

Memo

To: Les Purves

From: Jarrad Clark

CC: Michael Klvac

Date: 20 December 2017

Subject: Shorebird, Marine Turtle and other conservation significant fauna survey December 2017



Background and methods

This memo has been drafted to provide interim results from the recent Migratory Shorebird, Marine Turtle and other conservation significant fauna survey undertaken 4-9 December 2017 undertaken for the Mardie Salt Project (the Project). The aim is to identify any fatal flaws for the Project

Several tasks were completed during the survey:

1. Installed 13 time-lapse cameras to investigate tidal movement as per RPS supplied locations
2. Undertook 3 high tide and 3 low tide aerial surveys and several ground counts for migratory shorebirds
3. Examined marine turtle nests south of the water inlet creek
4. Located and documented additional marine turtle nest sites north of the water inlet creek on tenements not part of the study area at time of mobilisation – tenements being sought to expand Project options.
5. Deployed audio recording devices at:
 - a. Six sites targeting North-western Free-tailed Bat (*Mormopterus cobourgiensis*)
 - b. Three sites targeting Night Parrot
 - c. Identified nine additional sites to target Night Parrot – to be deployed by BCI Minerals staff
6. Investigated habitat for Northern Quoll and Black-flanked Rock Wallaby

Results

General

Time lapse cameras were all deployed as per RPS' specifications. They will remain in place until the next field trip, currently planned for mid-January 2018.

No habitat for Northern Quoll (EN), Black-flanked Rock Wallaby (EN) Ghost Bat (VU), Pilbara Leaf-nosed bat (EN) and Pilbara Olive Python (VU) present within the study area.

Habitat for North-western Free-tailed Bat (P1) abundant and likely to be recorded.

Habitat for Bilby (VU) present in small areas, particularly near the planned plant and infrastructure areas; less in the south.

Habitat for Night Parrot present particularly near planned plant and infrastructure area, and generally along eastern salt flats boundary, more so in the north. Historic record 30 km south of southern tenement border, however spinifex in this area looks sub-optimal. Habitat on salt flat 'island' highly variable; poor in the south, better in the central portions of the study area.

Migratory Shorebirds

Key findings:

- A total of 23 species listed under international agreements and protected at the state or federal levels were recorded

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- Three 'Critically Endangered' species recorded: Curlew Sandpiper, Great Knot, Eastern Curlew (EPBC Act)
- Two 'Endangered' species recorded (EPBC Act)
- One and four 'Vulnerable' species recorded (EPBC Act and WC Act, respectively)
- Difference in Species Richness between tides negligible: 13.3 species at high tide and 12.7 at low tide (mean). Daily mean Species Richness greater (17.7) highlighting importance of undertaking high and low tide surveys
- Abundance of birds greater during high tide (mean = 556) than low tide (mean = 353). Daily mean abundance (909) >50% less than that if Nationally important bird habitat
- Distribution data suggests that the algal mat and salt flats (proposed ponds areas) areas are of least importance to the birds of the area in terms of abundance and richness – though an in-depth analysis has not yet been undertaken.
- Species that forage in sediment tend to move to the coastal mudflats and offshore islands during the low tide and inland to the mangrove/samphire wetlands at high tide. Species that prefer rocky habitats forage on the few rocky shelves on the coast or on offshore islands during the low tide and roost in the mangroves during the high tide
- Area supports > 0.1% of the Eastern Flyway Population for Ruddy Turnstone

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Name	Common name	EPBC	WC ACT	Intl.Pop (1%)	Nat.Pop (0.1%)	Max	Intl.%	Nat.%
Actitis hypoleucos	Common Sandpiper	Mig.	Mig.	1900	190	2	0.1	1.1
Ardea modesta	Eastern Great Egret		Mig.	0		1		
Arenaria interpres	Ruddy Turnstone	Mig.	Mig.	300	30	202	67.3	673.3
Calidris alba	Sanderling	Mig.	Mig.	300	30	1	0.3	3.3
Calidris canutus	Red Knot	EN/Mig.	Mig.	1100	110	100	9.1	90.9
Calidris ferruginea	Curlew Sandpiper	CR/Mig.	VU/Mig.	900	90	40	4.4	44.4
Calidris ruficollis	Red-necked Stint	Mig.	Mig.	4750	475	195	4.1	41.1
Calidris tenuirostris	Great Knot	CR/Mig.	VU/Mig.	4250	425	1	0.0	0.2
Charadrius leschenaultii	Greater Sand Plover	VU/Mig.	VU/Mig.	2500	250	9	0.4	3.6
Charadrius mongolus	Lesser Sand Plover	EN/Mig.	EN/Mig.	2250	225	1	0.0	0.4
Charadrius veredus	Oriental Plover	Mig.	Mig.	2300	230	40	1.7	17.4
Chlidonias leucopterus	White-winged Black Tern	Mig.	Mig.	0		1		
Gelochelidon nilotica	Gull-billed Tern	Mig.	Mig.	0		100		
Glareola maldivarum	Oriental Pratincole	Mig.	Mig.	28800	2880	61	0.2	2.1
Limosa lapponica	Bar-tailed Godwit	Mig.	Mig.	3250	325	173	5.3	53.2
Numenius madagascariensis	Eastern Curlew	CR/Mig.	VU/Mig.	350	35	12	3.4	34.3
Numenius phaeopus	Whimbrel	Mig.	Mig.	650	65	38	5.8	58.5
Pluvialis fulva	Pacific Golden Plover	Mig.	Mig.	1200	120	59	4.9	49.2
Sterna albifrons	White-shafted Little Tern	Mig.	Mig.	0		40		
Sterna caspia	Caspian Tern	Mig.	Mig.	0		14		
Tringa brevipes	Grey-tailed Tattler	Mig.	P4/Mig.	700	70	42	6.0	60.0
Tringa cinerea	Terek Sandpiper	Mig.	Mig.	500	50	5	1.0	10.0
Tringa nebularia	Common Greenshank	Mig.	Mig.	1100	110	10	0.9	9.1
	Mig.	22	23					
	CR	3	0					
	EN	2	1					
	VU	1	4					

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P4	0	1
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Discussion

As per DoEE (2015) the study area is considered Nationally Important habitat for migratory birds, due to the following two criteria being met:

- 1) >15 species present
- 2) Area supports >0.1% of the Flyway Population for any one species: Ruddy Turnstone (only 30 individuals required, 202 recorded day 3 low tide aerial count).

With a maximum 202 individuals recorded, the study area appears to be important habitat for the species

It is also worth noting that:

- the National 0.1% Flyway Population abundance criteria for Red Knot (EN) was almost met, being 100 individuals of the 110 individuals required (90%) and is likely to be met in the future
- the National 0.1% Flyway Population abundance criteria for Curlew Sandpiper (CR; maximum 40 individuals) was 44% of the required 90 individuals
- the National 0.1% Flyway Population abundance criteria for Red-necked Stint (maximum 195 individuals) was 41% of the required 475 individuals
- the National 0.1% Flyway Population abundance criteria for Bar-tailed Godwit (maximum 173 individuals) was 53% of the required 325 individuals
- the National 0.1% Flyway Population abundance criteria for Eastern Curlew (CR; maximum 12 individuals) was 34% of the required 35 individuals
- the National 0.1% Flyway Population abundance criteria for Whimbrel (maximum 38 individuals) was 58.5% of the required 65 individuals
- the National 0.1% Flyway Population abundance criteria for Grey-tailed Tattler (P4; maximum 42 individuals) was 60% of the required 70 individuals

This analysis doesn't however consider direct impact vs. indirect impact, and is only considering the entire study area.

At this stage of the fatal flaw analysis it is worth discussing the potential for the project to have significant impacts on migratory birds and how that might be treated at the federal and state level during impact assessment. DoEE (2015) states that:

"an action is likely to have a significant impact on a migratory species if there is a real chance or possibility that it will:

- substantially modify (including by fragmenting, altering fire regimes, altering nutrient cycles or altering hydrological cycles), destroy or isolate an area of important habitat for a migratory species
- result in an invasive species that is harmful to the migratory species becoming established in an area of important habitat for the migratory species
- seriously disrupt the lifecycle (breeding, feeding, migration or resting behaviour) of an ecologically significant proportion of the population of a migratory species."

It appears that direct impacts to feeding habitat is minimal, though we haven't had time yet to analyse the dataset in terms of direct impact vs indirect. The main impact appears to be to roosting

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habitat, which is less critical and can be 'recreated'. Feeding habitat (i.e. mudflats, cannot be recreated.

Therefore, the outcome of round1 is that we have fairly significant results overall that will attract the attention of the DoEE and various bird groups such as BirdLife. We therefore need to validate the December results with another survey in January, during a more typical tide cycle.

We propose to mobilise the afternoon of January 12, with surveys being undertaken 13-15 January; and demobilising 16 January.

Yours Sincerely,

Jarrad Clark

Principal Zoologist

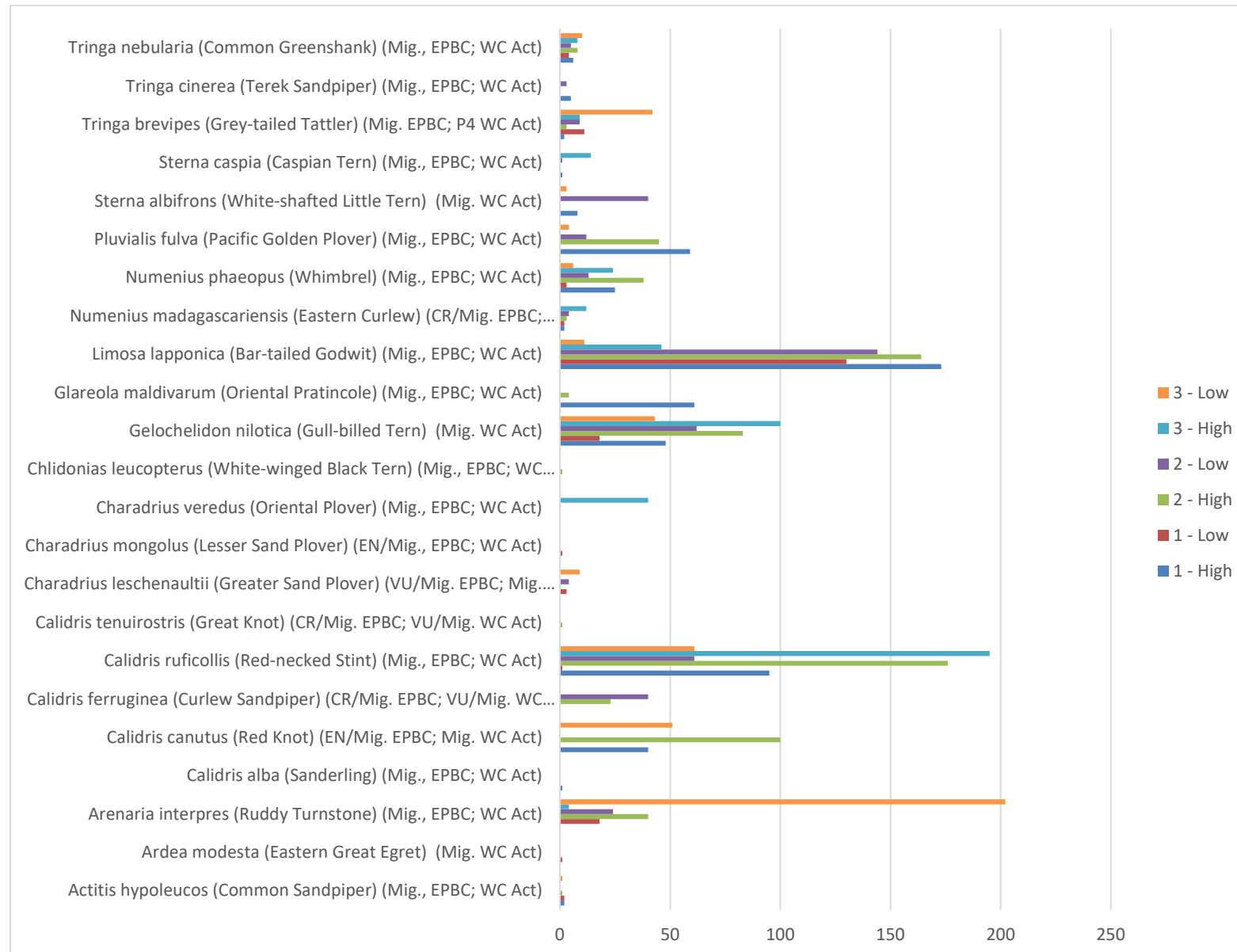
Jarrad.clark@phoenixenv.com.au

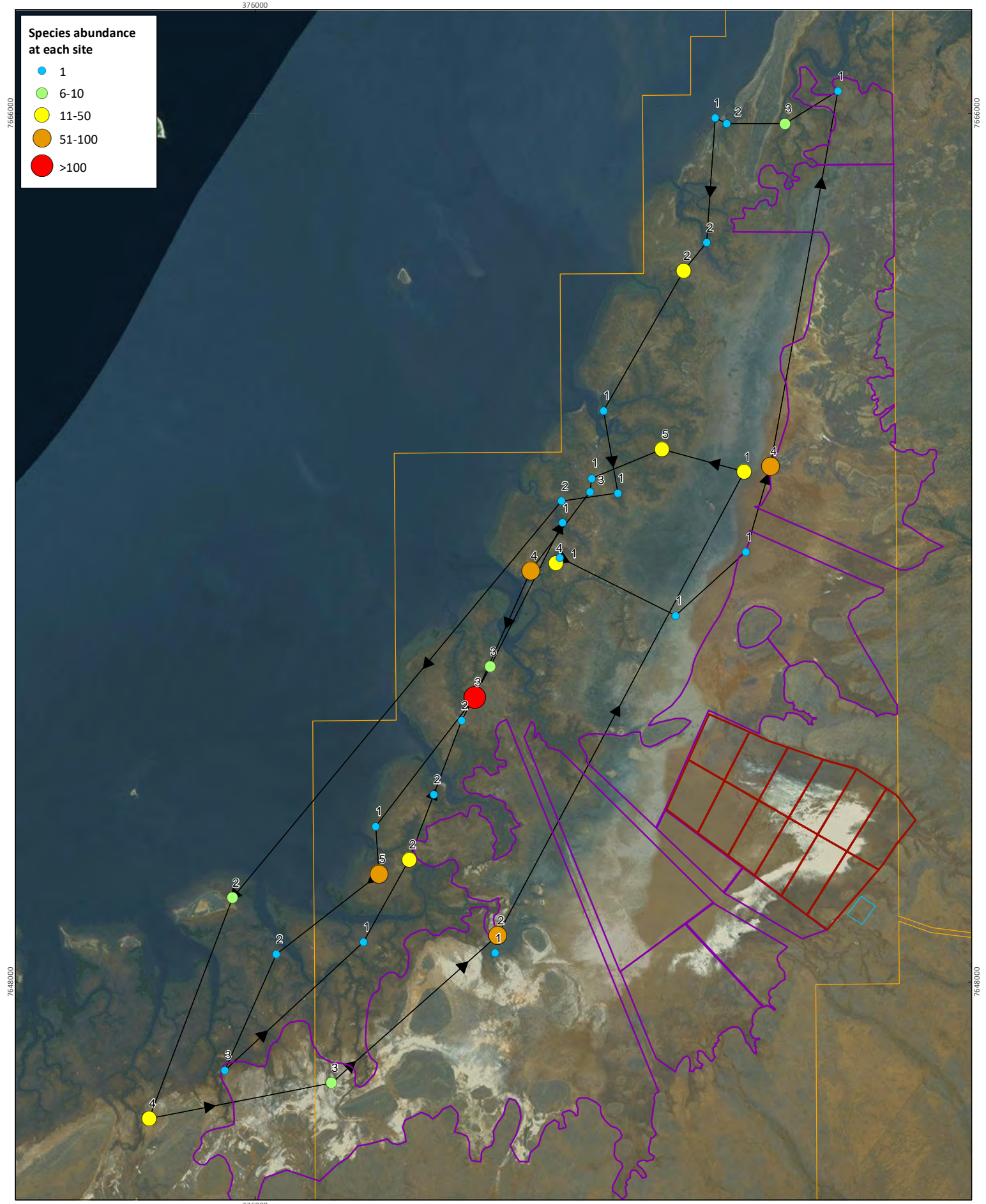
08 9345 1608

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BC Iron Mardie Salt Project

Project No	1181
Date	15-Dec-17
Drawn by	AL
Map author	JC

1:100,000 (at A4) GDA 1994 MGA Zone 50

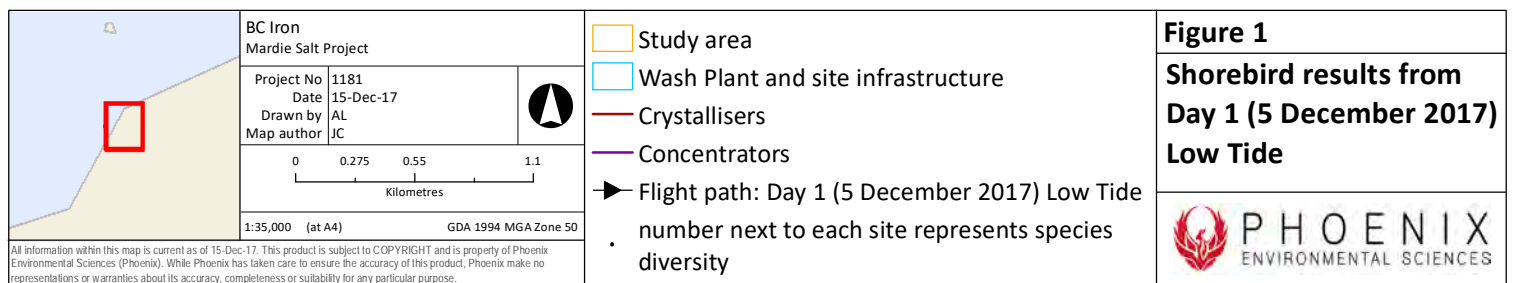
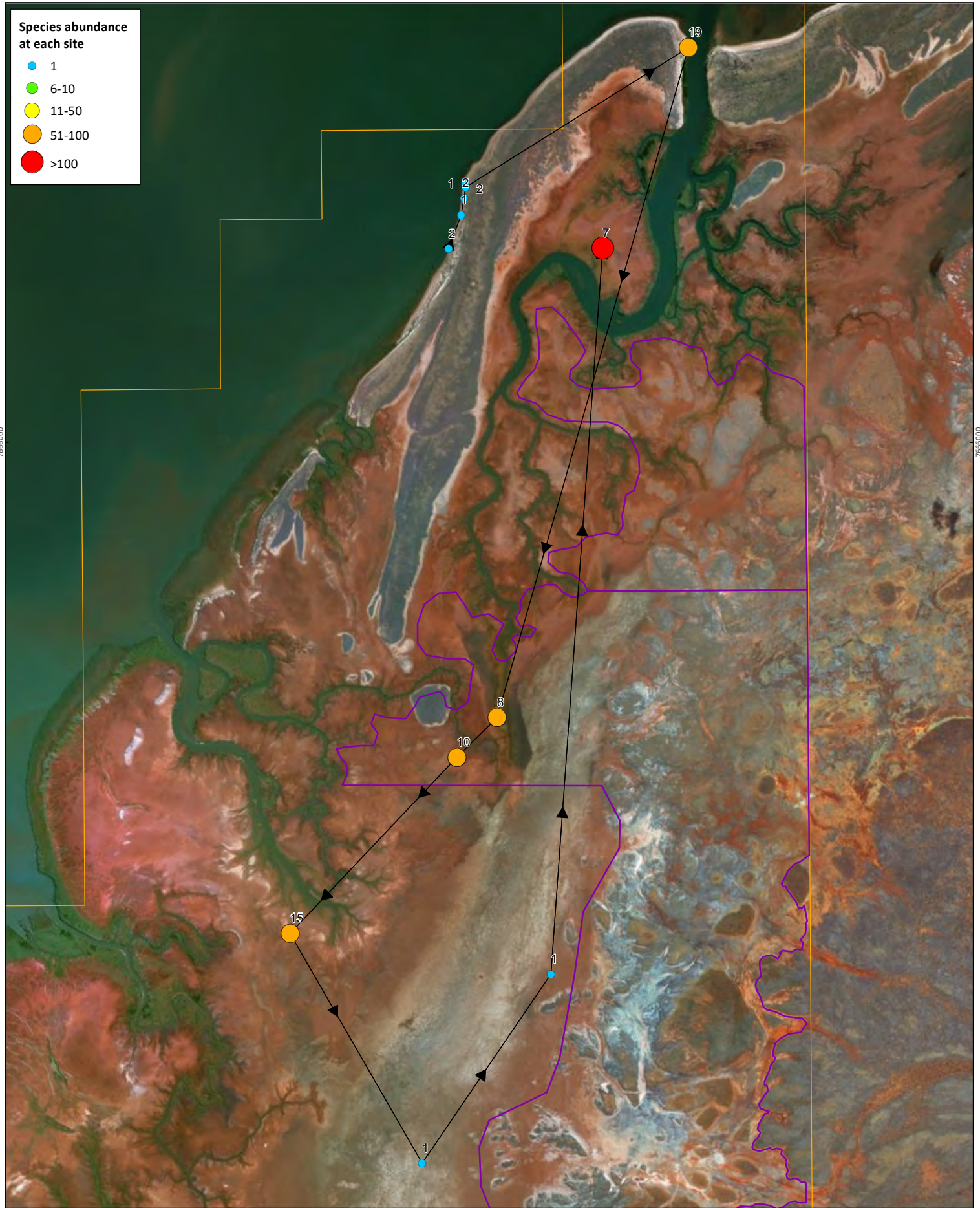
Study area
 Wash Plant and site infrastructure
 Crystallisers
 Concentrators

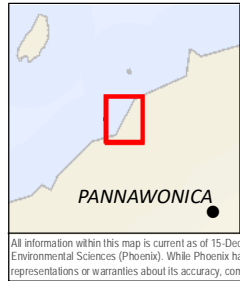
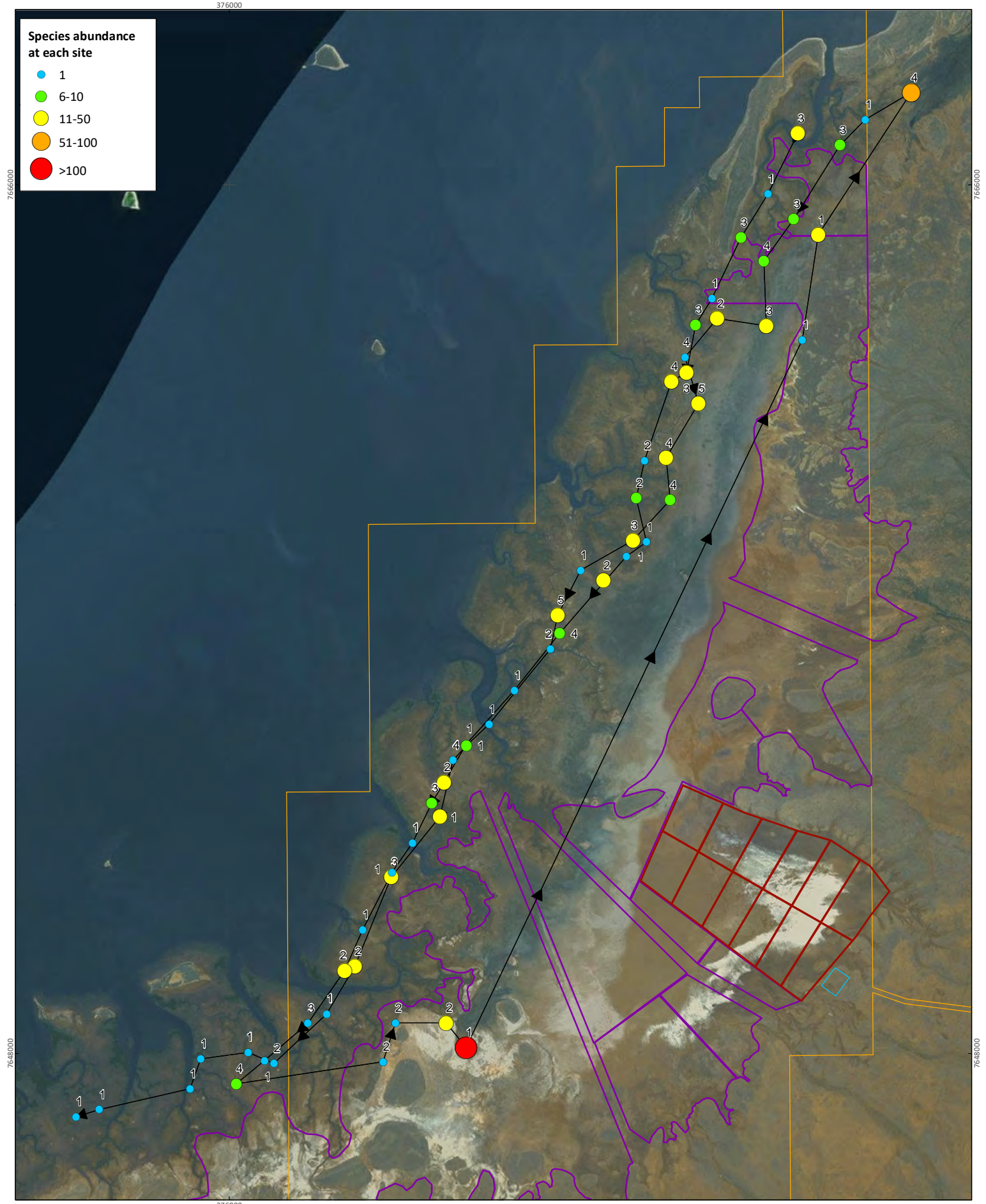
Flight path: Day 1 (5 December 2017) High Tide
 number next to each site represents species diversity

Figure 2

Shorebird results from Day 1 (5 December 2017) High Tide

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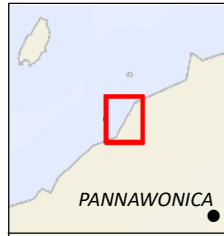
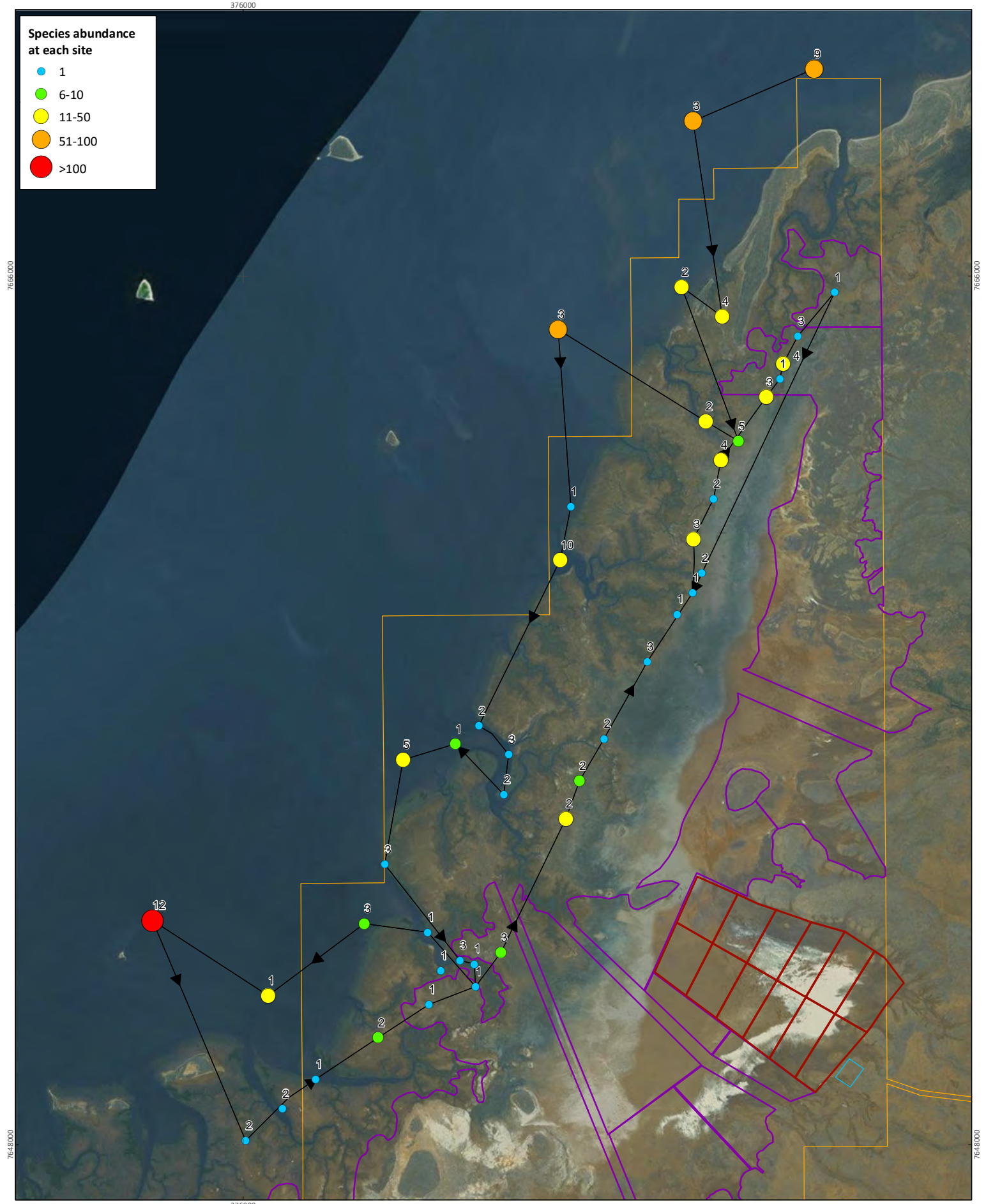




BC Iron Mardie Salt Project		
Project No	1181	 1:100,000 (at A4) GDA 1994 MGA Zone 50
Date	15-Dec-17	
Drawn by	AL	
Map author	JC	

- Study area
- Wash Plant and site infrastructure
- Crystallisers
- Concentrators
- Flight path: Day 2 (6 December 2017) High Tide

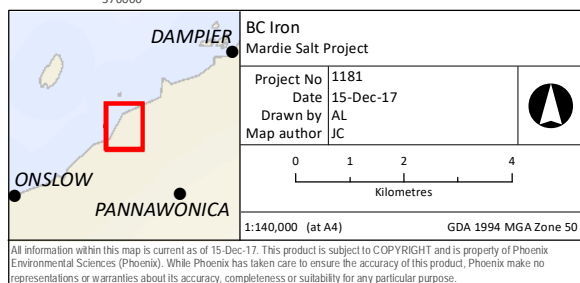
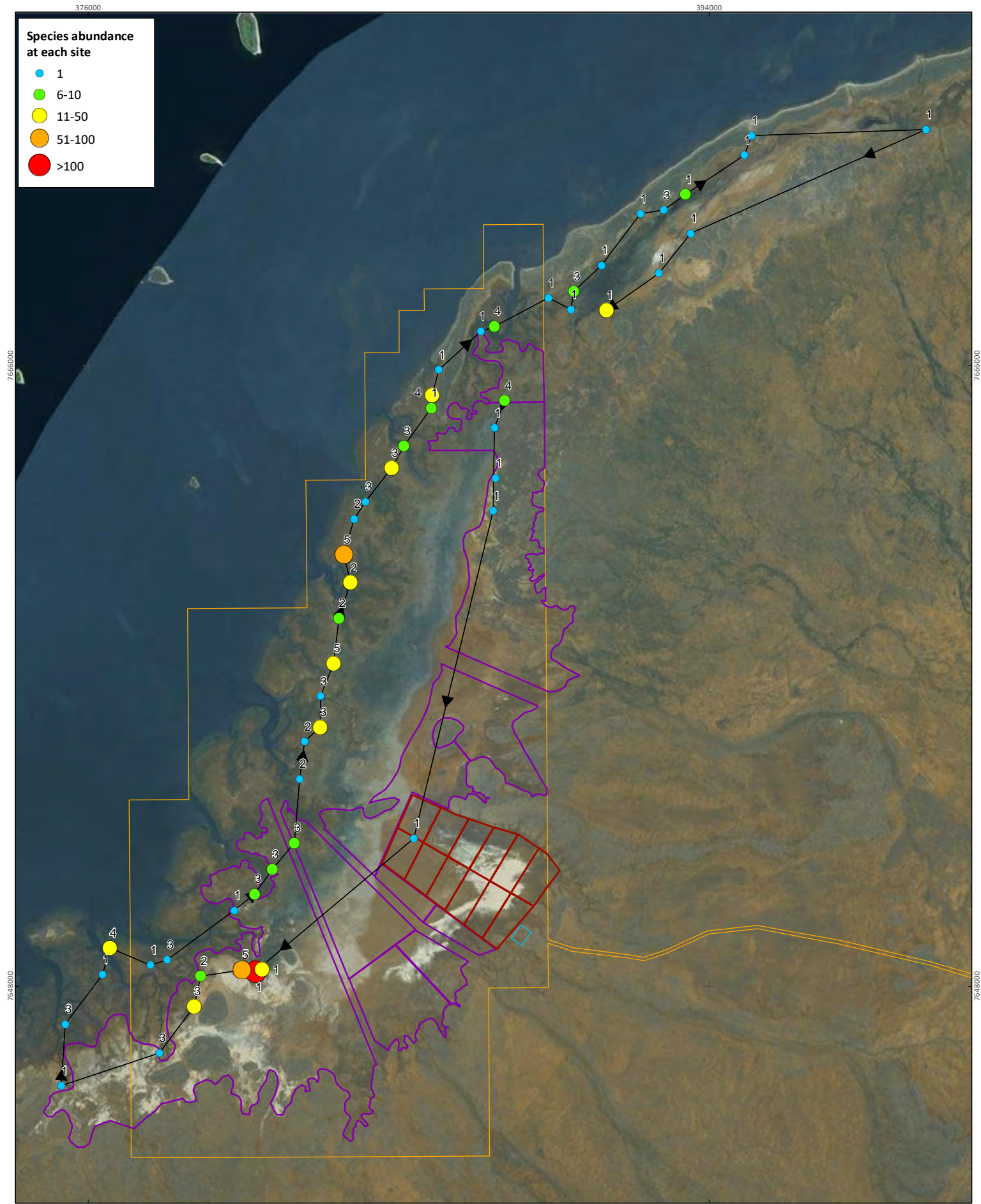
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BC Iron Mardie Salt Project		
Project No	1181	
Date	15-Dec-17	
Drawn by	AL	
Map author	JC	
1:100,000 (at A4)		GDA 1994 MGA Zone 50

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- Study area
- Wash Plant and site infrastructure
- Crystallisers
- Concentrators
- Flight path: Day 3 (6 December 2017) High Tide
- number next to each site represents species diversity

Figure 6
Shorebird results from
Day 3 (7 December 2017)
High Tide

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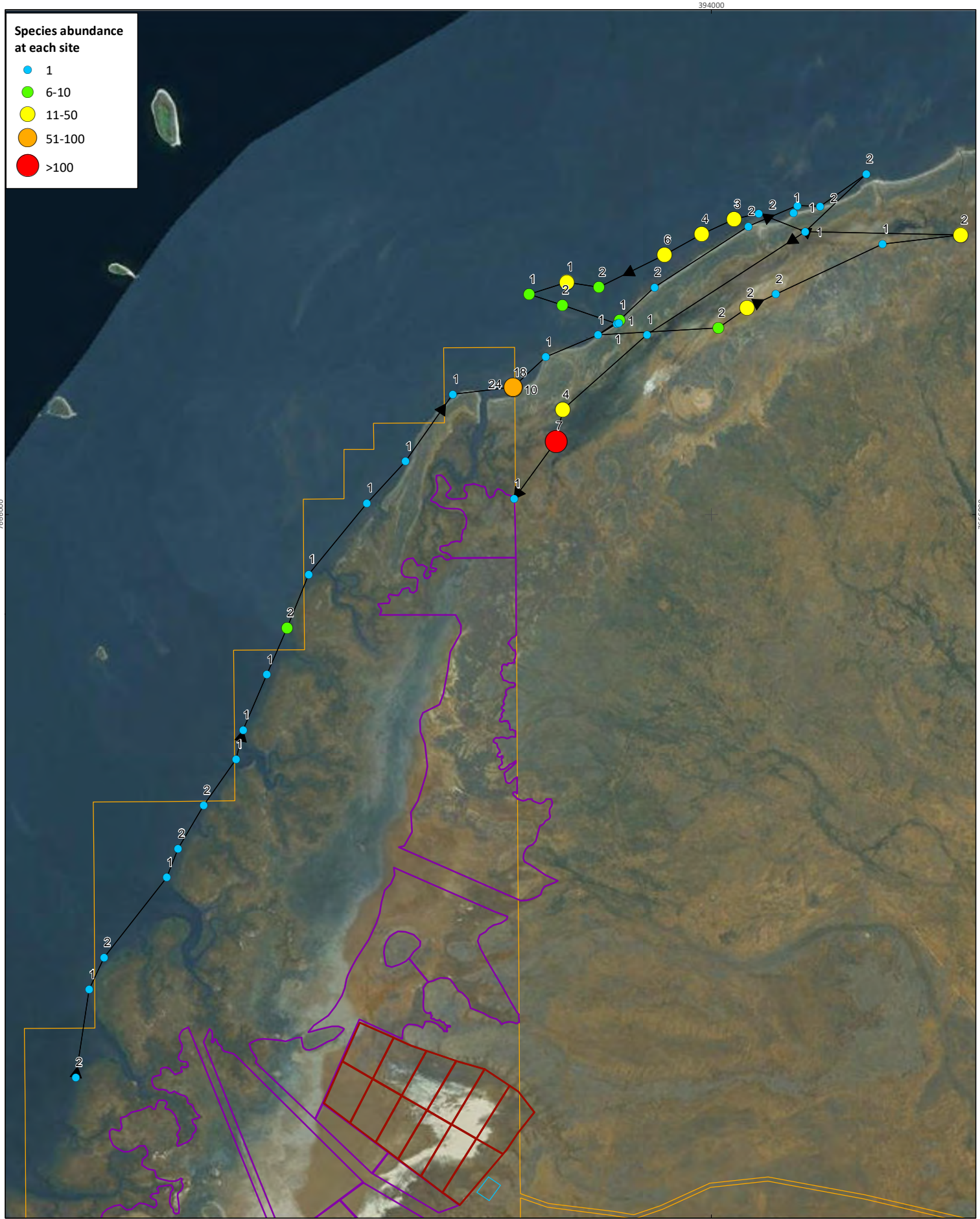


Figure 5
Shorebird results from Day 3 (7 December 2017) Low Tide

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BC Iron Mardie Salt Project

Project No 1181
 Date 15-Dec-17
 Drawn by AL
 Map author JC

Scale: 1:120,000 (at A4)
 GDA 1994 MGA Zone 50

Scale bar: 0, 0.75, 1.5, 3 Kilometres

North arrow

Map title: PANNAWONICA

Map scale: 1:120,000 (at A4)

Map projection: GDA 1994 MGA Zone 50

Map date: 15-Dec-17

Map author: JC

