

**AWSG NORTH-WEST AUSTRALIA WADER AND TERN EXPEDITION  
25 JANUARY TO 13 FEBRUARY 2021 REPORT**

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## INTRODUCTION

For 40 years, the Australasian Wader Studies Group (AWSG) expedition to north-west Australia (NWA) has provided an opportunity to investigate two major wader and tern (shorebird) areas of international significance, Roebuck Bay and Eighty Mile Beach. These areas are within the Shire of Broome in the Kimberley region of Western Australia.

Eighty Mile Beach extends south-west from Cape Missiessy (-19.05 121.516) in a shallow curve to Cape Keraudren (-19.966, 119.766), with its midpoint at (-19.616, 120.983). The beach is about 100 meters wide and has a gentle gradient. It consists of sand with a high proportion of shelly material, and experiences a very large tidal range with an amplitude of up to 9 m. The adjoining tidal mudflats vary from one to five kilometres in width. On the landward side it is bordered by dunes, a narrow floodplain and, further inland, by a strip of pindan woodland or shrubland. It is a Ramsar site, and the beach area is part of the Eighty Mile Beach Marine Park (state marine park). It is an Important Bird Area (IBA) (Birdlife International 2023a).

Anna Plains Station (-19.2532, 124.4864) adjoins Eighty Mile Beach and the part of the station subject to periodic flooding forms part of the 3,337 km<sup>2</sup> Mandora Marsh and Anna Plains IBA, identified by BirdLife International because of its importance for supporting large numbers of waders and waterbirds (BirdLife International 2023b).

Roebuck Bay (-17.973, 122.305) is a 550 km<sup>2</sup> tropical, marine embayment. It has red sandy beaches and areas of mangroves, with the eastern edge of the bay being made up of linear tidal creeks. It is surrounded by grasslands and pindan woodland. It is a Ramsar site and protected as part of the Yawuru Nagulagun/Roebuck Bay Marine Park and an IBA (BirdLife International 2023c). The northern

shore of the bay is dominated by a long and low red cliff, two to six meters in height, of pindan soil, which gives the beaches there their distinctive red colouration. It overlies yellowish-red Broome Sandstone of Cretaceous age, which, when exposed at the base of the cliff, shows occasional fossil footprints of dinosaurs. Landward of the mangrove-lined creeks along the eastern shore are bare flats that are only flooded on high spring tides, with the hypersaline soil inhibiting the establishment of vegetation, except for some areas of samphire. Ocean beaches between Entrance Point, Broome Port and Barred Creek are white sandy beaches.

Roebuck Plains Station is part of the Roebuck Bay IBA and is a pastoral lease located close to the township of Broome. Roebuck Plains is an extensive floodplain that contains several different types of wetland, including seasonally flooded grassland, permanent freshwater lakes and seasonal/intermittent freshwater lakes and marshes. The entire floodplain is inundated once every five to ten years, but the relative permanence of Lake Eda makes it an important wader and waterbird refuge in the southern Kimberley (BirdLife International 2020c).

Together these sites are the third most important sites for waders in the world. The legacy of long-term capture, marking, tracking, and resighting work by the AWSG and partners both here and throughout the flyway has illuminated the movements and plight of increasingly threatened waders and terns, helping advance positive conservation outcomes through knowledge of birds at individual, cohort and species level. Championed by the late Dr Clive Minton, these field expeditions have also facilitated the training of personnel from around the globe, sharing knowledge to develop the best science and field practices.

AWSG NWA 2021 is the fortieth year that AWSG has conducted a field expedition in the Kimberley

region, but the coronavirus pandemic did not “care a whit” for the weight of such an impressive milestone, nor the importance of contributing to long-term datasets. Closed international borders and heavy restrictions on domestic travel meant a large expedition field team was not possible. Despite much optimism from the leadership team and a multi-tiered contingency plan, border openings and closures meant the AWSG NWA 2021 expedition could draw volunteers from only three Australian States – the Northern Territory (NT), one participant, South Australia (SA), one participant and Western Australia (WA), nine participants. Most of the leadership team that had worked so hard to organise the field work, were residents on the “wrong side” of the WA state border. The on-ground leadership team comprised Tegan Douglas (WA), Maureen Christie (SA), Amanda Lilleyman (NT), Grace Maglio (WA), Frank O’Connor (WA) and Kelly Rayner (WA). Mentor Leaders were Robert Bush (Queensland), Rosalind Jessop (Victoria) and Prue Wright (Victoria).

While the long-term NWA project aims remain a priority, state borders closures meant that only a small team with limited fields of expertise would be available to participate and the aims for the field expedition had to be scaled accordingly. The tantalising results from the trackers fitted to Oriental Pratincole *Glareola maldivarum* on the 2019 AWSG NWA Expedition (Jessop *et al.* 2021) and the offer of a partnership with Charles Darwin University (NT, Australia) to purchase five satellite trackers meant that deploying trackers on Oriental Pratincole became the main objective for the expedition. On closure of the WA border to Queensland residents late in the planning process, Maureen Christie who has a cannon net license agreed to travel from SA which meant small scale cannon-netting for birds on the plains, or if in sufficient density, at high tide roosts on the beach was still possible. The smaller team and reduced field catching opportunities also meant that a recommendation from the AWSG NWA 2020 report of increased focus on flag and colour band resightings could be implemented (Jessop *et al.* 2021).

The AWSG NWA 2021 fieldwork was based at Anna Plains Station (Eighty Mile Beach) from 27 January to 8 February and Broome Bird Observatory (Roebuck Bay) from 9 to 15 February 2021.

## AIMS

### Long-term AWSG field research aims.

Long-term aims are to advance the conservation of waders and terns in NWA by:

1. Monitoring of annual breeding success of migratory waders via the percentage of juveniles in the population in their non-breeding areas by catching samples of 100+ birds of five priority species of interest: Red-necked Stint *Calidris ruficollis*, Curlew Sandpiper *C. ferruginea*, Great Knot *C. tenuirostris*, Red Knot *C. canutus*, Bar-tailed Godwit *Limosa lapponica*, Greater Sand Plover *Charadrius leschenaultii*, Terek Sandpiper *Xenus cinereus* and Grey-tailed Tattler *Tringa brevipes*.
2. Obtaining annual survival estimates of key species of waders and terns via the recapture of birds already carrying bands and observations of flagged birds.
3. use (e.g. sex differences in migration terminus) of non-breeding sites by migratory waders and terns by the recapture of birds already carrying bands or colour mark observations.
4. Obtain information on the site faithfulness and Obtain more information on the migratory pathways and breeding areas of terns and wader species by marking birds with unique leg flags that can be observed and reported from throughout the flyway including across Australia.
5. Continue to collect biometric information on birds to assist with the monitoring of the effects of climate change on birds.

### 2021 AWSG fieldwork aims.

The closure of the WA state border to international and some Australian travellers meant that the aims of the expedition were scaled back to the following:

- To deploy five satellite transmitters on Oriental Pratincole to track movements and habitat use, timing of migration, routes, stop-over sites and distances travelled from the non-breeding grounds in Australia in partnership with Charles Darwin University.
- To capture Siberian Sand Plover *Charadrius mongolus* to: (1) take extra measurements to help distinguish between the two sub-species confirmed to occur in Australia, *Charadrius mongolus* and *Charadrius stegmanni*, using tarsus (‘diagonal’ measurement - shorter in *mongolus*), and bill depth - potentially deeper in *stegmanni*; and (2) photograph moult and profile.
- To take photographs of moult of waders caught to further refine moult guides for future field work.
- Train volunteers in cannon netting and mist netting.

## RESULTS AND DISCUSSION

### Oriental Pratincole (compiled by Grace Maglio and Amanda Lilleyman)

From late November 2020, there were encouraging reports of Oriental Pratincole arriving at Anna Plains and Roebuck Plains Stations in large numbers (Helen Stoate *pers. comm.*; Clare Morton, 11 January 2021 <https://www.10000birds.com/locusts-and-oriental-pratincoles-around-broome.htm> Broome Bird Observatory News 5 December 2020 <http://www.broomebirdobservatory.com/news>).

When the AWSG team arrived at Anna Plains Station on 28 January 2021, there was an estimated 50,000+ Oriental Pratincole present. With these good numbers, combined with observations of birds loafing on station roads and flocking near station bores, the Oriental Pratincole leaders (Amanda Lilleyman AL and Grace Maglio GM) planned a daily capture routine using multiple approved methods – hand capture (at night), mist netting (at dusk) with cannon netting in reserve if these techniques were not successful.

Three Oriental Pratincoles were caught by hand netting between the 28 and 30 January and were all aged as adults (2<sup>nd</sup> year or older) (Table 1). No birds were caught by mist netting. Five Oriental Pratincole were caught by cannon net (7 February) at one of the “Turkey” dams where birds were observed coming in to drink and rest during the day. Weights of birds caught ranged from 67–101 g (average 82.4 g; Table 1). Two were birds in their first year (juveniles) and the others aged as adults (Table 1).

**Table 1.** Age and weight of Oriental Pratincoles caught at Anna Plains Station.

| Date     | Band number | Age      | Weight (g) | Capture method |
|----------|-------------|----------|------------|----------------|
| 28/01/21 | 05283126    | Adult    | 68         | hand netting   |
| 30/01/21 | 05283127    | Adult    | 67         | hand netting   |
|          | 05283128    | Adult    | 82         | hand netting   |
| 07/02/21 | 05283052    | Adult    | 101        | cannon netting |
|          | 05283053    | Adult    | 91         | cannon netting |
|          | 05283054    | Juvenile | 68         | cannon netting |
|          | 05283055    | Juvenile | 91         | cannon netting |
|          | 05283056    | Adult    | 91         | cannon netting |

Based on data collected on Oriental Pratincole weights by the AWSG in February in previous years, AL and GM decided that a minimum threshold of 100 g was desirable to successfully deploy a satellite tracking device (2% of the bird’s body weight), which was below the ethics approval threshold of 3% of body weight (>66g). No trackers were deployed at Anna Plains Station as only one bird met the 100 g criterion and team leaders believed it would not have progressed the aims of the project to tag one individual.

With the passing of the opportunity to deploy all five tags at Anna Plains, the team moved to Broome. Multiple surveys were conducted by the whole team at likely coastal and inland catch sites including the beaches of Roebuck Bay and Broome, lakes and floodplains on Roebuck Plains Station and surrounds, including Taylors Lagoon. No Oriental Pratincole were found and as the tag batteries would deteriorate over time, the team leaders AL and GM donated them with the approval of Charles Darwin University to the Queensland Wader Study Group for use in an existing project.

### Effect of weather on Oriental Pratincole distribution during the expedition (compiled by Rosalind Jessop from team field notes).

A tropical low 12U\_2021 formed in the Kimberley region prior to the team’s arrival at Anna Plains Station and crossed the coast on 28 January near Wyndham, tracking inland passing Anna Plains station on 31 January before crossing out to sea near Carnarvon on 4 February. Rainfall was widespread in the Kimberley and in the Anna Plains area where between 50 and 100 mm fell and over 150 mm in Broome (Paterson 2022).

The Oriental Pratincoles left both coastal stations ahead of the weather front. It was hoped the birds would return to Anna Plains within a few days of the tropical low passing. However, station owner John Stoate advised that once the birds had left the station on previous occasions they did not return. No Oriental Pratincole were observed on the station or beach from Cape Missiessy at the northern end of Eighty Mile Beach to Mandora Marsh in the south in the days following the weather system’s passing. Only by 7 February had a small number of birds (approx. 1200) returned.

### Catching

A flock of Siberian Sand Plover *Charadrius mongolus* is usually seen by wader counters during regular surveys at the northern end of Eighty Mile Beach towards Cape Missiessy (Danny Rogers, *pers. comm.*). With bad weather threatening on 30 January, the team visited the northern bores and continued to Cape Missiessy to find catching opportunities. Unfortunately, very few Siberian Sand Plover were present on the northern part of the beach or elsewhere along the beach. None were caught.

A combination of bad weather, and the departure of the Oriental Pratincole, meant that there were opportunities to catch other waders on the beach between 1 and 6 February. The net was set each day, and a catch was made on 2 February (Table 2). There were four retraps, all banded on previous field trips to Eighty Mile Beach. Astoundingly two birds caught together here, a Grey-tailed Tattler and a Greater Sand Plover, were also first banded in the

same catch event on 3 March 2014; both were then aged as birds in their second year or older (2+), making these two long-distance travel buddies now 9+ years old. One of the Terek Sandpipers was aged 10+ years (Appendix 1)

### Training (compiled by Maureen Christie)

Each time we set the cannon net on the beach the team was divided into three groups. Net setting, cannons/electrics, hide and shade. Everyone was encouraged to participate in each group at least once. Experienced team members were given the opportunity to be responsible for leading one of these tasks. See also bush bird mist netting.

**Table 2.** Catch total (cannon net) on 2 February 2021 on Eighty Mile Beach 39 km south of Anna Plains entrance.

| Species                                                | New       | Retrap   | Total     | Juv      |
|--------------------------------------------------------|-----------|----------|-----------|----------|
| Red-necked Stint<br><i>Calidris ruficollis</i>         | 1         |          | 1         |          |
| Grey-tailed Tattler<br><i>Tringa brevipes</i>          | 1         | 1        | 2         |          |
| Curlew Sandpiper<br><i>Calidris ferruginea</i>         | 11        |          | 11        | 1        |
| Ruddy Turnstone<br><i>Arenaria interpres</i>           | 3         |          | 3         |          |
| Terek Sandpiper <i>Xenus cinereus</i>                  | 35        | 2        | 37        | 1        |
| Greater Sand Plover<br><i>Charadrius leschenaultii</i> | 32        | 1        | 33        | 6        |
| <b>Total</b>                                           | <b>83</b> | <b>4</b> | <b>87</b> | <b>8</b> |

### Flag and Band Sighting (compiled by Frank O'Connor (FO))

One of the major tasks of the expedition in 2021 was the sighting of engraved leg flags and colour bands in Roebuck Bay and Eighty Mile Beach. These observations provide data on longevity and site faithfulness. The sighting of overseas flags complements the sighting of Australian flags overseas.

The use of colour marking by banders in Australia is managed by the ABBBS. AWSG has various registered colour marks attached to project approvals including plain yellow flags (upper right for waders, lower left for terns), engraved yellow flags (upper right for waders, lower left for terns), a combination of metal band, colour bands and a leg flag where the yellow leg flag and metal band change position with each combination, and the flag may also be clipped (ABBBS Schema WA used by AWSG partners Global Flyways Network (Battley *et. al.* 2011)). Colour flags for other countries in the flyway are outlined in the Colour Flagging Protocol for Migratory Shorebirds in the East Asian – Australasian Flyway (Commonwealth of Australia 2001).

Plain yellow leg flags were not recorded (as they do not identify individuals and have been banded

locally), and neither were incomplete sightings, except under two conditions. First, observers recorded sightings of incomplete colour bands if they were certain that they were incomplete (i.e. the bird had presumably lost the flag or a colour band). Second, observers recorded partial yellow engraved leg flags at Eighty Mile Beach on two Bar-tailed Godwits presumably banded in Roebuck Bay. Observers did not record colour bands where they only saw one leg. If the same leg flag or colour band combination was seen by the same observer on the same day at the same location, this was recorded as one entry with a comment that it was seen twice (or more).

The team recorded leg flags and colour bands at Eighty Mile Beach, both during dedicated outings, and spotted opportunistically while undertaking other activities (such as cannon-netting), but the smaller proportion of flagged birds in the flocks at Eight Mile Beach meant sightings were few. When back in Roebuck Bay, flag reading teams of two or three observers were formed, with three teams on Wednesday February 10, and two teams on Thursday 11 and Friday 12. FO also managed some opportunistic sightings on Saturday 13 and Sunday 14. The teams surveyed the Roebuck Bay shoreline from Minton's Straight (-17.9779, 122.2900) to Quarry Beach, (-17.9687, 122.2900), with several areas visited on multiple occasions. The 1,345 total sightings consisted of 58 seen on Eighty Mile Beach, and 1,167 seen in Roebuck Bay, and included 46 incomplete sightings. Of the 1,225 complete sightings 1,074 were unique combinations.

**Table 3.** Overview of overseas flags sighted during the NWA 2021 expedition.

| Species                                        | Banding location        | Flags     |
|------------------------------------------------|-------------------------|-----------|
| Great Knot <i>Calidris tenuirostris</i>        | Japan (N. Hokkaido) B/B | 1         |
| Grey-tailed Tattler<br><i>Tringa brevipes</i>  | Japan (Kyushu) B/O      | 1         |
| Red Knot <i>Calidris canutus</i>               | China (Bohai) B/Y       | 1         |
| Bar-tailed Godwit<br><i>Limosa lapponica</i>   | China (Chongming) Bk/W  | 5         |
| Black-tailed Godwit<br><i>Limosa limosa</i>    | China (Chongming) Bk/W  | 1         |
| Great Knot <i>Calidris tenuirostris</i>        | China (Chongming) Bk/W  | 13        |
| Great Knot <i>Calidris tenuirostris</i>        | China (Chongming?) W/Bk | 1         |
| Grey-tailed Tattler<br><i>Tringa brevipes</i>  | China (Jiangsu) G/B     | 1         |
| Great Knot <i>Calidris tenuirostris</i>        | China (Yalujiang) G/O   | 2         |
| Curlew Sandpiper<br><i>Calidris ferruginea</i> | Australia (Victoria) O  | 1         |
| Bar-tailed Godwit<br><i>Limosa lapponica</i>   | Missing Flag? W         | 1         |
| Red Knot <i>Calidris canutus</i>               | Missing Flag? Bk        | 1         |
| <b>Total</b>                                   |                         | <b>29</b> |

(Colour codes: B=Blue; Bk=Black; G=Green; O=Orange; W=White)

There were 29 non-engraved flags from elsewhere in the flyway resighted (Table 3). Several of these observations are of note.

The W/Bk Great Knot seen is an old combination used prior to 2006 at Chongming, China (Katherine Leung *pers. comm.*).

Although the Bar-tailed Godwit with just a white flag on the upper right leg would ordinarily be considered a bird from New Zealand, sightings of New Zealand birds in this part of the flyway are unlikely. Instead, it is more likely that this bird has lost its second flag. The Red Knot with just a Black flag on the upper right is not a valid combination, so has presumably lost its second flag also. Seven of the Bk/W Great Knots had engraved white flags allowing the individual to be identified, as did one of the Bar-tailed Godwits and the Black-tailed Godwit. Both the two Great Knots with G/O flags had engraved orange flags, but only one could be read. The Red Knot with B/Y flags had an engraved yellow flag.

One Bar-tailed Godwit was observed with a red colour band on the lower left leg, and a metal band on the upper right leg. As this colour band was on lower left leg the bird most likely was banded in 2005 in a cohort study by AWSG. There were many more yellow engraved flags seen (especially on the small species such as Greater Sand Plover which could not be read due to the distance, the heat haze or the angle of the flag. Some combinations could not be read because the bird was roosting on one leg.

Old or interesting yellow engraved flag (flag) and colour band sightings on Eighty Mile Beach and Roebuck Bay are outlined in Appendices 2 and 3 respectively.

### Bush bird banding (compiled by Kelly Rayner)

We continued to contribute to the cooperative study of passerines in north-west Australia, by contributing to three long-running bush bird banding projects while on the expedition. The capture and banding of passerines played a larger than normal role in the 2021 expedition, representing the first occasion in 40 years when more passerines were captured than waders. Passerine mist netting was undertaken on eight mornings at three different locations: Passerine Bore (Anna Plains, 3 days), Broome Bird Observatory (4 days) and Coconut Wells (1 day) with the permission of property owners Graeme and Helen Macarthur. Despite initial conversations and excitement about mist netting in the mangroves of Crab Creek, a recce proved to be more than enough to satiate our threshold for sandfly and mosquito interactions, and the idea was abandoned.

The extended passerine capture effort presented an excellent training opportunity for the ABBBS C-class banders (trainees). While licensed A-class

banders oversaw all catching and banding activities, trainees were presented with opportunities to work on more advanced skills and decision-making such as site selection, independent setting up of nets and net management. In addition, the opportunity for trainees to make a direct comparison between the methods and strategies used for mist netting waders (Oriental Pratincole) as opposed to passerines was also provided. There was a total of 103 birds caught across 18 species, including 87 new birds and 12 recaptures from 2020 (Table 4). While we are appreciative of all birds that we had the opportunity to closely inspect in the hand, there were a few highlights including an entire family group of Grey-crowned Babblers *Pomatostomus temporalis*, two Willie Wagtails *Rhipidura leucophrys*, a Dollarbird *Eurystomus orientalis* and a Sacred Kingfisher *Todiramphus sanctus*. Two Little Bronze-cuckoos *Chalcites minutillus* were also captured at Anna Plains – these individuals did initially present an identification challenge as both of these birds were age 1 (within their first year of life) and missing the more distinctive identifying features.

### CONCLUSION AND RECOMMENDATIONS

- Despite much planning and on ground effort not enough Oriental Pratincoles were caught that met the project weight requirements to deploy the satellite transmitters.
- Alternative catching methods such as the use of net guns that require only a small team of locally based volunteers and are extremely mobile will be investigated to facilitate catching outside the annual major field expeditions.
- Funding to meet the costs for continuing Oriental Pratincole research during future AWSG Expeditions to north-west Australia will be sought. This includes considering alternate satellite transmitter technology that allows battery replacement and/or longer storage options in the event of non-deployment.
- The AWSG scientific advisory committee will review the weight parameters used during the expedition for the deployment of transmitters considering the lifestyle, individual body size and fat deposition for migration of Oriental Pratincole (Wilson *et al.* 2021).
- Excellent numbers of colour marked waders sighted and this will add to the AWSG database for survival. The focus on including flag sighting in the expedition programme should be retained.

Good training opportunities were provided for mist netting and cannon netting for trainee banders. It is an on-going aim of AWSG to foster expertise in these techniques, both locally and throughout the

flyway. Although international travel restrictions have limited participation from elsewhere in the flyway in recent years, AWSG plans to reinvigorate international participation in future expeditions. The border closures associated with COVID-19 also reinforced the importance of having and developing sufficient local skills, such that research endeavours are not reliant on a small, or geographically concentrated pool of expertise. AWSG will continue to recruit participants and build expertise from throughout the country in their projects.

## ETHICS STATEMENT

Acquisition of satellite tracking devices was funded by Charles Darwin University and attachment was conducted under the approval of Charles Darwin University Animal Ethics Committee (Permit number A20029) and Department of Biodiversity, Conservation and Attractions Fauna Taking License (F025000322). Catching of Oriental Pratincole and other waders and terns was conducted in partnership with the Australasian Wader Studies Group under the approval of the Department of Primary Industries and Regional Development WA, Division of Agriculture and Food Animal Ethics Committee (Permit number AEC NO. 20-4-10) and Department of Biodiversity, Conservation and Attractions approvals: (a) Fauna Taking License (F025000260); and (b) Authorisation to Take or Disturb Threatened species (TFA 2020-0011). Banding and flagging of waders and terns was conducted under an Australian Bird Banding Scheme (ABBBS) project permit (banding authority number 8000). Banding of bush birds was conducted under the approval of the Department of Primary Industries and Regional Development Wildlife Animal Ethics Committee and ABBBS project approval (banding authority number 8012).

## ACKNOWLEDGEMENTS

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- AWSG acknowledges the Karajarri and Nyangumarta people for permission to catch birds to be marked for this project on the shores of Eighty Mile Beach and surrounds, traditional lands of the Karajarri and Nyangumarta people.
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- The on-ground expedition team would especially like to thank Robert Bush, Roz Jessop and Prue Wright for all their hard efforts in the organisation of this expedition. Thanks to all expedition team volunteers who self-funded their participation in the field work, mostly during their annual leave.

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## APPENDICES

### Appendix 1. Age and known movement of retrapped birds caught 2 February 2021 on Eighty Mile Beach

| Species             | Band     | Date banded | Banding location* | Age at banding (years) | Minimum age at retrap | Additional retrap/resighting                             |
|---------------------|----------|-------------|-------------------|------------------------|-----------------------|----------------------------------------------------------|
| Greater Sand Plover | 05274175 | 3/03/2014   | 80MB 40-45km S    | 2                      | 9                     |                                                          |
| Grey-tailed Tattler | 06322645 | 3/03/2014   | 80MB 40-45km S    | 2                      | 9                     | Resighted twice on 80MB 40-45 km South in 2014 and 2017. |
| Terek Sandpiper     | 05282142 | 12/02/2020  | 80MB 40-45km S    | 1                      | 2                     |                                                          |
| Terek Sandpiper     | 05269440 | 2/03/2013   | 80MB 40-45km S    | 2                      | 10                    |                                                          |

39 km south of Anna Plains entrance

### Appendix 2. Old or interesting yellow engraved flag (flag) and colour band sightings on Eighty Mile Beach (80MB). ABBBS Schema WA (Schema) used by AWSG partners Global Flyways Network (Battley *et al.* 2011).

| Species             | Flag | Schem a | Date banded | Banding location   | Age at band ing | Sighting date | 80MB sighting location | Age at resight | Additional information                                                                                              |
|---------------------|------|---------|-------------|--------------------|-----------------|---------------|------------------------|----------------|---------------------------------------------------------------------------------------------------------------------|
| Bar-tailed Godwit   | JTT  |         | 1/07/2012   | RB - Boiler Point  | 2               | 2/02/2021     | 39km S of AP           | 11             | Resighted on Roebuck, but not since 08/2012.                                                                        |
| Bar-tailed Godwit   | KND  |         | 25/02/2015  | 80MB 10-15 km S    | 3               | 6/02/2021     | 17km S of AP           | 9              | Not resighted since.                                                                                                |
| Bar-tailed Godwit   | KVB  |         | 16/02/2016  | 80MB 0-5km S       | 1               | 6/02/2021     | 17km S of AP           | 6              | Resighted once 11/2018 on 80MB                                                                                      |
| Curlew Sandpiper    | JBK  |         | 8/02/2016   | 80MB - 5-10 km S   | 2               | 6/02/2021     | 17km S of AP           | 7              | Not resighted since.                                                                                                |
| Great Knot          |      | 2BYRY   | 12/01/2008  | RB - Stilt Viewing | 3               | 6/02/2021     | 17km S of AP           | 16             | Not resighted since 11/2018. Sighted in Russia 2012, 2016, Resighted twice on 80MB 2014, 2017, and caught 2/2/2021. |
| Grey-tailed Tattler | DXJ  |         | 3/03/2014   | 80MB - 40-45km S   | 2               | 1/02/2021     | 38-41km S of AP        | 9              |                                                                                                                     |

| Species                | Flag | Schem<br>a | Date<br>banded | Banding<br>location  | Age<br>at<br>band<br>ing | Sighting<br>date | 80MB<br>sighting<br>location | Age at<br>resight | Additional<br>information                 |
|------------------------|------|------------|----------------|----------------------|--------------------------|------------------|------------------------------|-------------------|-------------------------------------------|
| Grey-tailed<br>Tattler | CSP  |            | 2/03/2013      | 80MB -<br>40-45km S  | 2                        | 1/02/2021        | 42-44km<br>S of AP           | 10                | Resighted<br>2014, 2015,<br>03/2019.      |
| Grey-tailed<br>Tattler | DXN  |            | 3/03/2014      | 80MB -<br>40-45km S  | 2                        | 1/02/2021        | 42-44km<br>S of AP           | 9                 | Not<br>resighted<br>since.                |
| Grey-tailed<br>Tattler | EPP  |            | 24/02/2015     | 80MB -<br>40-45 km S | 2                        | 1/02/2021        | 42-44km<br>S of AP           | 8                 | Resighted in<br>2017.                     |
| Grey-tailed<br>Tattler | EYJ  |            | 10/02/2016     | 80MB -<br>25-30 km S | 1                        | 6/02/2021        | 17km S<br>of AP              | 6                 | Not<br>resighted<br>since.                |
| Terek<br>Sandpiper     | LJM  |            | 9/02/2016      | 80MB -<br>20-25 km S | 2                        | 1/02/2021        | 38-40km<br>S of AP           | 7                 | Not<br>resighted<br>since.                |
| Terek<br>Sandpiper     | KRZ  |            | 2/03/2013      | 80MB -<br>40-45 km S | 2                        | 1/02/2021        | 42-44km<br>S of AP           | 10                | Resighted<br>next day, not<br>seen since. |

**Appendix 3.** Old or interesting yellow engraved flag (flag) or colour mark sightings on Roebuck Bay (RB). ABBBS Schema WA used by AWSG partners Global Flyways Network (Battley *et al.* 2011).

| Species              | Flag | Schema | Date<br>banded | Banding<br>location        | Age<br>at<br>band<br>ing | Sighting<br>date | Sighting<br>location      | Age at<br>resight | Additional<br>information                                                                        |
|----------------------|------|--------|----------------|----------------------------|--------------------------|------------------|---------------------------|-------------------|--------------------------------------------------------------------------------------------------|
| Bar-tailed<br>Godwit |      | 1RYYY  | 9/07/2006      | RB - Wader<br>Spit         | 2                        | 10/02/2021       | RB<br>(Wader<br>Beach)    | 17                | Not resighted on<br>RB since 03/2016.                                                            |
| Bar-tailed<br>Godwit |      | 1LLL B | 17/02/2007     | RB - Stilt<br>Viewing      | 2                        | 10/02/2021       | RB<br>(Wader<br>Beach)    | 16                | Resighted on RB<br>many times last<br>seen 11/2020.                                              |
| Bar-tailed<br>Godwit |      | 1YYYL  | 12/10/2008     | RB - Stilt<br>Viewing      | 3                        | 10/02/2021       | RB<br>(Wader<br>Beach)    | 14                | Resighted on RB<br>many times last<br>seen 11/2020.                                              |
| Bar-tailed<br>Godwit | DUV  |        | 3/07/2010      | RB -<br>Richard's<br>Point | 1                        | 10/02/2021       | RB<br>(Wader<br>Beach)    | 12                | Not resighted on<br>RB since 12/2016.                                                            |
| Bar-tailed<br>Godwit | ABY  |        | 14/11/2005     | RB -<br>Unspecified        | 2                        | 11/02/2021       | RB<br>(Wader<br>Beach)    | 17                | Resighted multiple<br>times on RB, and at<br>Yalu Jiang (2010,<br>2012 but not since<br>03/2018. |
| Bar-tailed<br>Godwit | EEP  |        | 1/08/2010      | RB - Eagles<br>Roost       | 2                        | 11/02/2021       | RB<br>(Wader<br>Beach)    | 12                | Not resighted on<br>RB since 2012,<br>most often sighted<br>at Simpsons Beach<br>in Broome Port. |
| Bar-tailed<br>Godwit | JBP  |        | 6/03/2012      | RB - Boiler<br>Point       | 2                        | 11/02/2021       | RB<br>(Wader<br>Beach)    | 11                | Resighted multiple<br>times on RB                                                                |
| Bar-tailed<br>Godwit | CD   |        | 1/12/2005      | RB -<br>Unspecified        | 2                        | 12/02/2021       | RB (Two<br>Dog<br>Hermit) | 17                | Resighted multiple<br>times on RB                                                                |
| Bar-tailed<br>Godwit |      | 1LYBL  | 19/08/2007     | RB -<br>Campsite<br>Beach  | 2                        | 12/02/2021       | RB (Two<br>Dog<br>Hermit) | 15                | Resighted multiple<br>times on RB last<br>seen 11/2020.                                          |
| Bar-tailed<br>Godwit |      | 1RBBL  | 4/09/2007      | RB - Stilt<br>Viewing      | 3                        | 12/02/2021       | RB (Two<br>Dog<br>Hermit) | 16                | Not resighted on<br>RB since 11/2015.                                                            |



| Species             | Flag | Schema | Date banded | Banding location     | Age at banding | Sighting date | Sighting location    | Age at resight | Additional information                                                                              |
|---------------------|------|--------|-------------|----------------------|----------------|---------------|----------------------|----------------|-----------------------------------------------------------------------------------------------------|
| Bar-tailed Godwit   |      | 1BLLL  | 14/11/2007  | RB - Richard's Point | 3              | 12/02/2021    | RB (Two Dog Hermit)  | 16             | Not resighted on RB since 11/2019                                                                   |
| Bar-tailed Godwit   |      | 1YYYYB | 15/01/2006  | RB - Stilt Viewing   | 2              | 12/02/2021    | RB (Wader Beach)     | 17             | Resighted multiple times on RB, last seen 11/2020. Also caught 7/4/2006 in China CDNNR Banding Boat |
| Bar-tailed Godwit   |      | 1RRBL  | 19/08/2007  | RB - Campsite Beach  | 2              | 12/02/2021    | RB (Wader Beach)     | 15             | Resighted multiple times on RB, last seen 11/2020.                                                  |
| Bar-tailed Godwit   | EJH  |        | 1/08/2010   | RB - Eagles Roost    | 2              | 12/02/2021    | RB (Wader Beach)     | 12             | Resighted multiple times on RB last seen 03/2019.                                                   |
| Bar-tailed Godwit   | EKU  |        | 6/03/2011   | RB - Boiler Point    | 1              | 12/02/2021    | RB (Wader Beach)     | 11             | Resighted multiple times on RB, including 04/2020.                                                  |
| Bar-tailed Godwit   | AKH  |        | 17/02/2007  | RB - Unspecified     | 2              | 13/02/2021    | RB (Richard's Point) | 16             | Resighted almost every year on RB since.                                                            |
| Black-tailed Godwit |      | 1BBYB  | 21/08/2011  | RB - Boiler Point    | 3              | 10/02/2021    | RB (Fall Point)      | 12             | Resighted almost every year on RB since.                                                            |
| Curlew Sandpiper    | CUA  |        | 17/07/2011  | RB - Campsite Beach  | 1              | 10/02/2021    | RB (Boat Ramp)       | 11             | Resighted regularly on RB                                                                           |
| Curlew Sandpiper    | JDL  |        | 20/02/2016  | RB - Wader Beach     | 2              | 10/02/2021    | RB (Fall Point)      | 7              | Resighted on RB twice, last 04/2019                                                                 |
| Curlew Sandpiper    | CKT  |        | 17/07/2011  | RB - Campsite Beach  | 1              | 12/02/2021    | RB (Wader Beach)     | 11             | Resighted regularly on RB.                                                                          |
| Great Knot          | DLU  |        | 19/08/2007  | RB - Unspecified     | 2              | 10/02/2021    | RB (Wader Beach)     | 15             | Not resighted on RB since 02/2008.                                                                  |
| Great Knot          | 1AX  |        | 7/02/2015   | RB - Nick's Beach    | 2              | 11/02/2021    | RB (Nick's Beach)    | 8              | Regularly resighted on RB                                                                           |
| Great Knot          | AAK  |        | 27/08/2006  | RB - Unspecified     | 3              | 11/02/2021    | RB (Wader Beach)     | 17             | Not resighted on RB since 03/2014.                                                                  |
| Great Knot          | CDU  |        | 8/07/2007   | RB - Unspecified     | 1              | 12/02/2021    | RB (Two Dog Hermit)  | 15             | Not resighted on RB since 11/2007.                                                                  |
| Great Knot          | ERC  |        | 9/10/2001   | RB - Unspecified     | 3              | 12/02/2021    | RB (Wader Beach)     | 22             | Flag changed in 09/2008, and resighted multiple times on RB.                                        |
| Great Knot          | ERE  |        | 19/08/2007  | RB - Unspecified     | 3              | 12/02/2021    | RB (Wader Beach)     | 16             | Not resighted on RB since 03/2016                                                                   |
| Great Knot          | DNS  |        | 12/08/2007  | RB - Unspecified     | 2              | 13/02/2021    | RB (Richard's Point) | 15             | Resighted multiple times on RB, and on Bohai Bay in 05/2009 and Russia in 08/2016.                  |
| Great Knot          | ESH  |        | 19/02/2008  | RB - Unspecified     | 2              | 13/02/2021    | RB (Richard's Point) | 15             | Not seen since                                                                                      |
| Greater Sand Plover | JSP  |        | 24/09/1998  | RB - Unspecified     | 2              | 10/02/2021    | RB (Fall Point)      | 25             | Not sighted since last caught in 03/2011.                                                           |
| Greater Sand Plover | KLR  |        | 14/09/2008  | RB - Unspecified     | 3              | 11/02/2021    | RB (Richard's Point) | 15             | Not resighted on RB since 08/2017                                                                   |
| Greater Sand Plover | EKH  |        | 25/09/2010  | RB - Wader Beach     | 3              | 12/02/2021    | RB (Two Dog Hermit)  | 13             | Not resighted on RB since 2011                                                                      |

| Species                                                         | Flag | Schema | Date banded | Banding location     | Age at banding | Sighting date | Sighting location    | Age at resight | Additional information                                                                         |
|-----------------------------------------------------------------|------|--------|-------------|----------------------|----------------|---------------|----------------------|----------------|------------------------------------------------------------------------------------------------|
| Greater Sand Plover                                             | EPP  |        | 26/09/2010  | RB - Wader Beach     | 3              | 12/02/2021    | RB (Two Dog Hermit)  | 13             | Not resighted on RB since 03/2019                                                              |
| Greater Sand Plover                                             | JBR  |        | 8/03/2011   | RB - Simpsons Beach  | 1              | 12/02/2021    | RB (Two Dog Hermit)  | 11             | Not resighted on RB since 03/2015                                                              |
| Greater Sand Plover                                             | EHU  |        | 22/09/2010  | RB - Quarry Beach    | 3              | 14/02/2021    | RB (Quarry Beach)    | 13             | Resighted on Roebuck and Cable Beach since.                                                    |
| Greater Sand Plover                                             | JSY  |        | 14/09/2011  | RB - Quarry Beach    | 2              | 14/02/2021    | RB (Quarry Beach)    | 11             | Not resighted on RB since 03/2017.                                                             |
| Grey-tailed Tattler                                             | DTV  |        | 22/02/2014  | RB - Eagles Roost    | 2              | 10/02/2021    | RB (Wader Beach)     | 9              | Not resighted on RB since 03/2017                                                              |
| Grey-tailed Tattler                                             | CCD  |        | 24/06/2012  | RB - Campsite Beach  | 1              | 11/02/2021    | RB (Tattler Rocks)   | 10             | Not resighted on RB since 10/2016                                                              |
| Grey-tailed Tattler                                             | DJT  |        | 14/07/2013  | RB - Wader Beach     | 1              | 11/02/2021    | RB (Tattler Rocks)   | 9              | Last resighted on RB 10/2016                                                                   |
| Grey-tailed Tattler                                             | CVD  |        | 3/03/2013   | 80MB - 40-45km S     | 1              | 14/02/2021    | RB (Quarry Beach)    | 9              | Not resighted since                                                                            |
| Siberian Sand Plover                                            | HHD  |        | 29/08/2015  | RB - Wader Beach     | 2              | 11/02/2021    | RB (Richard's Point) | 7              | Resighted twice on RB since.                                                                   |
| Australian Pied Oystercatcher<br><i>Haematopus longirostris</i> | A6   |        | 17/01/2001  | RB - Unspecified     | 3              | 12/02/2021    | RB (Nick's Beach)    | 23             | Resighted multiple times on RB (and at James Price Point and Coulomb Point)                    |
| Red Knot                                                        | CYY  |        | 16/11/2009  | RB - Eagles Roost    | 1              | 12/02/2021    | RB (Wader Beach)     | 12             | Resighted multiple times on RB, and at Bohai Bay in 2013, 2018, 2019, 2020.                    |
| Red Knot                                                        | YPA  |        | 19/07/2015  | RB - Quarry Beach    | 2              | 12/02/2021    | RB (Wader Beach)     | 8              | Seen with Geolocator in 2016 and in Bohai Bay China in 2018. Last seen 01/2020.                |
| Red Knot                                                        |      | 1LLLL  | 12/08/2007  | RB - Richard's Point | 3              | 13/02/2021    | RB (Richard's Point) | 16             | Resighted Bohai 05/2013, Last seen 11/2015.                                                    |
| Red Knot                                                        |      | 1YLRR  | 8/07/2007   | RB - Wader Spit      | 1              | 14/02/2021    | RB (Quarry Beach)    | 15             | Seen multiple times, Bohai Bay 2010, 2012, 2013, 2015, 2017, 2018, 2019, last seen RB 11/2020. |
| Red Knot                                                        |      | 1RYYB  | 27/11/2007  | RB - Quarry Beach    | 1              | 14/02/2021    | RB (Quarry Beach)    | 14             | Resighted multiple times RB and 80MB. Last resighted 12/2014.                                  |
| Ruddy Turnstone                                                 | BY   |        | 8/03/2012   | RB - Campsite Beach  | 1              | 11/02/2021    | RB (Eagle's Roost)   | 10             | Frequently resighted on RB                                                                     |
| Ruddy Turnstone                                                 | CX   |        | 24/06/2012  | RB - Campsite Beach  | 1              | 11/02/2021    | RB (Eagle's Roost)   | 10             | Frequently resighted on RB                                                                     |
| Ruddy Turnstone                                                 | AL   |        | 8/03/2012   | RB - Campsite Beach  | 2              | 11/02/2021    | RB (Nick's Beach)    | 11             | Frequently resighted on RB                                                                     |
| Ruddy Turnstone                                                 | AV   |        | 8/03/2012   | RB - Campsite Beach  | 2              | 11/02/2021    | RB (Nick's Beach)    | 11             | Frequently resighted on RB                                                                     |

| Species         | Flag | Schema | Date banded | Banding location     | Age at banding | Sighting date | Sighting location    | Age at resight | Additional information      |
|-----------------|------|--------|-------------|----------------------|----------------|---------------|----------------------|----------------|-----------------------------|
| Ruddy Turnstone | EU   |        | 11/08/2013  | RB - Two Dog Hermit  | 2              | 13/02/2021    | RB (Richard's Point) | 9              | Frequently resighted on RB  |
| Ruddy Turnstone | JE   |        | 6/11/2013   | RB - Nick's Beach    | 1              | 14/02/2021    | RB (Quarry Beach)    | 8              | Frequently resighted on RB  |
| Terek Sandpiper | TK   |        | 3/04/2011   | RB - Eagles Roost    | 2              | 10/02/2021    | RB (Fall Point)      | 12             | Frequently resighted on RB  |
| Terek Sandpiper | LM   |        | 21/09/2010  | RB - Richard's Point | 3              | 12/02/2021    | RB (Wader Beach)     | 13             | Not resighted since banding |
| Terek Sandpiper | NK   |        | 19/09/2011  | RB - Campsite Beach  | 3              | 12/02/2021    | RB (Wader Beach)     | 12             | Frequently resighted on RB  |

#### Appendix 4. Details of passerine catches during NWA 2021.

##### Anna Plains Station - Passerine Bore

5th February 2021. 4:55 - 7:05am

| Species            | New      | Retrap   | Total    | Details          |
|--------------------|----------|----------|----------|------------------|
| Brown Honeyeater   | 4        | 1        | 5        | 18/02/2020 as 1+ |
| Singing Honeyeater | 1        |          | 1        |                  |
| Rufous Whistler    | 1        |          | 1        |                  |
| <b>Total</b>       | <b>6</b> | <b>1</b> | <b>7</b> |                  |

##### Anna Plains Station - Passerine Bore

6th February 2021. 4:55 - 7:00am

| Species               | New      | Retrap   | Total    | Details          |
|-----------------------|----------|----------|----------|------------------|
| Brown Honeyeater      | 3        | 1        | 4        | 18/02/2020 as 1+ |
| Singing Honeyeater    | 1        |          | 1        |                  |
| Yellow-throated Miner | 1        |          | 1        |                  |
| <b>Total</b>          | <b>5</b> | <b>1</b> | <b>6</b> |                  |

##### Anna Plains Station - Passerine Bore

7th February 2021. 4:55 - 7:20am

| Species               | New       | Retrap   | Total     | Details          |
|-----------------------|-----------|----------|-----------|------------------|
| Variegated Fairy-wren | 1         |          | 1         |                  |
| Brown Honeyeater      | 9         | 1        | 10        | 18/02/2020 as 1+ |
| Little Bronze-cuckoo  | 2         |          | 2         |                  |
| <b>Total</b>          | <b>12</b> | <b>1</b> | <b>13</b> |                  |

##### Broome Bird Observatory

10th February 2021. 5:00 - 8:00

| Species             | New | Retrap | Total |
|---------------------|-----|--------|-------|
| Peaceful Dove       | 1   |        | 1     |
| Bar-shouldered Dove | 1   |        | 1     |
| Singing Honeyeater  | 1   |        | 1     |
| Great Bowerbird     | 1   |        | 1     |

|                  |          |          |
|------------------|----------|----------|
| Yellow White-eye | 2        | 2        |
| <b>Total</b>     | <b>6</b> | <b>6</b> |

**Broome Bird Observatory**

11th February 2021. 5:10 - 8:00am

| Species              | New      | Retrap | Total    |
|----------------------|----------|--------|----------|
| Grey-crowned Babbler | 1        |        | 1        |
| Little Friarbird     | 1        |        | 1        |
| Brown Honeyeater     | 1        |        | 1        |
| Willie Wagtail       | 2        |        | 2        |
| Yellow White-eye     | 2        |        | 2        |
| Double-barred Finch  | 1        |        | 1        |
| <b>Total</b>         | <b>8</b> |        | <b>8</b> |

**Broome Bird Observatory**

12th February 2021. 5:15 - 8:15am.

| Species                | New       | Retrap   | Total     | Details          |
|------------------------|-----------|----------|-----------|------------------|
| Sacred Kingfisher      | 1         |          | 1         |                  |
| White-gaped Honeyeater |           | 1        | 1         | 27/02/2020 as 1+ |
| Rufous Whistler        | 3         |          | 3         |                  |
| Grey-crowned Babbler   | 6         | 1        | 7         | 11/02/2021       |
| <b>Total</b>           | <b>10</b> | <b>2</b> | <b>12</b> |                  |

**Broome Bird Observatory**

14th February 2021. 5:20 - 8:20am

| Species                    | New       | Retrap (SS) | Total     |
|----------------------------|-----------|-------------|-----------|
| Peaceful Dove              | 7         | (1)         | 7         |
| Bar-shouldered Dove        | 1         |             | 1         |
| Dollarbird                 | 1         |             | 1         |
| Little Friarbird           | 2         |             | 2         |
| Rufous-throated Honeyeater | 2         |             | 2         |
| Double-barred Finch        | 2         |             | 2         |
| <b>Total</b>               | <b>15</b> | <b>(1)</b>  | <b>15</b> |

**Coconut Wells**

13th February 2021.

| Species                    | New       | Retrap (SS)  | Total     | Details           |
|----------------------------|-----------|--------------|-----------|-------------------|
| Rufous Whistler            | 2         | 1            | 3         | 10/10/2020 Age 2+ |
| Grey-crowned Babbler       | 3         | 1 (1)        | 4         | 20/08/2020 Age 2+ |
| Variegated Fairy-wren      | 6         | 1            | 7         | 4/01/2020 Age 3+  |
| Brown Honeyeater           | 1         |              | 1         |                   |
| Rufous-throated Honeyeater | 2         |              | 2         |                   |
| White-gaped Honeyeater     | 2         | 1            | 3         | 12/06/2020 Age 2  |
| Double-barred Finch        | 6         |              | 6         |                   |
| Great Bowerbird            | 3         | 4 (1)        | 7         |                   |
| <b>Total</b>               | <b>25</b> | <b>8 (2)</b> | <b>33</b> |                   |