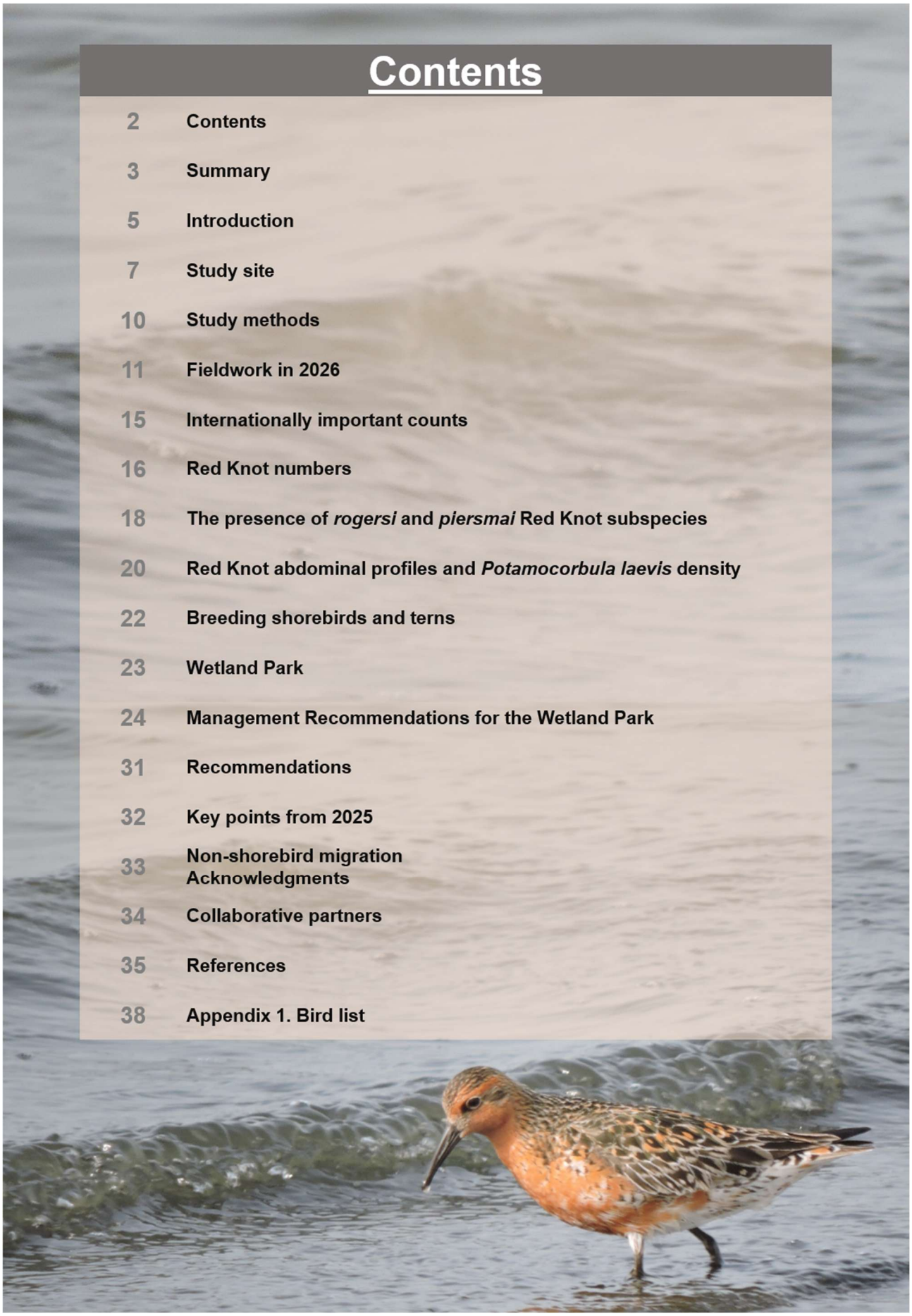
global flyway network
Team Piersma

SHOREBIRD NORTHWARD MIGRATION THROUGH THE LUANNAN COAST, BOHAI BAY, CHINA, MAY – JUNE 2026

Katherine Leung, Chris Hassell,
Weipan Lei, Zhengwang Zhang and Theunis Piersma

Cover photo: Red Knots in Nanpu saltpond, 15 May 2026. © Katherine Leung

Contents



Red Knot feeding in a salt pond at Luannan Coast, 24 May 2026. © Katherine Leung

Summary

This is the nineteenth year for Global Flyway Network (GFN)'s fieldwork at the Luannan Coast, Bohai Bay, China. Chris Hassell, Katherine Leung and Yang Liu (Xiao Liu, Nanpu local) carried out the fieldwork for 4 weeks, from 8 May to 4 June 2026, 28 days in total.

This 2026 season's work was made possible with financial support from three private donors and the UK-based shorebird conservation charity Wader Quest, and administrative support from Beijing Normal University (BNU). Katherine Leung and Chris Hassell volunteered their time and expertise.

The main findings from this year's fieldwork showed that in 2026, Red Knot *Calidris canutus* highest daily peak counts at Nanpu dropped to the level similar to low numbers of 2021-2024. The biggest day count was 9,000 on 9 and 10 May at Nanpu, with a second peak of 8,070 on 27 May. The number of Red Knot using the Luannan Coast varies a lot from year to year. The 2018 (48,630) and 2019 (47,537) counts were our highest since 2015, and the lowest was 3,660 in 2023. The fluctuating numbers of Red Knot at Nanpu appear to reflect local food abundance and intensity of human activities. None of the non-breeding areas across the East Asian – Australasian Flyway (EAAF) has experienced dramatic changes in the numbers of Red Knots. Therefore, despite the dramatic fluctuations recorded at the Luannan Coast over the past 12 years, we do not consider these local changes to reflect a flyway-wide crash in Red Knot numbers. However, the decline is steady and worrying. We believe that the northward migration pattern of Red Knot keeps changing in recent years, which may not be unusual for migratory species in a rapidly changing flyway landscape. Despite of the low number this year, the highest day count of Red Knot is still equivalent to 8.2% of the EAAF's Red Knot population, highlighting the continued international significance of the Luannan Coast to the EAAF's Red Knot.

This year, we recorded 743 marked shorebirds, a relatively low number. Nevertheless, these records include 10 migratory shorebird species from 22

Red Knots on the Nanpu mudflats, 10 May 2026. © Katherine Leung

marking locations across the EAAF, as well as from India on the Central Asian Flyway (CAF). Seventy-eight Red Knots and one Bar-tailed Godwit *Limosa lapponica* were individually recognisable from the GFN colour-banding project in Northwest Australia (NWA), which is the lowest in our 19 years of fieldwork. Despite the low number of records, the vital importance of the Luannan Coast for Red Knots from NWA and throughout the EAAF is indisputable.

A list of species recorded in internationally important numbers has been compiled from GFN and BNU studies spanning 2010–2026. The list is a clear indication of the immense importance of the Luannan Coast shorebird site. In the period 2017-2026, 12 species of migratory shorebirds have been recorded in internationally significant numbers, including three species for which at least 10% of their entire EAAF populations passing through the Luannan Coast during northward migration. In addition to the migratory shorebirds and terns passing through the site, we have recorded 11 species breeding within the study site from 2010 to 2026.

Both the mudflats and the adjacent ponds of the Luannan Coast are vital components of the site for shorebird conservation, as well as important contributing factors to the local economy and employment. In October 2020, 5,791.6 ha of the Luannan Coast at Nanpu was designated as Hebei Luannan Nanpu Zuidong Provincial Wetland Park. However, over the past few years, there has been little positive progress in the site management, despite its critical importance for migratory and breeding waterbirds. Proper and sustainable conservation management underpinned by strategic planning and close engagement with local scientists is vital for enhancing the conservation of this critical site. We hope that better communication can be set up between decision makers and scientists, so that subsequent conservation management of the Wetland Park will ultimately enable the Red Knots and many other waterbird species of the EAAF to maintain sustainable population levels, as well as serving the local communities with a sustainable economy and for raising the public's awareness of wetland conservation. GFN will endeavour to continue assisting with conservation efforts at the Luannan Coast in collaboration with BNU.

Rising tide at the Nanpu muflats, 9 May 2026. © Katherine Leung

Introduction

Most of the Yellow Sea intertidal mudflats are critical feeding areas for shorebirds migrating between their breeding and non-breeding grounds. The areas used by migratory shorebirds are referred to as 'stop-over sites' (sites used mainly for a 'pit-stop', a rest) or 'staging sites' (sites used for more than a few days for serious refuelling). Birds spend from a few days to about six weeks at any one or several sites on their way north. The Luannan Coast is one such critical area and is particularly important to Red Knot (Piersma *et al.* 2016, Rogers *et al.* 2010, Yang *et al*. 2011). Red Knots are represented in the EAAF by three subspecies: *piersmai, rogersi* and *roselaari* (the latter is not part of this study because it only breeds on Wrangel Island in the Russian Far East and migrates to the Americas). The subspecies *piersmai* and *rogersi* breed in different areas in the Siberian Arctic and share wintering sites in Australasia (Tomkovich 2001, Rogers *et al.* 2010), as well as South-east Asia.

Despite Red Knot having been one of the best researched shorebird species in the world for quite a long time (see, for example, summary in Piersma *et al*. 1997), we only started to understand the northward and southward migration strategies of the two subspecies that use the Luannan Coast, and changes to these strategies, as a consequence of habitat loss and change within the EAAF (Piersma *et al.* 2021). Surveys of the Yellow Sea by Mark Barter and his Chinese colleagues in May 2000 did not record Red Knots in significant numbers despite extensive searching. During northward migration in 2002, they recorded 14,277 individuals in the north-west Bohai Bay region, now called the Luannan Coast (Barter *et al.* 2003). During a brief six-day visit in late April 2007, Chris Hassell counted a single flock of 10,650 Red Knots in the same region. In September 2007, Hongyan Yang (Nicky), then a Master postgraduate student and later a PhD candidate at BNU commenced a project on the food, foraging and staging ecology of Red Knots in the area. She conducted regular counts during northward migration in 2003-2014 and her work showed that numbers of Red Knot at the Luannan Coast increased over the years, presumably reflecting habitat destruction elsewhere and consequently birds moving into her study site (Yang *et al*. 2011).

Red Knot with NWA colour bands on Nanpu mudflats, 21 May 2026. © Katherine Leung

Building on the research conducted in NWA, in conjunction with the work by researchers from BNU, Fudan University and the Center for East Asian-Australasian Flyway Studies at Beijing Forestry University (CEAAF), studies by GFN have continued during the northward migration seasons of 2009 to this year, 2026. Our fieldwork focused on searching for individually marked Red Knots and have been remarkably successful. Several PhD students graduated from the University of Groningen under the supervision of Theunis

Piersma have used data from the Luannan Coast studies. These academic studies are made possible through the Rudi Drent Chair in Global Flyway Ecology at the University of Groningen, with past support from WWF Netherlands, WWF-China, SEE Foundation, Natural Science Foundation of China and BirdLife-Netherlands, with the in-kind support of the Royal Netherlands Institute for Sea Research (NIOZ), and in close cooperation with BNU.

It is clear from our current knowledge that the Luannan Coast has been the single most important site known for Red Knot on northward migration in the EAAF, encompassing the majority of the populations wintering in Australia, New Zealand and South-east Asia. In recent years there have been changes in the daily peak counts of Red Knot at the Luannan Coast, and it is possible that other sites now also support significant number of Red Knots during the northward migration season. The Luannan Coast still remains of significant international importance to the EAAF's Red Knots.

This 2026 season's work was made possible with financial support from three private donors and the UK-based shorebird conservation charity Wader Quest, and administrative support from Beijing Normal University (BNU).

All the migratory birds mentioned in this report are covered by the China-Australia Migratory Bird Agreement (CAMBA). The data presented in this report confirms the importance of the Luannan Coast for migratory birds and underscore the priority for both Australia and China to build on and advance their actions to protect this site and the wider Yellow Sea mudflats for the future of migratory birds.

Flocks of Red Knot on Nanpu mudflats, 9 May 2026. © Katherine Leung

Study site

Figure 1. Interpreted satellite image of northern Bohai Bay, China with the coastal study sites marked in yellow.

The Luannan Coast referred to throughout this report encompasses our study sites shown in Figure 1 and the adjacent salt and aquaculture ponds.

The centre of our study site is situated at 39.0597N, 118.2092E. It is near Nanpu Development Zone of Tangshan City, situated 190 km south-east of Beijing, China. Figure 1 shows the six coastal study sub-sites. The mudflats of our six sub-sites cover 40 km in length and are 1-4 km wide (on the lowest tides). The total coastline of Bohai Bay is 1,294 km of which more than 95% 'built environment'. This is mostly the huge port and industrial developments of Caofeidian, Tianjin and Huanghua (Sun *et al.* 2017).

The Nanpu mudflat is the largest of the sub-sites that we study at 8 km long and 4 km wide, at the lowest tide. It is probably the most important of the remaining mudflats in the area, where most of the Red Knots often congregate. This is presumably because, at present, this site has the most abundant and/or accessible prey. Due to the topography of the artificial seawall, it is also the last area of mudflat to be covered on an in-coming tide and the first to become exposed on an out-going tide. Consequently, this is where we obtain the best views of birds and is where most of our fieldwork is conducted.

The Nanpu mudflats are an important shorebird foraging ground as well as contributing to the local communities. Shell-fishing operations are carried out by people from the nearby village of Beipu. Reasonable levels of fishing activity do not appear to concern the birds; we often watch flocks of birds feeding close to the people collecting shellfish.

Thanks to the continuous effort and discussions between provincial and county governments, BNU and NGOs, the Nanpu mudflats and some of the adjacent ponds are protected within the Hebei Luannan Nanpu Zuidong Provincial Wetland Park since October 2020 (see later section).

Continued management for the conservation of Nanpu and the remaining mudflats at the Luannan Coast, and their benign ecological offerings to shorebirds, remains of great importance to enable the internationally significant number of Red Knot and other migratory shorebirds and terns to continue using the area as a staging site. For details of the other sub-sites, please refer to previous reports (see Report 2021).

The Nanpu intertidal mudflats are separated by a man-made seawall from the Nanpu ponds complex. These were reputedly 'the largest salt works in Asia'. This ponds complex, adjacent to the mudflats, is also critical habitat for birds to forage and roost (Lei *et al.* 2018, Lei *et al.* 2021a), and for some species to nest (Lei *et al.* 2021b), but some of these areas have also been lost to industrial development. The area of ponds adjacent to the Luannan Coast is vast, stretching 10 km inland and across the entire 20 km, from south-east to north-west, of our four southerly study sites and therefore roosting opportunities are many and varied for migratory shorebirds and terns. There are also suitable ponds for feeding and roosting shorebirds and terns adjacent to the Hangu mudflats located in Tianjin City.

Salt, fish, *Litopenaeus* shrimp, *Artemia* brine shrimp (adult and cysts) are the major products from the ponds adjacent to the Luannan Coast. Different water levels and salinities of the ponds are suited to the different uses (Lei *et al*. 2025). For the purposes of this report, all and any pond, regardless of its use, is referred to as a 'pond'.

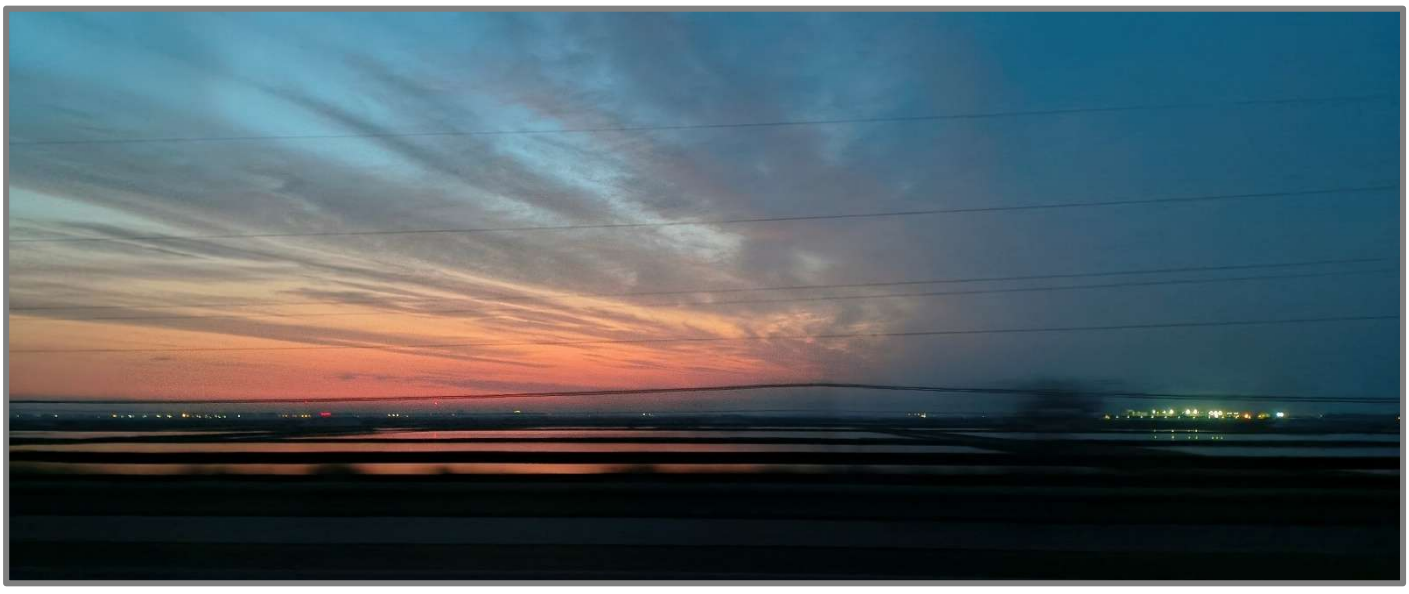
Shorebirds roosting and feeding at the salt ponds behind the Nanpu seawall, 30 May 2026. © Katherine Leung

Our drive to the seawall has enabled us to see the same ponds over the entire 19 years of study, despite that journey now occurring along a stretch of six-lanes highway. Prior to 2018, the majority of shorebirds and terns have used these ponds for roosting as well as feeding, particularly after mid-May. In 2013 when there were many and varied ponds available to birds, we had the amazing sight of 95,833 mixed shorebird species foraging in a single, shallow, large pond (2.6 km^2), and a count of 34,200 Red Knot foraging in another shallow, large pond (3.4 km^2). Between 2016 and 2018, the water levels in most of these large ponds gradually became deeper due to increased management for aquaculture while maintaining salt production. The deep water in these large ponds made them unsuitable for foraging shorebirds, particularly for the small and medium-sized species.

In recent years water levels in these large ponds remain high throughout the season, and even long-legged shorebirds such as Black-tailed Godwits *Limosa limosa* and Pied Avocets *Recurvirostra avosetta* were rarely seen in these ponds. This year we did not find any large pond with low water level at all. The foraging opportunities have diminished almost completely.

A 10-ha area of small salt ponds behind the seawall adjacent to Nanpu mudflats is where the main roosting sites have been in the past few years. This area continues to have shallow water and is relatively undisturbed although pond workers do cause some occasional disturbance. It is now used during our entire study period. This is different from before 2018 when birds used to roost and do some foraging in these close ponds early in the season but then move further inland to the larger pond complex around mid-May.

Despite this change, it remains the case that both the ponds and the adjacent mudflats of the Luannan Coast are vital components of the area for shorebird conservation, even though the ponds are now predominately only suitable for their safe and relatively undisturbed roosting opportunities.



View from the drive along the six-lanes highway before dawn, 1 Jun 2026. © Katherine Leung

Study methods

Shorebirds captured throughout the EAAF are mostly marked with plain coloured leg flags, engraved leg flags (ELF), or combinations of one plain leg flag with four colour-bands. Each bird also has a metal band placed on it supplied by the corresponding country's banding centre. Each capture location has its own colour leg flag combination and/or position of the flag on the birds' leg: Shorebird Colour Flagging Protocol for the East Asian-Australasian Flyway.

'Scanning' is systematically searching through feeding or roosting birds using telescopes to look specifically for flags and colour-bands on bird legs. Each marked bird is recorded, and the records are sent to each banding project at the end of our fieldwork season.

The focus of our study is GFN's individually colour-banded birds marked in NWA at Roebuck Bay and Eighty Mile Beach. The capture and marking component of this study ceased in 2019 except for a one-off tagging project in 2023 when a further 129 birds were colour-banded. But during our fieldwork at the Luannan Coast, we record every single marked bird we see, not just from the GFN project, thereby documenting the importance of the Luannan Coast for various shorebird species from the EAAF and CAF.

In addition to the data collected during our studies at the Luannan Coast, the GFN project is also getting tens of thousands of resightings at Roebuck Bay and Eighty Mile Beach. This huge dataset, with such a high number of records of individually marked birds, is very valuable for learning about survival and movements of these shorebirds (Piersma *et al.* 2016, Lok *et al*. 2019, Ross *et al*. 2026).

NWA colour-banded Red Knot 4LBYY was marked at Eighty Mile Beach, NWA on 2 March 2013 as an adult. It has visited the Luannan Coast almost every spring ever since. This year, it was photographed in Quanzhou, Fujian on 30 April (this image) before resighted at Luannan Coast on 9 May and stayed until 27 May. © Jimmy

Fieldwork in 2026

The fieldwork this year started on 8 May and finished on 4 June, equating to 28 consecutive days with two or three observers in the field daily. This year fieldwork was again almost solely focused on Red Knots at Nanpu with much reduced visits to other sites.

The birds' use of the study site (Fig. 1) has changed since our first visit in 2007 and continues to vary each year as local conditions fluctuate and affect the suitability of different areas for the birds, particularly Red Knot, as it is a highly specialised molluscivore (Piersma *et al*. 1998, Yang *et al*. 2013). Beipu, North Beipu and Heiyanzi continued to be inaccessible as the seawall is blocked by locked gates. We only made a few visits to Hangu this year, the highest single count of Red Knot there this year was 3,500.

Table 1 documents the duration of our study periods at the Luannan Coast, Bohai Bay. We started with a preliminary visit in 2007, as our understanding of the importance of the site became clear to us, we started to cover the entire northward migration season of Red Knots, leading to the complete and continuous coverage of northward migration from 2010-2019 and 2021. The fieldwork in 2020 and 2022 was hampered by COVID-19 restrictions. Since 2023, the fieldwork period was reduced due to funding availability.

Table 1. Days of observation, total sightings of marked birds and resightings of individually recognisable colour-banded Red Knot from NWA at the Luannan Coast study site 2007-2026.

YEAR	DAYS OF OBSERVATION	TOTAL SIGHTINGS OF ALL MARKED BIRDS	COLOUR-BANDED RED KNOT FROM NWA
2007	7	49	0
2008	-	-	-
2009	19	859	76
2010	57	3133	106
2011	52	3354	170
2012	53	4496	279
2013	59	4613	269
2014	57	5014	345
2015	57	4147	387
2016	56	3554	261
2017	55	2765	265
2018	57	4116	313
2019	57	3452	336
2020	34	1169	189
2021	59	2087	208
2022	40	486	106
2023	42	1211	124
2024	35	1288	131
2025	36	1389	132
2026	**28**	**743**	**78**
TOTAL	**832**	**47182**	**3697**

Xiao Liu scanning at the Nanpu salt pond, 27 May 2026. © Katherine Leung

Table 2 below summaries the totals of all marked migratory shorebirds recorded during all our fieldwork seasons and the locations they were originally marked. The birds with plain flags only indicate their original marking location and cannot be identified to an individual bird. The colour-banded birds, the engraved leg-flagged birds and some birds with unique positioning of flags on their legs can be attributed to individual birds when close views are obtained. As the team were seeing individually marked birds that were 'new' to the site late into the fieldwork period, it is reasonable to assume that plain-flagged birds were also still arriving while others will have departed. So, while some will undoubtedly be multiple sightings, the numbers in Table 2 provide a good reflection of the numbers of flagged birds present during the study period. These resighting records of marked birds from 38 marking locations within the EAAF highlight the importance of the Luannan Coast, not only to birds from NWA, but also to those from the entire EAAF. In recent years, we have also started to record birds marked from two areas in India which is part of the CAF.

During the 28 days of fieldwork, we made a total of 743 sightings of marked birds, of which 239 were 'known individuals', those able to be identified from unique engraved leg flags or colour-band combinations to an individual bird (Tables 1, 2 and 3). The total number of sightings of all marked birds this year was very low due to both the low number of Red Knots at the Luannan Coast this year (see later section) and the shorter fieldwork period. Also, we do not get the total numbers of marked birds that we used to get in the peak years of 2010 to 2019 possibly due to some of the main research projects in the EAAF having, for some years now, been marking much smaller numbers of birds.

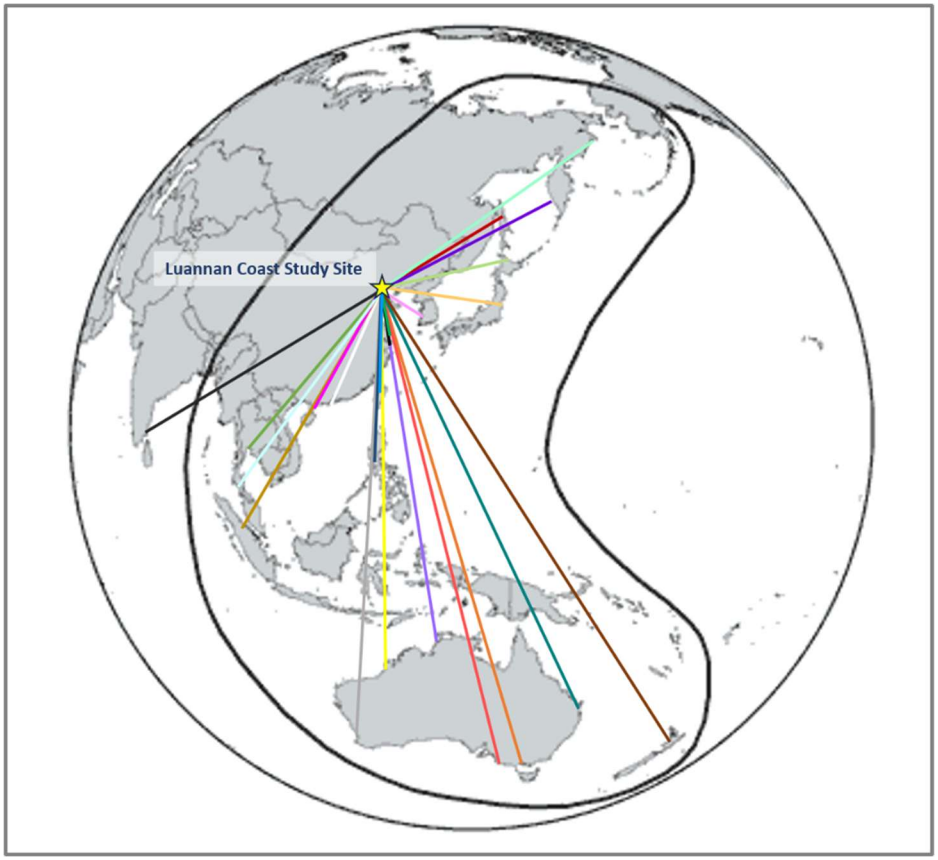


Figure 2. Between 2010 and 2026 we have recorded Red Knot from 26 different banding locations throughout the EAAF, and from India on the CAF. The map is a representation of some of these sites.

Table 2. Totals of resightings of marked shorebirds, of all species, by banding area, recorded during fieldwork 2010-2026.

MARKING LOCATION	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	Total 2010-26	KNOWN INDIVIDUALS 2026
1. CHUKOTKA, RUSSIA	1	32	43	50	62	38	44	22	22	50	6	16	4	14	17	26	10	457	3
2. KAMCHATKA, RUSSIA	1	3	4	1	0	6	7	20	37	65	11	25	23	17	23	26	7	276	1
3. SAKHALIN, RUSSIA	0	4	5	48	52	44	43	33	36	21	3	1	1	4	2	0	2	299	0
4. MONGOLIA	0	0	0	0	0	0	0	0	0	0	0	5	0	1	1	3	0	10	0
5. HOKKAIDO, JAPAN	1	7	10	5	9	5	8	2	0	2	0	0	0	0	0	0	0	49	0
6. NORTH-EAST COAST, JAPAN	0	0	0	0	0	4	1	0	0	0	0	0	0	0	0	0	0	5	0
7. TOKYO BAY, JAPAN	0	0	0	0	0	0	0	0	1	7	0	1	0	1	0	0	0	10	0
8. KYUSHU, JAPAN	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	0	2	0
9. SOUTH KOREA	0	0	0	0	8	12	5	0	5	0	0	0	0	0	0	0	0	30	0
10. LIAONING YALUJIANGKOU WETLAND NATIONAL NATURE RESERVE	0	0	0	1	3	3	0	0	0	0	0	5	0	1	0	0	0	13	0
11. LIAONING LIAOHEKOU NATIONAL NATURE RESERVE (SAUNDERS'S GULL)	1	9	0	1	1	7	1	5	0	0	0	0	0	0	0	0	0	25	0
12. HEBEI KANGBAO KANGBANOR NATIONAL WETLAND PARK (RELICT GULL)	0	0	0	0	0	0	0	0	0	2	0	0	1	0	0	0	0	3	0
13. BOHAI BAY, LUANNAN & HANGU	122	96	129	125	108	55	162	78	126	77	16	43	2	75	101	96	58	1487	14
14. BOHAI BAY, SOUTH										4	0	4	0	5	2	3	0		0
15. JIANGSU, DONGTAI AND RUDONG	0	0	0	0	0	0	0	1	2	8	0	7	0	3	3	4	3	31	1
16. SHANGHAI CHONGMING DONGTAN NATIONAL NATURE RESERVE	321	447	565	552	679	510	518	342	437	356	98	231	25	86	156	136	71	5530	17
17. ZHEJIANG, HANGZHOU BAY	0	0	0	0	0	0	0	0	0	0	4	2	0	6	8	7	8	35	0
18. GUANGDONG, LEIZHOU	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	2	0
19. HONG KONG	5	23	19	44	39	20	20	6	18	9	4	24	10	19	16	22	4	302	3
20. TAIWAN	4	0	2	3	2	4	1	0	1	7	0	6	0	1	0	1	1	33	0
21. KINMEN ISLAND	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0	0	2	0
22. SINGAPORE	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	3	0
23. INNER GULF OF THAILAND	31	18	34	96	153	92	125	75	113	118	47	82	1	63	58	54	26	1186	3
24. PENINSULA, THAILAND	35	29	36	33	60	56	33	27	49	33	12	32	3	11	8	8	4	469	0
25. PHILIPPINES	0	0	0	1	1	0	0	0	0	0	0	0	0	0	6	6	0	14	0
26. JAVA, INDONESIA	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0
27. SUMATRA, INDONESIA	12	4	5	8	7	6	2	2	0	2	0	0	0	0	0	0	0	48	0
28. NORTH-WEST AUSTRALIA (COLOUR-BANDS)	317	412	904	613	922	1221	671	680	1122	1095	446	535	177	329	317	283	167	10211	79
NORTH-WEST AUSTRALIA (FLAGS)	912	812	1166	1053	1222	1036	964	916	1315	963	332	791	191	405	371	521	314	13284	97
29. NORTHERN TERRITORY, AUSTRALIA	3	0	0	1	0	4	57	24	55	53	6	11	0	9	6	4	1	234	1
30. QUEENSLAND, AUSTRALIA	7	7	8	27	12	4	14	3	1	13	1	8	0	3	2	2	0	112	0
31. NEW SOUTH WALES	0	2	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	4	0
32. SOUTH-WEST WESTERN AUSTRALIA	6	0	0	1	4	3	0	0	0	0	0	0	0	0	0	0	0	14	0
33. SOUTH AUSTRALIA	12	35	62	73	54	31	40	20	20	26	15	12	1	9	12	9	3	434	1
34. VICTORIA, AUSTRALIA	746	644	798	985	858	507	487	290	433	309	97	139	25	76	86	86	42	6608	12
35. KING ISLAND, AUSTRALIA	3	2	4	0	1	5	2	4	1	0	0	1	0	0	0	0	0	23	0
36. NORTH & SOUTH ISLAND, NEW ZEALAND	590	768	702	890	756	469	335	203	309	226	71	95	22	61	83	72	19	5671	5
37. NORTH INDIA	0	0	0	0	0	0	5	5	5	4	0	7	0	4	5	9	2	46	1
38. SOUTH INDIA	1	0	0	0	0	4	7	5	8	2	0	2	0	8	5	11	1	54	1
TOTALS	3133	3354	4496	4613	5014	4147	3554	2765	4116	3452	1169	2087	486	1211	1288	1389	743	47017	239
NUMBER OF SPECIES	14	14	13	18	17	18	17	15	14	15	11	16	6	11	12	10	10		

Table 3 shows the records of individually colour-banded birds marked in NWA resighted on the Luannan Coast between 2010 to 2026. This year, seventy-eight Red Knots and one Bar-tailed Godwit were individually recognisable from the GFN colour-banding project in NWA, which is the lowest in our nineteen years of studies. This reflects the fact that very little marking of Red Knots with colour bands has been done in NWA since 2019 (see section above). Numerous Red Knots have been resighted over many consecutive years with some individuals recorded every year from 2010 to 2026. The Bar-tailed Godwit has been resighted in all years since 2010, either by GFN or by birdwatchers, and the bird is a minimum of 21 years old. Despite this individual being very faithful to the Luannan Coast, this area is not a major staging site for Bar-tailed Godwits.

Table 3. Totals of individually colour-banded birds from the GFN project marked in NWA resighted on the Luannan Coast 2010-2026. No marked Black-tailed Godwit from NWA have been recorded within the study site.

NWA COLOUR-BANDED INDIVIDUALS	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
BAR-TAILED GODWIT	3	2	4	3	5	6	3	4	4	3	1	5	0	3	2	1	**1**
GREAT KNOT	6	20	17	12	11	30	31	22	44	48	3	23	1	1	1	2	**0**
RED KNOT	106	170	287	272	329	387	261	269	313	336	189	208	106	124	131	132	**78**
TOTAL	**115**	**192**	**308**	**287**	**345**	**423**	**295**	**295**	**361**	**387**	**193**	**236**	**107**	**128**	**134**	**135**	**79**

Katherine scanning on the Nanpu seawall, 9 May 2026. © Chris Hassell

Internationally important counts

During the fieldwork period from 2010 to 2026, GFN conducted regular counts in conjunction with BNU on the Luannan Coast. The importance of this site is not in any doubt. Table 4 shows clearly the immense importance of the Luannan Coast mudflats and ponds to shorebirds from throughout the EAAF. All the counts should be considered absolute minimum totals for the site because there are areas of mudflats and ponds inaccessible to us and we cannot count all sites used by shorebirds simultaneously with our current resources and no turnover analysis is done: if that statistic was applied, the total number of birds assessed using the Luannan Coast during the northward migration season would be much greater (Lok *et al*. 2019). Note that there have been higher counts of some species in Table 4 prior to 2017 but with the renewed EAAF Waterbird Populations Portal (Wetlands International 2023), we have only used counts from the last ten years to more accurately reflect the current situation at the Luannan Coast. As most migratory shorebird populations in the EAAF are declining, it is therefore unsurprising that many species have also shown declines in peak numbers on the Luannan Coast.

Asian Dowitchers in Nanpu salt pond, 2 Jun 2026.

© Chris Hassell

Sanderling in Nanpu salt pond, 16 May 2026.

© Katherine Leung

Table 4. Internationally important counts at Luannan Coast 2017-2026.

Species	Scientific name	Date recorded	Count	% of EAAF population present	Waterbird Populations Portal*	Total for 1% Ramsar criteria^
Pied Avocet	*Recurvirostra avosetta*	26 04 2019	1,149	1.1	100,000	1,000
Grey Plover (VU)	*Pluvialis squatarola*	26 04 2019	3,220	4	80,000	800
Eurasian Curlew (NT)	*Numenius arquata*	26 04 2019	2,722	2.7	100,000	1,000
Black-tailed Godwit (NT)	*Limosa limosa*	13 04 2019	17,937	11.2	160,000	1,600
Great Knot (EN)	*Calidris tenuirostris*	08 05 2019	12,971	3.1	425,000	4,250
Red Knot (NT)	*Calidris canutus*	16 05 2018	48,630	43.8	110,000	1,100
Broad-billed Sandpiper (VU)	*Calidris falcinellus*	13 05 2026	1,380	4.6	30,000	300
Curlew Sandpiper (VU)	*Calidris ferruginea*	18 05 2026	10,000	11.1	30,000	300
Spoon-billed Sandpiper (CR)	*Calidris pygmaea*	02 06 2019	1	0.1	800	8
Sanderling	*Calidris alba*	30 05 2021	1,048	3.5	30,000	300
Dunlin (NT)	*Calidris alpina*	07 05 2017	40,000	1.6	2,460,900#	24,609
Asian Dowitcher (NT)	*Limnodromus semipalmatus*	08 05 2017	1,754	6.3	28,400	280
Nordmann's Greenshank (EN)	*Tringa guttifer*	08 05 2019	6	0.6	1,200	10
Marsh Sandpiper	*Tringa stagnatilis*	20 04 2019	3,000	2.3	130,000	1,300

* - Wetlands International (2023). # - Uncertainty of distribution of all subspecies in EAAF.

^ - The 1% Ramsar criteria refers to Criterion 6 of the Ramsar Convention: A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird.

Red Knot numbers

Red Knot is the focus of our studies on the Luannan Coast, so we carried out daily counts or estimates wherever possible. In 2026, the highest daily peak count was recorded at the beginning of the fieldwork period with 9,000 individuals on 9 and 10 May at Nanpu. This is similar to the low levels recorded in 2021-2024. Numbers then gradually dropped to 2,000 on 17 May, probably because of the departure of the *rogersi* subspecies towards the breeding grounds. An influx of 7,620 occurred on 19 May, possibly due to the arrival of birds from the *piersmai* subspecies. The daily counts then remained low between 1,200 and 2,628 from 20 to 22 May until another influx with 6,700 individuals on 23 May. Only 3,700 birds remained on 24 May, and then the number increased day by day to reach a second peak of 8,070 on 27 May. Red Knot number dropped to 3,500 on 28 May, followed by the last influx of 6,570 and 5,070 birds on 29 and 30 May. Numbers remained low (583 to 2,437) on the last five days of the fieldwork period. The daily counts fluctuated strongly throughout this year's fieldwork period. Compare to other years, the Luannan Coast had experienced more heavy rain and thunderstorms this May, which might be part of the reason for the fluctuation.

It should be noted that these counts are from Nanpu only as some other sub-sites are inaccessible. We counted 1,000 and 3,500 Red Knots at Hangu on 13 and 14 May, followed by only 191 on 18 May. From our knowledge of the study sites over the years, we know that Nanpu is usually where the largest numbers of Red Knots occur. Therefore, while we cannot completely rule out the possibility, we are confident that there were not thousands of Red Knots at any of the other sub-sites this year.

Note: counting birds at Nanpu is difficult, as it is at most shorebird sites with large numbers. The counts were often estimates but they were done at the same stage of the tide from the same vantage point, after we considered that most Red Knots had moved from the pond roosts on to the mudflats.

Red Knots arriving on Nanpu mudflats as it started to expose, 10 May 2026. © Chris Hassell

Red Knot numbers using the Luannan Coast vary greatly from year to year (Table 5). None of the non-breeding areas of the EAAF have shown dramatic changes in the numbers of Red Knots utilising them. Summer counts from NWA, where a significant percentage of the *piersmai* population spends the non-breeding season, showed no notable decline in the 2025/26 season. The Monitoring Yellow Sea Migrants in Australia (MYSMA) count programme that has been running for 22 years shows 'no significant change' in the Red Knot population in NWA (Rogers *et al*. 2020, Australasian Wader Studies Group unpublished). The numbers in New Zealand, the majority of which are the *rogersi* subspecies are trending downwards, like in most sites, but are not showing short term dramatic fluctuations. Therefore, despite the dramatic changes in numbers over the past 12 years at the Luannan Coast, we do not believe there is a flyway-wide crash in Red Knot numbers. However, the decline is steady and worrying.

We believe that the northward migration pattern of Red Knot keeps changing in recent years. In a cooperative study with BNU, Princeton University and Australasian Wader Studies Group (AWSG), GFN attached trackers to 29 Red Knots at Roebuck Bay, NWA in late 2023, hoping that will improve our understanding of the recent migration patterns and allow comparison with tracking results from previous years (Piersma *et al*. 2021, also see Tagging Report 2023). We also think the fluctuating numbers of Red Knot at Nanpu are also highly related to the local food abundance (see later section).

Despite the low number recorded this year, the highest daily count of Red Knot this year was equivalent to 8.2% of the EAAF's Red Knot population, highlighting the continued international significance of the Luannan Coast to the EAAF's Red Knot populations.

Table 5. Peak counts of Red Knots at Luannan Coast from 2015-2026.

2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026
29,956	20,000	17,000	48,630	47,537	20,000	9,000	9,938 (BNU's data)	3,660	13,000	30,000	9,000

Chris and Katherine counting at Hangu mudflats, 18 May 2026. © Ziyou Yang

The presence of *rogersi* and *piersmai* Red Knot subspecies

A 'typical' *piersmai* (left) and 'typical *rogersi* (right). © Adrian Boyle

The subspecies *piersmai* and *rogersi* Red Knot both use the Luannan Coast as a staging site. We get fabulous data each year on the individually marked birds enabling sophisticated analyses and estimates of turnover rate and site use (Lok *et al*. 2019). The majority of the two subspecies of Red Knot using the EAAF can be distinguished, when in fresh, full or near-full breeding plumage by the colour and pattern of that breeding plumage (Tomkovich 2001, Hassell *et al*. 2011, Verhoeven *et al*. 2016). This is particularly noticeable when the two subspecies are side by side in very good views, as is usually the case in our study site.

The *rogersi* birds, predominantly from non-breeding grounds in south-east Australia and New Zealand, generally arrive first and depart for their eastern Siberian breeding grounds earlier than the *piersmai* birds. The *piersmai* birds, predominantly from non-breeding grounds in NWA, breed at more northerly latitudes on the New Siberian Islands.

In relation to Red Knot marked in Roebuck Bay and Eighty Mile Beach, NWA, for both the total number of resightings and the individuals that those sightings represent, it needs to be considered that approximately 20% of Red Knots marked in NWA may be the *rogersi* subspecies. These *rogersi* birds may or may not move to New Zealand after being marked in NWA and then use New Zealand as their permanent non-breeding ground. From New Zealand they may migrate to the Luannan Coast under different schedules than *rogersi* that use NWA as their non-breeding location. Interestingly both *rogersi* and *piersmai* depart NWA at the same time (late April) despite the difference in breeding locations (Verhoeven *et al*. 2016). The breeding grounds of *rogersi* in Chukotka, Russia become snow free from about mid-May while the New Siberian breeding grounds of *piersmai* are not snow free until early-June.

In the years 2010-2019, it appeared that birds which arrive at the Luannan Coast early in the season, before 1 May, are predominantly *rogersi* and stay for up to a month. Birds that arrive late in the season, mid-May onwards, are predominantly *piersmai* that only stay for a short time, in some cases, a week or less. This was confirmed by a sophisticated statistical analysis showing the *piersmai* subspecies stay for 5-9 days at the

Luannan Coast (Lok *et al*. 2019).

To evaluate the proportions of the two subspecies we conduct regular, random scans of flocks and assign a subspecies to each individual bird based on plumage characteristics. The number of flocks and birds scanned have been similar across the years, apart from 2020 and 2022, when no scans were carried out during the outbreak of COVID-19. This year we only assessed 10,435 Red Knots in 62 flocks, which is lower than usual due to limitations in scanning conditions (Table 6).

Note: our subspecies scan relies on observing flocks at a reasonable distance in good light. We also need a good view of all parts of the bird to assign a subspecies, and therefore not every bird will be able to be assigned to a subspecies. By late May, plumages of some birds become difficult to distinguish and we do not assign a subspecies unless we are sure.

Figure 3 shows the 'flow' of the *rogersi* and *piersmai* subspecies through the Luannan Coast over the northward migration period. In the years 2010-2019, this graph was almost identical year on year, with *rogersi* arriving and departing earlier and, *piersmai* later. Here we use 2019 to show a 'typical' year (Figure 3a). This year's 'flow' (Figure 3b) was similar to those 'typical' years in that the *piersmai* percentage increased steadily over the course of May but without hitting the very high ratio in favour of *piersmai*. This suggests that either *piersmai* are not using Luannan in the numbers they have used to be or that *rogersi* are delaying their departure to the breeding grounds. It is difficult to be certain.

In 2023 and 2024, the 'flows' were very different from the 'typical' years. The percentage of *piersmai* birds gradually built up from 20% at the end of April until reaching 60% in mid-May and then dropping back to 40-50% in the 2nd half of May (see Reports 2023, 2024).

Table 6. Number of Red Knot flocks and birds scanned for subspecies at Luannan Coast 2015-2026.

YEAR	Number of scans	Number of Red Knots assessed
2015	225	39,925
2016	221	38,364
2017	218	38,866
2018	231	39,164
2019	257	52,186
2020	0	0
2021	212	34,184
2022	0	0
2023	176	39,830
2024	140	31.423
2025	150	29,545
2026	62	10,435

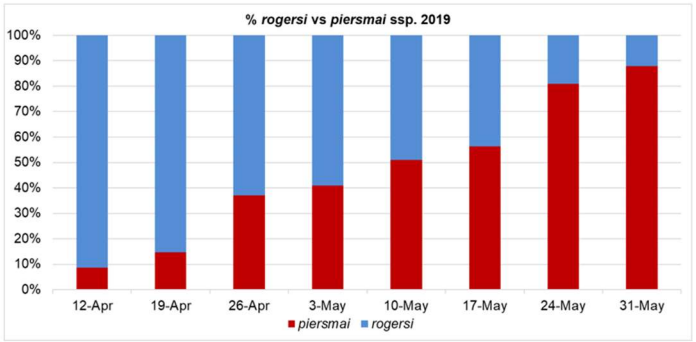


Figure 3a. Percentage *rogersi* vs *piersmai* subspecies over time 2019.

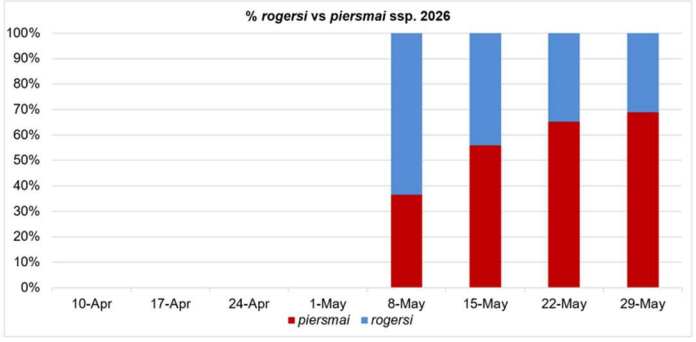


Figure 3b. Percentage *rogersi* vs *piersmai* subspecies over time 2026.

Red Knot abdominal profiles and *Potamocorbula laevis* density

As we are not catching Red Knots at the Luannan Coast, there is an absence of year-to-year body mass data (see Hua *et al*. 2013 for data on the early years of study), however it is possible to score the abdominal profile (AP) of birds visually in the field from telescope observations (Wiersma & Piersma 1995). This is a low-effort alternative way to assess the fat stores and weight gain of birds. We record abdominal profile on all flagged and colour-banded Red Knot assigned to a subspecies when we get a suitable view. A side-on view of the bird is needed for an accurate assessment. The scores range from AP 1- very thin to AP 5 - obese. A bird scored as 1 looks unhealthy and a bird scored at 5 is very fat.

A *piersmai* subspecies Red Knot in AP 5, 21 May 2026.

© Katherine Leung

An immature Red Knot in AP 2, 21 May 2026.

© Katherine Leung

Both subspecies and most individuals are arriving at our Luannan Coast study site in good body condition, whilst no birds are arriving in very poor condition (AP 1). This likely means that they are staging somewhere between their Australian, New Zealand and SE Asian non-breeding sites and the Luannan Coast. Colour-band and flag resightings show this and it is further supported from geolocator and satellite tracking data confirming birds stop at many sites south of the Luannan Coast including north-east Borneo, southern and eastern China coast (GFN, AWSG unpublished data, Piersma *et al*. 2021).

The results in 2010-2019 have been very similar with both subspecies' abdominal profile score increasing gradually through the season. Since 2020, there are some changes to the results such as early appearance of AP 5 birds in 2020 and 2021, whereas in 2023 both subspecies did only reach AP 4 rather than AP 5 at the end of the season. This year's result is very similar to 2023. Abdominal profile score assessed on 451 Red Knot individuals this year shows that both subspecies appeared to only be able to feed effectively enough to AP 4 at the end of the season (Figure 4), which might impact the next leg of their migration to the breeding grounds. These changes coincide with changes in density of *Potamocorbula laevis* in the Nanpu mudflats.

P. laevis is the key food for Red Knots at the Luannan Coast (Yang *et al*. 2013). Understanding the availability of food for Red Knots would help to interpret variations in the changes in AP scores of

Red Knots using the Luannan Coast from year to year. Our colleague Hebo Peng conducted benthic sampling on mudflats along the China coast to monitor the variation of shorebirds' food (Peng *et al*. 2021, also "The 2024 shorebird survey in China: a myriad of threats"). His team visited the Luannan Coast twice to survey the macrobenthos in both early and late May. From 2010-2019, *P. laevis* showed stable levels at a high density, which provided abundant, high-quality food for Red Knots and other shorebirds. His results show that *P. laevis* densities declined at the Luannan Coast in 2020-2023, that directly correlated with the changes in AP scores results and, the low Red Knot numbers in those years. Although the density of *P. laevis* recovered in 2024 and 2025, this year the density was very low at the eastern 3km and was almost absent at the western 5km of the Nanpu mudflats (Hebo Peng pers. comm.). This matches very well with our observations in the field of how the Red Knots foraged and moved along the mudflats.

The northward migration strategy is one piece of the Red Knot life-cycle question that we are still attempting to answer more fully (Piersma *et al*. 2021). We do not fully understand yet how the numbers, density and availability of food at a particular site is affecting Red Knot distribution along the China coast, particularly the Yellow Sea coast, during northward migration. The intriguing question to us is, how do the Red Knots know and 'decide' if there is enough food for the numbers of birds present to allow them, as an individual, to gain enough weight for successful migration? And then logically they would need to decide to either stay at a particular site or to move on to ensure the necessary weight gain? Birds are not the 'auto-pilot' machines they have been considered to be. They must make decisions throughout the year and some of these are critical to get correct. Continuation of the benthic sampling fieldwork along the China coast and our fieldwork at the Luannan Coast, together with new migration tracking data should eventually give us more insights.

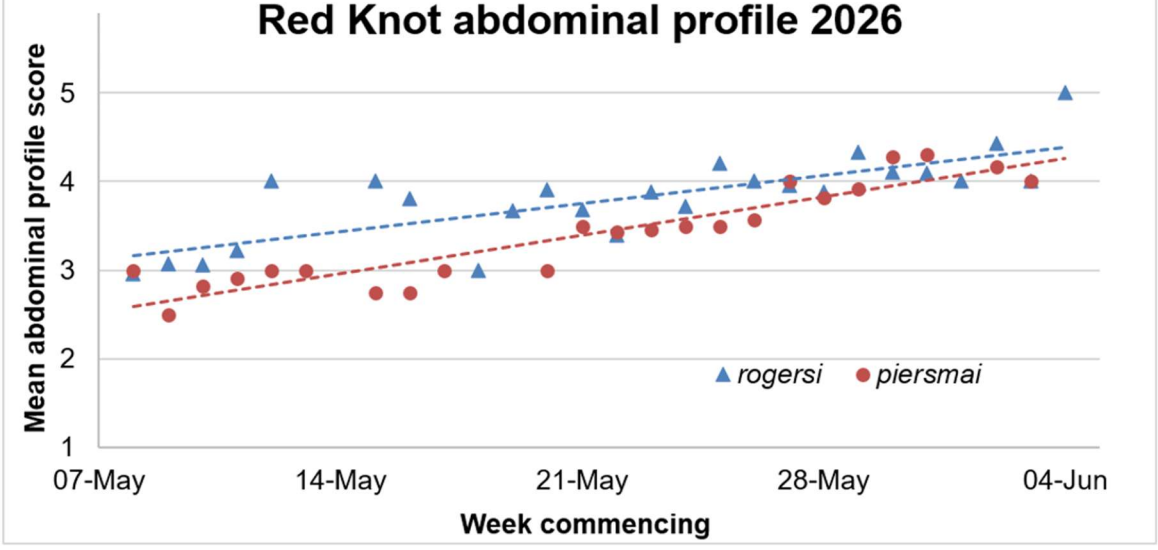


Figure 4. The graph shows the change in abdominal profile, over time, for the two subspecies of Red Knot in 2026 using 451 records.

Breeding shorebirds and terns

In addition to the migratory shorebirds and terns passing through the Luannan Coast, there are 11 species we have recorded breeding within the study site from 2010 to 2026: Black-winged Stilt *Himantopus himantopus*, Pied Avocet, Eurasian Oystercatcher *Haematopus ostralegus*, Little Ringed Plover *Thinornis dubius*, Grey-headed Lapwing *Vanellus cinereus*, Kentish Plover *Anarhynchus dealbatus*, Common Redshank *Tringa totanus*, Little Tern *Sternula albifrons*, Gull-billed Tern *Gelochelidon nilotica*, Whiskered Tern *Chlidonias niger* and Common Tern *Sterna hirundo*.

Pied Avocet is the most common breeding species and was the focus of study by Professor Zhengwang Zhang's laboratory at College of Life Sciences at BNU (see Lei *et al*. 2018, Lei *et al*. 2021b). Pied Avocets nest on the bare banks of ponds, on open areas of dry mud in unused or recently reclaimed ponds and on small islands within the ponds. The total nesting population in the Luannan pond complex was estimated between 1,000 and 2,000 pairs (Weipan Lei pers. comm.). In recent years they have had less breeding habitat available and lower breeding success due to deep or unstable water levels in the ponds. Sudden rises in water level by severe weather or for the purpose of pond management often lead to direct loss of eggs or chicks. Feral dogs and cats also pose threats to the breeding shorebirds and terns.

Grey-headed Lapwing parent and chicks, 16 May 2026. © Katherine Leung

Black-winged Stilt, Kentish Plover, Common Tern and Little Tern breed in the same locations as Pied Avocet, all were recorded breeding in 2026 and presumably face similar threats to those of the Pied Avocet.

Breeding colony of Common Terns in a deep-water pond by the highway, 26 May 2026. © Chris Hassell

Wetland Park

The Hebei Luannan Nanpu Zuidong Provincial Wetland Park (the Wetland Park) established on 26 October 2020 covers an area of 5,791.6 ha, including nearly 3,000 ha of shallow sea habitat and 2,177 ha of intertidal mudflat along the whole 8 km shore of Nanpu, plus 690 ha of salt and aquaculture ponds behind the Nanpu seawall at the north-west corner near Beipu. We fully support the decision to protect the area as a wetland park as it allows both the biodiversity and, importantly, the income of the local communities to be maintained.

In June 2021, a workshop was held in Luannan with all the major stakeholders to share their view of the future management for the Wetland Park. Back then we saw lots of potential for the Wetland Park management to be a success and a model example of a win-win situation for both biodiversity conservation and sustainable income for the local communities.

However, despite our full support, we would like to highlight some areas where management actions would likely lead to better outcomes for the Wetland Park's goals. These are based on our 19 years of studies at the Luannan Coast, and they are standard practice in many protected wetland areas around the world. We do not intend these suggestions as criticism, we hope they are seen as constructive suggestions. No new protected area immediately meets all their conservation objectives. It can take years for the habitat management actions to bring about the desired outcomes.

Where the Wetland Park is situated and due to the fantastic ornithological significance of the area, four major priorities for biodiversity seem logical: (1) **to maintain available intertidal habitats in good condition**; (2) **to enhance the pond habitats, making them even more suitable as migratory shorebirds feeding and roosting sites**; likewise, (3) **to support breeding shorebirds and terns during spring and summer**; and (4) of course, for the Wetland Park to serve as **a haven for waterfowl and gulls in winter**. These can all be achieved without compromising the current use of the mudflats and ponds by local communities.

The Nanpu mudflats are the core area of the Wetland Park for both shorebirds and local communities, 22 May 2026. © Chris Hassell

Management Recommendations for the Wetland Park

Intertidal habitats: community use and its conservation

Mollusc aquaculture is carried out at both Zuidong and Nanpu mudflats by the local fishing communities of Nanpu and Beipu villages. Locals mentioned that summer harvesting (July to August) of *P. laevis* could be beneficial to their harvest in the following year. This theory has been argued by Yang *et al*. (2016) that the very intense fishing practices for *P. laevis* in the late-summer may even benefit shorebirds staging in the next spring because it would allow an increase in the settlement of new recruits in the subsequent spring. Our colleague Hebo Peng's work demonstrate that careful management of the mollusc aquaculture is needed to secure the food for the staging Red Knots (Peng *et al*. 2025). With the establishment of the Wetland Park, there is potential to explore regulated aquaculture and harvesting of *P. laevis* on the Nanpu mudflats, which might maximise the benefit to both shorebirds, especially Red Knot, and local communities.

At the Zuidong mudflats, the main mollusc harvested is *Mactra veneriformis*. The Zuidong mudflats are the main foraging area of Great Knots on the Luannan Coast and are currently not protected within the Wetland Park. Given the importance of the intertidal habitats to Great Knot using the Luannan Coast, the Zuidong mudflats should be included as a protected area or established as an Other Effective Area-Based Conservation Measure (OECM) site in future.

There is a strong relationship between density of *P. laevis* and Red Knot population on Nanpu mudflats, 10 May 2026.

Intertidal habitats: control of invasive Spartina

Smooth Cordgrass *Spartina alterniflora* is a highly invasive, non-native species and has caused major problems at important shorebird sites along the China Coast. This invasive plant had also established on the mudflats adjacent to the seawall at Zuidong and Nanpu. In 2018 and 2019, we were very pleased to see that the issue addressed at Nanpu through a project led by WWF-China with a spraying programme to control the spread of the Spartina, following the success at Shanghai Chongming Dongtan National Nature Reserve. The spraying programme was very successful with only small green spouts of new growth observed during the 2020 field season. A similar spraying project was also initiated by the Paulson Institute at Zuidong mudflats in 2019.

During the winter 2020/21, an ecological restoration project was carried out by the Luannan County Government, which involves the removal of Spartina by cutting and digging the plants up to a depth of 40 cm over a total area of 18.3 ha at the Nanpu and Zuidong mudflats. We are uncertain whether such mechanical digging would cause any impact on the mudflat habitat, but a digger would bring greater and longer disturbance to birds when comparing to using drones to spray and treat the Spartina. Nevertheless, it is good to see the Luannan County Government's good intention in addressing the issue.

In early 2023, the Chinese Central Government has set a target to eliminate at least 90% of the invasive Spartina along China coast by 2025. Efforts over the past few years have been a great success in the control of Spartina with almost zero regrowth observed at both sites.

This year we observed small patches of Spartina regrowth on the Nanpu mudflats. Prof. Zhengwang Zhang has now established communication with the local authority to take measures and remove the Spartina on the Wetland Park mudflats after the spring migration season.

To eradicate Spartina from intertidal areas, persistent effort is needed. Regrowth should be treated as soon as possible before further expansion. If small incursions are left untreated, it increases the resources required for effective treatment.

Left: Nanpu mudflats invaded by Spartina, late May 2018. Left: Nanpu mudflats free of Spartina, 15 May 2026.

Pond habitats: low islands and shallow water habitats for shorebirds

The ponds adjacent to the Luannan Coast are used for the production of salt (evaporation, storage and crystallization ponds), fish and shrimp for human consumption, and brine shrimp (*Artemia*) that are fed to larger species of *Litopenaeus* shrimp to fatten them for harvest and sale for human consumption. Harvesting of brine shrimp are either carried out manually or with mechanical boats dragging a fine net in the water column. Brine shrimp cysts (dormant eggs) are also collected at the edge of the pond with hand net. They can be stored for long periods and hatched, on demand, to provide a convenient form of live feed for larval fish and are the most sought after of the *Artemia* products. The brine shrimp cysts in the shallow waters of the ponds are important food source for Red Knots and many other shorebirds. In recent years, most ponds in Nanpu have become deeper due to increased management for aquaculture and the availability of brine shrimp cysts for shorebirds has diminished almost completely.

Brine shrimp and its dormant eggs are important commercial products of the Luannan ponds.

© Zhang Wei

In October 2022, a hundreds-million yuan ‘wetland restoration’ project commenced at the Wetland Park to ‘restore’ some of the ponds near Beipu. During our 2023 fieldwork season we saw shorebirds feeding on the intertidal mudflats frequently disturbed by large trucks running along the seawall to transport earth into a few ponds for building high and steep-sided artificial islands. If large earthworks need to be carried out, they should be conducted outside of the times of major use of the site by the huge numbers of migratory shorebirds (spring and autumn).

‘Restored’ island in the Wetland Park with limited bare and flat parts for shorebirds, 20 May 2024.

© Katherine Leung

Disappointingly, the islands that were built do not benefit shorebirds or encourage them to use the pond habitats. In addition to the unsuitable steep sides, in 2024 we saw hundreds of tree seedlings were planted on these islands. We did record Black-winged Stilt, Pied Avocet, Eurasian Oystercatcher, Kentish Plover, Little Tern and Common Tern breeding in the ‘restored’ ponds. All of these species also breed in other ponds around Nanpu and these birds breeding in the ‘restored’ ponds could be despite, rather than because of, the restoration. We observed that these birds only nested on the limited bare and flat areas of the islands or on the bare bunds within these restored

ponds, indicating that the rest of the vegetated areas were not suitable for them. In 2025, the trees were slightly larger and the tangled vegetation on the islands was thicker, further reducing the already limited bare patches of ground where birds had nested in 2024. This year we observed no birds nesting or roosting in those ponds. This is a very disappointing outcome of the 'restoration' of this habitat.

These same ponds previously had shallow water level with low, sloping perimeters and internal bunds. These bunds would not require major modification to provide roosting, feeding and breeding habitat for birds. It is with regret that we feel an opportunity has been missed to enhance the site, particularly in respect to its suitability for roosting shorebirds and breeding shorebirds and terns. However, as stated, no managed area is perfect immediately.

We suggest that low islands with sparse vegetation surrounded by shallow water for the migration and breeding seasons would be preferable. Then the water level can be raised in the ponds before winter comes. This will be good for gulls and waterfowl and 'drown' the vegetation on the islands making it suitable once again the following spring for breeding and roosting birds with a corresponding lowering of the water levels. This is standard management practice in wetlands managed for conservation around the world and would work at the Nanpu ponds (Lei *et al*. 2025).

'Traditional' salt pond at Nanpu with gentle sloped-bund and shallow water on the edge provide feeding and roosting habitats for various sizes shorebirds, 24 May 2026. © Katherine Leung

Landscape and visitor facilities

Before the start of our field season in 2021, a line of *Tamarix* sp. tree seedlings was planted on the first 1.8 km section of the south-east end of the Nanpu seawall. During the 2024 fieldwork season as part of the 'wetland restoration' project, the Wetland Park continued to plant trees on both sides of the seawall for the remaining 5.3 km. Fortunately, over the past few years these trees did not grow too tall due to the harsh weather conditions at the coast. Currently they are at a height that shields vehicles and people from the birds without being so tall that birds are nervous close to the trees therefore seemingly alleviating disturbance. If the trees grow tall then this may change.

It is broadly accepted that shorebirds do not like tall trees close to them when they are feeding or roosting as it restricts their view of approaching danger, mainly birds of prey (Rogers *et al*. 2006). Therefore, tall trees might be detrimental to the bird's ability to forage close to the seawall, a very valuable portion of the mudflat to them as the importance of the upper tidal area is very likely a joint effect of longer exposure and higher food density (Mu *et al*. 2022). Therefore, the growth of these trees should be closely monitored in future years and managed appropriately if necessary.

Over the past years we have also seen some other management that could be detrimental to shorebird use of the area including an unnecessary viewing platform built. Great views of the birds can be obtained from the path along the seawall and the platform does not get people any

Small Tamarix trees along the Nanpu seawall, 21 May 2026. © Ziyou Yang

closer to the birds. When the birds first return from the salt pond roosts, they land close to the wall, start to feed, sometimes bathe, and sleep. The only outcome from people climbing high on to the platform will be disturbing the birds. We suggest changing the platform to a birdwatching hide back on the seawall footpath.

A series of educational signs and a visitor centre have been constructed over the past couple of years. We had a visit to the centre in 2024 and are very impressed. We found the exhibitions very informative and attractively presented. These facilities have great potential to educate local communities, school kids, and the public about the importance of the Luannan Coast and its biodiversity. However, somewhat confusingly the centre is not open to the public and some of the signs along the seawall have also started to degrade. This is a huge opportunity missed for education. We hope the Wetland Park Visitor Centre will open for public visitors soon.

Potential threats

The Luannan Coast is very important for oil production and China National Petroleum Corporation (CNPC) operate there and have done so for many years. Generally, this industry does not cause too much of a conservation threat to the migratory bird populations. There is the loss of some habitat for drill rigs and infrastructure, but much of the exploration and infrastructure is offshore and away from the intertidal mudflats. However, due to the presence of oil production in the area, the World Heritage listing China – Migratory Bird Sanctuaries along the Coast of Yellow Sea-Bohai Gulf of China (Phase II) has not been supported to include Luannan Napu Zuidong Wetland Park by the IUCN.

Some serious risks maybe associated with large scale oil production. An oil spill would be serious for the Luannan Coast mudflats, the associated benthos and birds. If that oil spill were to coincide with the spring migration season, the effects on migratory populations could be catastrophic. If an accident were to occur outside of peak bird season of the site it would still be a very serious as the benthos would be affected and diminish the site biodiversity, suitability for shorebirds and shellfish harvest for the local people.

In relation to energy production, this year we observed new solar panels and electricity towers being erected in some pond areas and along pond bunds. This type of infrastructure is not new to the Luannan Coast. Over the past decade, we saw that many solar farms have been built over aquaculture pond areas, particularly along the highway between Nanpu and Hangu but not so

New solar panels in the Nanpu area, 30 May 2026.

© GFN

many around the Nanpu area. Although some of these solar farms still function as aquaculture ponds, their availability to shorebirds and terns is completely lost. Combining the loss of many pond habitats due to increased water level for aquaculture since 2016, and further developments in the Nanpu pond area might further deprive shorebirds and terns roosting foraging and breeding opportunities.

With the increase in pond aquaculture around the Luannan Coast, attention should also be paid to the discharge of water from the ponds to the intertidal area. This water probably contains chemicals like disinfectants and fertilizers. In the past few years, we have heard from talking to local communities at the seawall that there were a few incidents of pollution from pond discharge which affected the benthos and aquatic life in Nanpu.

Conclusion on management recommendations for the Wetland Park

It goes without saying that GFN is supportive of the protection of the Luannan Coast as a Wetland Park. However, there are clearly areas for improvement in the management strategies particularly to enhance the area for shorebirds. Proper strategic conservation management with careful planning and engagement with shorebird experts from BNU is vital to enhance the status of this critical site. It is hoped that better communication can be set up between decision makers and scientists so that subsequent conservation management of the Wetland Park will ultimately enable Red Knot and many other waterbird species of the EAAF to maintain sustainable population levels, as well as serving the local communities for sustainable economy and raising conservation awareness with visitors from the local community and elsewhere.

Signage with the map and zoning of the Wetland Park on the Nanpu seawall, 29 April 2024. © Katherine Leung

Recommendations

- Support, or help raise support for universities and Global Flyway Network, enabling them to continue field research, including follow-up analyses and publication utilising the huge dataset already recorded and curated in the GFN database. This will help to document the futures of four shorebird species (Bar- and Black-tailed Godwit and Red and Great Knot) at their non-breeding sites in NWA and throughout the EAAF, with an emphasis on the Luannan Coast, Bohai Bay. We hope that our dataset will be able to assess the effects of human-induced habitat change on survival rates of the populations and a variety of demographic parameters.
- The formal protection of the remaining mudflats at Zuidong, Nanpu, Beipu and Hangu, and their benign ecological offerings to shorebirds, remains of great conservation importance. Retaining these mudflats in good ecological condition will enable the large numbers of migratory shorebirds and terns to continue using the area as a staging site.
- Within the intertidal zones of the Hebei Luannan Nanpu Zuidong Provincial Wetland Park, explore the possibilities for sustainable shellfish harvesting on the mudflat, which could maximise the benefits to both local communities and shorebirds, and in the pond areas providing foraging and breeding habitats during spring and summer as well as potential for over-wintering habitats for waterfowl and gulls.
- Establish strategic conservation management of the Wetland Park and consistent communication between decision makers and scientists.

Shorebirds on the Nanpu mudflats, 21 May 2026. © Katherine Leung

Key points from 2026

- It is clear from our current knowledge that the Luannan Coast is an important staging site of international significance for two subspecies of Red Knot in the EAAF encompassing the vast majority of Red Knots wintering in Australia, New Zealand and South-east Asia. Between 2010 and 2026, we have recorded Red Knot from 26 different banding locations throughout the EAAF, plus India in the CAF.
- We recorded 743 marked shorebirds of 10 species from 22 banding locations throughout the EAAF, as well as from India, within the CAF, highlighting the importance of the Luannan Coast for these two flyways.
- This year, 78 Red Knots and one Bar-tailed Godwit were individually recognisable from the GFN colour-banding project in NWA.
- In the period 2017-2026, 12 species of migratory shorebirds have been recorded in internationally significant numbers, including three species for which at least 10% of their entire EAAF population passing through the Luannan Coast during northward migration.
- In addition, there are 11 species of shorebirds and terns we have recorded breeding within the study site from 2010 to 2026.
- On the Luannan Coast in 2026, the highest daily count of Red Knot was only 9,000 on 9 and 10 May at Nanpu. The number has dropped to the level similar to low numbers of 2021-2024. The decline in densities of Red Knot's preferred bivalve prey *P. laevis* at Nanpu mudflats might be the main reason. Despite this, the highest day count this year is still equivalent to 8.2% of the EAAF's Red Knot population, highlighting the continued international significance of the Luannan Coast to the EAAF's Red Knot.
- Both the mudflats and the adjacent ponds of the Luannan Coast are vital components of the site for shorebird conservation, and important contributing factors to the local economy and employment.

Shorebirds flying over the Nanpu seawall, 27 May 2026. © Katherine Leung

Non-shorebird migration

Although the migratory shorebirds were the focus of our work, whenever there was an opportunity, we were looking for anything with wings. The passerine migration through the area is marked by high species diversity despite the paucity of any substantial wooded habitat.

Appendix 1 has a complete list of all the 175 birds seen during the fieldwork period.

Eyebrowed Thrush at Hangu Coastal Woods, 14 May 2026. © Chris Hassell

Acknowledgements

Yang Liu (Xiao Liu) is now an integral part of our team, much more than a local driver. His reliable scanning work, safe and secure driving, every conceivable logistical help and his great company mean that now the project would struggle without him, we convey huge thanks to him. Junfeng Liu (Mr. Liu) is always our best local ambassador for the birds and mudflats of Luannan since 2016.

We thank Dr Weipan Lei for the administrative work to enable our presence at Nanpu. Prof. Zhengwang Zhang and Beijing Normal University for continued support and invitations to conduct research together.

Left to right Dr Lei Weipan, Xiao Liu, Chris, and Katherine, 10 May 2026. © BNU

The funds for this year's work were from three private donors and the UK-based shorebird conservation charity Wader Quest, via the auspices of Rick Simpson.

Our major funders over the years have been WWF Netherlands (2010-14 & 2016-19) with important help from BirdLife Netherlands (2007-2012) and the Spinoza Premium 2014 of NWO the Netherlands Science Foundation to Theunis Piersma (2014-2018). We also receive financial, and much logistical support during fieldwork every year from Beijing Normal University principally from Prof. Zhengwang Zhang, and his PhD students and postdocs. From 2019 to 2022, the Centre for East Asian-Australasian Flyway Studies at Beijing Forestry University, headed by Prof. Guangchun Lei, covered the cost of the project. In the past years, GFN have also received donations from Bobolink Foundation, Australasian Wader Studies Group, Queensland Wader Study Group and personal donations towards the Luannan Coast study. GFN extend the thanks to all our supporters over the years.

Thank you to all the shorebird enthusiasts throughout the EAAF who send in resightings of marked birds. Thank you to the NWA expedition teams, the AWSG and Broome Bird Observatory. GFN acknowledges the Yawuru People via the offices of Nyamba Buru Yawuru Limited for permission to research birds for this project on the shores of Roebuck Bay, traditional lands of the Yawuru people. GFN acknowledges the Karajarri and Nyangumarta people for access to Eighty Mile Beach.

Collaborative partners

- Australasian Wader Studies Group, Australia
- BirdEyes, Centre for Global Ecological Change at the University of Groningen, Leeuwarden, The Netherlands
- Broome Bird Observatory, Broome, Australia
- Broome Community Volunteers, Broome, Australia
- CEAAF Center for East Asian-Australasian Flyway Studies, Beijing Forestry University, Beijing, China
- Ministry of Education Key Laboratory for Biodiversity Sciences and Ecological Engineering, College of Life Sciences, Beijing Normal University, Beijing, China
- Ministry of Education Key Laboratory for Biodiversity Science and Ecological Engineering, National Observation and Research Station for Wetland Ecosystems of the Yangtze Estuary, Fudan University, Shanghai, China
- NIOZ Royal Netherlands Institute for Sea Research, Department of Coastal Systems, Texel, The Netherlands
- Princeton School of Public and International Affairs, Princeton University, New Jersey, USA
- WWF China, Shanghai/Beijing, China
- WWF Netherlands, Zeist, The Netherlands

More information of GFN, see https://www.globalflywaynetwork.org/.

Contact Chris Hassell turnstone@wn.com.au

Shorebirds arriving at Nanpu mudflats at falling tide at dawn, 19 May 2026. © Katherine Leung

References

Hassell, C.J., Southey, I., Boyle, A. & Yang, H-Y. (2011) Red Knot *Calidris canutus*: subspecies and migration in the East Asian-Australasian Flyway—where do all the Red Knot go? *BirdingASIA* **16**: 89–93.

Hua, N., Piersma, T. & Ma, Z. (2013) Three-phase fuel deposition in a long-distance migrant, the red knot (*Calidris canutus piersmai*), before the flight to High Arctic breeding grounds. *PLoS ONE* **8**, e62551. https://doi.org/10.1371/journal.pone.0062551.

Lei, W., Masero, J.A., Zhu, B., Yang, H-Y., Zhang, Z. (2018) Alternative habitat: the importance of the Nanpu Saltplans for migratory waterbirds in the Chinese Yellow Sea. *Bird Conservation International* **28**, 549-566. https://doi.org/10.1017/S0959270917000508.

Lei, W., Masero, J.A., Dingle, C., Liu, Y., Chai, Z., Zhu, B., Peng, H., Zhang, Z. and Piersma T. (2021a) The value of coastal saltpans for migratory shorebirds: conservation insights from a stable isotope approach based on feeding guild and body size. *Animal Conservation* **24**: 1071-1083. https://doi.org/10.1111/acv.12717.

Lei, W., Wu, Y., Wu, F., Piersma, T., Zhang, Z. and Masero, J.A. (2021b) Artificial wetlands as breeding habitats for shorebirds: a case study on Pied Avocets in China's largest saltpan complex. *Frontiers in Ecology and Evolution* **9**: 622756. https://doi.org/10.3389/fevo.2021.622756.

Lei, W., Masero, J.A., Chai, Z., Zhu, B.-R., Mu, T., Peng, H.-B., Zhang, Z. & Piersma, T. (2025) Maintaining shallow waters to maximize the potential of saltpans as foraging habitat for migratory shorebirds along an endangered flyway. *Biological Conservation* **306**: 111100. https://doi.org/10.1016/j.biocon.2025.111100.

Lok, T., Hassell, C.J., Piersma, T., Pradel, R. & Gimenez, O. (2019) Accounting for heterogeneity when estimating stopover duration, timing and population size of red knots along the Luannan coast of Bohai Bay, China. *Ecology & Evolution* **9**: 6176–6188. https://doi.org/10.1002/ece3.5139.

Mu, T., Cai, S., Peng, H-B, Hassell, C. J., Boyle, A., Zhang, Z., Piersma, T., & Wilcove, D. S. (2022) Evaluating staging habitat quality to advance the conservation of a declining migratory shorebird, Red Knot *Calidris canutus*. *Journal of Applied Ecology* **59**: 2084-2093. https://doi.org/10.1111/1365-2664.14220

Peng, H-B., Chan, Y-C., Compton, T.J. et al. (2021) Mollusc aquaculture homogenizes intertidal soft-sediment communities along the 18,400 km long coastline of China. *Diversity and Distributions* **27**: 1553-1567. https://doi.org/10.1111/ddi.13302.

Peng, H-B., Zhu, Z., Choi, C-Y., Mu, T., Huang, Y., Li, J., Lei, W., Bouma, T.J., Melville, D.S., Zhang, Z., Ma, Z., Lei, G., Yang, Z. & Piersma, T. (2025) China's intertidal mariculture as an unexpected lifeline sustaining the world's most threatened shorebird flyway. *Nature Communication* **16**: 10972. https://doi.org/10.1038/s41467-025-65948-w.

Piersma, T., Lok, T., Chen, Y., Hassell, C.J., Yang, H-Y., Boyle, A., Slaymaker, M., Chan, Y-C., Melville, D.S., Zhang, Z-W. & Ma, Z. (2016) Simultaneous declines in summer survival of three shorebird species signals a flyway at risk. *Journal of Applied Ecology* **53**: 479–490. https://doi.org/10.1111/1365-2664.12582.

Piersma, T., van Aelst, R., Kurk, K., Berkhoudt, H. & Maas, L.R.M. (1998) A new pressure sensory mechanism for prey detection in birds: the use of principles of seabed dynamics? *Proceedings of the Royal Society B Biological Sciences* **265**: 1377-1383. https://doi.org/10.1098/rspb.1998.0445.

Piersma, T., Wiersma, P., & van Gils, J. (1997). The many unknowns about plovers and sandpipers of the world: introduction to a wealth of research opportunities highly relevant for shorebird conservation. *Wader Study Group Bulletin* **82**: 23-33.

Piersma, T., Kok, E.M.A., Hassell, C.J., Peng, H-B., Verkuil, Y.I., Lei, G., Karagicheva, J., Rakhimberdiev, E., Howey, P.W., Tibbitts, T.L. and Chan, Y-C. (2021) When a typical jumper skips: itineraries and staging habitats used by Red Knots (*Calidris cantus piersmai*) migrating between northwest Australia and the New Siberian Islands. *Ibis* **163**: 1235-1251. https://doi.org/10.1111/ibi.12964.

Rogers, D.I., Piersma, T. and Hassell, C.J. (2006) Roost availability may constrain shorebird distribution: Exploring the energetic coasts of roosting and disturbance around a tropical bay. *Biological Conservation* **133**: 225-235. https://doi.org/10.1016/j.biocon.2006.06.007.

Rogers, D.I., Scroggie, M.P. and Hassell, C.J. (2020) Review of long-term shorebird monitoring in north Western Australia. *Arthur Rylah Institute for Environmental Research Technical Report Series* No. **313**.

Red Knots and Black-winged Stilt in the Nanpu saltpond, 16 May 2026.

Rogers, D.I., Yang, H-Y., Hassell, C.J., Boyle, A.N., Rogers, K.G., Chen, B., Zhang, Z-W. & Piersma, T. (2010) Red Knots (*Calidris canutus piersmai* and *C. c. rogersi*) depend on a small threatened staging area in Bohai Bay, China. *Emu* **110**: 307-315. https://doi.org/10.1071/MU10024.

Ross, T.A., Australasian Wader Studies Group, Victorian Wader Study Group, Queensland Wader Study Group, Atkinson, R., Christie, M., Rogers, D.I., Hassell, C., Jessop, R., Coleman, J.T., Piersma, T., Ryding, S., Spence, A., & Klaassen, M. (2026) Extreme site fidelity in long-distance migratory shorebirds in Australia and potential implications for conservation. *Conservation Biology*, 2026; e70345. https://doi.org/10.1111/cobi.70345

Tomkovich, P. S. (2001). A new subspecies of Red Knot *Calidris canutus* from the New Siberian Islands. *Bulletin of the British Ornithologists' Club* **121**: 257–263.

Verhoeven, M. A., Eerbeek, J-V., Hassell, C.J., and Piersma, T. (2016) Fuelling and moult in Red Knots before northward departure: a visual evaluation of differences between ages, sexes and subspecies. *Emu* **116**: 158-167. https://doi.org/10.1071/MU15035.

Wetlands International (2026) "Waterbird Populations Portal". Retrieved from wpp.wetlands.org on Tue Jul 7 2026.

Yang H-Y., Chen, B., Barter, M., Piersma, T., Zhou, C-F., Li, F-S., & Zhang, Z-W. (2011) Impacts of tidal land reclamation in Bohai Bay, China: ongoing losses of critical Yellow Sea waterbird staging and wintering sites. *Bird Conservation International* **21**: 241–259. https://dio.org/10.1017/S0959270911000086.

Yang, H-Y., Chen, B., Ma, Z., Hua, N., van Gils, J.A., Zhang, Z-W. & Piersma. T. (2013) Economic design in a long-distance migrating molluscivore: how fast-fuelling red knots in Bohai Bay, China, get away with small gizzards. *Journal of Experimental Biology* **216**: 3627-3636. https://doi.org/10.1242/jeb.083576.

Katherine and Chris scanning on the Nanpu seawall, 11 May 2026. © Wang Xu

Appendix 1. Bird list

The full list of the 175 species recorded 8 May to 4 June 2026.

Greylag Goose *Anser anser*
Common Shelduck *Tadorna tadorna*
Garganey *Spatula querquedula*
Gadwall *Mareca strepera*
Eastern Spot-billed Duck *Anas zonorhyncha*
Mallard *Anas platyrhynchos*
Tufted Duck *Aythya fuligula*
Common Pheasant *Phasianus colchicus*
Rock Dove (Feral Pigeon) *Columba livia*
Oriental Turtle Dove *Streptopelia orientalis*
Eurasian Collared Dove *Streptopelia decaocto*
Spotted Dove *Spilopelia chinensis*
Lesser Coucal *Centropus bengalensis*
Indian Cuckoo *Cuculus micropterus*
Common Cuckoo *Cuculus canorus*
Grey Nightjar *Caprimulgus jotaka*
Common Swift *Apus apus*
Common Moorhen *Gallinula chloropus*
Eurasian Coot *Fulica atra*
Whit-breasted Waterhen *Amaurornis phoenicurus*
Black-winged Stilt *Himantopus himantopus*
Pied Avocet *Recurvirostra avosetta*
Eurasian Oystercatcher *Haematopus ostralegus*
Grey Plover *Pluvialis squatarola*
Pacific Golden Plover *Pluvialis fulva*
Little Ringed Plover *Thinornis dubius*
Grey-headed Lapwing *Vanellus cinereus*
Siberian Sand Plover *Anarhynchus mongolus*
Greater Sand Plover *Anarhynchus leschenaultii*
Kentish Plover *Anarhynchus alexandrinus*
Eurasian Whimbrel *Numenius phaeopus*
Far Eastern Curlew *Numenius madagascariensis*
Eurasian Curlew *Numenius arquata*
Bar-tailed Godwit *Limosa lapponica*
Black-tailed Godwit *Limosa limosa*
Asian Dowitcher *Limnodromus semipalmatus*
Common Snipe *Gallinago gallinago*
Terek Sandpiper *Xenus cinereus*
Common Sandpiper *Actitis hypoleucos*
Green Sandpiper *Tringa ochropus*
Grey-tailed Tattler *Tringa brevipes*
Marsh Sandpiper *Tringa stagnatilis*
Wood Sandpiper *Tringa glareola*
Common Redshank *Tringa totanus*
Spotted Redshank *Tringa erythropus*
Common Greenshank *Tringa nebularia*
Ruddy Turnstone *Arenaria interpres*
Great Knot *Calidris tenuirostris*
Red Knot *Calidris canutus*
Ruff *Calidris pugnax*
Broad-billed Sandpiper *Calidris falcinellus*
Sharp-tailed Sandpiper *Calidris acuminata*
Curlew Sandpiper *Calidris ferruginea*
Red-necked Stint *Calidris ruficollis*
Sanderling *Calidris alba*
Dunlin *Calidris alpina*
Little Stint *Calidris minuta*
Oriental Pratincole *Glareola maldivarum*
Saunders's Gull *Saundersilarus saundersi*
Black-headed Gull *Chroicocephalus ridibundus*
Relict Gull *Ichthyaetus relictus*
Black-tailed Gull *Larus crassirostris*
Mongolian Gull *Larus mongolicus*
Glaucous Gull *Larus hyperboreus*
Little Tern *Sternula albifrons*
Gull-billed Tern *Gelochelidon nilotica*
Caspian Tern *Hydroprogne caspia*
Whiskered Tern *Chlidonias hybrida*
White-winged Tern *Chlidonias leucopterus*
Common Tern *Sterna hirundo*
Little Grebe *Tachybaptus ruficollis*
Great Crested Grebe *Podiceps cristatus*
Oriental Stork *Ciconia boyciana*
Great Cormorant *Phalacrocorax carbo*
Eurasian Spoonbill *Platalea leucorodia*
Black-crowned Night Heron *Nycticorax nycticorax*
Chinese Egret *Egretta eulophotes*
Little Egret *Egretta garzetta*
Striated Heron *Butorides striata*
Chinese Pond Heron *Ardeola bacchus*
Eastern Cattle Egret *Ardea coromanda*
Great Egret *Ardea alba*
Grey Heron *Ardea cinerea*
Purple Heron *Ardea purpurea*


Left: Ruddy Turnstone at Nanpu salt pond, 16 May 2026. Right: White-winged Tern at Nanpu salt pond, 15 May 2026.

Chinese Sparrowhawk *Tachyspiza soloensis*
Eurasian Sparrowhawk *Accipiter nisus*
Eastern Marsh Harrier *Circus spilonotus*
Pied Harrier *Circus melanoleucos*
Grey-faced Buzzard *Butastur indicus*
Eastern Buzzard *Buteo japonicus*
Eurasian Hoopoe *Upupa epops*
Black-capped Kingfisher *Accipiter nisus*
Oriental Dollarbird *Eurystomus orientalis*
Eurasian Wryneck *Jynx torquilla*
Grey-capped Pygmy Woodpecker *Yungipicus canicapillus*
Rufous-bellied Woodpecker *Dendrocopos hyperythrus*
Great Spotted Woodpecker *Dendrocopos major*
Common Kestrel *Falco tinnunculus*
Amur Falcon *Falco amurensis*
Eurasian Hobby *Falco subbuteo*
Peregrine Falcon *Falco peregrinus*
Black-naped Oriole *Oriolus chinensis*
Black Drongo *Dicrurus macrocercus*
Hair-crested Drongo *Dicrurus hottentottus*
Brown Shrike *Lanius cristatus*
Long-tailed Shrike *Lanius schach*
Azure-winged Magpie *Cyanopica cyanus*
Oriental Magpie *Pica serica*
Yellow-bellied Tit *Periparus venustulus*
Cinereous Tit *Parus cinereus*
Chinese Penduline Tit *Remiz consobrinus*
Eurasian Skylark *Alauda arvensis*
Asian Short-toed Lark *Alaudala cheleensis*
Zitting Cisticola *Cisticola juncidis*
Thick-billed Warbler *Arundinax aedon*
Black-browed Reed Warbler *Acrocephalus bistrigiceps*
Oriental Reed Warbler *Acrocephalus orientalis*
Sand Martin *Riparia riparia*
Barn Swallow *Hirundo rustica*
Eastern Red-rumped Swallow *Cecropis daurica*
Light-vented Bulbul *Pycnonotus sinensis*
Yellow-browed Warbler *Phylloscopus inornatus*
Chinese Leaf Warbler *Phylloscopus yunnanensis*
Pallas's Leaf Warbler *Phylloscopus proregulus*
Radde's Warbler *Phylloscopus schwarzi*
Dusky Warbler *Phylloscopus fuscatus*
Eastern Crowned Warbler *Phylloscopus coronatus*
Pale-legged Leaf Warbler *Phylloscopus tenellipes*
Arctic Warbler *Phylloscopus borealis*
Claudia's Leaf Warbler *Phylloscopus claudiae*
Reed Parrotbill *Paradoxornis heudei*
Vinous-throated Parrotbill *Suthora webbiana*
Chestnut-flanked White-eye *Zosterops erythropleurus*
Swinhoe's White-eye *Zosterops simplex*
Daurian Starling *Agropsar sturninus*
Red-billed Starling *Spodiopsar sericeus*
White-cheeked Starling *Spodiopsar cineraceus*
Crested Myna *Acridotheres cristatellus*
White's Thrush *Zoothera aurea*
Siberian Thrush *Geokichla sibirica*
Chinese Blackbird *Turdus mandarinus*
Grey-backed Thrush *Turdus hortulorum*
Eyebrowed Thrush *Turdus obscurus*
Grey-streaked Flycatcher *Muscicapa griseisticta*
Dark-sided Flycatcher *Muscicapa sibirica*
Asian Brown Flycatcher *Muscicapa dauurica*
Rufous-tailed Robin *Larvivora sibilans*
Siberian Blue Robin *Larvivora cyane*
Bluethroat *Luscinia svecica*
Siberian Rubythroat *Calliope calliope*
Red-flanked Bluetail *Tarsiger cyanurus*
Yellow-rumped Flycatcher *Ficedula zanthopygia*
Mugimaki Flycatcher *Ficedula mugimaki*
Taiga Flycatcher *Ficedula albicilla*
Daurian Redstart *Phoenicurus auroreus*
White-throated Rock Thrush *Monticola gularis*
Blue Rock Thrush *Monticola solitarius*
Amur Stonechat *Saxicola stejnegeri*
Eurasian Tree Sparrow *Passer montanus*
Grey Wagtail *Motacilla cinerea*
Eastern Yellow Wagtail *Motacilla tschutschensis*
White Wagtail *Motacilla alba*
Richard's Pipit *Anthus richardi*
Olive-backed Pipit *Anthus hodgsoni*
Red-throated Pipit *Anthus cervinus*
Chinese Grosbeak *Eophona migratoria*
Common Rosefinch *Carpodacus erythrinus*
Chestnut-eared Bunting *Emberiza fucata*
Yellow-throated Bunting *Emberiza elegans*
Yellow-breasted Bunting *Emberiza aureola*
Little Bunting *Emberiza pusilla*
Black-faced Bunting *Emberiza spodocephala*
Chestnut Bunting *Emberiza rutila*
Yellow-browed Bunting *Emberiza chrysophrys*
Tristram's Bunting *Emberiza tristrami*


Left: Black-capped Kingfisher at Nanpu seawall, 30 May 2026. Right: Asian Brown Flycatcher at Caofei Wetland, 16 May 2026.

global flyway network
Team Piersma

SHOREBIRD NORTHWARD MIGRATION THROUGH THE LUANNAN COAST, BOHAI BAY, CHINA, MAY – JUNE 2026