BARROW ISLAND NATURE RESERVE
ROCK-WALLABY SURVEY AUGUST 2005

Andrew A Burbidge and Neil Thomas

Science Division, Department of Conservation and Land Management
WA Wildlife Research Centre, PO Box 51, Wanneroo WA 6946

Department of Conservation and Land Management
Western Australian Wildlife Research Centre
Wildlife Place, Woodvale, WA
PO Box 51, Wanneroo, WA 6946

CONTENTS

INTRODUCTION

The Black-flanked Rock-wallaby *Petrogale lateralis lateralis* is the least abundant of the mammals occurring on Barrow Island Nature Reserve. While monitoring methods are available for the other larger mammal species, monitoring of rock-wallabies has proved to be difficult. The reasons for this are discussed by Burbidge and Drew (2004). In brief, trapping, which can provide mark and recapture data or trap success data, and which is a successful population monitoring method on the mainland, is ineffective on Barrow Island because:

1. The shelter habitat is scattered along 12 km of coastline and short distances inland; animals in mainland rock-wallaby colonies usually shelter in small, concentrated areas.
2. Rock-wallaby numbers are low with few animals in any given area of shelter habitat.
3. Brushtail possum numbers are high and they readily enter traps set for rock-wallabies, making trapping unproductive for rock-wallabies.

Spotlighting has also proved to be ineffective because animal density is low and most rock-wallabies move relatively long distances from shelter soon after dark. Spotlighting from a vehicle is not possible because of lack of vehicle tracks near shelter habitat, except in a few isolated locations, and spotlighting on foot is limited because of the terrain, and because the wallabies tend to move well away from shelter habitat.

Burbidge and Drew (2004) reported on previous surveys of the black-flanked rock-wallaby on Barrow Island. They trialed three methods of monitoring: 'daytime searching', 'dusk watching' and 'spotlighting' and concluded that daytime searching was more successful in locating rock-wallabies than spotlighting on foot. Dusk watching was only trialed at an isolated rockpile near Well Q21, as most shelter is in inaccessible areas on the west coast. They recommended that the daytime searching method be repeated in winter 2005, as anecdotal information suggested that rock-wallabies were more visible during daytime in cooler weather. We also repeated 'dusk watching' to see whether more animals would be sighted in winter and in an attempt to find out the total population at this isolated site.

METHODS

Daytime searching

We visited Barrow Island from 3 August to 10 August 2005 and used the methods described in Burbidge and Drew (2004). We searched near-coastal and inland areas from 'Obe's Beach' south to 'Bogg's Beach'. Each 'site' (Appendix 1) was searched on foot at least twice, with at least one search of each site being conducted in the morning between 0645 (sunrise at the time of our visit) and 1000 hrs. A few sites were searched three times.

Local daily weather observations were downloaded from the Bureau of Meteorology Internet site.

Dusk watching

On the evenings of 4, 5 and 7 August, at the isolated colony near Well Q21 (Site 27), we watched from about 300 m away for rock-wallabies emerging from shelter in the late afternoon and evening to feed. Two people used 10x40 binoculars and a spotting telescope. On 4 August we watched from 1600 to 1825 hrs (when it became too dark to see activity, and on the other two evenings we watched from 1700 to 1820 hrs.

RESULTS

Daytime searching

Appendix 1 shows the location of the sites searched, while Table 1 shows the highest number of rock-wallabies recorded at each site in 2004 and 2005. In all we sighted 71 rock-wallabies; however, when the higher number from the two counts of each 'site' is compared, we recorded a maximum of 51 animals. Many of the wallabies sighted were flushed from low clumps of figs (*Ficus* spp.) growing on the slope below cliffs or, occasionally, just above the cliff; some were sighted among large rocks just below cliffs; some were seen in rockpiles at the base of slopes below cliffs, often close to the ocean, and a few were first seen in the open above the cliff. Subjectively, more wallabies were flushed from fig clumps than in November 2004.

Dusk watching

Two rock-wallabies were seen leaving shelter at Site 27 (the Q21 colony) on the evening of 5 August: at 1800 and 1801 hrs. One of these came from a clump of *Ficus* about 100 m west of the main cliff and associated rocks. On 4 and 7 August, no wallabies were sighted. When we walked this rockpile on the afternoon of 8 August, a rock-wallaby was flushed from a clump of *Ficus* spp. on the plateau above the cliff. This may explain why we did not see rock-wallabies on two of the three evenings. Dusk watching does not seem to be a useful method of counting all rock-wallabies in a colony.

DISCUSSION

The total of 51 rock-wallabies sighted during daytime searching was lower than the 59 seen by Burbidge and Drew in November 2004. Our conclusion is that winter searching does not reveal more animals than searching in late spring - early summer. Two factors that may have affected our results are:

- Prevailing weather. We had several cloudy days and also had strong winds, particularly during the mornings of 7-9 August when fresh to strong and gusty easterly winds prevailed (Table 2, note that the weather station is at the airport on the east coast of the island; conditions on the west coast may be a little different). Few rock-wallabies were sighted at these times. While this may have reduced the number seen on those mornings, we did not consistently sight more animals earlier in the trip, despite cool conditions with light winds.
- A white-bellied sea-eagle nest with two small chicks was located in Site 22. No rock-wallabies were seen at this site in 2005 during the two searches. A single animal was seen at the extreme northern end of this site on 9 August after we had searched Site 21. In 2004, the maximum count was seven. The pair of adult eagles was seen to attack another sea-eagle that entered the area near the nest and they would probably have attacked any large animal that moved anywhere near the nest. Whether the rock-wallabies inhabiting this area in 2004 moved to another nearby site, whether they were sheltering out of sight of the eagles (and us) or whether they had been predated, we do not know; however, we believe that the lack of rock-wallaby sightings near the nest can be attributed to the eagles. There were no rock-wallaby remains at the nest; only those of a wedge-tailed shearwater.

The aim of the 2004 and 2005 work was to develop a method of monitoring rock-wallabies on Barrow Island, not to provide an estimate of the total population. Of the methods trialed, we conclude that 'daytime searching' is the only one available to monitor rock-wallabies on Barrow Island. It should provide an index of abundance. Therefore, we have provided a prescription to be used in future monitoring.

Assuming that the rock-wallabies do not move far from their shelter habitat from year to year, an indication of minimum population size might be gained adding the maximum number of animals sighted in each site over several years. When this is done for the 2004 and 2005 counts, the maximum number sighted is 78 (Table 1). Further counts could refine this minimum estimate.

The following points are relevant in designing the monitoring prescription:

- A minimum of two personnel is required for effective searching, as well as for safety reasons.
- It would be more efficient to have three people available, with one person driving the vehicle to the next access point, eliminating the need to walk back to the vehicle after a search, as has been done so far. All three could take turns searching and driving or two people could search and the third act only as the driver. In the former case, all three people would require a Chevron driving permit, obtained by attending the Chevron defensive driving course.
- Figure 1 shows the frequency of rock-wallaby sightings against the time of day. In interpreting this figure the following is relevant:
    - Searching did not commence until there was sufficient light to see where we were walking, at about sunrise or 6:45 am.
    - More effort was put into searching in the morning.
    - We left the search area for lunch at about 11:30 am.
    - On many days we did no searching between 11:30 am and 3:00 pm.
    - Searching ceased about 5:00 pm.

  Nevertheless, Figure 1 suggests that more wallabies are sighted in the early morning after the sun is up (from about 7:00 am to 10:30 am) than immediately after dawn, in the late morning or in the afternoon.
- Strong winds appear to result in fewer sightings. Strong easterly winds are common at Barrow Island in winter. Table 3 shows mean wind speeds at the old Barrow Island weather station in the centre of the island. It shows little variation in wind speed throughout the year. However, these monthly averages do not show the frequent strong winds during winter, interspersed with calmer weather. Winds in spring tend to be lighter and more even. From late November through the summer months, the hot weather results in greater stress on the walkers and may cause the wallabies to seek deep, shaded shelter earlier in the day.

ROCK-WALLABY MONITORING PRESCRIPTION

1. Monitoring should be conducted in spring from late September to early November.
2. Two, preferably three, people should take one week to complete the work. Two people will do the actual searching. If three people are available, one will drop the walkers at a location and then drive to the next vehicle access point to pick them up again.
3. Each walker must have a pair of binoculars, drinking water, and a portable two-way radio. One person will carry colour air photographs with the ‘sites’ to be searched marked on them, plus a notebook or data sheet.
4. Searching should commence about half an hour after sunrise. Additional searches can take place later in the morning and in the afternoon; however, each site should be searched at least once between 30 minutes after sunrise and three hours after sunrise.
5. Where the terrain permits, one person will walk above the cliff top while the other walks below the cliff. The two people should keep close to each other and walk quietly so rock-wallabies are not frightened before they are seen. Attention needs to be paid to rockpiles at the base of cliffs and to the clumps of figs growing on the scree or just above the cliff

edge. Wallabies may be flushed from these by walking close by, making a noise (eg, by clapping the hands) or by throwing a stone into the edge of the clump.

6. The terrain in and near rock-wallaby shelter habitat is undulating with cliffs and steep screes. Above the cliff edge, there are large areas of exposed limestone, often highly weathered. Safety procedures are overviewed in the *2005 Barrow Island rock-wallaby monitoring health, safety and environment plan* (Burbidge 2005). Basic safety rules during walking are:
    - Walk slowly and carefully. Do not rush, do not jump.
    - Always look where you are putting your feet; do not look for wallabies while you are moving.
    - Do not approach the cliff edge unless you have checked the area and ensured that it is safe to do so. Do not walk on undercut areas or on fragile edges. The cliff edge in the north of the area (sites 1 to 6) is crumbling and unsafe. Some other areas have similar characteristics, especially near Bogg's Beach (sites 16 to 32).
    - Where it is possible to walk below the cliff, take care to avoid steep slopes or areas where the ground is unstable. If you enter such an area, turn around and retrace your steps to safer ground.
    - The walker above the cliff should not drop small stones into fig clumps below the cliff unless s/he is certain that the other person is not nearby.
    - Carry plenty of drinking water and take frequent drinks. Avoid the hottest part of the day (early afternoon).
7. Each site should be searched at least twice, with at least one search being in the early morning between 30 minutes after sunrise and three hours after sunrise.
8. All rock-wallabies sighted should be recorded in a note book or on a data sheet, with the higher number of the two (or more) searches being the accepted number for that site.

ACKNOWLEDGEMENTS

This project is part of the joint CALM – Chevron Barrow Island mammal monitoring program. We thank Stephan Fritz of Chevron for arranging the trip, Kris Holmes and Nikki Meskanen of RPS Bowman Bishaw Gorham for helping to arrange our visit and Luke Ulstrup of Chevron for looking after us on the island.

REFERENCES

Burbidge, A. (2005). 2005 Barrow Island rock-wallaby monitoring health, safety and environment plan. Compiled by RPS Bowman Bishaw Gorham. Chevron Australia Pty Ltd, Perth.

Burbidge, A.A. and Drew, M. (2004). Barrow Island Nature Reserve rock-wallaby survey November 2004. Unpublished report, Department of Conservation and Land Management, Woodvale.

Table 1. Maximum number of rock-wallabies sighted in defined 'sites' at Barrow Island Nature Reserve

Site No.*	2004 max count	2005 max count	Higher count
1	1	0	1
2	1	2	2
3	3	2	3
4	1	0	1
5	2	0	2
6	1	1	1
7	0	2	2
8	1	1	1
9	1	0	1
10	2	1	2
11	0	0	0
12	2	5	5
13	0	0	0
14	5	0	5
15	3	2	3
16	3	1	3
17	2	4	4

Site No.	2004 max count	2005 max count	Higher count
18	1	1	1
19	2	4	4
20	4	0	4
21	4	8	8
22	7	1	7
23	7	8	8
24	2	2	2
25	1	1	1
26	2	0	2
27	1	2	2
28	0	0	0
29	0	0	0
31	0	1	1
30	0	0	0
32	0	1	1
33	0	1	1
Total	**59**	**51**	**78**

* See Appendix 1 for location of Sites.

Table 2. Barrow Island Airport daily weather observations, August 2005 (Bureau of Meteorology data)

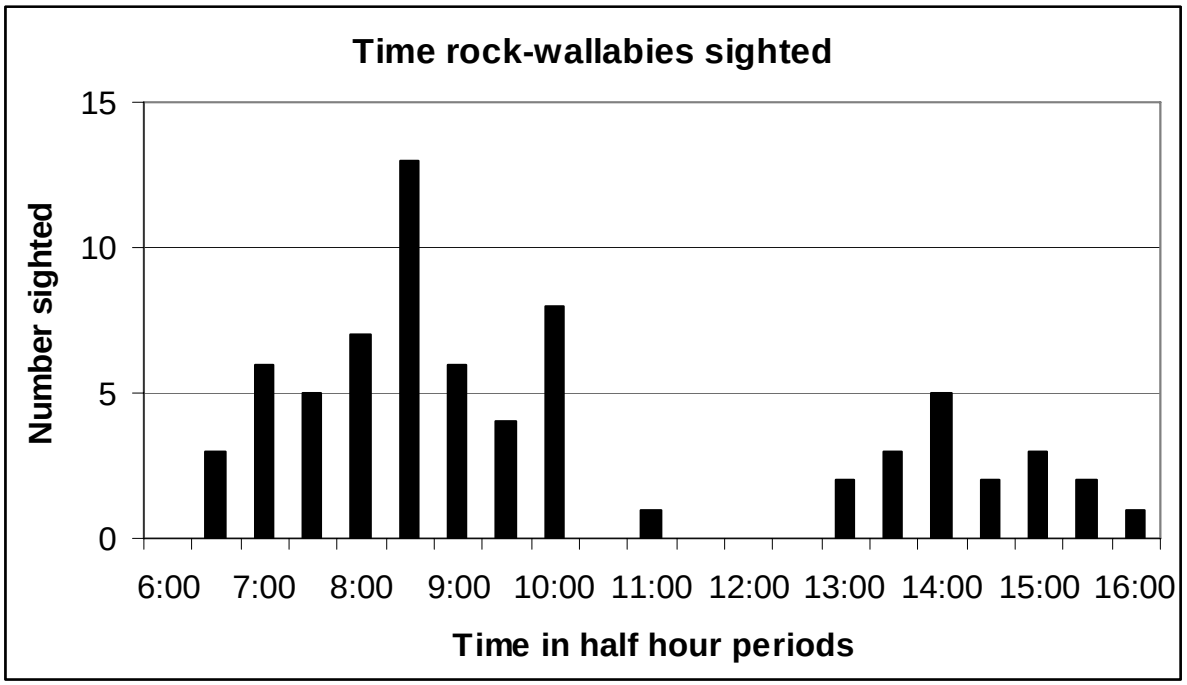
Date	Min Temp °C	Max Temp °C	Rain (mm)	Max wind gust km/h		
				Direction	Speed	Time
3	21.6	26.7	0.4	SSE	35	0648
4	19.5	24.0	0	NE	50	1238
5	17.1	25.1	0	ENE	30	1214
6	17.1	25.0	0	SW	33	0034
7	18.2	25.0	0	E	52	1058
8	18.6	24.2	0	E	59	0955
9	17.9	23.7	0	ENE	46	1015
10	20.3	24.8	0	SSE	35	0954

Date	9:00 AM observations				3.00 pm observations			
	Temp °C	RH %	Wind dir	Speed	Temp °C	RH %	Wind dir	Speed
3	22.4	73	SE	24	25.8	32	SSE	7
4	23.1	54	ENE	43	23.6	50	NE	41
5	22.9	56	E	15	23.8	38	ENE	13
6	22.8	45	E	28	24.3	43	ENE	11
7	22.5	46	E	33	24.2	55	NE	22
8	22.2	39	ENE	44	23.5	47	ENE	31
9	22.2	49	ENE	31	23.1	54	NE	31
10	22.4	56	S	24	24.2	63	SSW	9

Table 3. Average wind speeds (km/h) at the ‘Barrow Island’ weather station (Bureau of Meteorology data)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
9 am	21.8	19.7	20.0	19.2	22.3	23.5	24.0	22.2	22.4	24.0	24.0	22.9	22.2
3 pm	25.9	23.9	21.7	19.8	20.9	23.8	22.3	21.9	23.5	25.1	26.4	26.4	23.5

Figure 1. Time rock-wallabies were sighted in half-hour periods from 6.30 am to 4.30 pm



Appendix 1. Aerial photographs of the west coast of Barrow Island showing ‘Sites’ searched

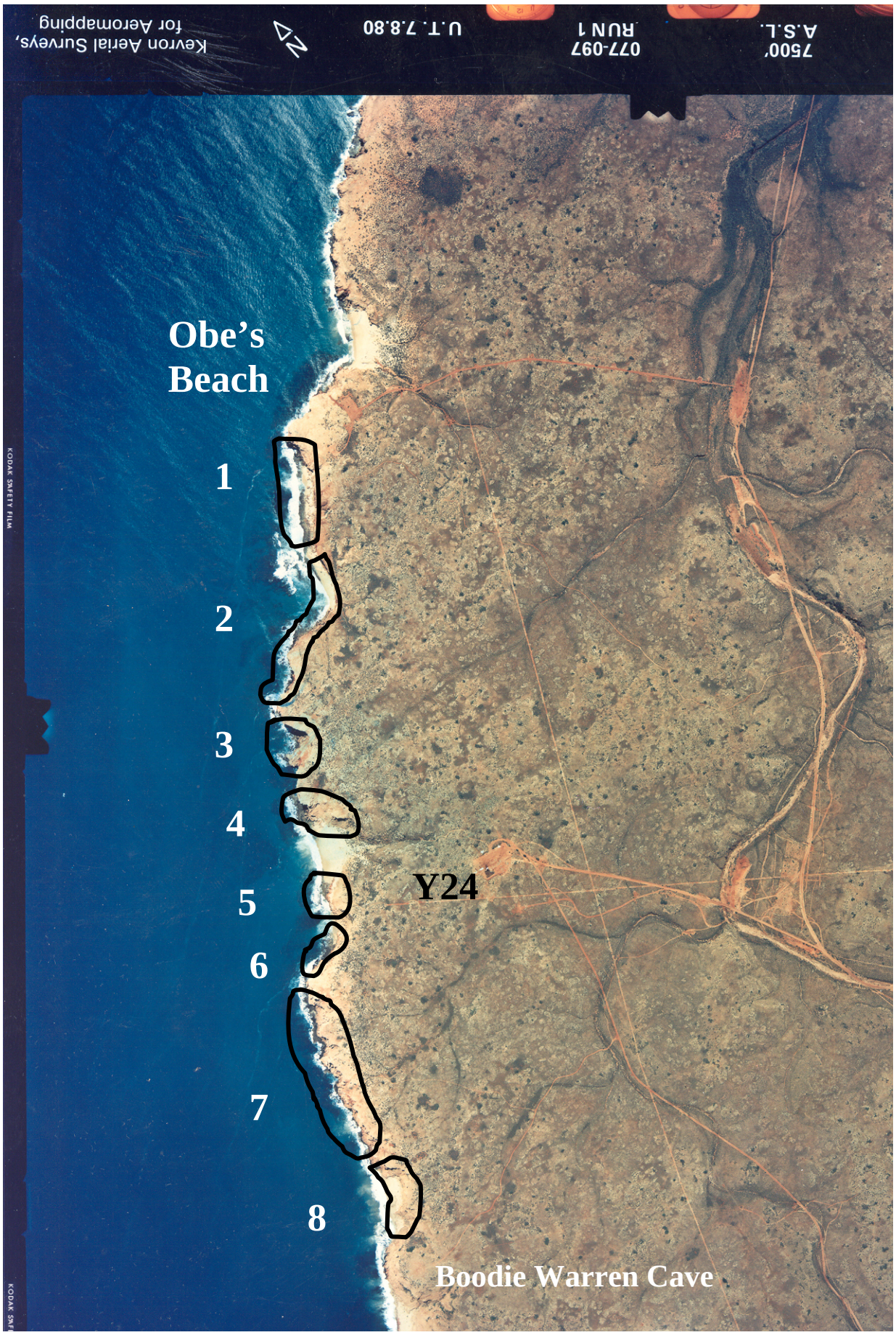


Photo 91

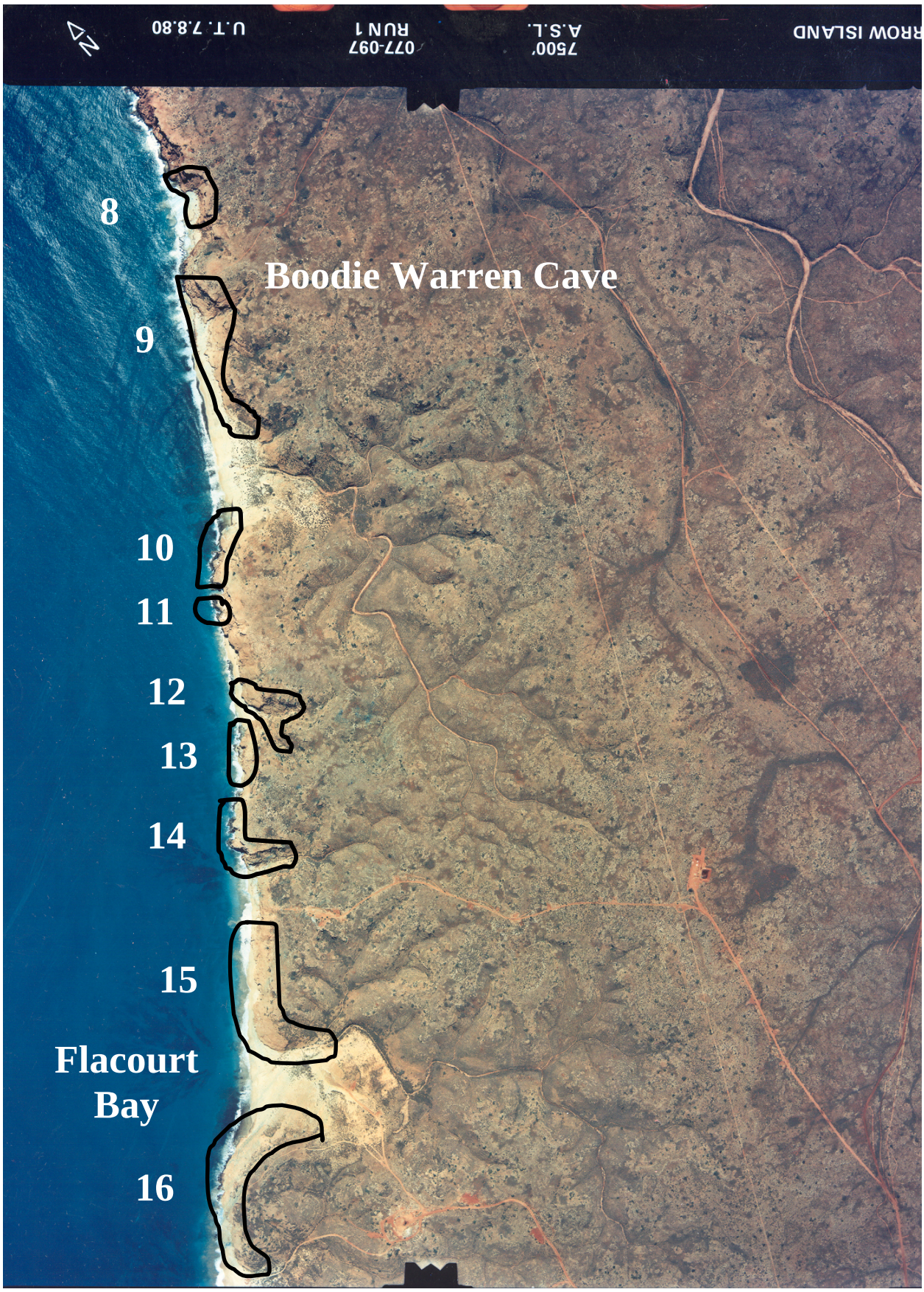


Photo 89

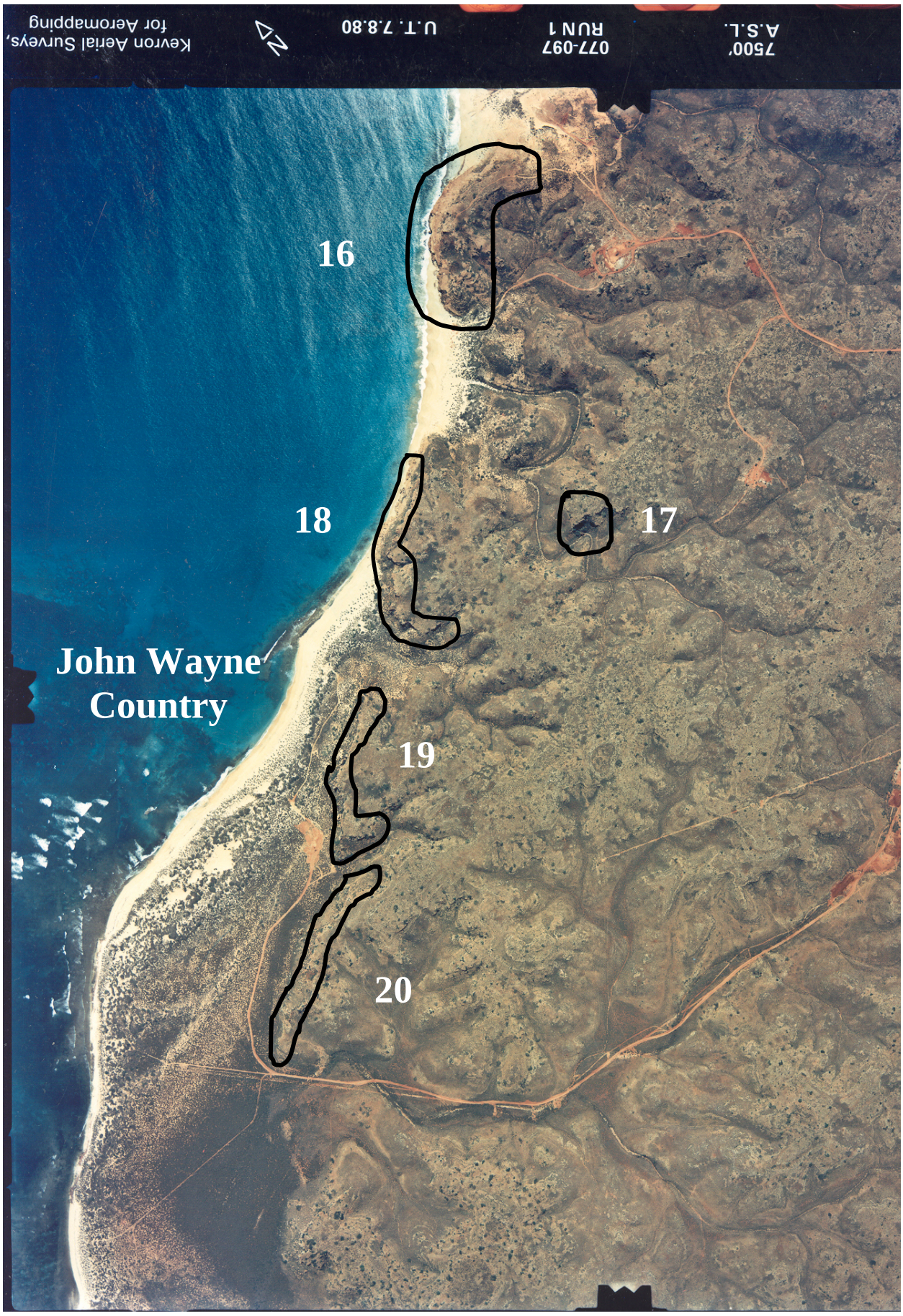


Photo 87

Photo 85, inland

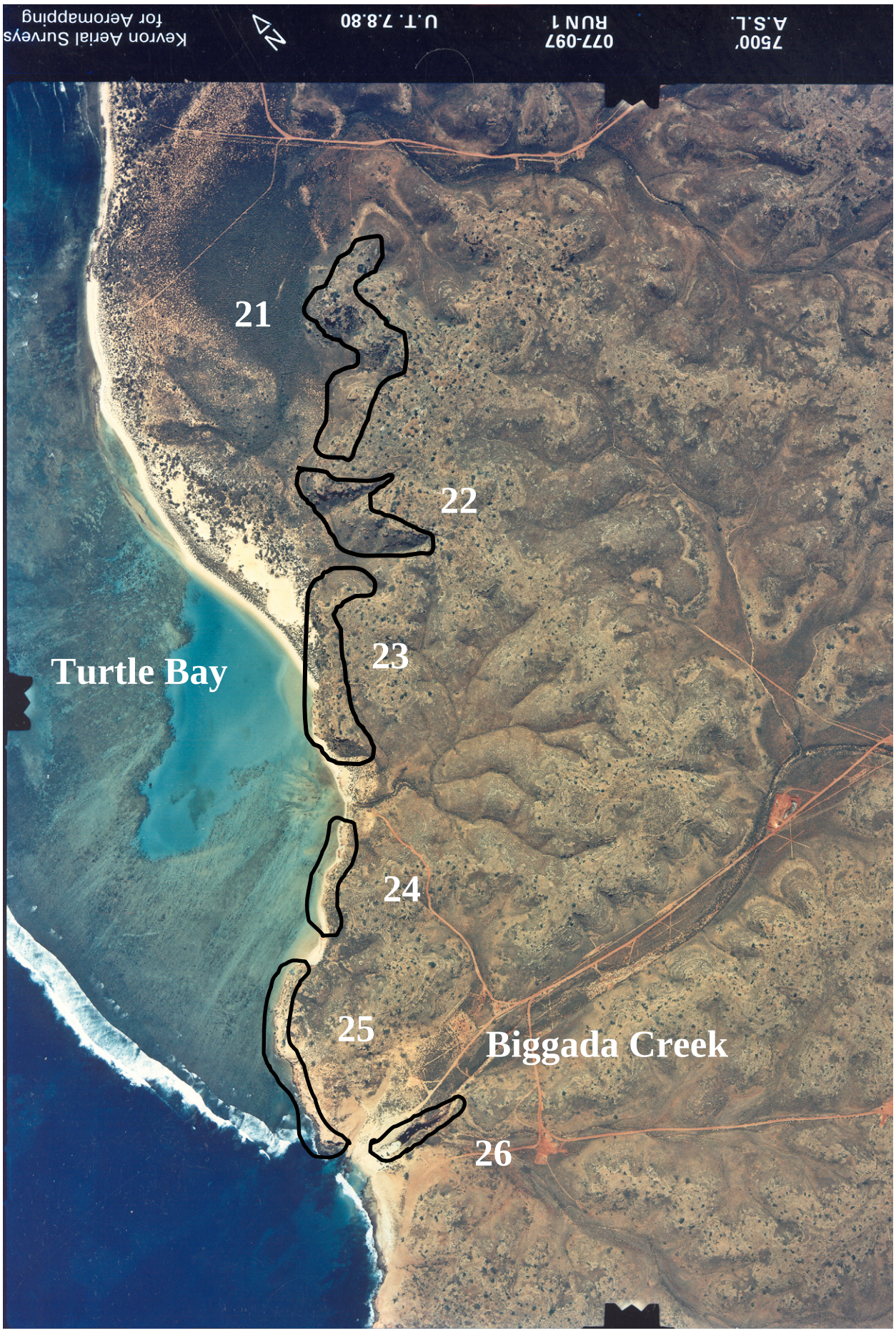

Kevron Aerial Surveys
for Aeromapping
N
U.T. 7.8.80
RUN 1
077-097
7500'
A.S.L.
21
22
23
24
25
26
Turtle Bay
Biggada Creek

Photo 85

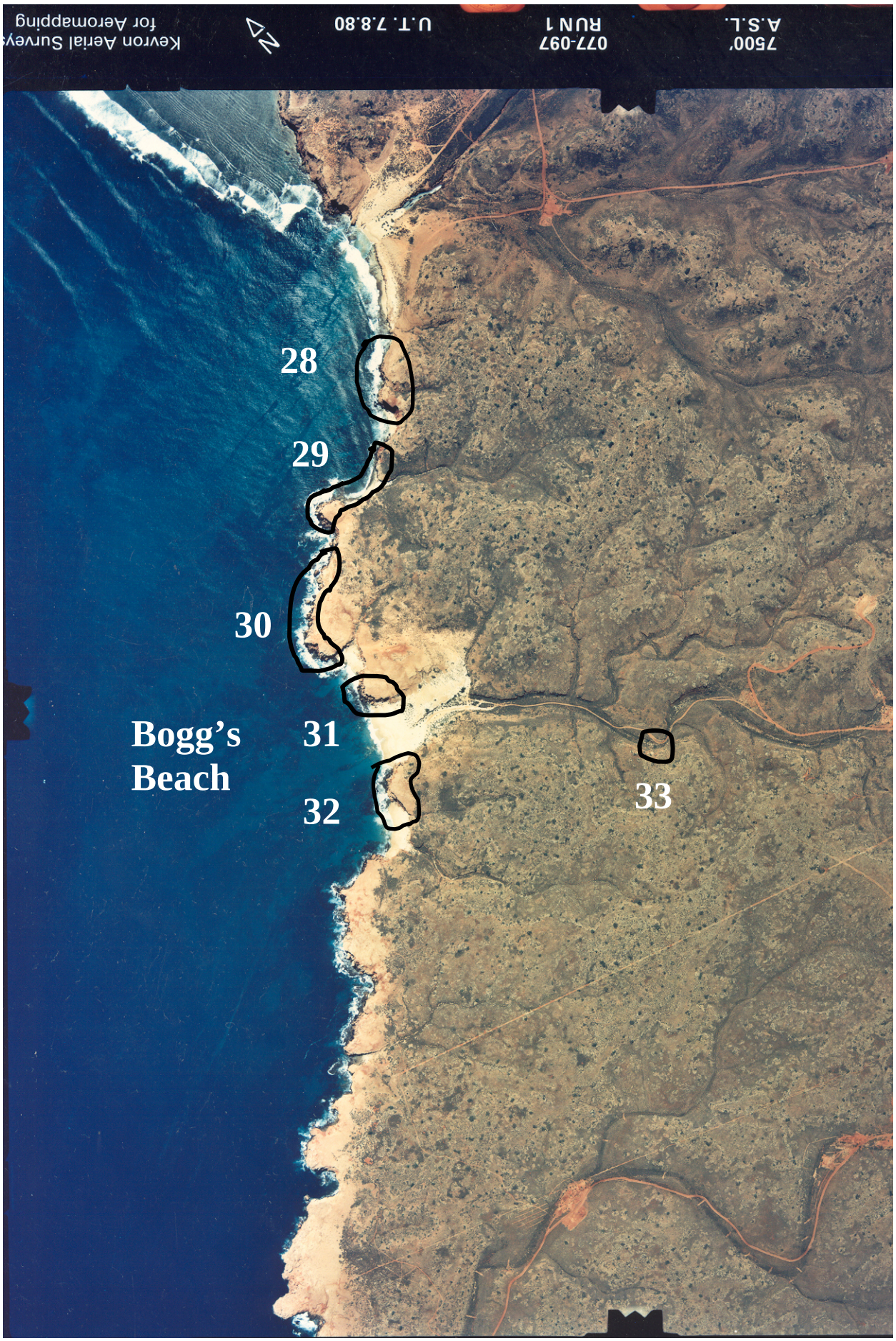


Photo 83