WADER BREEDING SUCCESS IN THE 2019 ARCTIC SUMMER, BASED ON JUVENILE RATIOS OF BIRDS WHICH SPEND THE NON-BREEDING SEASON IN AUSTRALIA

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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 Australia. This is usually carried out in two different regions, some 3,000 km apart. In south-east Australia (SEA) the Victorian Wader Study Group (VWSG) aims to monitor breeding success for seven species. All birds are caught by cannon netting between mid-November and March/early April (depending on the species) on the Victorian coast, on coasts in the south-east of South Australia (around Port Macdonnell to Nora Creina) and on the Bass Strait Island of King Island, Tasmania. The other area sampled, by the Australasian Wader Studies Group (AWSG), is in north-west of Western Australia (NWA) – specifically Roebuck Bay, Broome, and the northern parts of 80 Mile Beach and the adjacent grassland plains of Anna Plains Station. Here a minimum of eight species are targeted for monitoring annually.

In SEA birds were caught at a range of sites, mostly the same sites each year. The bushfires and weather in Victoria in 2019/1920 negatively impacted on the field season and no data was collected for Bar-tailed Godwit and Red Knot as it was not possible to make field trips to the sampling locations due to entry restrictions to bushfire affected areas and the need for Parks Victoria staff to fight the bushfires (not available for boat transport duties). In addition, a new breeding colony of the endangered Fairy Tern (*Sternula nereis*) prevented cannon netting at one of the usual Bar-tailed Godwit catch sites. Travel restrictions bought in by Australian state governments to combat the Coronavirus disease (CORVID-19) pandemic prevented the usual March field trip to King Island, Tasmania and to South Australia to sample Ruddy Turnstone. In NWA samples of the main species were successfully caught in adequate numbers during the AWSG NWA2020 Expedition (February-March 2020).

This note gives the numerical data relating to the relevant catches made in the two regions during the 2019/2020 wader non-breeding season. It also categorises the estimated breeding success of each population in the 2019 Arctic summer.

METHODS

There were significant interruptions in the sampling period in 2019/2020, in SEA due to the extensive bushfires and associated weather, travel restrictions, availability of boat transportation and restrictions relating to the CORVID-19 pandemic. In NWA sampling was carried out between 7 February and 1 March 2020 during the planned fieldwork programme. The usual techniques for catching/ageing birds etc. were employed in both regions. Methods are outlined in Minton et al. (2005). A sample of between 100 and 220 birds gives a juvenile fraction error range of 0.1 to 0.15 (see Rogers & Standen 2019).

RESULTS & DISCUSSION

SEA

A total of 1,067 birds, of the seven species targeted for annual monitoring were caught in SEA in the sampling period (Tables 1 and 3). As usual, Red-necked Stint topped the species catch total with 714 individuals caught during the mid-November to early April monitoring period. The percentage of

juveniles (24.5%) was higher than last year (9.1%) and above the long-term average (17.1%) (Minton et al. 2020). This was an improvement after two consecutive years of poor breeding success. However, it should be noted that the four catches used in this estimate 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). Due to fire and heatwave entry restrictions and changes in habitat management at the other major catch site the Western Treatment Plant no significant catches of Red-necked Stint were made. This site typically has less juveniles than Yallock Creek (VWSG unpublished data).

Curlew Sandpipers (25.0%) also had above average breeding success (16.9%) after two successive poor breeding years (Minton et al. 2020).

Sharp-tailed Sandpipers (2%) appear to have had very low breeding success following on from last year's successful breeding year (45.9% juveniles – Table 3) (Minton et al. 2020). Sharp-tailed Sandpipers were again present in numbers in coastal areas of SEA and may have been affected by the widespread drought conditions that continued throughout the year in inland Australia that meant inland wetlands remained dry. The good numbers of Sharp-tailed Sandpipers present in SEA can be attributed to both the drought and the previous two good breeding seasons.

We always find Red Knot the hardest species to catch and monitor and in the 2019/2020 non-breeding season we were not able to catch enough birds in the VWSG field sites. Similarly, we did not catch enough Bar-tailed Godwits or Sanderling to report on percentage juveniles in the populations.

Ruddy Turnstone had an average breeding year. A total of 132 birds were caught in December 2019 on King Island. The field trips in March to King Island and South Australia were cancelled due to Australian state government travel restrictions for the CORVIS-19 pandemic. The breeding season appeared to be average (17.4%) and follows last years of good breeding success for this species (25.7% – Table 3) (Minton et al. 2020).

Overall, for south-east Australia, breeding success in the Arctic summer of 2019 was average or above average for all but one of the four species successfully monitored had low breeding success.

NWA

Of the five wader populations which breed above the Arctic Circle and spend the non-breeding season in NWA two species had low breeding outcomes, one below average and one average. Insufficient Curlew Sandpipers were caught to determine percentage juveniles.

For the three species that breed below the Arctic Circle, Greater Sand Plover had an average breeding season, Terek Sandpiper below average and Grey-tailed Tattler a particularly good breeding season (Tables 2&4).

Overall, 2,125 waders were of the eight species were caught during the period for breeding success assessments in 2019/2020.

Bar-tailed Godwits has second bad breeding outcome (2.0% juveniles) in the 2019 breeding season. This is the third successive year with an extremely low breeding productivity. It was noticeable how relatively few Bar-tailed Godwits were present at high tide roosts.

Great Knot also had another poor breeding year in 2019 (2.1%) following on from 2018 (5.5% juveniles) (Minton et al. 2020). It is now 10 years since the average percentage juveniles was exceeded in this species.

In comparison Red Knot fared better in 2019 (12.7%) which was close to the long-term average of 14.9% (Table 4). This species is prone to rather wide fluctuations in breeding success from year to year and in 2016/2017 21.6% juveniles were present in the summer populations in NWA (Table 4).

Red-necked Stints in NWA had a slightly lower (13.8%) breeding season compared to the 22-year average of (18.2%) (Table 2). This percentage of juveniles is lower than that recorded in SEA, however this may be due to SEA samples being all from a site with known higher number of juveniles (VWSG unpublished data).

Greater Sand Plover had an above average breeding season with 26.9% juveniles which is slightly above the long-term average of 21.5%. 2019 produced the highest number of juveniles in the population since 2012/2013 (Table 4).

Grey-tailed Tattler had a very good breeding year with 30.8% juveniles recorded, well above the long-term average of 19.4%. Terek Sandpiper had an above average breeding season 19.3% compared to the long-term average 13.3%, this is the second year of above average breeding success (Table 4).

Insufficient Ruddy Turnstone were caught to comment on breeding success.

CONCLUSION

Breeding success results were mixed for 2019/2020. Non-Arctic migrants had average or slightly above average success whereas Arctic species were less successful.

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Table 1. Percentage of juvenile (first year) waders in cannon-net catches in south-east Australia 2019/2020

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*	4		714	175	**24.5**	17.1	(22)	Above average
Curlew Sandpiper *C. ferruginea*		5	113	27	**23.9**	16.9	(21)	Above average
Bar-tailed Godwit *Limosa lapponica*			0					
Red Knot *C. canutus*		1	1					
Ruddy Turnstone *Arenaria interpres*	1	3	132	23	**17.4**	15.1	(22)	Average
Sanderling *C. alba*			0					
Sharp-tailed Sandpiper *C. acuminata*	1		99	2	**2.0**	19.2	(21)	Low
All birds cannon-netted in the period 2 November to 25^{t} March except Sharp-tailed Sandpiper and Curlew Sandpiper to end February only and some Ruddy Turnstone and Sanderling to early April and one Sanderling catch in late April (2015).								
*Includes the 2019/2020 figures.								

Table 2. Percentage of juvenile (first year) waders in cannon-net catches in north-west Australia 2019/2020.

Species	No. of catches		Total caught	Juveniles		Long-term average* % juvenile (no. years)	Assessment of 2019 breeding success
	Large (>=50)	Small (<50)		No.	%		
Great Knot *Calidris tenuirostris*	4	5	331	7	2.1	10.0 (22)	Low
Bar-tailed Godwit *Limosa lapponica*	1	5	98	2	2.0	9.4 (22)	Low
Red-necked Stint *C. ruficollis*	1	8	203	28	13.8	18.2 (22)	Below average
Red Knot *C. canutus*	1	7	150	19	12.7	14.9 (21)	Average
Curlew Sandpiper *C. ferruginea*		4	21	1	(4.8)	17.0 (22)	-
Non-arctic northern migrants							
Greater Sand Plover *Charadrius leschenaultii*	6	3	951	256	26.9	21.5 (22)	Average
Terek Sandpiper *Xenus cinereus*	1	69	176	34	19.3	13.4 (21)	Below average
Grey-tailed Tattler *Heteroscelus brevipes*	2	5	195	60	31.0	19.4 (21)	Very good

All birds cannon-netted in period 9 February to 1 March 2020

*Includes the 2019/2020 figures

Table 3. Percentage of juvenile (first year) birds in wader catches in south-east Australia 1998/1999 to 2019/2020.

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	Average (last 22yrs)
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	*15.1*
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	*17.1*
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	*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	*19.2*
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*

All birds cannon-netted between 15th November and 25th March, except Sharp-tailed Sandpiper and Curlew Sandpiper to end February only and some Ruddy Turnstone and Sanderling to early April and one Sanderling catch in late April (2015). Averages (for 22 years) exclude figures in brackets (small samples) and include 2019/20 figures

Table 4. Percentage of juvenile (first year) birds in wader catches in north-west Australia 1998/1999 to 2019/2020

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	Average (last 22yrs)
Red-necked Stint *Calidris ruficollis*	26	46	15	17	41	10	13	20	21	20	10	17	18	24	15	19	10	11.1	17.2	6.8	8.4	14	*18.2*
Curlew Sandpiper *C. ferruginea*	9.3	22	11	19	15	7.4	21	37	11	29	10	35	24	1	1.9	23	18	0.7	40.3	8.1	13.8	(4.8)	*17.2*
Great Knot *C. tenuirostris*	2.4	4.8	18	5.2	17	16	3.2	12	9.2	12	6	41	24	6	6.6	5	6	5.7	9.0	2.6	5.5	2.1	*9.6*
Red Knot *C. canutus*	3.3	14	9.6	5.4	32	3.2	(12)	57	11	23	12	52	16	8	1.5	8	13	2.7	21.6	5.4	1.5	12.7	*14.9*
Bar-tailed Godwit *Limosa lapponica*	2.0	10	4.8	15	13	9.0	6.7	11	8.5	8	4	28	21	8	7.6	17	5	10.3	11.0	3.0	2.0	2.0	*9.4*
Non-arctic northern migrants																							
Greater Sand Plover *Charadrius leschenaultii*	25	33	22	13	32	24	21	9.5	21	27	27	35	17	19	28	21	20	10.5	12.4	13.2	15.1	26.9	*21.5*
Terek Sandpiper *Xenus cinereus*	12	(0)	8.5	12	11	19	14	13	11	13	15	19	25	5	12	15	12	9.2	5.8	3.8	26.5	19.3	*13.4*
Grey-tailed Tattler *Heteroscelus brevipes*	26	(44)	17	17	9.0	14	11	15	28	25	38	24	31	20	18	16	19	8.9	14.5	7.3	18.7	30.8	*19.4*

All birds cannon-netted in the period 9 February to 1 March 2020. Averages exclude figures in brackets (small samples) but include 2019/2020 figures.