, but slightly bigger. Silver Gull is 38–43 cm head to tail, while Black-headed Gull is 37–43 cm (Burger et al. 2020). The head and body of the Sinarjaya bird were completely white consistent with Burger et al. (2020) and Eaton et al. (2021). The head of Silver Gull is white, blending into grey mantle, back and wings;with the body and tail also white, while the outer primaries are mostly black with white subterminal spots on outermost three, while the inner primaries are white at the base (Burger et al. 2020, Eaton et .al. 2021). The red bill and legs, white iris and narrow fleshy red orbital ring, were also observed in the Sinarjaya bird

There has been a change in land use at Sumbawa from mangrove into fishponds recently, which made it easier to see birds in the open, while the birds were resting and foraging within the ponds. Therefore it is possible that previously the occurrence of Silver Gull was overlooked. The government in Sumbawa is planning to create more fish and shrimp ponds, as part of the "Shrimp Estate Program", which means more mangrove opening and more wetland areas in the north part of Sumbawa Island.

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BOOK REVIEW

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WADERS OF THE INDIAN SUBCONTINENT

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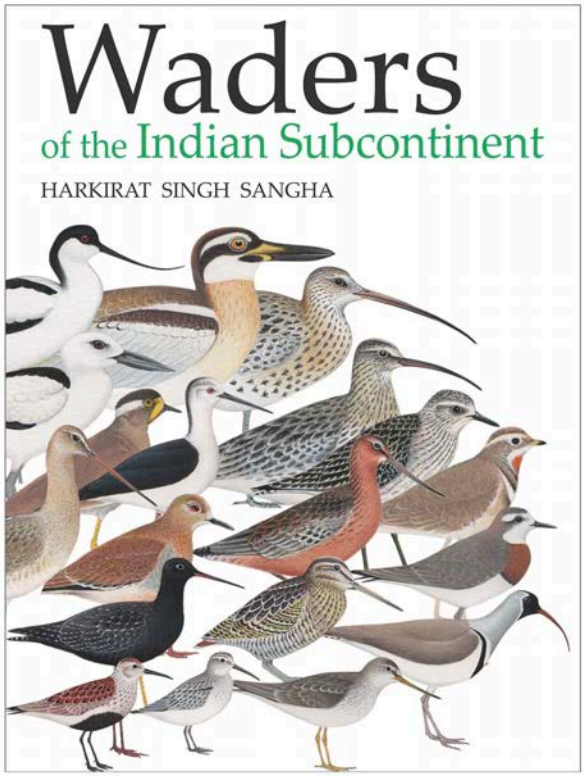

What an accomplishment this book is. Most works of such reach would have a number of authors and financial backers. That Mr Harkirat Singh Sangha has produced this book mostly single-handedly with only some help from WWF-India with funds, is a monumental effort.

That Harkirat mentions Point Calimere and Dr Balachandran as an inspiration brings good memories for me as I too have had the wonderful experience of banding shorebirds with 'Bala' there and that interest in India's shorebirds persists with me after 23 years.

This book is very much a handbook, it won't fit in your pocket and will be heavy in your backpack. It is packed with detail on shorebirds on the Indian Subcontinent (including Bangladesh, Bhutan, Maldives, Nepal, Pakistan, Sri Lanka and the Chagos Archipelago). The informative opening sections cover migration, flyways, research, and habitats. The habitat section is excellent and will be of particular interest to overseas readers. Anyone interested in shorebirds knows they face many threats and Harkirat doesn't shy away from this but finishes that section with 'Areas of Hope' which I think is a nice positive touch. The book has both plates and images for all the species covered. I am more a fan of plates for identification guides but here the two complement each other nicely. I would say the plates have an old-fashioned feel to them. That is not a criticism. Some of the plates are beautiful, the woodcock and snipes being prime examples. Unfortunately, the pratincole plate has not printed well and the Buff-breasted Sandpiper drawings won't help much with identification.

There is a very nice and informative part of the book early on where the author documents the early days of Indian shorebird study, right through to digital photography and eBird. The book even lists some unpublished theses, emphasising the wide range of references explored and the dedication behind that. And the lack of any snobbery!

This brings me to the images. That I usually prefer plates is challenged in this book. The images are very informative. They include a very good mix of birds in flight, breeding birds, non-breeding birds, juveniles, and plumages in transition between ages. They are not chosen to be award-winning although some are. They are chosen to help the reader in identifying this wonderful group of birds and they do an admirable job in that.

Maps in bird books are always a difficult part to get right, and documenting sightings on a country-wide map is tricky. This book does a good job and with careful reading of the explanation in 'Range and Distribution' and then studying a few examples the maps, are a good contribution to all the other information supplied for the reader.

If you are a shorebird-nerd, you should consider having this book on your shelf. If you are going to India and have any interest in shorebirds then perusing this book for a few months before you go will only enhance your subsequent trip.

A great achievement and a very nice book.

WADER BREEDING SUCCESS IN THE 2020 ARCTIC SUMMER, BASED ON JUVENILE RATIOS OF BIRDS WHICH SPEND THE NON-BREEDING SEASON IN SOUTHEAST AUSTRALIA

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Overall, for South East Australia, breeding success in the Arctic summer of 2020 was average or slightly below average for all but one of the four species successfully monitored (Red-necked Stint *Calidris ruficollis* (18.5%), Curlew Sandpiper *C. ferruginea* (18.2%), Ruddy Turnstone *Arenaria interpres* (13%), with one species Sharp-tailed Sandpiper *C. acuminata* (10.2%) having low breeding success.

INTRODUCTION

Each year wader banders in Australia attempt to collect 'percentage juvenile' data to measure the annual breeding success of wader populations which spend the non-breeding season in south-east Australia. The Victorian Wader Study Group (VWSG) aims to monitor breeding success for seven species (see Table 1). All birds are caught by cannon netting between mid-November and March, early April (depending on the species) on the Victorian coast, on coastal sites in the south-east of South Australia (around Port Macdonnell to Nora Creina) and on the Bass Strait island of King Island, Tasmania Figure 1.

Figure 1. VWSG catching locations (source https://www.birdmark.net/bm_overviewBandingDataVWSG.php).

In South East Australia (SEA) birds were caught at a range of sites, mostly the same sites each year. The Coronavirus disease (COVID-19) pandemic in 2020/21 negatively impacted on the field season and no data were collected for Bar-tailed Godwit *Limosa lapponica* and Red Knot *Calidris canutus*. This was because it was not possible to make field trips due to state travel and group size restrictions and closure of study sites within lands managed by Parks Victoria (government body) and restrictions on in-kind support such as boat transport.

Additionally, Australian state government restrictions prevented the usual field trip in November 2020 to King Island, Tasmania. However, a local team carried out some limited field work in South Australia to sample Ruddy Turnstone *Arenaria interpres.* In addition no catching took place in north-west Australia due to travel restrictions, thus only SEA data was available for this analysis.

METHODS

In SEA sampling took place between December 2020 and April 2021. The usual techniques for catching, ageing birds and data recording were employed as described in Minton *et al*. 2005. A minimum sample of between 100 and 220 birds captured is required for percentage juvenile estimates, which gives a juvenile fraction error range of 0.1 to 0.15 (Rogers & Standen 2019).

RESULTS AND DISCUSSION

South-eastern Australia (SEA)

A total of 1565 birds of the seven species targeted for annual monitoring were caught in SEA in the sampling period (Tables 1 and 2). As usual, Red-necked Stint *C. ruficollis* were the most numerous species captured, with 1068 individuals caught during the mid-November to early April monitoring period. The percentage of juveniles (18.5%) was lower than last year (24.3%) and similar to the long-term average (17.2%) (Jessop et al. 2020). It should be noted that the catches used in this estimate, as for last year, were made at Yallock Creek in Victoria, a location where juveniles are known to be at higher numbers than other sites usually sampled (VWSG unpublished data). No significant catches of Red-necked Stint were made due to COVID-19 entry restrictions and changes in habitat

management at the other major catch site (the Western Treatment Plant). Howerver, the Western Treatment Plant typically has fewer juveniles than Yallock Creek (VWSG unpublished data).

Curlew Sandpipers *C. ferruginea* (18.2%) had slightly higher, albeit approximately average breeding success in 2020 compared to the long term average breeding success of 16.9% (Table 1). This follows the two poor breeding years in 2017/18 (5.4%) and 2018/19 (9.9%) but slightly less than 2019/20 (23.9) (Table 2) (Jessop et al 2020; Minton et al. 2020).

Sharp-tailed Sandpiper *C. acuminate* breeding success (10.0%) appears to have had improved following on from last year's poor breeding success (2.0% juveniles; Table 2) (Jessop et al 2020) but was less than the long-term average success in 2020 (18.7%) (Table 1). Further north in the East Asian Australasia Flyway at Lianyungang, China, a stopover site for the species this poor breeding success is reflected in a reduction in numbers of Sharp-tailed Sandpiper (Choi et al. 2020). Lianyungang supports 14.8% of the flyway population (Hansen et al 2022), reclamation projects that commenced in 2019 are likely to impact on the quality of this stopover site leading to long term declines in this species (http://hbj.lyg.gov.cn/lygshbj/mqfw/content/0d79370a-6a0d-48ae-8385-d9ad66af9018.html accessed 20/09/2022).

We always find Red Knot the hardest species to catch and monitor and in the 2020/21 non-breeding season we were not able to catch enough individuals in the VWSG field sites. Similarly, we did not catch enough Bar-tailed Godwits or Sanderling *C. alba* to report on the percentage of juveniles in the populations.

A total of 208 Ruddy Turnstone were caught. The breeding success appeared to be slightly below average (13.0%, Table 1) and follows last year's good breeding success for this species (17.4%; Table 2) (Jessop et al. 2020).

Overall, for SEA, breeding success in the Arctic summer of 2020 was average or slightly below average for all but one of the four species that we successfully monitored. Only the Sharp-tailed Sandpiper had low breeding success.

Table 1. Percentage of juvenile (first year) waders in cannon-net catches in south-east Australia 2020/21. All birds were cannon-netted from 2 November to 25th March except Sharp-tailed Sandpiper and Curlew Sandpiper, which were captured to end February only and some Ruddy Turnstone and Sanderling, which were captured to early April and one Sanderling catch in late April (in 2015).

Species	**No. of catches**			**Juveniles**		**Long-term average***		**Assessment of 2019 breeding success**
	Large (>50)	**Small (<50)**	**Total caught**	**No.**	**%**	**% juvenile (no. years)**		
Red-necked Stint *Calidris ruficollis*	6	2	1068	198	**18.5**	17.2	(23)	Slightly above average
Curlew Sandpiper *C. ferruginea*	1	5	181	33	**18.2**	16.9	(22)	Slightly above average
Bar-tailed Godwit *Limosa lapponica*			0					
Red Knot *C. canutus*			0					
Ruddy Turnstone *Arenaria interpres*	1	9	208	27	**13.0**	15.0	(23)	Slightly below average
Sanderling *C. alba*			0					
Sharp-tailed Sandpiper *C. acuminata*	1	1	108	11	**10.2**	18.7	(22)	Low

*Includes the 2019/2020 figures.

Table 2. Percentage of juvenile (first year) birds in wader catches in south-east Australia 1998/1999 to 2020/21. All birds were cannon-netted between 15th November and 25th March, except the Sharp-tailed Sandpiper and Curlew Sandpiper, which were captured to end February only and some Ruddy Turnstone and Sanderling to early April and one Sanderling catch in late April (in 2015). Averages (for 22 years) exclude figures in brackets (small samples) and include 2020/21 figures.

Species	98/99	99/00	00/01	01/02	02/03	03/04	04/05	05/06	06/07	07/08	08/09	09/10	10/11	11/12	12/13	13/14	14/15	15/16	16/17	17/18	18/19	19/20	20/21	Average (last 23yrs)
Ruddy Turnstone *Arenaria interpres*	6.2	29	10	9.3	17	6.7	12	28	1.3	19	0.7	19	26	10	2.4	38	17	2.3	28.6	7.0	25.7	17.4	*13.0*	*15.0*
Red-necked Stint *Calidris ruficollis*	32	23	13	35	13	23	10	7.4	14	10	15	12	20	16	22	17	19	6.0	31.3	3.8	9.5	24.5	*18.5*	*17.2*
Curlew Sandpiper *C. ferruginea*	4.1	20	6.8	27	15	15	22	27	4.9	33	10	27	(-)	4	3.3	40	5.1	1.9	47.6	5.4	9.9	23.9	*18.2*	*16.9*
Sharp-tailed Sandpiper *C. acuminata*	11	10	16	7.9	20	39	42	27	12	20	3.6	32	(-)	5	18	19	16	8.9	(-)	27.8	45.9	2.0	*10.2*	*18.7*
Sanderling *C. alba*	10	13	2.9	10	43	2.7	16	62	0.5	14	2.9	19	21	2	2.8	21	14	6.8	17.5	(-)	11.6	(-)	(-)	*14.9*
Red Knot *C. canutus*	(2.8)	38	52	69	(92)	(86)	29	73	58	(75)	(-)	(-)	78	68	(-)	(95)	(100)	(100)	90.3	33.3	(-)	(-)	(-)	*58.8*
Bar-tailed Godwit *Limosa lapponica*	41	19	3.6	1.4	16	2.3	38	40	26	56	29	31	10	18	19	45	15	26.7	12.5	20.4	3.0	(-)	(-)	*22.5*

ACKNOWLEDGEMENTS

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VWSG acknowledges the Traditional Owners of the land on which we conduct field research and pay our respects to Elders past and present.

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Research papers should document the outcome of original research from scientific studies and monitoring of waders. Research papers should contain the following sections:

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[3]Birds Singapore, National University, Jurong N4321 SINGAPORE

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Books: **Kershaw, K.A.** 1964. Quantitative and dynamic ecology. Edward Arnold, London.
Reports: **Noor, Y.R.** 1994. A status overview of shore birds in Indonesia. Pp. 178-88. *In*: Wells, D.R. & T. Mundur. (Eds.) Conservation of migratory water birds and their wetland habitats in the East Asian Australia Flyway. Asian Wetland Bureau, Malaysia.
Online material: **Dutson G., S. Garnett & C. Gole** 2009. Australia's Important Bird Areas: Key sites for bird conservation. Birds Australia (RAOU) Conservation Statement Number 15. Available at http://www.birdlife.org.au/document/OTHPUB-IBA-supp.pdf (accessed 10 August 2012). Please check the copyright section of the webpages, they usually have a recommended citation.

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