Part 2: Cay summaries (islands, islets and cays)

Southern reef systems

Central reef systems

Southern Reef Systems

2.1 Cato Island, Cato Reef

Figure 15 Cato Island Jake Sanders © Queensland Government

2.1.1 Drone imagery

25 May 2022:

- Drone – Phantom 4 RTK
- Image capture height 100m. Inclement weather necessitated a fast capture time
- Resolution 2.8cm/px
- Map stitching software – Drone Deploy

2.1.2 Physical description

- Low tide extent 855m x 337m
- Approximate high tide extent 814m x 264m
- Vegetated area 14.8ha

Cato Island, shown in *Figure 15,* is located at 480 km ENE of Gladstone at-23.251 degrees latitude and 155.54 degrees longitude. The cay rises from the shoreline to a central plateau with a depression in the central interior. An automated weather station (AWS), visible in *Figure 15,* is located at the highest point on the island in the northeast. *Figure 16* contains surface elevation profiles of Cato Island.

2.1.3 Vegetation

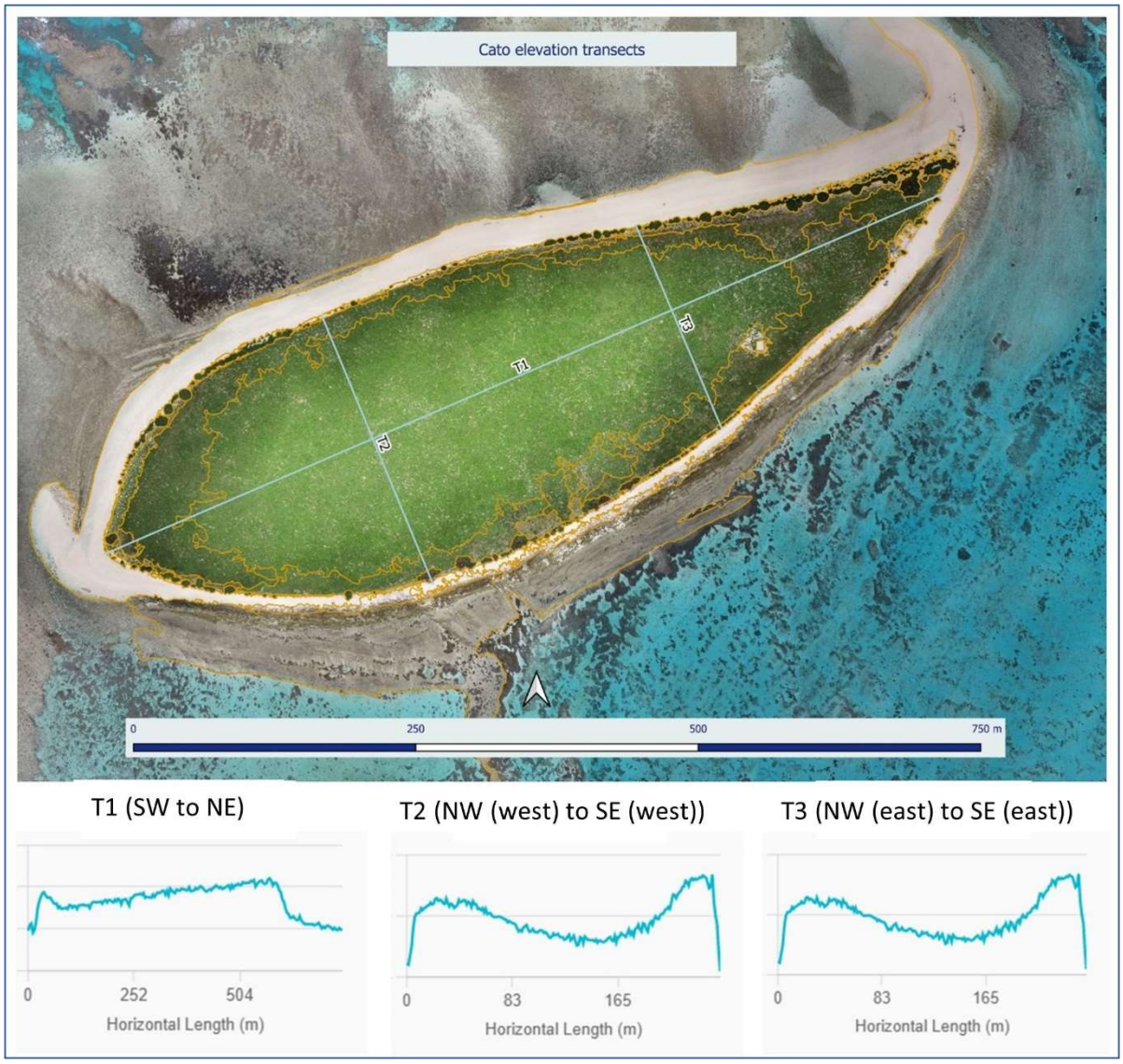


Figure 16 Surface profiles of Cato Island

Note: Maximum height is approximately six metres above sea level (ASL). Vertical heights and scale are not included in surface profile diagrams as accurate vertical datum information was not available.

Survey intensity

Two people each spent 7.6 hours surveying the vegetation of Cato Island. Vegetation data was recorded at 25 ground-truthing sites and two permanently marked BioCondition monitoring sites (M16 and M17). Locations of these sites are shown in *Figure 17*. The yellow lines are the boundaries of the vegetation communities shown on the vegetation map in *Figure 18.*

As a result of extreme weather conditions, the ground truthing survey could not be completed and the traverses and surveyed locations did not include some parts of the island, particularly the northern central section and parts of the southern coastal areas of the cay. Areas without sites (refer to *Figure 17*) give an indication of sections of the cay that were not surveyed. Attributes applied to the vegetation polygons in these areas are based solely on interpretation of the drone imagery. Refer to the shapefile database table for estimated reliability of the vegetation attributes.

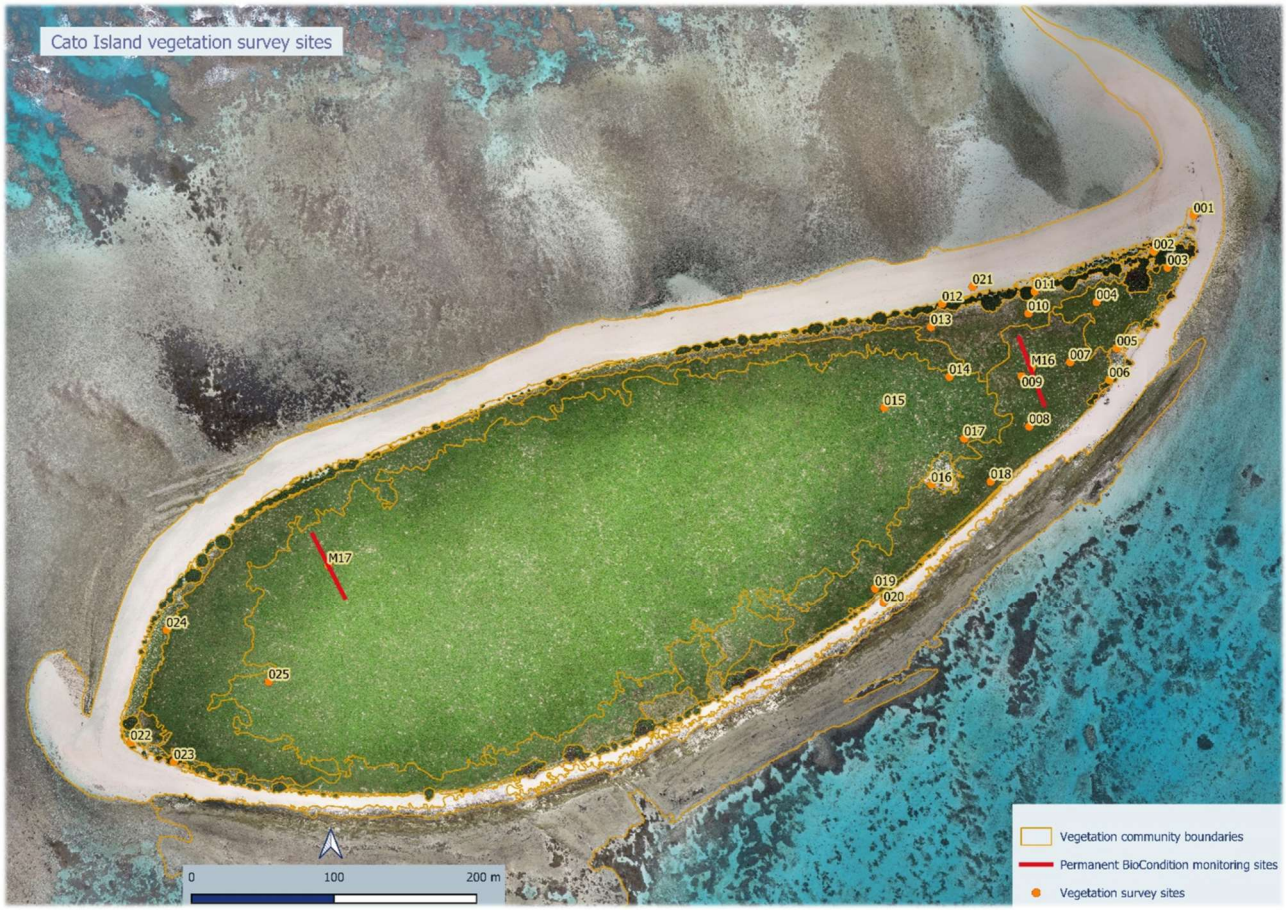


Figure 17 Cato Island showing the number and location of ground-truthing vegetation survey sites and the BioCondition monitoring sites relative to the vegetation map unit boundaries

Vegetation condition

There was some dieback in a number of *Argusia argentea* (octopus bush) shrubs along the eastern and southeastern shorelines (shown in *Photo 11*) and an occasional dead *Argusia argentea* plant was also present in these areas. This is likely due to over wash by waves and/ or salt water incursion in the root zone caused by cyclonic or storm surges.

Otherwise, the vegetation on the cay was in very good condition at the time of the survey.

Photo 11 Minor dieback in *Argusia argentea*
Joy Brushe ©

Floristic data

Seven native cay plant species were recorded on Cato Island. *Argusia argentea* (octopus bush) was the only woody plant species present. The most abundant and widespread species was *Portulaca oleracea* (pig weed). *Lepturus repens* (stalky grass) *and Boerhavia albiflora* var. *albiflora* (tar vine) were also widespread in sites across the cay. *Achyranthes aspera* (chaff flower) was widespread and abundant in the interior of the cay. No weed species were observed.

Plant species recorded during the survey of Cato Island are listed in *Table 1* together with frequency in sites, the averaged cover for each species for sites in which the species was present and their averaged cover over the entire cay. Data for species cover at each site plus occurrence of each species in relation to vegetation community and landform are contained in *Table 3*.

Table 1 Plant Species recorded on Cato Island (25-26/05/2022)

Layer: (G) = ground
Lifeform: G = grass, Ga = annual grass, H = herb, Ha = annual herb, Hp = perennial herb, ST = large shrub/small tree

Scientific Name	Common name	Family	Life form	Presence in sites (% of sites)	Average % cover for each layer (averaged cover only for sites in which species was present	Overall average % cover for each layer- (averaged cover over all sites including 0% covers at sites where species was absent
Achyranthes aspera	chaff flower	Amaranthaceae	Ha	40.7%	17.5% (G)	7.1% (G)
Argusia argentea	octopus bush	Boraginaceae	ST	37.0%	62.1% (S1), 2.5% (G)	16.1% (S1), 0.7% (G)
Boerhavia albiflora var. *albiflora*	tar vine	Nyctaginaceae	Hp	70.4%	9.6% (G)	6.8% (G)
Lepturus repens	stalky grass	Poaceae	G	77.8%	10% (G)	7.8% (G)
Portulaca oleracea	pig weed	Portulaceae	H	92.6%	26.7% (G)	24.7% (G)
Stenotaphrum micranthum	beach buffalo grass	Poaceae	Ga	37.0%	7.5% (G)	2.8% (G)
Tribulus cistoides	bulls head burr	Zygophyllaceae	Hap	63.0%	13.2% (G)	8.3% (G)
Total no of species = 7						

Vegetation communities

Argusia argentea (octopus bush) shrubs formed an interrupted zone around the entire perimeter of the cay.

No *Pisonia grandis* (pisonia) or other tree or shrub communities were present.

The interior vegetation consisted of vegetation communities dominated by forbs, predominantly *Achyranthes aspera* (chaff flower) and *Portulaca oleracea* (pigweed) at the time of the survey.

Flat areas and swales landward of the coastal *Argusia argentea* shrublands consisted of more open grassland or herbland communities variously dominated by *Portulaca oleracea, Boerhavia albiflora* var. *albiflora* (tar vine)*, Stenotaphrum micranthum* (beach buffalo grass) and *Lepturus repens* (stalky grass).

Vegetation communities present on Cato Island in May 2022, the area of each and representative survey sites within each vegetation community are listed in *Table 2*. The spatial distribution and extent of the vegetation communities are shown in the vegetation map in *Figure 18*.

Comparisons with equivalent and similar communities on other Coral Sea cays are shown in *Appendix 3.*

Table 2 Vegetation communities on Cato Island

Veg Map Unit	Summary description	Additional description	Total area (ha)	Sites
Unvegetated areas				
A	sandy shores		4.626	
B	lithified shores		4.192	
C	rubble banks		0.310	
Vegetation of shorelines, beaches and sand spits				
1a	sparse to open grassland or herbland on sandy shores	sparse grassland/ herbland dominated by Lepturus repens and seedlings of *Argusia argentea* on sandy shorelines	0.171	1, 21
1b	sparse herbland on shoreline rubble banks		0.016	
2a	*Argusia argentea* open shrubland to isolated shrubs on shorelines and sand spits		0.117	22
2b	coastline *Argusia argentea* communities	coastline *Argusia argentea* dwarf shrubland/ shrubland to closed shrubland with a very sparse to sparse ground layer typically composed of a mixture of *Lepturus repens, Portulaca oleracea, Stenotaphrum micranthum* and seedlings of *Argusia argentea*	0.533	2, 6, 11, 12, 20, 23
Grasslands				
3a	*Lepturus repens* grassland to closed grassland	*Lepturus repens* grassland/ closed grassland +/- *Achyranthes aspera* +/- *Boerhavia albiflora* var. *albiflora* +/- *Portulaca oleracea*	0.008	
3e	*Lepturus repens/ Portulaca oleracea* grassland	*Lepturus repens/ Portulaca oleracea* open grassland +/- *Argusia argentea* seedlings present	0.067	5
5a	*Stenotaphrum micranthum* open grassland	*Stenotaphrum micranthum* open grassland with *Boerhavia albiflora* var. *albiflora*	0.023	
5b	*Stenotaphrum micranthum* closed grassland	*Stenotaphrum micranthum* closed grassland with *Boerhavia albiflora* var *albiflora* +/- *Achyranthes aspera* +/-*Tribulus cistoides*	0.001	
Herblands				
6a	*Boerhavia albiflora* var. *albiflora/ Portulaca oleracea* herbland	*Boerhavia albiflora* var. *albiflora/ Portulaca oleracea/ Tribulus cistoides* herbland	0.003	?9
6c	*Boerhavia albiflora* var. *albiflora/ Achyranthes aspera/ Portulaca oleracea* open herbland		0.181	16
8	*Achyranthes aspera/Portulaca oleracea/ Boerhavia albiflora* var. *albiflora* herbland to closed herbland	*Achyranthes aspera/ Portulaca oleracea* herbland/ *Boerhavia albiflora var. albiflora* to closed herbland with *Tribulus cistoides* +/- *Lepturus repens*	9.051	14, 15, 17, 25, M17
16a	*Portulaca oleracea* herbland to closed herbland	*Portulaca oleracea* herbland to closed herbland +/- *Achyranthes aspera* +/- *Boerhavia albiflora* var. *albiflora* +/- *Tribulus cistoides*	0.956	3, 4, 10, M16
16b	*Portulaca oleracea/Lepturus repens* closed herbland	*Portulaca oleracea/ Lepturus repens* closed herbland +/- *Boerhavia albiflora* var. *albiflora* +/- *Stenotaphrum micranthum* +/- *Tribulus cistoides*	3.139	7, 8, 18, 19
16c	*Portulaca oleracea/ Stenotaphrum micranthum/ Boerhavia albiflora* var. *albiflora* herbland	*Portulaca oleracea/ Stenotaphrum micranthum/ Boerhavia albiflora* var. *albiflora* herbland +/- *Tribulus cistoides* +/- *Lepturus repens*	0.542	13, 24
Human use – infrastructure				
I	Infrastructure	Automated weather station	0.006	
		Total vegetated area (ha)	23.943	

Note: Areas of sandy shores and rocky shores, particularly those of the rocky shores are only approximate due to the difficulty in determining the location of the boundary between the edge of the shoreline and the surrounding reef flat using the imagery.

The following pages contain photographs and descriptions of all the vegetation communities observed at the time of the May 2022 survey.

Photographs and descriptions of Cato Island vegetation communities

Shoreline, beaches and sand spit vegetation

1a **Sparse to open-grassland or herbland on sandy shorelines**

ground truthing sites: 1 and 21

Photo 12 Veg map unit 1a, Site 1, Cato Is.
Note *Argusia argentea* seedlings
Joy Brushe ©

Vegetation community 1a was present just above the high tide level and was more prevalent along the sandy leeward (northern) shoreline than on the more exposed windward shoreline. Vegetation in this community was dominated by *Lepturus repens* (stalky grass) and seedlings of *Argusia argentea* (octopus bush).

Vegetation in this community is highly dynamic, with plants constantly recruiting and establishing during periods of accretion and low intensity wave action and then disappearing as a consequence of high energy wave action, beach erosion and turtle nesting activity.

1b **sparse herbland on shoreline rubble banks**

No site data or photographs available for this unit

2a ***Argusia argentea* open shrubland to isolated shrubs on shorelines and sand spits**

ground truthing site: 22

Photo 13 Veg map unit 2a, site 22 Cato Is.
Joy Brushe ©

The shrubs in vegetation community 2a were quite low, one metre or lower and partially buried by sand. The sparse ground layer was dominated by *Lepturus repens* (stalky grass) in Site 22. *Argusia argentea* (octopus bush) seedlings were present in this community in most places along the shoreline.

2b **Coastline *Argusia argentea* dwarf shrubland/ shrubland to closed shrubland with a very sparse to sparse ground layer typically composed of a mixture of *Lepturus repens, Portulaca oleracea, Stenotaphrum micranthum* and seedlings of *Argusia argentea***

ground truthing sites: 2, 6, 11, 12, 20, 23

These shrublands were located on low dunes along the shoreline. The height of the shrubs varied from one to 2 metres and many of the shrubs were partially buried by sand.

Photo 14 Veg map unit 2b, Site 2 Cato Is.
Joy Brushe ©

Photo 15 Veg map unit 2b, site 12 Cato Is.
Joy Brushe ©

Grasslands and herblands

3a ***Lepturus repens* grassland/ closed grassland +/- *Achyranthes aspera* +/- *Boerhavia albiflora* var. *albiflora* +/- *Portulaca oleracea***

No site data available for this unit

Photo 16a (above) and b (below) Veg map unit 3a (foregrounds), western end of the Cato Is.
Joy Brushe ©

3e ***Lepturus repens/ Portulaca oleracea*** **open grassland +/-** ***Argusia argentea*** **seedlings**

ground truthing site: Site 5

Photo 17 a (above) and b (below) Veg map unit 3e, Site 5 Cato Is. Joy Brushe ©

This vegetation community was present on flats adjacent to the shoreline. The presence of dead shrub branches indicates that the vegetation in this community is pioneer vegetation re- establishing following death of previous shoreline *Argusia argentea* shrubland by either wave or turtle disturbance.

5a ***Stenotaphrum micranthum*** **open grassland with** ***Boerhavia albiflora*** **var.** ***albiflora***

No photos or site data available for this unit

5b *Stenotaphrum micranthum* closed grassland with *Boerhavia albiflora* var*. albiflora* +/- *Achyranthes aspera* +/-*Tribulus cistoides*

No photos or site data available for this unit

6a *Stenotaphrum micranthum* open grassland with *Boerhavia albiflora* var. *albiflora*
ground truthing site 9:

Photo 18 Veg map unit 6a, Site 9 Cato Is.
Joy Brushe ©

This site was present on a mid-slope. Soil was light brown sand with high organic content.

6c *Boerhavia albiflora* var. *albiflora/ Achyranthes aspera/ Portulaca oleracea* open herbland
ground truthing site 16:

Photo 19 Veg map unit 6c, Site 16 Cato Is.
Joy Brushe ©

This site was present on the crest of the interior plateau. Soil was light brown sand with some organic content and occasional fine coral rubble surface fragments.

8 *Achyranthes aspera/ Portulaca oleracea / Boerhavia albiflora* var. *albiflora* herbland to closed herbland with *Tribulus cistoides* +/- *Lepturus repens*

ground truthing sites: 14, 15, 17, 25 and BioCondition monitoring site M17

Photo 20 Veg map unit 8, Site 15 Cato Is. Joy Brushe ©

Photo 21 Veg map unit 8, Site 14 Cato Is Joy Brushe ©

Vegetation community 8 was by far the most abundant vegetation community on the cay, forming a dense cover over most of the central interior. Soil was typically light brown sand with high organic content.

16a ***Portulaca oleracea herbland to closed herbland +/- Achyranthes aspera +/- Boerhavia albiflora* var. *albiflora +/- Tribulus cistoides***

ground truthing sites: 3, 4, 10 and BioCondition monitoring site M16

Photo 22 Veg map unit 16a, site 3, Cato Is. Joy Brushe ©

This vegetation community was most prevalent on the windward side of the cay on the slopes to the central plateau. Soil was typically light grey-brown sand with some organic content and contained some fine coral fragments.

16b ***Portulaca oleracea/ Lepturus repens* closed herbland *+/- Boerhavia albiflora* var. *albiflora +/- Stenotaphrum micranthum +/- Tribulus cistoides***

ground truthing sites: 7, 8, 18, 19

Photo 23 Veg map unit 16b, Site 7, Cato Is. (AWS) in the background) Joy Brushe ©

Photo 24 Veg map unit 16b, Site 18, Cato Is. Joy Brushe ©

Vegetation community 16b covered large areas of the cay on the slopes to the central plateau. *Tribulus cistoides* was abundant in some places. Soil was typically light brown sand with some organic content.

16c ***Portulaca oleracea/ Stenotaphrum micranthum/ Boerhavia albiflora* var. *albiflora* herbland *+/- Tribulus cistoides +/- Lepturus repens***

ground truthing sites: 13, 24

Photo 25 Veg map unit 16c, Site 13, Cato Is. Joy Brushe ©

Photo 26 Veg map unit 16c, Site 24, Cato Is.
Joy Brushe ©

Vegetation community 16c was located in swales at the base of the slopes to the central plateau adjacent to the coastal communities on the leeward side of the cay. Soil was light coloured sand with some organic content and some coral rubble surface fragments.

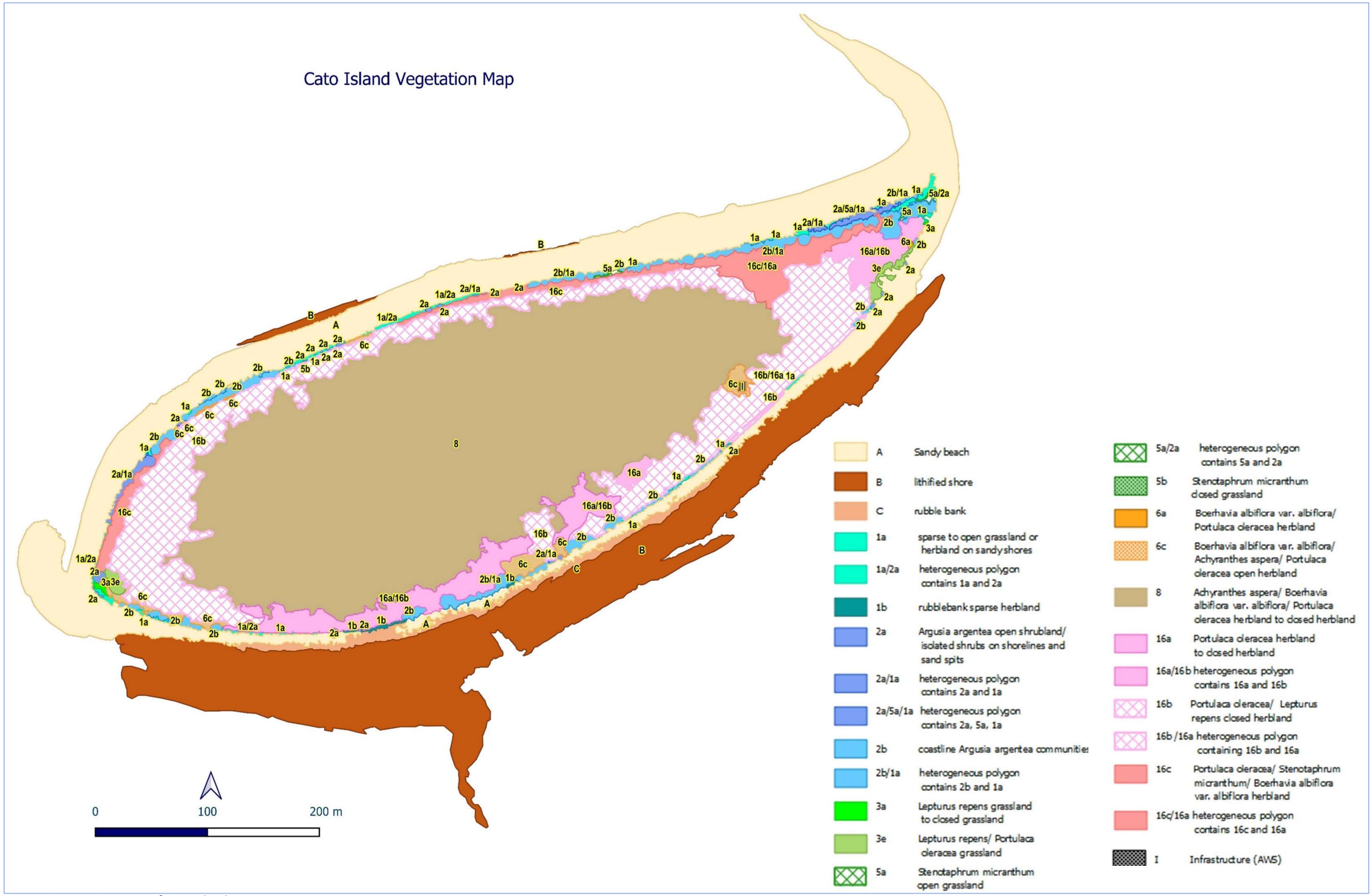


Figure 18 Vegetation map of Cato Island

Table 3 Site data recorded at Cato Island 25-26/05/2022

Datum = WGS 84; green shading = site dominants

											Upper Shrub Layer	Ground Layer															
Site	Lat	Long	Number of photos	Landform	Aspect	Estimated altitude	Soil Description	Total weed cover %	Veg map unit code	Community	Argusia argentea	Achyranthes aspera	Argusia argentea	Boerhavia albiflora var. albiflora	Lepturus repens	Portulaca oleracea	Stenotaphrum micranthum	Tribulus cistoides	Litter	Plant specimens collected	Notes	Birds	Start	Finish	Dominant growth form	Shrub Layer Height	T/S Canopy Crown Cover	Ground FPC
001	-23.248587	155.543548	2	beach	N	0	white sand with occasional medium coral rubble surface fragments	0	1a	sparse grassland dominated by Argusia argentea seedlings and Lepturus repens			trace-5%	trace-5%	trace-5%	trace-5%			trace-5%				12:14:06	12:25:13	grass			very sparse (<10%)
002	-23.248816	155.543296	2	dune		1	white sand with medium coral rubble surface fragments	0	2b	Argusia argentea shrubland with very sparse ground layer dominated by Stenotaphrum micranthum	50-75%				trace-5%	trace-5%	5-25%		5-25%			some red-footed boobies, some frigatebirds, some masked boobies	12:27:59	12:42:56	shrub 1-2m	1	mid-dense (>50-80%)	very sparse (<10%)
003	-23.248916	155.543383	3	flat		1	light coloured sand with fine coral rubble surface fragments	0	16a	Portulaca oleracea closed herbland						75-95%			trace-5%			some masked boobies, occasional brown boobies	12:45:10	12:52:27	forb			dense (>70)
004	-23.249134	155.542935	3	lower slope	N	2	light grey sand with some organic content	0	16a	Portulaca oleracea/ Tribulus cistoides closed herbland					trace-5%	50-75%		25-50%	trace-5%	Tribulus cistoides		large numbers masked boobies	12:57:09	13:03:40	forb			dense (>70)
005	-23.249425	155.543064	3	flat		2	white sand with medium coral rubble surface fragments	0	3e	Lepturus repens/ Portulaca oleracea open herbland; Argusia seedlings present		trace-5%	trace-5%	trace-5%	5-25%	5-25%		trace-5%	trace-5%		Dead Argusia argentea at this site	some masked boobies, some brown boobies	13:07:55	13:18:16	herb			sparse (10-30%)
006	-23.249623	155.543016	2	dune		1	white sand with fine coral rubble surface fragments	0	2b	Argusia argentea shrubland with very sparse ground layer dominated by Portulaca oleracea	50-75%				trace-5%	trace-5%			5-25%		Dead Argusia argentea at this site	large numbers red-footed boobies	13:20:48	13:32:20	shrub 1-2m	1	sparse (20-50%)	very sparse (<10%)
007	-23.249512	155.542768	3	lower slope	NE		light grey-brown sand with high organic content	0	16b	Portulaca oleracea/ Tribulus cistoides/ Lepturus repens closed herbland				5-25%	5-25%	25-50%		25-50%	trace-5%			large numbers masked boobies, some wedgetail shearwater burrows	13:35:59	13:48:30	herb			dense (>70)
008	-23.249917	155.542510	3	mid slope	NE	4	brown sand with high organic content	0	16b	Portulaca oleracea closed herbland				trace-5%	trace-5%	50-75%		5-25%	trace-5%			some masked boobies	13:53:46	14:02:31	forb			dense (>70)
009	-23.249601	155.542464	2	mid slope	N	3	light brown sand with high organic content	0	6a	Boerhavia albiflora var. albiflora/ Portulaca oleracea/ Tribulus cistoides herbland		trace-5%		5-25%	trace-5%	5-25%		5-25%	trace-5%			some masked boobies	14:08:56	14:15:20	forb			mid-dense (>30-70%)
010	-23.249205	155.542505	2	Depress-ion		2	light grey-brown sand with some organic content	0	16a	Portulaca oleracea/ Tribulus cistoides herbland				trace-5%		25-50%	trace-5%	5-25%	trace-5%			some brown noddies, some masked boobies	14:23:25	14:29:00	forb			mid-dense (>30-70%)
011	-23.249068	155.542545	2	dune		1	white sand with occasional fine coral rubble surface fragments	0	2b	Argusia argentea shrubland with very sparse ground layer dominated by Lepturus repens and Portulaca oleracea. Argusia seedlings present	50-75%		trace-5%		5-25%	5-25%	trace-5%		5-25%	Argusia argentea, Portulaca oleracea, Lepturus repens		some red-footed boobies	14:42:01	14:51:44	shrub 1-2m	2	mid-dense (>50-80%)	very sparse (<10%)
012	-23.249144	155.541962	3	dune		1	white sand	0	2b	Argusia argentea closed shrubland with very sparse ground layer dominated by Lepturus repens; Argusia seedlings present	75-95%		trace-5%		trace-5%	trace-5%	trace-5%	trace-5%	trace-5%	5-25%			large numbers red-footed boobies	14:53:56	15:01:52	shrub 1-2m	2	dense (>80%)	very sparse (<10%)
013	-23.249290	155.541890	3	swale		2	light coloured sand with some organic content	0	16c	Portulaca oleracea/ Stenotaphrum micranthum open herbland		trace-5%		trace-5%		5-25%	5-25%	trace-5%	5-25%	Stenotaphrum micranthum		occasional masked boobies	15:04:04	15:11:23	herb			sparse (10-30%)
014	-23.249604	155.542007	3	mid slope	NW	4	light brown sand with high organic content	0	8	Achyranthes aspera/ Portulaca oleracea/ Boerhavia albiflora var. albiflora closed herbland		25-50%		5-25%	trace-5%	25-50%	trace-5%	5-25%	5-25%	Achyranthes aspera Boerhavia albiflora var. albiflora		some masked boobies, occasional brown boobies, occasional brown noddies, abundant wedgetail shearwater burrows	15:13:42	15:21:52	herb			dense (>70)
015	-23.249799	155.541596	3	upper slope	NW	5	light brown sand with high organic content	0	8	Achyranthes aspera/ Boerhavia albiflora var. albiflora/ Portulaca oleracea closed herbland		25-50%		25-50%		25-50%		5-25%	trace-5%			some masked boobies, abundant wedgetail shearwater burrows, occasional brown boobies	15:26:07	15:32:58	forb			dense (>70)

											Upper Shrub Layer	Ground Layer																
Site	Lat	Long	Number of photos	Landform	Aspect	Estimated altitude	Soil Description	Total weed cover %	Veg map unit code	Community	Argusia argentea	Achyranthes aspera	Argusia argentea	Boerhavia albiflora var. albiflora	Lepturus repens	Portulaca oleracea	Stenotaphrum micranthum	Tribulus cistoides	Litter	Plant specimens collected	Notes	Birds	Start	Finish	Dominant growth form	Shrub Layer Height	T/S Canopy Crown Cover	Ground FPC
016	-23.250283	155.541893	3	crest		6	light brown sand with some organic content, occasional fine coral rubble surface fragments	0	6c	Boerhavia albiflora var. albiflora/ Achyranthes aspera/ Portulaca oleracea open herbland		5-25%		5-25%	5-25%	5-25%	trace-5%	5-25%	trace-5%		Disturbed area. Site of Automated Weather Station	occasional brown boobies, occasional masked boobies, abundant wedgetail shearwater burrows	15:45:21	15:54:03	herb			sparse (10-30%)
017	-23.249994	155.542101	3	upper slope	NNE	6	brown sand with high organic content	0	8	Achyranthes aspera/ Portulaca oleracea closed herbland		25-50%		5-25%	5-25%	25-50%		5-25%	5-25%			some brown boobies, some masked boobies, abundant wedgetail shearwater burrows	15:57:42	16:09:35	forb			dense (>70)
018	-23.250264	155.542268	2	mid slope	ESE	5	light brown sand with some organic content	0	16b	Lepturus repens/ Portulaca oleracea closed herbland		trace-5%		trace-5%	25-50%	25-50%		trace-5%	trace-5%			some brown noddies, some masked boobies, some wedgetail shearwater burrows	16:11:42	16:18:05	herb			dense (>70)
019	-23.250938	155.541539	2	mid slope	E	4	light brown sand with some organic content	0	16b	Portulaca oleracea/ Lepturus repens/ Stenotaphrum micranthum closed herbland				trace-5%	25-50%	25-50%	5-25%	trace-5%	5-25%			occasional brown noddies, occasional wedgetail shearwater burrows	16:22:31	16:30:32	grass			dense (>70)
020	-23.251025	155.541593	3	lower slope	E	1	white sand	0	2b	Argusia argentea shrubland with very sparse ground layer dominated by Portulaca oleracea; Argusia seedlings present	50-75%		trace-5%		trace-5%	trace-5%			5-25%				16:31:32	16:37:01	shrub 1-2m	2	mid-dense (>50-80%)	very sparse (<10%)
021	-23.249037	155.542154	3	beach		0	white sand with occasional fine coral rubble surface fragments	0	1a	sparse grassland dominated by Argusia argentea seedlings and Lepturus repens			trace-5%	trace-5%	trace-5%								8:57:24	9:02:11	herb			very sparse (<10%)
022	-23.251916	155.536844	3	dune		1	white sand with coral rubble fragments in soil occasional medium coral rubble surface fragments	0	2a	Argusia argentea dwarf shrubland with sparse ground layer dominated by Lepturus repens; Argusia seedlings present	25-50%		trace-5%	trace-5%	5-25%	trace-5%	trace-5%		trace-5%			occasional red-tailed tropic birds	9:19:07	9:30:36	shrub <1m	1	sparse (20-50%)	sparse (10-30%)
023	-23.252036	155.537117	2	dune		1	white sand	0	2b	Argusia argentea shrubland with very sparse ground layer dominated by Lepturus repens; Argusia seedlings present	50-75%		trace-5%		trace-5%				5-25%			large numbers red-footed boobies	9:33:47	9:46:08	shrub 1-2m	1	mid-dense (>50-80%)	very sparse (<10%)
024	-23.251205	155.537070	3	swale		1	light coloured sand with occasional medium coral rubble surface fragments	0	16c	Portulaca oleracea/ Stenotaphrum micranthum herbland				trace-5%	5-25%	25-50%	5-25%		5-25%			some masked boobies	9:47:16	9:53:23	herb			mid-dense (>30-70%)
025	-23.251531	155.537715	3	mid slope	WSW	4	light brown sand with high organic content	0	8	Achyranthes aspera/ Boerhavia albiflora var. albiflora/ Portulaca oleracea/ Tribulus cistoides closed herbland		5-25%		5-25%	trace-5%	5-25%		5-25%	5-25%			some masked boobies, abundant wedgetail shearwater burrows	9:57:47	10:10:24	forb			dense (>70)
M16	-23.249548	155.542525	10	mid slope	N	3	light brown sand with high organic content	0	16a	Portulaca oleracea herbland		trace-5%		5-25%	trace-5%	25-50%		5-25%	5-25%			shearwater burrows present, some masked boobies	11:00:00	12:00:00	forb			mid-dense (>30-70%)
M17	-23.250792	155.538091	10				light brown sand with high organic content	0	8	Achyranthes aspera/ Portulaca oleracea/ Boerhavia albiflora var. albiflora closed herbland		25-50%		5-25%		5-25%		5-25%	5-25%			abundant shearwater burrows	12:20:00	13:00:00	forb			dense (>70)

Comparison with previous vegetation surveys

In 1979, Heatwole described the vegetation of Cato Island as “covered with coarse tufted grass and creeping plants which are in parts 3 to 4 feet high, affording cover to numerous birds”. The Australian Pilot (in Heatwole, 1979) noted that in 1902 there appeared to be little or no vegetation on the island and that wells sunk on the island failed to find any fresh water.

According to Stokes and McNamara (1979) there was only one young plant of *Argusia argentea* (octopus bush), named *Messerschmidia argentea* at that time, on Cato Island. The location of this plant is shown in *Figure 19*. Shaughnessy and Hill (1983) also noted that, “The solitary bush of *Argusia argentea* on Cato Island was very stunted (about 30cm high). It covered an area of about two square metres.” Since 1983, large numbers of *Argusia argentea* have established and have formed shrubland communities growing around most of the shoreline These can be seen in the 2022 drone images in *Figure 15, Figure 16 and Figure 17* and the vegetation community photos in the previous section. Current recruitment of this species was evident in the large numbers of *Argusia argentea* seedlings present in vegetation community 1a along the shoreline at the time of the 2022 survey.

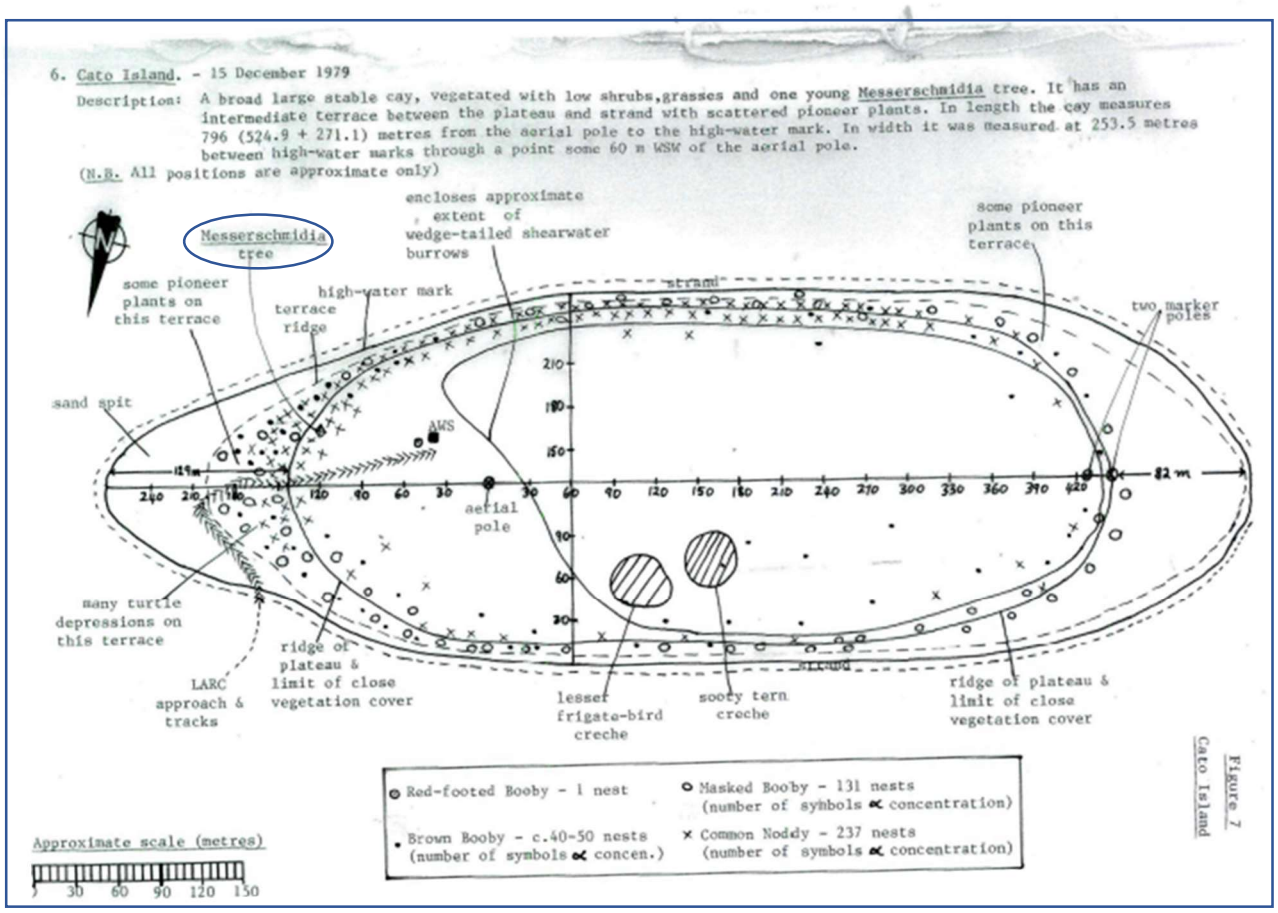


Figure 19 Vegetation, bird and marine turtle data recorded on Cato Island in 1979 (source Stokes and McNamara, 1979) – note the location of the single young Argusia argentea plant adjacent to the eastern shoreline (circled)

Shaughnessy and Hill (1983) noted that. “The grass, *Lepturus repens* was common and dominant everywhere”. They recorded and collected 7 species on Cato Island in 1983. These species were confirmed by the National Herbarium in Canberra as *Argusia argentea, Achyranthes aspera* (chaff flower), *Boerhavia albiflora* (tar vine), *Portulaca oleracea* (pig weed), *Tribulus cistoides, Lepturus repens* (stalky grass) and *Stenotaphrum micranthum* (beach buffalo grass). These species were the same as those recorded during the 2022 survey.

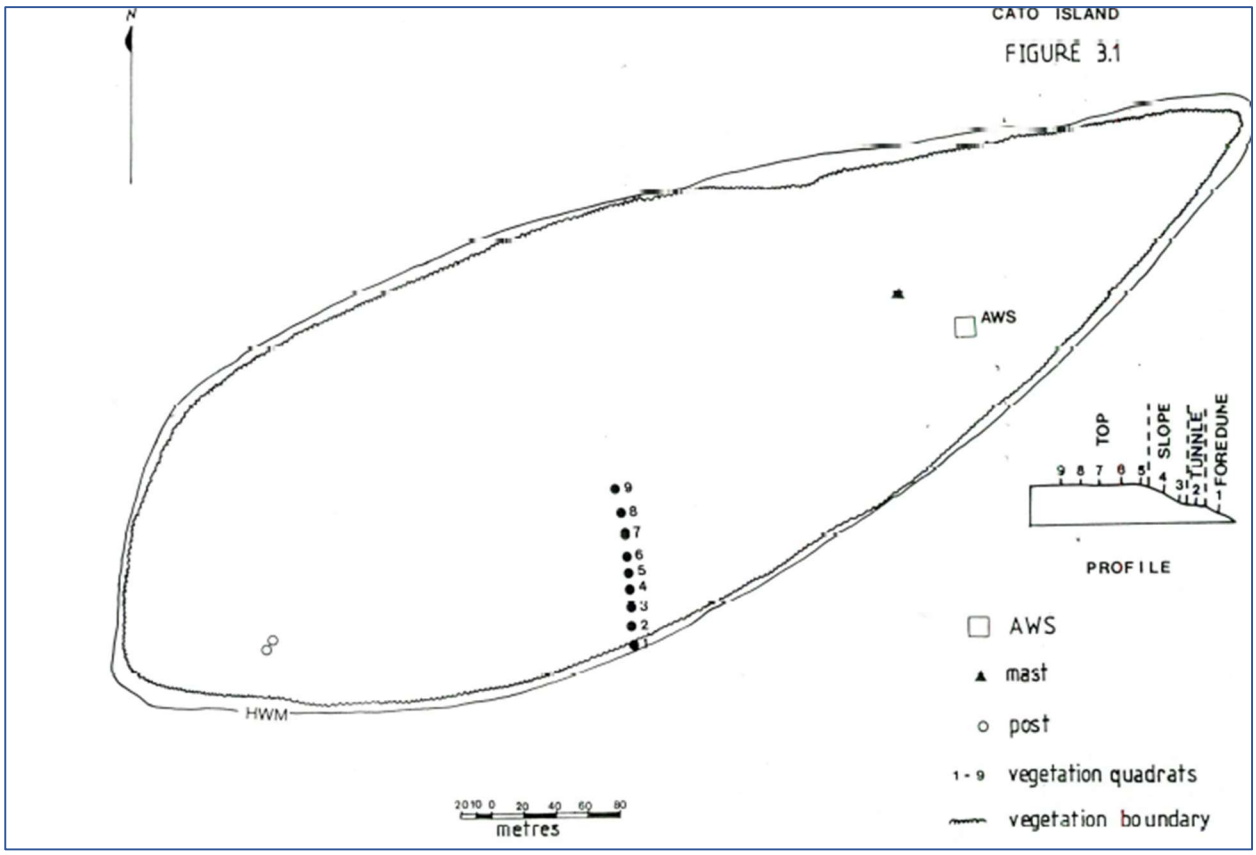


Figure 20 Map showing location of 1983 vegetation transects (Hill, 1984)

Shaughnessy and Hill recorded the average percentage cover of all plant species in nine quadrats across the cay. The average percentage covers and the number of quadrats in which the species was recorded for these species were:

Argusia argentea	0% (0)
Achyranthes aspera	0% (0)
Boerhavia albiflora	10% (8)
Portulaca oleracea	1% (1)
Tribulus cistoides	7% (3)
Lepturus repens	45% (8)
Stenotaphrum micranthum	6% (2)

The location of the 9 quadrats is shown in *Figure 20*. As Shaughnessy and Hill noted in their report, nine quadrats would not be a statistically valid sample. Although data was recorded from a larger number of sites (25 sites) during the 2022 survey these sites did not include some large sections of the island, so the cover data in *Table 1* may also not accurately represent the average covers of individual species across the entire island. So, although it appears that there have been considerable increases in the covers of *Argusia argentea, Achyranthes aspera* (chaff flower) and *Portulaca oleracea* (pigweed) and a considerable decrease in the cover of *Lepturus repens* (stalky grass) since 1989, these observations cannot be conclusive.

BioCondition monitoring site data

Two permanently marked BioCondition monitoring sites (M16 and M17) were established and surveyed on Cato Island. The location of the centre transect of these sites are shown as the red lines in *Figure 17*. *Table 4* and *Table 5* contain the data recorded at these sites. The photographs included with the BioCondition attribute data are four of the 10 site photographs taken at each of these sites. Photographs shown are all taken from the centre point of the centre transect, the first facing along the transect bearing and then consecutively facing 90°, 180^0 and 270^0 from the direction of the centre transect bearing.

BioCondition attributes

Table 4. BioCondition attribute data recorded in monitoring site M16, Cato Island on 26 May 2022

Site M16	
Cay	Cato Island
Vegetation community description	*Portulaca oleracea* herbland
Transect start (WGS 84)	-23.249362 155.542444
Transect Centre (WGS84)	-23.249548 155.542525
Transect end (WGS 84)	-23.249778 155.542601
Transect bearing (degrees)	153
Median canopy height/range (metres)	0.25/0.05-0.3
Tree canopy cover %	n/a
Shrub canopy cover %	n/a
Basal area m^2/ha (at 30 cm height, calculated	n/a
Total number of large trees/ha	0
Total no of trees per ha	n/a
Total number of tree stems/ha	n/a
Total no. shrubs/ha	0
Total no. shrub stems/ha	n/a
Large shrubs – mean diameter at 30 cm height	n/a
Recruitment of ecologically dominant layer (%)	n/a
Tree species richness	0
Tree species present	n/a
Shrub species richness	0
Shrub species present (layer in brackets)	n/a
Median ground layer height/range (metres)	0.25/0.05-0.3
Total ground layer cover of native cay species	61.2%
Grass species richness	1
Grass cover (%)	3.6%
Grass species present in order of decreasing	*Lepturus repens* (3.6%)
Forb (including vines) species richness	4
Forb species cover (%)	57.6%
Forb species present in order of decreasing cover – most abundant first (cover in brackets)	*Portulaca oleracea* (36.6%), *Tribulus cistoides* (11.8%), *Boerhavia albiflora* var. *albiflora* (9.2%), *Achyranthes aspera* (<0.1%)
Native shrub ground cover (%)	0%
Non-native plant cover (all strata) (%)	0%
Litter cover (%)	5.4%
Bare ground (%)	33.4%
Woody debris (m/ha of Logs >0.5m long and	0
Soil pH	8.54 (average for 0-30cm depths)

Photo 27
Monitoring site M16, Cato Island facing SSE

Photo 28
Monitoring site M16, Cato Island facing WSW

Photo 29
Monitoring site M16, Cato Island facing NNW

Photo 30
Monitoring site M16, Cato Island facing ENE

Joy Brushe ©

Table 5 BioCondition attribute data recorded in monitoring site M17, Cato Island on 26 May 2022

Site M17	
Cay	Cato Island
Vegetation community description	closed herbland dominated by *Achyranthes aspera*, *Portulaca oleracea* and *Boerhavia albiflora* var. *albiflora*
Transect start (WGS 84)	-23.250598 155.53799
Transect Centre (WGS84)	-23.250792 155.538091
Transect end (WGS 84)	-23.250997 155.538193
Transect bearing (degrees)	153
Median canopy height/range (metres)	0.25/0.15-0.4
Tree canopy cover %	n/a
Shrub canopy cover %	n/a
Basal area m^2/ha (at 30 cm height, calculated from stem diameters)	n/a
Total number of large trees/ha	0
Total no of trees per ha	n/a
Total number of tree stems/ha	n/a
Total no. shrubs/ha	0
Total no. shrub stems/ha	n/a
Large shrubs – mean diameter at 30 cm height	n/a
Recruitment of ecologically dominant layer (%)	n/a
Tree species richness	0
Tree species present	n/a
Shrub species richness	0
Shrub species present (layer in brackets)	n/a
Median ground layer height/range (metres)	0.25/0.15-0.4
Total ground layer cover of native cay species (%)	78.6%
Grass species richness	2
Grass cover (%)	0.4%
Grass species present in order of decreasing cover – most abundant first (cover in brackets)	*Lepturus repens* (0.2%), *Stenotaphrum micranthum* (0.2%)
Forb (including vines) species richness	4
Forb species cover (%)	78.2%
Forb species present in order of decreasing cover – most abundant first (cover in brackets)	*Achyranthes aspera* (35%), *Portulaca oleracea* (24.4%), *Boerhavia albiflora* var. *albiflora* (13%), *Tribulus cistoides* (5.8%)
Native shrub ground cover (%)	0%
Non-native plant cover (all strata) (%)	0%
Litter cover (%)	5%
Bare ground (%)	16.4%
Woody debris (m/ha of logs >0.5m long and >10cm wide)	0
Soil pH	8.22 (average for 0-30cm depths)

Photo 31
Monitoring site
M17, Cato Island
facing SSE

Photo 32
Monitoring site
M17, Cato Island
facing WSW

Photo 33
Monitoring site
M17, Cato Island
facing NNW

Photo 34
Monitoring site
M17, Cato Island
facing ENE

Joy Brushe ©

Soil data

Soil samples were collected from BioCondition monitoring sites M16 and M17 on Cato Island.

Refer to *Appendix 5* for results of all the soil analyses for M16 and M17 and the other sites sampled during the 2022 voyage. For comparison of M16 and M17 soil analysis data with data from previous Coral Sea and Southern GBR soil surveys, refer to the Soils section under the *Methodologies, general results and discussion* in this report.

Total sulphur levels at all 2022 sample sites were high – Refer to *Figure 13* and explanatory text in the Soils section under *Methodologies, general results and discussion* in this report.

M16

Organic carbon levels at M16 were higher and total sodium levels were slightly higher than at all other locations previously sampled.

Total potassium levels were higher than in the interior herblands of the Willis islets, Diamond Islets, Lihou Reef cays and Bird Islet.

Other interior herbland locations had slightly higher aluminium levels than soils at M16 (except for the grey water outlet site on South Islet (Willis Islets) which had much higher total aluminium than all the other interior herbland locations.

pH, electrical conductivity, total nitrogen, total carbon, total and Colwell phosphorus, total calcium, exchangeable potassium, total and exchangeable magnesium and exchangeable sodium levels were similar to those of other Interior herbland locations.

Exchangeable calcium, cation exchange capacity and levels of all the trace elements (copper, iron, manganese and zinc) were similar to other Interior herbland locations except for the grey water outlet site on South Islet (Willis Islets) sites which had higher exchangeable calcium, cation exchange capacity and considerably higher levels of all trace elements (particularly iron) than all the other locations.

M17

Total phosphorus and all trace elements (copper, iron, manganese and zinc) levels were higher and electrical conductivity levels were slightly higher than at all other interior herbland locations except for the grey water outlet site on South Islet (Willis Islets) which had much higher trace element levels (particularly iron) than all other interior herbland locations.

Colwell phosphorus and total potassium levels were higher than soils on all other internal herblands except for the interior herbland site on Bird Islet (M19).

Organic carbon levels were higher than those in herbland sites on the Willis Islets, Diamond Islets and Lihou Reef cays.

Total sodium levels were slightly higher than those in most interior herbland locations. Exchangeable sodium levels were higher than in most interior herbland locations except for the averaged interior herbland sites on the Coringa Herald cays and the grey water outlet site on South Islet (Willis Islets) both of which had only slightly higher levels.

Exchangeable calcium and cation exchange capacity had similar levels to other sites except for the grey water outlet site on South Islet (Willis Islets) which had higher exchangeable calcium and cation exchange capacity than all the other interior herbland locations.

Total and exchangeable magnesium levels were lower than those in other interior herbland locations.

pH, electrical conductivity, total nitrogen, total carbon, total calcium levels were similar to those of other interior herbland locations except for the North Cay (Willis Islets) site which had a much higher pH than the other interior herbland locations.

Exchangeable calcium, exchangeable potassium levels , cation exchange capacity levels and total aluminium levels were similar to those of other interior herbland locations except for the Coringa Herald cays which had higher average exchangeable potassium than the other interior herbland locations and the grey water outlet site on South Islet (Willis Islets) which had higher exchangeable calcium, higher cation exchange capacity and much higher aluminium levels than all the other interior herbland locations.

2.1.4 Birds

Table 6 Bird species and their breeding status – Cato Island

Cato Island	25/05/2022	Breeding stages present				
common name	**scientific name**	Nests	Chicks	Young	Breeding pairs	Adolescents and adults
red-tailed tropicbird	*Phaethon rubricauda roseotinctus*	0	0	0	0	0
Herald petrel	*Pterodroma heraldica*	0	0	0	0	0
wedge-tailed shearwater	*Ardenna pacifica*	0	0	<10	<10	0
great frigatebird	*Fregata minor*	25		2	27	28
lesser frigatebird	*Fregata ariel*	408		103	511	474
masked booby	*Sula dactylatra dactylatra*	239		1	240	1003
brown booby	*Sula leucogaster*	327	19	47	393	373
red-footed booby	*Sula sula*	388			388	526
sooty tern	*Onychoprion fuscatus*	0	0	0	0	>8750
bridled tern	*Onychoprion anaethetus*	0	0	0	0	0
crested tern	*Thalasseus bergii*	0	0	0	0	13
roseate tern	*Thalasseus bengalensis*	0	0	0	0	0
black-naped tern	*Sterna sumatrana*	0	0	0	0	0
New Caledonian fairy tern	*Sternula nereis exsul*	0	0	0	0	0
black noddy	*Anous minutus*	0	0	0	0	0
brown noddy	*Anous stolidus*	P	0	0	P	P
buff-banded rail	*Gallirallus philippensis tounelieri*	0	0	≥1	≥1	P
purple swamphen	*Porphyrio melanotus*	0	0	0	0	0
sacred kingfisher	*Todiramphus sanctus*	0	0	0	0	2
white-faced heron	*Egretta novaehollandiae*	0	0	0	0	1
Pacific golden plover	*Pluvialis fulva*	0	0	0	0	13
ruddy turnstone	*Arenaria interpres*	0	0	0	0	7
wandering tattler	*Tringa incana*	0	0	0	0	1
grey-tailed tattler	*Tringa brevipes*	0	0	0	0	0
lesser sand plover	*Charadrius mongolus*	0	0	0	0	0

Notes

- Drone footage was required to complete the lesser frigatebird breeding count. Accurate ground counts were hindered by thick vegetation.
- The majority of brown noddies were adolescents and adults. Some adults were nest building while others had nests with eggs on the southern edge of the cay.
- Two female great frigatebirds with red orbital rings were observed. One on a nest. Most female great frigatebirds in the Pacific Ocean have blue orbital rings. These birds could be from Indian Ocean colonies.
- A small number of fledged wedge-tailed shearwaters were at burrow entrances. Most had perished. These are the last of the birds from the previous breeding event.
- No nesting sooty terns were observed. Adult numbers increased dramatically from midday. The adult numbers shown in the table were an estimation with more arriving after the survey.

- Two sacred kingfishers were observed. This species is common on islands in the Great Barrier Reef, but less so on the remote Coral Sea cays.
- A freshly deceased (probably the morning of the survey) white-faced heron was recorded. Hermit crabs would be on the carcass if the bird had died the previous day.

Photo 35 Last of the fledged wedge-tailed shearwaters Collette Bagnato © Queensland Government

Photo 36 Deceased white-faced heron Collette Bagnato © Queensland Government

Photo 37 Masked booby colony on the island and incoming sooty terns
Collette Bagnato © Queensland Government

Photo 38 Drone imagery showing part of the lesser frigatebird colony
Jake Sanders © Queensland Government

2.1.5 Pest and invertebrate sampling

(Refer to Health Check section for map)

25-26 May 2022

Table 7 Rodents, Cato Island

Collection period	Sampling methods	Sampling sites	Species
overnight	baited tunnel traps/ink pads	11	0

Rodent sampling was spread across Cato Island and included several vegetation types, island infrastructure and typical island landing/access areas. Hermit crabs *Coenobita* sp. were collected at several trap sites. No evidence of rodents was observed.

Table 8 Invertebrates, Cato Island

Collection period	Sampling methods	baited sites	Species
daylight search	Bait station and ground search	24	See below

Order	Family	Spp ID	Common name
Hymenoptera	Formicidae	*Pheidole megacephala*	African big-headed ant
Ixodida	Argasidae	*Ornithodoros capensis*	Argasid tick

Multiple specimens of a single species of ant, *Pheidole megacephala,* were collected at 13 of the 24 collection sites. This exotic species has been associated with ecosystem changing events on islands in the Great Barrier Reef Marine Park, notably the *Pisonia grandis* forest at Tryon Island in the Capricornia Cays (Olds, 2018). The species has been recorded on Willis Island (Olds et al., 2020) and on many other islands within the Great Barrier Reef Marine Park, including islands with *Pisonia* forest. Not all islands have shown adverse impacts at this point. It is however an introduced species and further consideration to its actual threat at Cato Island warrants further discussion.

The Argasid tick is a widespread species associated with seabirds. There is no concern around its presence at Cato Island.

2.1.6 Health Checks and Island Watch

Ten Health Checks (HC) assessed the condition of vegetation communities across Cato Island. *Table 10* summarises vegetation communities at each site.

The overall condition class of the island's vegetation communities was **Good** (the highest rating, see Table 9 Assessed condition class for each HC site *Table 9*). Detailed criteria for each HC site are included in *Appendix 8*.

Table 9 Assessed condition class for each HC site

	Cato Island, Cato Reef			
HC Site	Overall condition class			
HC01	Good	Good with concern	Significant concern	Critical
HC02	Good	Good with concern	Significant concern	Critical
HC03	Good	Good with concern	Significant concern	Critical
HC04	Good	Good with concern	Significant concern	Critical
HC05	Good	Good with concern	Significant concern	Critical
HC06	Good	Good with concern	Significant concern	Critical
HC07	Good	Good with concern	Significant concern	Critical
HC08	Good	Good with concern	Significant concern	Critical
HC09	Good	Good with concern	Significant concern	Critical
HC10	Good	Good with concern	Significant concern	Critical

Table 10 Summary of vegetation communities around each HC site (reference with *Table 2* and *Figure 21*)

HC Site	Ecosystems/vegetation communities				
HC01	1a	2b	5a	6a	
HC02	16a	16b	16c		
HC03	2b	6c	16b		
HC04	2a	3a	3e	6c	16b
HC05	1a	1b	2b	16a	16b
HC06	8				
HC07	2b	16b	16c	8	
HC08	16a	16b			
HC09	8				
HC10	15a	16b	16c		

Some dieback was noted in *Argusia argentea* communities, but this was not considered unusual. Probably the result of natural weather or biological conditions (bushes heavily used by roosting birds often display some sort of defoliation or dieback).

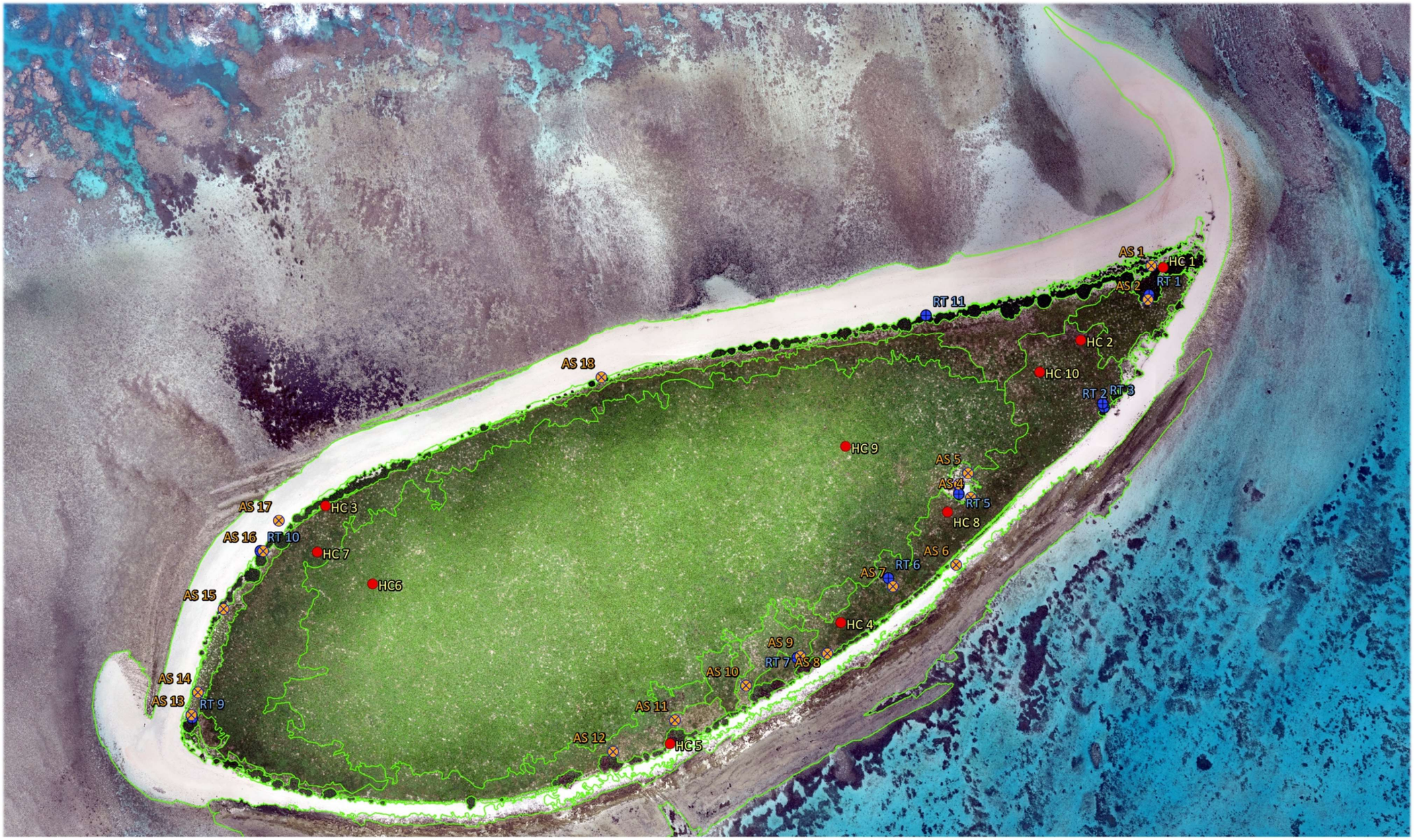
Island Watch

A summarised table of all Island Watch information gathered throughout the trip can be found at *Appendix 9.*

The full series of HC photos will be provided to PAD. Examples are provided below.

Photo 39 HC01 South

Photo 40 HC06 East



Cato Island, Cato Reef

Area: 14.8 ha (area above HAT)

- Vegetation communities
- Health check
- Rodent tunnel
- Ant bait station

Figure 21 Cato Island Health Check and pest station sites

2.2 West Islet, Wreck Reefs

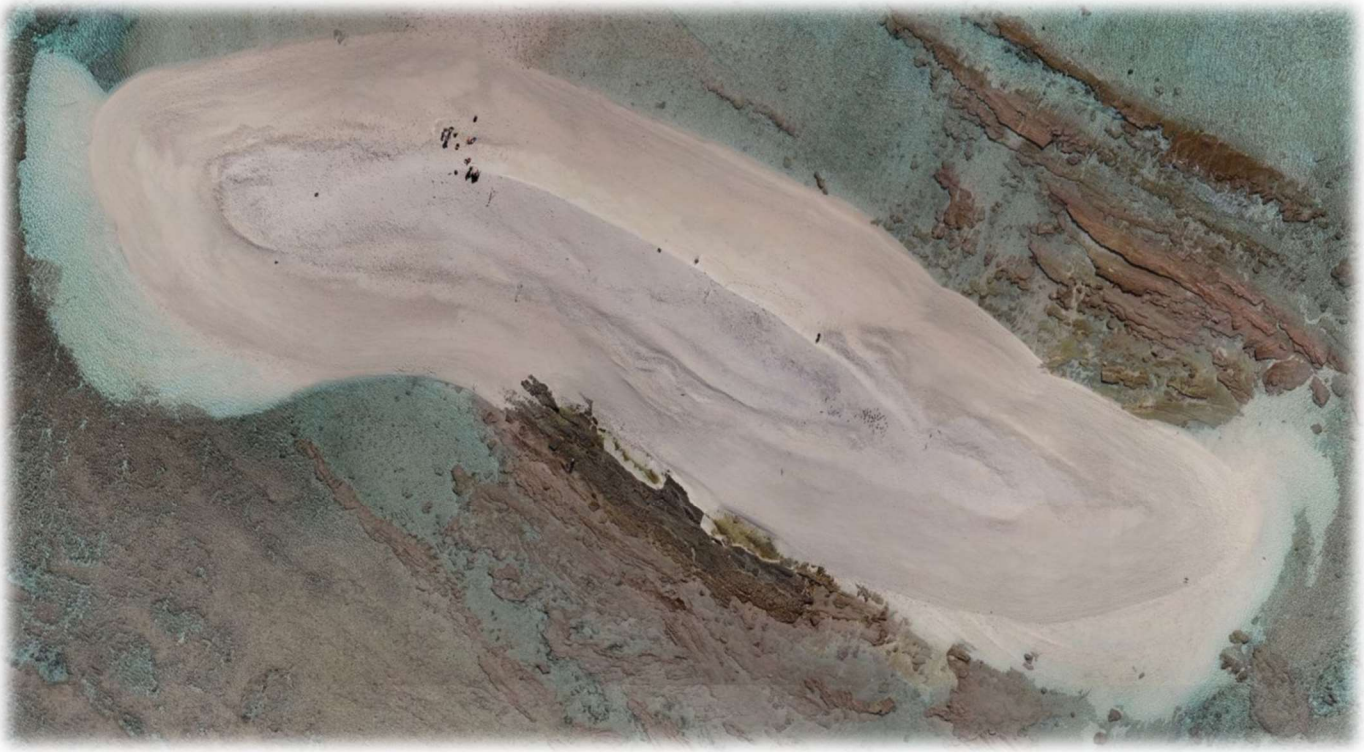


Figure 22 West Islet Jake Sanders © Queensland Government

2.2.1 Drone imagery

Capture date - 27 May 2022

Drone - Phantom 4 RTK

- Image capture height 60m
- Resolution 1.7cm/px
- Map stitching software – Drone Deploy

2.2.2 Physical description

- Low tide extent 171m x 43m
- Approximate high tide extent 123m x 14m
- Approximate area above high tide 0.19ha

West Islet, shown in *Figure 22,* is an unvegetated sand and coral rubble cay located at 441km north-east of Gladstone, Queensland at -22.1888 degrees latitude and 155.1758 degrees longitude.

2.2.3 Vegetation

On the 27th of May 2022, West Islet was unvegetated.

Photo 41 Dubois' sea snake *Aipysurus duboisii* Andrew McDougall © Queensland Government

Photo 42 Pale edged scales of Dubois' sea snake. Two specimens were observed on West Islet.
Andrew McDougall © Queensland Government

2.2.4 Birds

Table 11 Bird species and their breeding status – West Islet, Wreck Reefs

West Islet	27/05/2022	Breeding stages present				
common name	**scientific name**	Nests	Chicks	Young	Breeding pairs	Adolescents and adults
red-tailed tropicbird	*Phaethon rubricauda roseotinctus*	0	0	0	0	0
Herald petrel	*Pterodroma heraldica*	0	0	0	0	0
wedge-tailed shearwater	*Ardenna pacifica*	0	0	0	0	0
great frigatebird	*Fregata minor*	0	0	0	0	0
lesser frigatebird	*Fregata ariel*	0	0	0	0	0
masked booby	*Sula dactylatra dactylatra*	0	0	0	0	2
brown booby	*Sula leucogaster*	0	0	0	0	19
red-footed booby	*Sula sula*	0	0	0	0	0
sooty tern	*Onychoprion fuscatus*	0	0	0	0	6
bridled tern	*Onychoprion anaethetus*	0	0	0	0	0
crested tern	*Thalasseus bergii*	11	17	0	28	41
roseate tern	*Thalasseus bengalensis*	0	0	0	0	0
black-naped tern	*Sterna sumatrana*	0	0	0	0	0
New Caledonian fairy tern	*Sternula nereis exsul*	0	0	0	0	0
black noddy	*Anous minutus*	0	0	0	0	0
brown noddy	*Anous stolidus*	6	1	1	8	230
buff-banded rail	*Gallirallus philippensis tounelieri*	0	0	0	0	0
purple swamphen	*Porphyrio melanotus*	0	0	0	0	0
sacred kingfisher	*Todiramphus sanctus*	0	0	0	0	0
white-faced heron	*Egretta novaehollandiae*	0	0	0	0	0
Pacific golden plover	*Pluvialis fulva*	0	0	0	0	0
ruddy turnstone	*Arenaria interpres*	0	0	0	0	0
wandering tattler	*Tringa incana*	0	0	0	0	0
grey-tailed tattler	*Tringa brevipes*	0	0	0	0	0
lesser sand plover	*Charadrius mongolus*	0	0	0	0	0

Notes

- Seabird breeding effort is governed by the availability of suitable nesting habitat. This unvegetated islet is susceptible to physical changes through wind and water movement. Direct comparison of breeding effort (breeding trends) over time is not recommended without taking into consideration the available habitat during each survey.
- The breeding absence of large seabird species may reflect the dynamic characteristics of this cay and the birds' requirements for a stable breeding substrate over the several months of their breeding cycle.

Photo 43 Crested tern chick with adults Andrew McDougall © Queensland Government

Photo 44 Brown noddy young with adult Andrew McDougall © Queensland Government

2.2.5 Pest and invertebrate sampling

Rodents – unvegetated cay, no rodent tunnels deployed

Table 12 Invertebrates West Islet, Wreck Reefs

Collection period	Sampling methods	Sampling sites	Species
daylight search	ground search	not applicable	Nil

2.2.6 Health Checks and Island Watch

One Health Check was assessed at West Islet, Wreck Reefs.

The overall condition class of the island's ecosystem was Good (the highest rating, see *Table 13*). Detailed criteria for each HC site are included in *Appendix 8*.

Table 13 Assessed condition class for each HC site

	West Islet, Wreck Reefs			
HC Site	Overall condition class			
HC11	Good	Good with concern	Significant concern	Critical

Table 14 Summary of ecosystem type around each HC site (refer to *Figure 23)*

HC Site	Ecosystems/vegetation communities
HC11	Unvegetated, sandy substrate, fine sediments with coral rubble

Photo 45 West Islet, HC11 West

Island Watch

A summarised table of all Island Watch information gathered throughout the trip can be found at *Appendix 9*.

West Islet, Wreck Reefs

Area: Approx. 0.772 ha (area above HAT)
Approx. 1.284 ha (total area of cay)

- Health check

Figure 23 Health Check sites on West Islet, Wreck Reefs

2.3 Hope Cay, Wreck Reefs

Figure 24 Hope Cay, Wreck Reefs Jake Sanders © Queensland Government

2.3.1 Drone imagery

27 May 2022:

- Drone - Phantom 4 RTK
- Image capture height 50m
- Resolution 1.4cm/px
- Map stitching software – Drone Deploy

2.3.2 Physical description

- Low tide extent 230m x 36m
- Approximate high tide extent 143m x 18m
- Approximate area above high tide 0.21ha

Hope Cay, shown in *Figure 24,* is an unvegetated sand and coral rubble cay located at 447km north-east of Gladstone at -22.213 degrees latitude and 155.248 degrees longitude.

2.3.3 Vegetation

On the 27th of May 2022, Hope Cay was unvegetated.

2.3.4 Birds

Table 15 Bird species and their breeding status – Hope Cay, Wreck Reefs

Hope Cay	27/05/2022	Breeding stages present				
common name	**scientific name**	Nests	Chicks	Young	Breeding pairs	Adolescents and adults
red-tailed tropicbird	*Phaethon rubricauda roseotinctus*	0	0	0	0	0
Herald petrel	*Pterodroma heraldica*	0	0	0	0	0
wedge-tailed shearwater	*Ardenna pacifica*	0	0	0	0	0
great frigatebird	*Fregata minor*	0	0	0	0	0
lesser frigatebird	*Fregata ariel*	0	0	0	0	0
masked booby	*Sula dactylatra dactylatra*	0	0	0	0	2
brown booby	*Sula leucogaster*	0	0	0	0	37
red-footed booby	*Sula sula*	0	0	0	0	0
sooty tern	*Onychoprion fuscatus*	0	0	0	0	1
bridled tern	*Onychoprion anaethetus*	0	0	0	0	0
crested tern	*Thalasseus bergii*	0	0	0	0	0
roseate tern	*Thalasseus bengalensis*	0	0	0	0	0
black-naped tern	*Sterna sumatrana*	0	0	0	0	0
New Caledonian fairy tern	*Sternula nereis exsul*	0	0	0	0	0
black noddy	*Anous minutus*	0	0	0	0	0
brown noddy	*Anous stolidus*	280-320	0	0	280-320	510
buff-banded rail	*Gallirallus philippensis tounelieri*	0	0	0	0	0
purple swamphen	*Porphyrio melanotus*	0	0	0	0	0
sacred kingfisher	*Todiramphus sanctus*	0	0	0	0	0
white-faced heron	*Egretta novaehollandiae*	0	0	0	0	0
Pacific golden plover	*Pluvialis fulva*	0	0	0	0	0
ruddy turnstone	*Arenaria interpres*	0	0	0	0	0
wandering tattler	*Tringa incana*	0	0	0	0	0
grey-tailed tattler	*Tringa brevipes*	0	0	0	0	0
lesser sand plover	*Charadrius mongolus*	0	0	0	0	0

Notes

- Brown noddy nests (with eggs) were positioned at the highest section of the cay.
- This area also contained turtle pits, the undulations making an accurate count of breeding pairs difficult (keeping in mind distance to minimise disturbance was maintained). Some birds appeared to be on nests but were only roosting in a similar manner. The numbers in the table are a confidence range of the true number of breeding pairs.
- Cay stability may be too variable and unstable at this time for larger seabirds to attempt nesting.

Photo 46 Brown noddy colony at Hope Cay Collette Bagnato © Queensland Government

2.3.5 Pest and invertebrate sampling

Rodents – unvegetated cay, no rodent tunnels deployed.

Table 16 Invertebrates, Hope Cay, Wreck Reefs

Collection period	Sampling methods	Bait stations	Species
daylight search	ground search	0	Nil

2.3.6 Health Checks and Island Watch

Two Health Checks were assessed at Hope Cay, Wreck Reefs.
The overall condition class of the cay's ecosystem was **Good** (the highest rating, see *Table 17*). Detailed criteria for each HC site are included in *Appendix 8*.

Table 17 Assessed condition class for each HC site

Hope Cay, Wreck Reefs				
HC Site	Overall condition class			
HC12	Good	Good with concern	Significant concern	Critical
HC13	Good	Good with concern	Significant concern	Critical

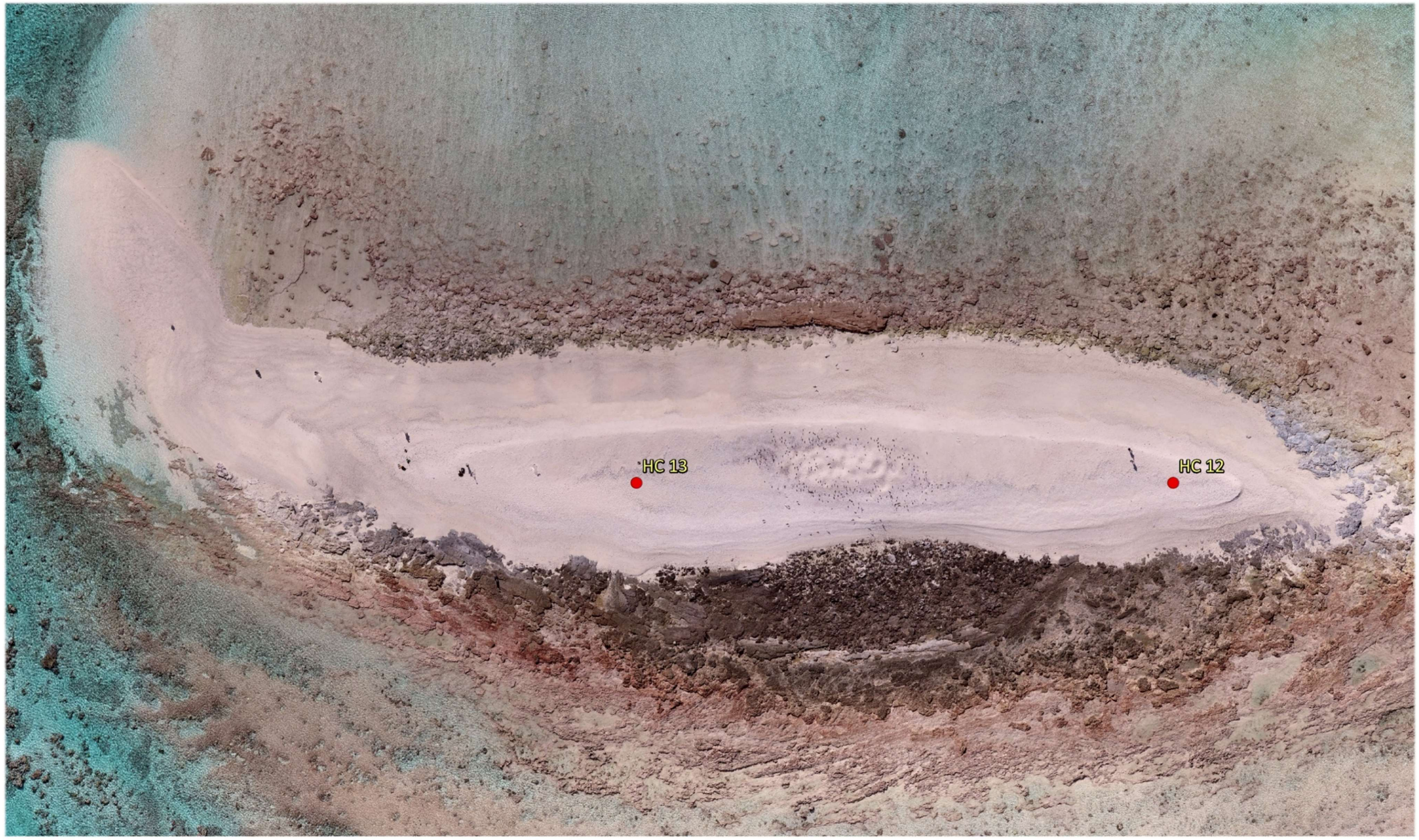
Table 18 Summary of ecosystem type around each HC site (refer to *Figure 25*)

	Ecosystems/vegetation communities
HC12	Unvegetated, sandy substrate, fine sediments with coral rubble
HC13	Unvegetated, sandy substrate, fine sediments with coral rubble

Photo 47 Hope Cay HC12 West

Island Watch

A summarised table of all Island Watch information can be found at *Appendix 9*.



Hope Cay, Wreck Reefs

Area: Approx. 0.245 ha (area above HAT)
Approx. 0.929 ha (total area of cay)

- Health check

N
W E
S

0 5 10 20 30 40 50
Metres

Printed on:
17/11/2022

Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
Projection: Mercator Auxiliary Sphere
Datum: WGS1984

Figure 25 Health Check sites on Hope Cay, Wreck Reefs

2.4. Porpoise Cay, Wreck Reefs

Figure 26 Porpoise Cay Jake Sanders © Queensland Government

2.4.1 Drone imagery

27 May 2022:

- Drone - Phantom 4 RTK
- Image capture height 50m
- Resolution 1.5cm/px
- Map stitching software – Drone Deploy

2.4.2 Physical description

- Low tide extent (sand) 151m x 57m
- Approximate high tide extent 126m x 40m
- Approximate area above high tide 0.38ha
- Approximate vegetated extent 85m x 25.5m
- Vegetated area 0.2ha

Porpoise Cay, shown in *Figure 26,* is located 492 km NE of Gladstone on Wreck Reefs at -22.191 degrees latitude and 155.351 degrees longitude. It is the smallest vegetated cay in the Coral Sea. *Figure 27* shows surface elevation profiles of Porpoise Cay.

2.4.3 Vegetation

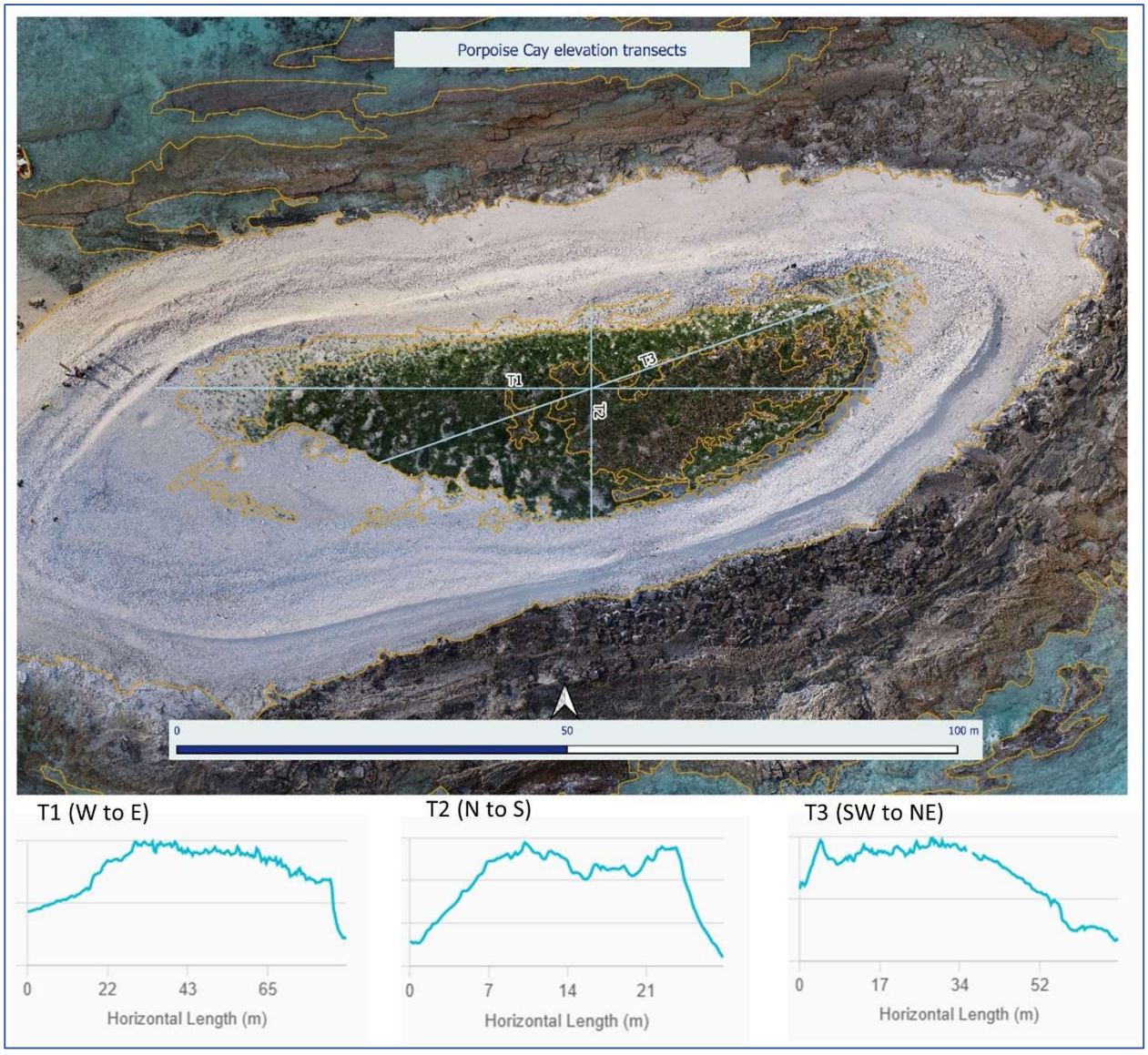


Figure 27 Surface profiles of Porpoise Cay

Note: Maximum height is approximately 3m. Vertical heights and scale are not included in the surface profile diagram as accurate datum information was not available.

Survey intensity

Two people each spent 1.3 hours surveying the vegetation of Porpoise Cay. Vegetation data was recorded at 10 ground-truthing sites. The locations of these sites are shown in *Figure 28*. The yellow lines are the boundaries of the vegetation communities shown on the vegetation map in *Figure 29.*

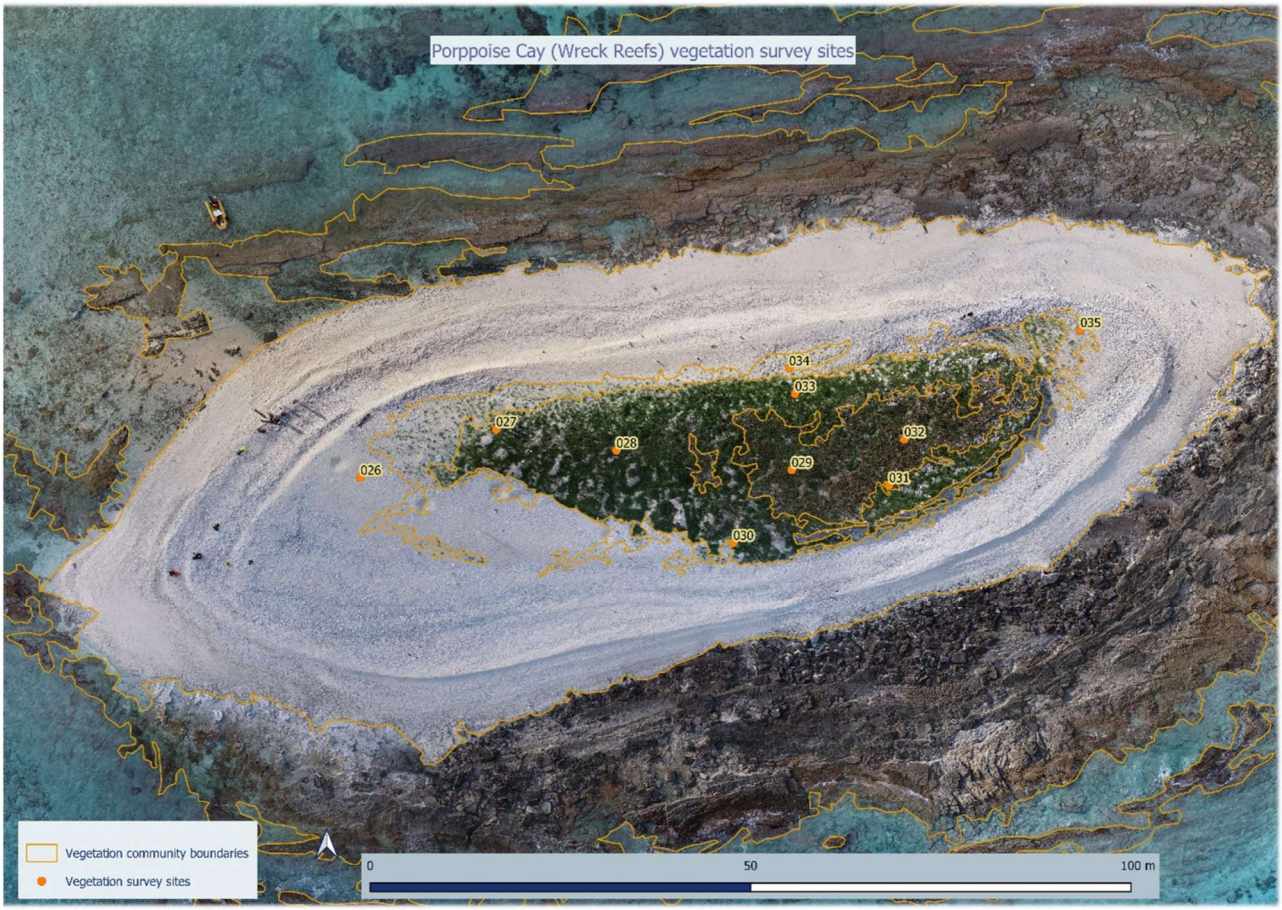


Figure 28 Porpoise Cay showing the number and location of ground-truthing vegetation survey sites relative to the vegetation map unit boundaries

Vegetation condition

The vegetation on the cay was all in good condition at the time of the survey.

Floristic data

Only four plant species were recorded on Porpoise Cay, the lowest species richness of the 20 vegetated Coral Sea cays surveyed.

Lepturus repens (stalky grass) and *Portulaca oleracea* (pigweed) were the most abundant species present. *Boerhavia albiflora* var. *albiflora* (tar vine) was also relatively common. Unlike most of the other Coral Sea cays, the interior vegetation contained very little *Achyranthes aspera* (chaff flower).

Plant species recorded during the 2022 survey are listed in *Table 19* together with frequency in sites, the averaged cover for each species for sites in which the species was present and their averaged cover over the entire cay. Data for species cover at each site plus occurrence of each species in relation to vegetation community and landform are contained in *Table 21*.

Table 19 Plant species recorded on Porpoise Cay, Wreck Reefs (27/05/2022)

Layers: (G) = ground Lifeform: G = grass, Ha = annual herb, Hp = perennial herb

Scientific name	Common name	Family	Life form	Presence in sites (% of sites)	Average % cover for each layer (averaged cover only for sites in which species was present	Overall average % cover for each layer- (averaged cover over all sites including 0% covers at sites where species was absent
Achyranthes aspera	chaff flower	Amaranthaceae	Ha	30%	2.5% (G)	0.75% (G)
Boerhavia albiflora var. *albiflora*	tar vine	Nyctaginaceae	Hp	60%	6.7% (G)	4.0% (G)
Lepturus repens	stalky grass	Poaceae	Gp	100%	36% (G)	36% (G)
Portulaca oleracea	pig weed	Portulaceae	H	50%	14.5% (G)	7.25% (G)
Total no of species = 4						

Vegetation communities

The vegetation was poorly developed with low diversity, probably due to the small size of the cay and regular disturbance by turtle nesting and periodic tidal over-wash.

No *Pisonia grandis* (pisonia) communities or other tree or shrub communities were present on the cay.

The vegetation communities of the cay were dominated by the grass, *Lepturus repens* (stalky grass) and/or the succulent forb, *Portulaca oleracea* (pig weed).

Vegetation communities present on Porpoise Cay in May 2022, the area of each and representative survey sites within each vegetation community are listed in *Table 20.* The spatial distribution and extent of these vegetation communities are shown in the vegetation map in *Figure 29*. Comparisons with equivalent and similar communities on other Coral Sea cays are shown in *Appendix* 3.

Table 20 Vegetation communities on Porpoise Cay, Wreck Reefs

Veg map unit	Summary description	Additional description	Total area (ha)	Sites
Unvegetated areas				
A	sandy shores		0.5318	
B	lithified shores		0.8898	
C	rubble banks			
Vegetation of shorelines, beaches and sand spits				
1a	*Lepturus repens* sparse grassland on sandy shorelines		0.0455	26, 34, 35
Grassland communities				
3a	*Lepturus repens* grassland to closed grassland	*Lepturus repens* grassland to closed grassland with *Boerhavia albiflora* var. *albiflora* +/- *Portulaca oleracea* +/- *Achyranthes aspera*	0.0972	27, 28, 30, 33, 31
3e	*Lepturus repens/ Portulaca oleracea* grassland	*Lepturus repens/ Portulaca oleracea* grassland with *Boerhavia albiflora* var. *albiflora* +/- *Achyranthes aspera*	0.0391	29, 32
		Total vegetated area (ha)	0.1818	

Note: Areas of sandy shores and rocky shores, particularly those of the rocky shores are only approximate due to the difficulty in determining the location of the boundary between the edge of the shoreline and the surrounding reef flat using the imagery.

The following pages contain photographs and detailed descriptions of the vegetation communities present at the time of the May 2022 survey.

Photographs and descriptions of Porpoise Cay vegetation communities

Shoreline, beaches and sand spit vegetation

1a ***Lepturus repens* sparse grassland on sandy shorelines**

ground truthing sites: 26, 34, 35

Photo 48 Veg map unit 1a, Site 26 Porpoise Cay
Joy Brushe ©

Vegetation community 1a consisted of newly establishing plants of *Lepturus repens* (stalky grass) growing in coarse sand containing fine to medium coral rubble on the shoreline and beach.

Grassland communities

3a ***Lepturus repens* grassland to closed grassland with *Boerhavia albiflora* var. *albiflora* +/- *Portulaca oleracea* +/- *Achyranthes aspera***

ground truthing sites: 27, 28, 30, 33, 31

Vegetation community 3a was located adjacent to the shoreline and in the interior of the western end of the cay. Soil was light coloured coarse sand containing coral rubble with organic content in some places.

Photo 49 Veg map unit 3a, Site 30 Porpoise Cay
Joy Brushe ©

Photo 50 Veg map unit 3a, Site 28 Porpoise Cay
Joy Brushe ©

3e ***Lepturus repens*** **and** ***Portulaca oleracea*** **herbland with** ***Boerhavia albiflora*** **var.** ***albiflora*** **+/-** ***Achyranthes aspera***

ground truthing sites 29, 32

Photo 51 Veg map unit 3e, Site 32 Porpoise Cay
Joy Brushe ©

Vegetation community 3e was present in the interior flats at the eastern end of the cay. Soil was dark brown coarse sand with high organic content and contained coral rubble.

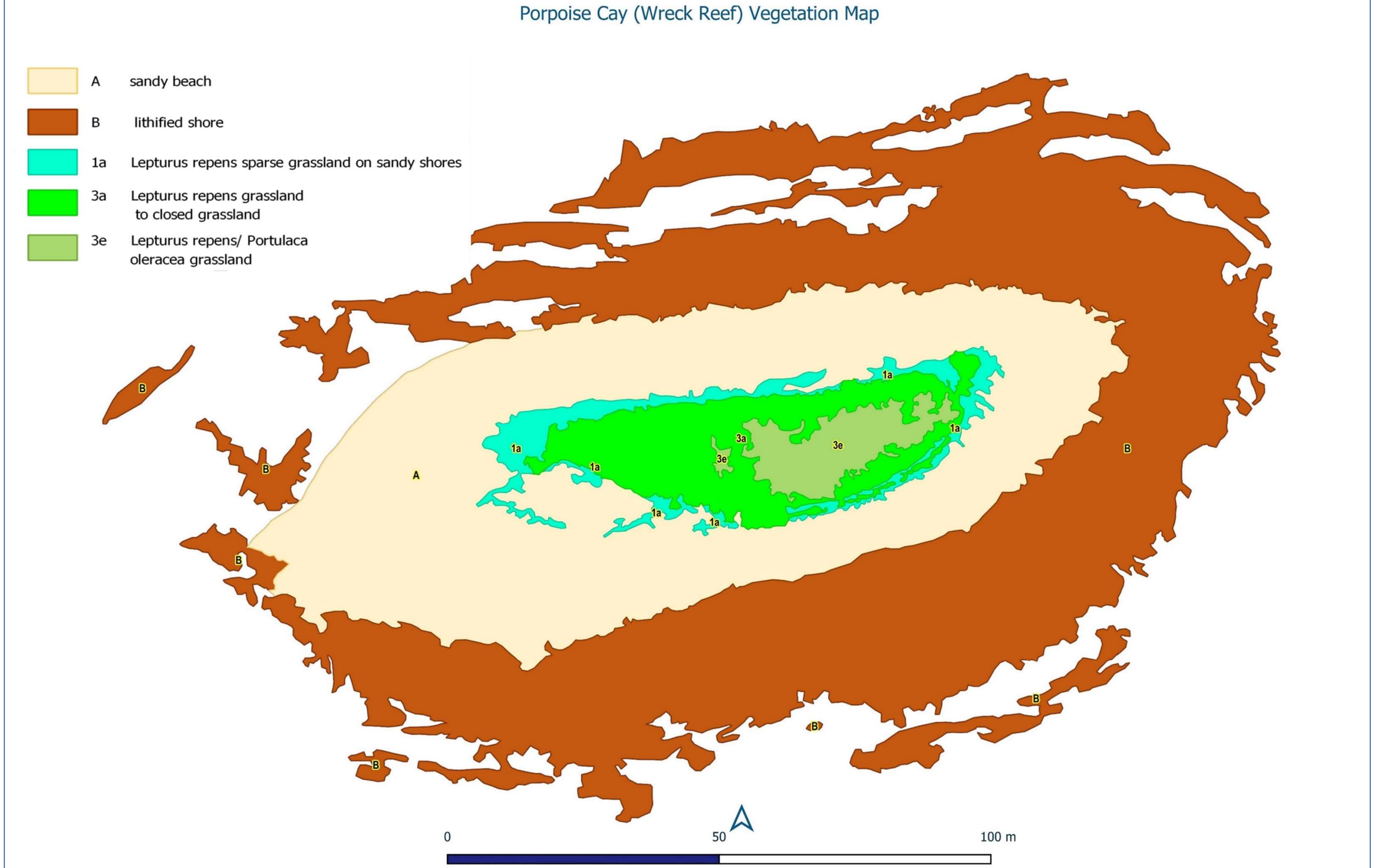


Figure 29 Vegetation map of Porpoise Cay, Wreck Reefs

Table 21 Site data recorded on Porpoise Cay, Wreck Reefs (27/05/2022)

Datum = WGS 84; Green shading = site dominants

											ground layer											
Site	Lat	Long	Number of photos	Landform	Aspect	Estimated altitude	Soil Description	Total weed cover %	Veg map unit code	Community	Achyranthes aspera	Boerhavia albiflora var. albiflora	Lepturus repens	Portulaca oleracea	Litter	Plant Specimens Collected	Birds	Turtle activity	Start	Finish	Dominant growth form	Ground FPC
026	-22.191224	155.350573	5	beach		1	white coarse sand with abundant fine coral rubble fragments in soil abundant medium coral rubble surface fragments	0	1a	Lepturus repens sparse grassland			5-25%				some masked boobies, some brown boobies	low	15:19:55	15:26:11	grass	very sparse (<10%)
027	-22.191167	155.350733	2	mid slope	WNW	2	light coloured coarse sand with abundant fine coral rubble fragments in soil abundant medium coral rubble surface fragments	0	3a	Lepturus repens grassland		5-25%	25-50%		trace-5%		large numbers brown noddies, large numbers brown boobies		15:28:44	15:36:18	grass	mid-dense (>30-70%)
028	-22.191192	155.350875	4	crest		4	brown coarse sand with high organic content, occasional fine coral rubble fragments in soil, abundant medium coral rubble surface fragments	0	3a	Lepturus repens closed grassland	trace-5%	5-25%	50-75%	trace-5%	5-25%		large numbers brown boobies, large numbers brown noddies		15:37:48	15:43:05	grass	dense (>70)
029	-22.191215	155.351082	3	flat		3	dark brown coarse sand with high organic content, occasional fine coral rubble fragments in soil, abundant medium coral rubble surface fragments	0	3e	Lepturus repens/ Portulaca oleracea grassland	trace-5%	trace-5%	25-50%	25-50%	25-50%	Lepturus repens, Portulaca oleracea, Boerhavia albiflora var albiflora, Achyranthes aspera	large numbers brown boobies, abundant brown noddies	low	15:45:00	15:52:35	herb	mid-dense (>30-70%)
030	-22.191301	155.351013	3	mid slope	S	2	light brown coarse sand with some organic content, occasional fine coral rubble fragments in soil, abundant medium coral rubble surface fragments	0	3a	Lepturus repens open grassland			25-50%	5-25%	trace-5%		abundant brown noddies		15:56:19	16:01:49	grass	sparse (10-30%)
031	-22.191233	155.351197	2	flat		4	light brown coarse sand with some organic content, abundant fine coral rubble fragments in soil, abundant large coral rubble surface fragments	0	3a	Lepturus repens closed grassland	trace-5%	trace-5%	50-75%	trace-5%	5-25%		abundant brown noddies		16:04:09	16:08:23	grass	dense (>70)
032	-22.191179	155.351215	3	flat		3	dark brown coarse sand with high organic content, abundant coral rubble fragments in soil, abundant coral rubble surface fragments	0	3e	Lepturus repens/ Portulaca oleracea grassland		trace-5%	5-25%	5-25%	25-50%		abundant brown noddies, some brown boobies	low	16:10:26	16:17:01	herb	mid-dense (>30-70%)
033	-22.191125	155.351086	3	mid slope	N	2	light coloured coarse sand with occasional fine coral rubble fragments in soil abundant coral rubble surface fragments	0	3a	Lepturus repens closed grassland		trace-5%	50-75%		trace-5%		abundant brown noddies, some brown boobies		16:18:34	16:25:10	grass	dense (>70)
034	-22.191095	155.351079	2	lower slope	N	1	light coloured coarse sand with abundant fine coral rubble fragments in soil abundant coral rubble surface fragments	0	1a	Lepturus repens sparse grassland			5-25%				some masked boobies		16:25:41	16:29:40	grass	very sparse (<10%)
035	-22.191050	155.351423	2	beach		1	white coarse sand with abundant fine coral rubble fragments in soil abundant medium coral rubble surface fragments	0	1a	Lepturus repens sparse grassland			5-25%				occasional masked boobies	low	16:33:36	16:37:07	grass	very sparse (<10%)

Comparison with previous vegetation surveys

The Australian Pilot (In Heatwole, 1979) recorded that Bird Islet was the only vegetated cay on Wreck Reef, suggesting that Porpoise Cay was unvegetated at the time the Australian Pilot document was published. The date of this publication is not known.

BioCondition monitoring site data

No permanent BioCondition monitoring sites were established on Porpoise Cay.

2.4.4 Birds

Table 22 Bird species and their breeding status – Porpoise Cay, Wreck Reefs

Porpoise Cay	27/05/2022	Breeding stages present			breeding pairs	Adolescents and adults
common name	**scientific name**	Nests	Chicks	Young		
red-tailed tropicbird	*Phaethon rubricauda roseotinctus*	0	0	0	0	0
Herald petrel	*Pterodroma heraldica*	0	0	0	0	0
wedge-tailed shearwater	*Ardenna pacifica*	0	0	0	0	0
great frigatebird	*Fregata minor*	0	0	0	0	0
lesser frigatebird	*Fregata ariel*	0	0	0	0	1
masked booby	*Sula dactylatra dactylatra*	10	0	0	10	62
brown booby	*Sula leucogaster*	48	0	0	48	106
red-footed booby	*Sula sula*	0	0	0	0	2
sooty tern	*Onychoprion fuscatus*	0	0	0	0	2
bridled tern	*Onychoprion anaethetus*	0	0	0	0	0
crested tern	*Thalasseus bergii*	0	0	0	0	5
roseate tern	*Thalasseus bengalensis*	0	0	0	0	0
black-naped tern	*Sterna sumatrana*	0	0	0	0	0
New Caledonian fairy tern	*Sternula nereis exsul*	0	0	0	0	0
black noddy	*Anous minutus*	0	0	0	0	0
brown noddy	*Anous stolidus*	340	0	0	340	440
buff-banded rail	*Gallirallus philippensis tounelieri*	0	0	0	0	0
purple swamphen	*Porphyrio melanotus*	0	0	0	0	0
sacred kingfisher	*Todiramphus sanctus*	0	0	0	0	0
white-faced heron	*Egretta novaehollandiae*	0	0	0	0	0
Pacific golden plover	*Pluvialis fulva*	0	0	0	0	2
ruddy turnstone	*Arenaria interpres*	0	0	0	0	0
wandering tattler	*Tringa incana*	0	0	0	0	0
grey-tailed tattler	*Tringa brevipes*	0	0	0	0	0
lesser sand plover	*Charadrius mongolus*	0	0	0	0	0

Notes

- Vegetation was high enough to make counting brown noddies surprisingly difficult for such a small cay. Nests were not closely inspected to minimise disturbance.
- Bird diversity and breeding status was as expected.

Photo 52 Brown booby pair (male left, female at nest on right).
Collette Bagnato © Queensland Government

Photo 53 Brown noddy colony. Collette Bagnato © Queensland Government

2.4.5 Pest and invertebrate sampling

(Refer to Health Check section for map)

25-26 May 2022

Table 23 Rodents

Collection period	Sampling methods	Sampling sites	Rodent species
overnight	baited tunnel traps/ink pads	3	nil

Hermit crabs *Coenobita* sp. were present at each sampling site.

Table 24 Invertebrates

Collection period	Sampling methods	Sample sites	Species
daylight search	Bait station and ground search	9	See below

Order	Family	Spp ID	Common name
Orthoptera	Acrididae	*Aiolopus thalassinus*	grasshopper
Orthoptera	Gryllidae	*Telegryllus oceanicus*	black field cricket
Dermaptera		Dermaptera	earwig
Araneae	Lycosidae	*Hogna crispipes*	wolf spider
Not provided	Not provided	Isopoda	slater
Coleoptera	Coccinellidae	*Harmonia octomaculata*	ladybird

2.4.6 Health Checks and Island Watch

Three Health Check (HC) sites were assessed at Porpoise Cay, Wreck Reefs.

The overall condition class of the vegetation communities was **Good** (the highest rating, see *Table 25*).

Detailed criteria for each HC site are included in *Appendix 8*.

Table 25 Assessed condition class for each HC site

	Porpoise Cay, Wreck Reefs			
HC Site	Overall condition class			
HC14	Good	Good with concern	Significant concern	Critical
HC15	Good	Good with concern	Significant concern	Critical
HC16	Good	Good with concern	Significant concern	Critical

Table 26 Summary of vegetation community around each HC site (refer to *Table 20 and Figure 30*)

HC Site	Ecosystems/vegetation communities				
HC14	1a	3a			
HC15	3a	3e			
HC16	3a	3e			

Island Watch

A summarised table of all Island Watch information can be found in *Appendix 9*.

Photo 54 Porpoise Cay, Wreck Reefs HC16 North

Photo 55 Porpoise Cay, Wreck Reefs HC16 West

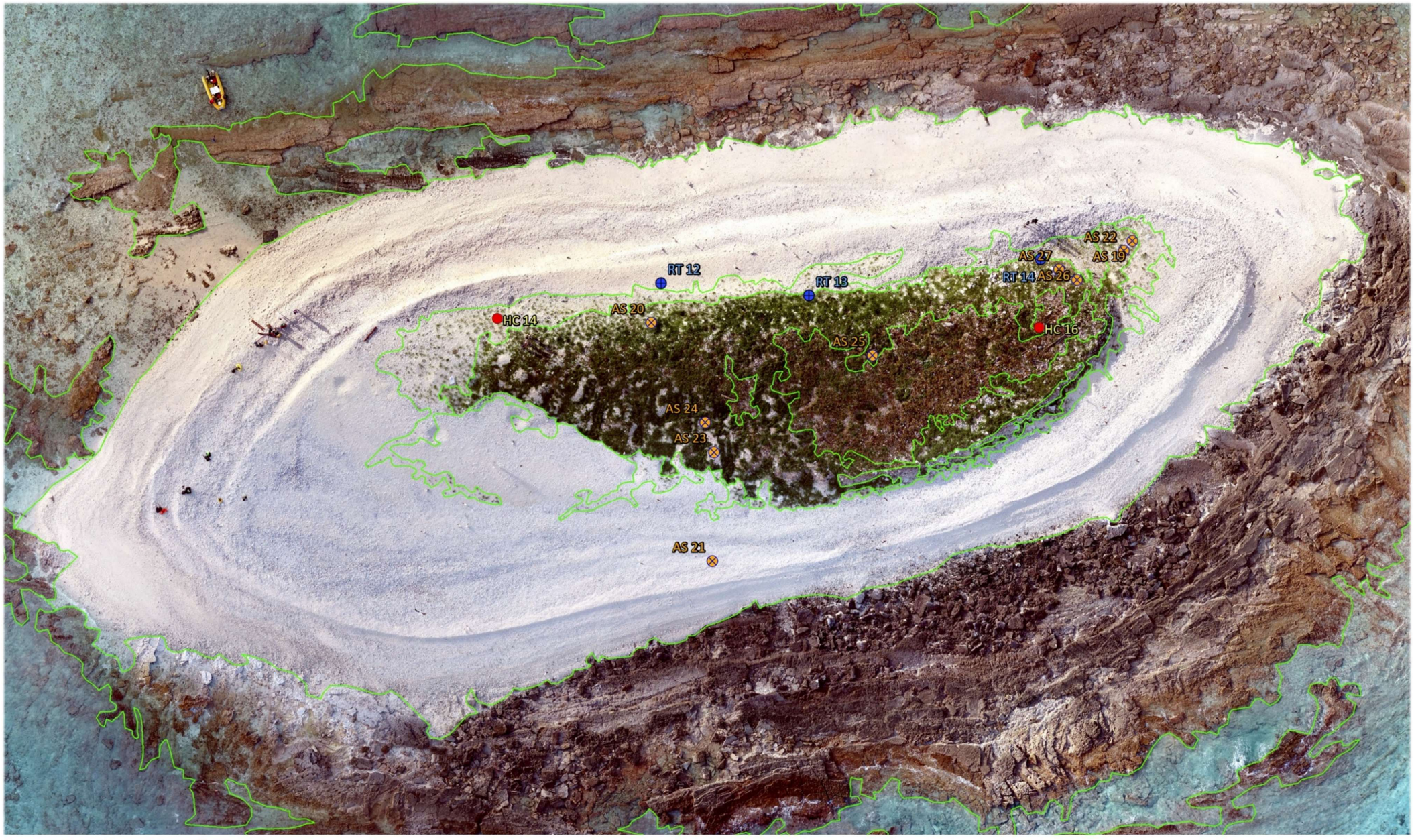


Figure 30 Health Check, rodent tunnel and ant bait station sites on Porpoise Cay, Wreck Reefs

2.5. Bird Islet, Wreck Reefs

Figure 31 Bird Islet Jake Sanders © Queensland Government

2.5.1 Drone imagery

28 May 2022:

- Drone - Phantom 4 RTK
- Image capture height 50m
- Resolution 1.5cm/px
- Map stitching software – Drone Deploy

2.5.2 Physical description

- Low tide extent 496m x 277m
- Approximate high tide extent 126m x 40m
- Approximate area above high tide 8.8ha
- Approximate vegetated extent 430m x 235m
- Vegetated area 8.4ha

Bird Islet, shown in *Figure 31,* is a vegetated cay located 504 km north-east of Gladstone on Wreck Reefs at -22.172 degrees latitude and 155.460 degrees longitude. *Figure 32* shows surface elevation profiles of Bird Islet.

2.5.3 Vegetation

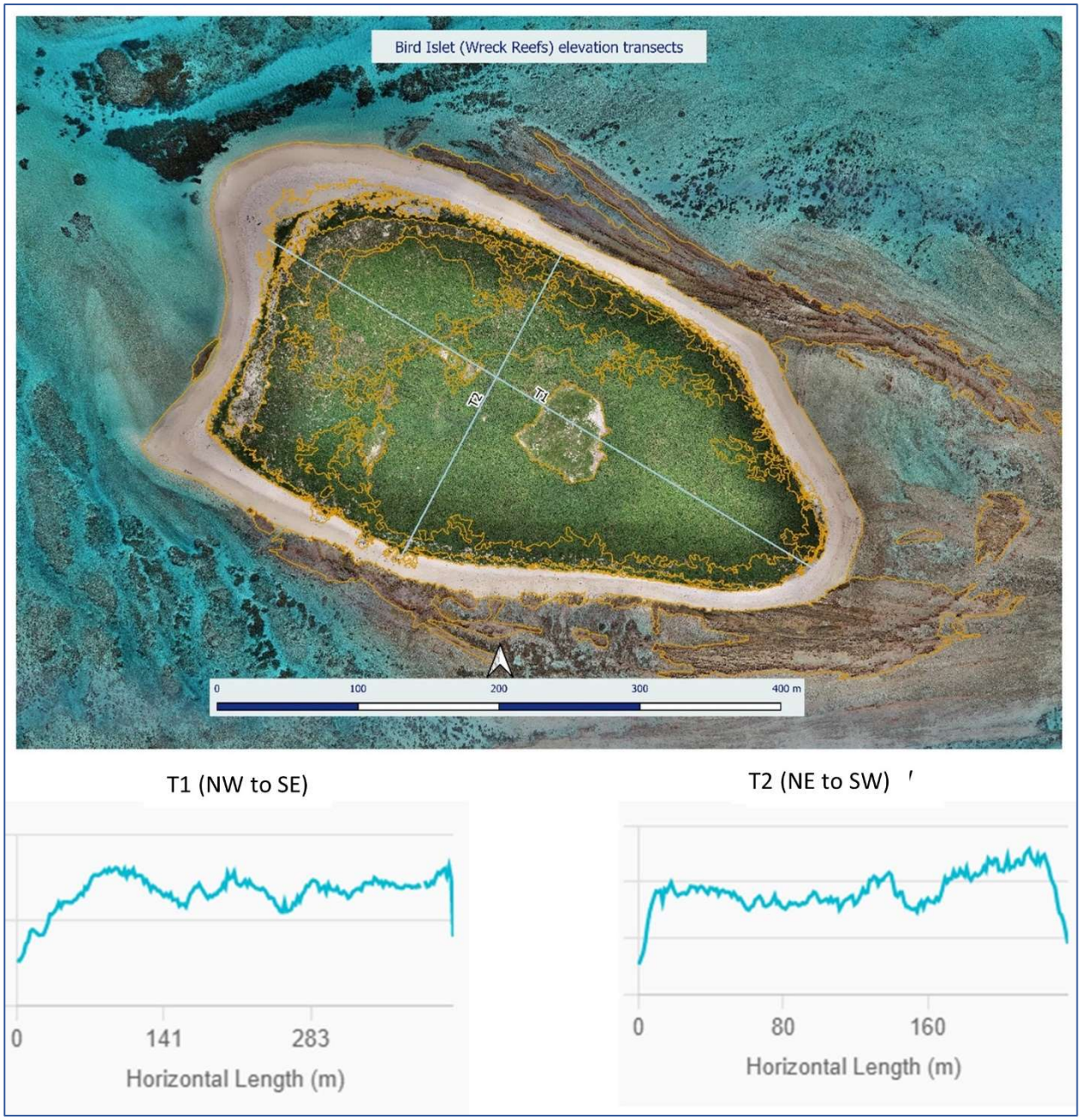


Figure 32 Surface elevation profiles of Bird Islet

Note: Maximum height is approximately 3.5 metres ASL. Vertical heights and scale are not included in the surface profile diagram as accurate datum information was not available.

Survey intensity

Two people each spent 7.4 hours surveying the vegetation of Bird Islet. Vegetation data was recorded at 20 ground-truthing sites and two permanent monitoring sites (M18 and M19). The locations of these sites are shown in *Figure 33*. The yellow lines are the boundaries of the vegetation communities shown on the vegetation map in *Figure 35.*

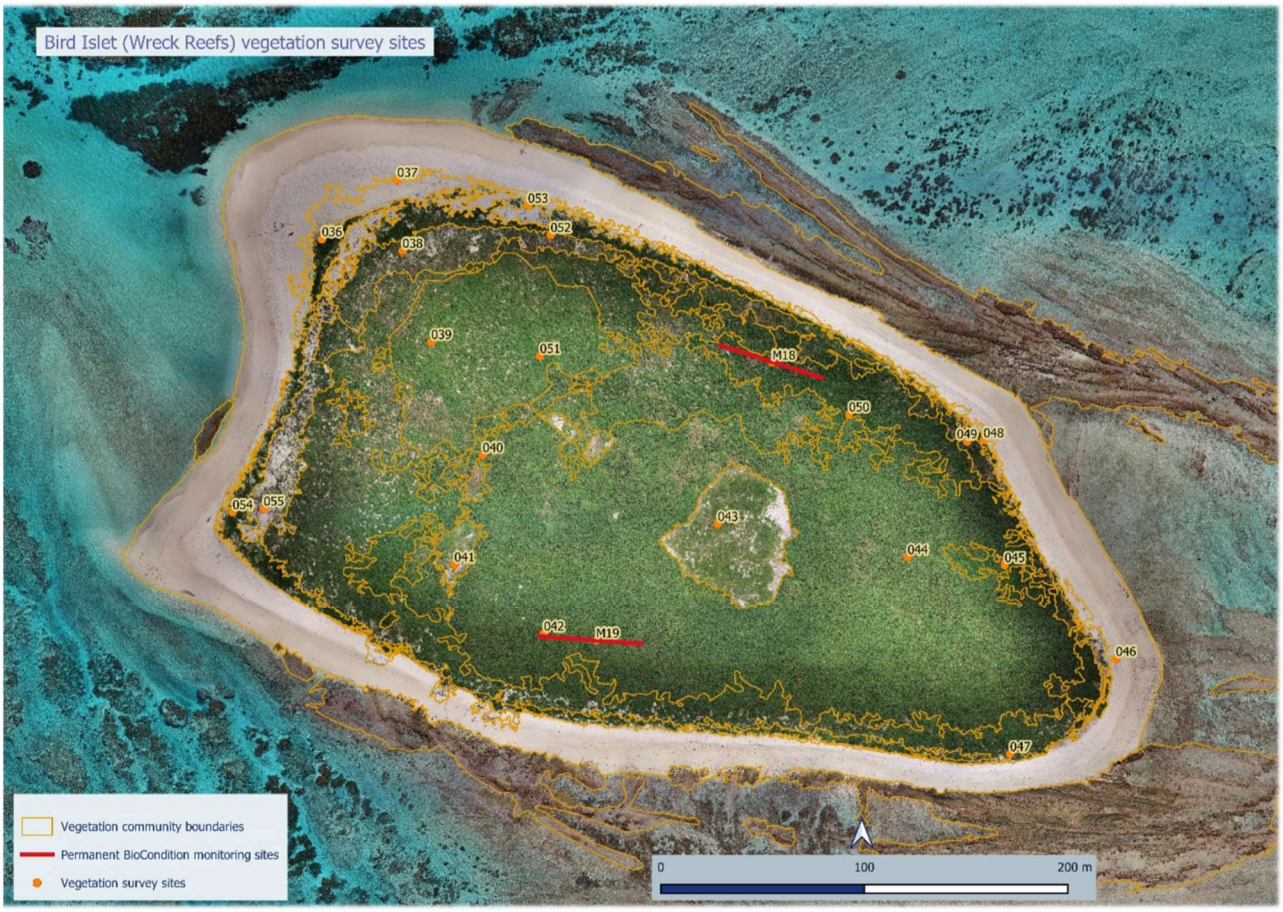


Figure 33 Bird Islet showing the number and location of ground-truthing vegetation survey sites and permanent monitoring sites relative to the vegetation map unit boundaries.

Vegetation condition

The natural vegetation on the cay was all in good condition at the time of the survey. Weeds are present on the cay and have displaced natural vegetation in a large area in the northwest interior of the cay.

Floristic data

Nine plant species were recorded on Bird Islet, six native cay species and three exotic naturalised weeds.

All the native species present were quite widespread across the cay and the most abundant species present at the time of the survey were *Achyranthes aspera* (chaff flower)*, Lepturus repens* (stalky grass)*, Boerhavia albiflora* var. *albiflora* (tar vine) and *Stenotaphrum micranthum* (beach buffalo grass).

Plant species recorded on Bird Islet are listed in *Table 27* together with frequency in sites, the averaged cover for each species for sites in which the species was present and their averaged cover over the entire cay. Data for species cover at each site plus occurrence of each species in relation to vegetation community and landform are contained in *Table 29*.

Table 27 Plant Species Recorded on Bird Islet, Wreck Reef (28/05/2022)

Layer: (G) = ground
Lifeform: G = grass, Ga = annual grass, Gp = perennial grass, H = herb, Ha = annual herb, Hp = perennial herb, H = herb, ST = large shrub/small tree
Data for weeds are shown in red; * = naturalized exotic species not native to Australia

Scientific name	Common name	Family	Life form	Presence in sites (% of sites)	Average % cover for each layer (averaged cover only for sites in which species was present	Overall average % cover for each layer- (averaged cover over all sites including 0% covers at sites where species was absent
Achyranthes aspera	chaff flower	Amaranthaceae	Ha	45.5%	35.8% (G)	16.25% (G)
Boerhavia albiflora var. *albiflora*	tar vine	Nyctaginaceae	Hp	81.8%	16.0% (G)	13.1% (G)
Lepturus repens	stalky grass	Poaceae	G	63.6%	22.3% (G)	14.2% (G)
Portulaca oleracea	pig weed	Portulaceae	H	81.8%	14.0% (G)	11.5% (G)
Stenotaphrum micranthum	beach buffalo grass	Poaceae	Ga	63.6%	19.5% (G)	12.4% (G)
Tribulus cistoides	bulls head burr	Zygophyllaceae	Ha	45.45%	5% (G)	2.3% (G)
**Amaranthus viridis*	green amaranth	Amaranthaceae	Ha	4.55%	2.5% (G)	0.11% (G)
**Cynodon dactylon* var. *dactylon*	common couch	Poaceae	Gp	4.55%	85% (G)	3.9% (G)
**Solanum americanum*	nightshade	Solanaceae	Ha	4.55%	2.5% (G)	0.11% (G)
Total no of species = 9 (6 native cay species, 3 non-cay species)						

Weeds

There is currently an infestation of *Cynodon dactylon* var. *dactylon* (common couch) densely covering approximately 7,000 square meters on the northwestern interior of the cay in the vicinity of the survey marker. The National Herbarium has a record of this species collected by K. Keith in 1961, so it has been present on the cay for some considerable time. The early record did not contain any information on the extent or location on the cay, so it is not known if it is currently spreading or at what rate.

Numbers of nesting seabirds were much lower within this vegetation than in the surrounding vegetation communities, possibly because of the high density and tightly rooted growth form of this species.

Amaranthus viridis (green amaranth) was also recorded during the 2022 visit in the same area as the *Cynodon dactylon* var. *dactylon*, but in much lower abundance. This is the first record of this species for Bird Islet. It is a commonly occurring invasive weed on the southern Great Barrier Reef cays.

Both *Cynodon dactylon* var. *dactylon* and *Amaranthus viridis* are also present on South Islet (Willis Islets) but are not known from any other location in the Coral Sea Marine Park.

Solanum americanum (nightshade) was also recorded in the central eastern interior of Bird Islet during the 2022 survey. Although this species is a widespread problem weed on cays in the southern GBR, it has not previously been recorded on any Coral Sea cays. It is usually dispersed by fruit eating birds, which are rarely present (transients) on the Coral Sea cays. The area where this species was present was thoroughly searched and only a few plants were found. Although these were carefully hand pulled to prevent seed drop, bagged and removed from the cay, plants were quite large and had seeded, so it is likely that regrowth from these seeds will occur.

Although some seeding *Amaranthus viridis* was also hand pulled, bagged and removed from the cay, more seeding plants were observed just prior to departure but could not be removed as there was no time to obtain bags and return to the site prior to departure.

Figure 34 shows the location and extent of the weeds on Bird Islet in May 2022.

Figure 34 Weed map of Bird Islet, Wreck Reefs May 2022