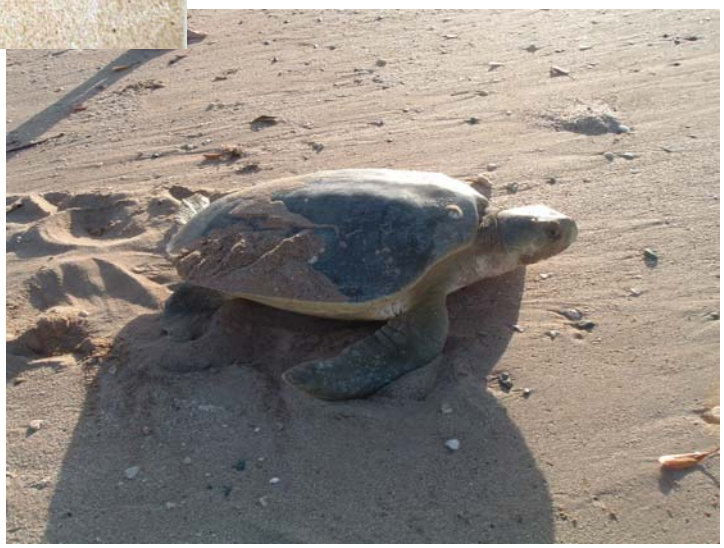
Aerial survey of beaches between Onslow to Port Hedland for marine turtle nesting

2004



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June 2005

ABSTRACT
This study aimed to detect beaches along the mainland and island coastlines between Onslow and Port Hedland that were being used for nesting by marine turtles. The results provide a snapshot of turtle nesting along this coastline. They highlight the importance of certain locations, particularly some islands, for marine turtle populations. Further surveys and ground truthing will be required to determine which species are using each location, and whether some locations are more important to some species than others.

INTRODUCTION
Four species of marine turtles nest on beaches in Western Australia: Hawksbill, Green, Flatback and Loggerhead turtles. Little is known about turtle nesting on the mainland coast of the Pilbara region, although nesting is relatively well documented on islands off the coast.

Marine turtles are listed threatened species both nationally and internationally. Green and Hawksbill turtles are listed as critically endangered by the IUCN and vulnerable in Australia. Loggerhead turtles are listed as endangered by both the IUCN and in Australia. The Flatback turtle is listed as data deficient by the IUCN, but not currently listed in Australia, although it is recognised that it is subject to many of the same threats as other turtle species. Marine turtles are subject to a number of threats both within and outside of Australia, and it is important that we improve our knowledge of these species to be able to put appropriate management in place.

The aim of this project was to determine whether marine turtles were nesting on any beaches on the mainland coast of the Pilbara region, between Onslow and Port Hedland, and to confirm previous observations of nesting on island beaches.

Aerial surveys are a quick way to determine whether nesting is occurring on a particular beach. If new beaches are detected, further surveys and ground truthing would be used to determine the particular species that is nesting on a particular beach.

METHODS
Flights were conducted in a Cessna 172 aircraft, hired from Karratha Flying Services. Two sets of flights were undertaken – one from Karratha to Onslow and return and a second from Karratha to Port Hedland and return. Flights were conducted in late September (28th and 29th) and mid December (13th and 14th) 2004.

The plane flew at just above 400 feet, and approximately 200-300 feet horizontally from the shoreline, travelling at 70-80 knots. An observer sat next to the pilot in the left front seat and directed the pilot along the flight path. The plane landed at the end of the outward flight so the pilot and observer could change seats, to enable the observer to view the coastline on the return flight. The flight path followed the mainland coastline on the outward journey and then flew over islands on the return journey. Where possible, islands were circled so the observer could see all beaches.

The observer noted where turtle tracks were seen and counted how many were seen on particular beaches. Tracks were observed through binoculars where possible. In some cases, the observer was able to determine the species of turtle that had made

the track but this was not always possible due to flight speed, flight height or the position of the sun. It was noted whether tracks had been made the night previous to the flight, or whether they were older.

RESULTS

Karratha to Onslow

September 2004

No turtle tracks were observed on any mainland beaches between Karratha and Onslow. Tracks were observed on a number of islands as listed in Table 1. The most tracks were seen on Sholl (6), Long (6), Round (5) and Large (4) Islands. The majority of the tracks seen were identified as being made by Hawksbill turtles. However, on Sholl and Large Islands the species of turtle was not identified as the tracks crossed over each other making identification from the air impossible.

December 2004

No turtle tracks were observed on any mainland beaches between Karratha and Onslow. Tracks were observed on a number of islands as listed in Table 1. The most tracks were seen on Direction (10), South West Twin (3) and Sholl (3) Islands. One green turtle was sighted in the water off Pup Island. In addition, a number of islands had tracks that were not made the night before but had been made this nesting season. These were Fortescue (30+ tracks, northern end), Sholl (20+ tracks, eastern beach), Long (50+ tracks, eastern side), Great sandy (25+ tracks, eastern side) and Middle Mangrove (20+ tracks, southeast corner) Islands.

It was difficult to identify the species of turtle that had made the tracks during this flight, although tracks made by three species were seen. Generally, Hawksbill and Green tracks were seen on north western or southern beaches, while Flatback tracks were seen on beaches on the eastern sides of islands.

Table 1: Number of tracks recorded on islands between Karratha and Onslow.

Island name	September	December
Steamboat		
Fortescue	2	
Mardie		
Stewart		
Sholl	6	3
Round	5	1
Long		2
Middle	6	
Angle		
Passage		
Solitary		
South Passage		1
Pup		1
Great Sandy	3	1
North Sandy	3	
East		
Middle Mary Anne		

Mary Anne		2
Large	4	
West		2
False		
Weld		
Little Rocky		
North Mangrove		2
Middle Mangrove		
South Mangrove		
NE Twin		2
SW Twin		3
Direction		10

Karratha to Port Hedland

September 2004

One turtle track was seen on the mainland approximately 1 km east of Munda Beach. Three tracks were seen on island beaches (Table 2).

December 2004

Large numbers of turtle tracks were seen on mainland beaches during this flight. Fifty eight (58) tracks were seen on Cowrie Beach, with 12 tracks on adjacent Victory Beach. Four (4) tracks were seen on Bell's Beach, near Wickham. Two tracks were seen on Reef Island (Table 2). In addition, two islands had tracks that were not made the night before but had been made this nesting season. Thus 12 tracks were seen on Downes Island and 4 on Ronsard Island.

Table 2: Number of tracks recorded on islands between Karratha and Port Hedland.

Island name	**September**	**December**
West Moore		
East Moore		
Depuch		
Sable	1	
Ronsard	2	
Reef		2
Weerdee		
Downes		

Dampier Archipelago

On the return flight from Port Hedland, a detour was made to check turtle activity on some islands in the Dampier Archipelago, particularly Rosemary, Legendre and Delambre Islands where extensive turtle activity has been recorded previously. The species of turtle that made these was not identified due to the angle of the sun and the height and speed of the plane.

Table 3: Turtle tracks recorded on islands of the Dampier Archipelago.

Island name/location	Number of tracks
Rosemary Island	
Tish point beach	6
Beach 7	18
Beach 6	10
Beach 5	2
Beach 4	4
Beach 3	4
Beach 2	1
Beach 1	3
Chookie Bay	12
Shack point	10
Norbill Bay	12
West of Norbill Bay	42
Legendre Island	
Western beach (north side of island)	10
Long eastern beach (north side of island	50
Delambre Island	
Eastern side	10
Western side	12

DISCUSSION

This study highlights the importance of certain areas, particularly islands, along the coast between Onslow and Port Hedland to marine turtle populations. The results confirm existing knowledge to a large extent, but provide useful data on numbers of turtles using more remote locations that are not often visited.

Locations that appear to be of most importance to nesting turtles are Rosemary, Delambre and Legendre Islands in the Dampier Archipelago, many of the islands in the Great Sandy Islands Nature Reserve, Middle Mangrove Island, Bell's Beach, Munda (Cowrie Beach and Victory Beach) and Cemetery Beach. This survey also highlights that only a small percentage of this entire stretch of coastline is actually used by nesting turtles. This means that the areas that are in use are important and need to be managed with turtle conservation in mind.

No mainland nesting sites were observed between Karratha and Onslow during this study. However, turtle nesting (Green and Flatback) has previously been recorded on the beaches of Cape Preston (pers. obs. Peter Kendrick & Geoff Kregor, CALM, 2003). Further visits, either by air on or ground or both, are required to confirm the presence of nesting turtles on these beaches. It is planned to undertake such visits in the 2005/2006 nesting season.

There are very few sandy beaches on the mainland coast between Onslow and Port Hedland, probably accounting for the very few records of turtle nesting along this stretch of coastline. However, sandy beaches are found on nearly all islands off this

coastline, and the results of this study confirm that most of these islands are used by nesting turtles to a greater or lesser extent.

An attempt was made to capture the coastline beaches on a video camera on the first flight from Karratha to Onslow. However, the structure of the windows and the vibration of the plane made it difficult to obtain a visual image. In addition, it was attempted to link the video camera to a GPS to record the actual location of tracks seen, but the link between the camera and GPS could not be established. This technique has been used successfully on the Ningaloo coastline and should be investigated further for future surveys. Digital still photography should be investigated on future aerial surveys to assist in identification of individual turtle tracks.

ACKNOWLEDGEMENTS

CALM would like to thank Woodside Energy and BHP Billiton Iron Ore for their generous support for this study.

We would also like to recognise Adam of Karratha Flying Services, for his willingness to adjust his flight path to suit our requirements.

Aerial survey of coastal beaches for Marine turtle activities

Object:
To identify which beaches are used by Marine turtles as nesting beaches.

There was two flights flown in each direction Southwest to Onslow and two north east to Pt Hedland One flight each way was done at the end of September, this flight should have been able to show which beaches were being used by Hawksbill turtles as this flight was setup to be to early for the other two species Greens and Flatbacks. The second flight is programmed for the middle of December when there should be Greens and Flatbacks and only a few Hawksbills

Dates of flights

Karratha to Onslow 28th of September
Karratha to Pt Hedland 29th of September
Karratha to Onslow 13th December
Karratha to Pt Hedland 14th December

The flight to Onslow started at 06.30 so that we could take advantage of the low sun angle. This meant that there was better definition to the turtle tracks making them easier to see, and it possible to tell the difference between Paired and alternate tracks of Hawksbills and Green turtles using a pair of Binoculars if the plan is not shacking too much. Flying at about 400ft, which is just above the lowest legal hight that we were able to fly. We flow down the coast with the observer seated in the L/H front seat to get the best view to the front and to the side at the beaches. We travel were possible approximately 200 to 300ft away from the shoreline. These distances gave a good view of the coast and any tracks that were on the beaches.

The flight flew down the coast with observers watching the coast on the left. There were no fresh tracks or nest seen on any beaches between Karratha and Onslow on either flight. The plane landed at Onslow so that pilot and observer could change seats. The flight back up the coast covered all the islands, which were generally circled so that a good view of all the beaches was obtained. Most of the islands along the coast have rocky coastlines to the west and any beaches are generally on the North, east or southern sides.

September flight south and Islands that had signs of turtle activity

Large I	4 tacks
	2 nests
Great Sandy I	3 tracks
North Sandy I	3 tracks
Middle I	2 Tracks
Long I	6 tracks
Round I	5 tracks
	3 nests

Sholl I	6 tracks
Fortescue I	2 Nests

December flight south and Islands that had signs of turtle activity overnight

Direction I	10 tracks
SW Twin I	3 tracks
NE Twin I	2 tracks
North Mangrove I	2 tracks
West I	2 tracks
Mary Anne I	2 tracks
Great Sandy I	1 track
Pup I	1 track = 1 Green turtle sighted
South Passage I	1 track
Long I	2 Tracks
Round I	1 Track
Sholl I	3 tracks

Islands that have been used by Turtle (this season but no FRESH)

Fortescue I	30+ tracks on the northern end
Sholl I	20+ tracks on the eastern beach
Long I	50+ tracks on the beach on the eastern side
Great sandy I	25+ tracks on the eastern side
Middle Mangrove I	20+ tracks on the SE corner

The above locations were islands that are used regularly by turtles more so than other beaches listed

The flight up the coast On the 29th of September was similar to the flight down the coast in the way it was run, but started later 06.30, as we would have been flying east into the sun to Pt Hedland unable to see anything because of the sun. On this flight only one track being found on the mainland coast that about 1km from the top end of Munda Beach the only other tracks found on the flight were on

Ronsard I	2 tracks
Sable I	1 track

The flight Karratha to Pt Hedland on the 14th of December used the same Times and flight path. Tracks were seen on the fallowing beaches

Cowrie Beach	58 tracks
Victory Beach	12 tracks
Reef Is	2 tracks
Bell's Beach	4 tracks

Some Islands had tracks on them, made this season but that had no visitors last night

Downes I	12 nests
Ronsard I	4+ nests

Results??
As best as could be established from the air (using binoculars) Most of the tracks seen on the October flight to the south were alternative tracks as made by Hawksbill Turtles although there was some tracks on large and Sholl Islands that were hard to separate because of the jumble of tracks over one an other on a short section of beach. On the December flight tracks were harder to identify but tracks from all three species were seen with usually hawksbill Turtles seen on western/ northern or southern beaches, green on both and Flatbacks being seen on beaches on the eastern sides of islands.

On the flight down the coast to Onslow we tried to Video the beaches in conjunction with GPS so that a visual record could be kept of the flight and the tracks but this was unsuccessful because of Crazing on the windows the Long distances involved and the vibrations of the aircraft. Digital still photography may work if individual photos were taken of tracks that could not be identified using binoculars.

The coastline between Karratha and Pt Hedland Is predominately Mangrove flats or rocky cliffs and beaches, areas that turtle do not use. Although there are sandy beaches on the few islands along the coast they have little use by turtles.

Maps attached show sighting highlighted in green for September flights and blue for December. There was only one short section of coast on the northern flight on which tracks were seen, the map only covers that section

Archipelago islands that were checked

When the flights up the coast to Pt Hedland were flown a detour was made to check turtle activity on some islands in the Dampier archipelago. In particular Rosemary, Legendre and Delambre Islands
The fallowing is a list of beaches and the activity observed

Rosemary Island

Tish point beach	6 tracks
Beach 7	18 tracks
Beach 6	10 tracks
Beach 5	2 tracks
Beach 4	4 tracks
Beach 3	4 tracks
Beach 2	1 track
Beach 1	3 tracks
Chookie bay	12 tracks
Shack point	10 tracks
Norbill Bay	12 Tracks
West of Norbill Bay	42 tracks

Legendre Island beaches on the northern shore about 2/3 the way along the island

Western beach	10 tracks
Long eastern beach	50+ tracks

Delambre Island

East side of island	10 tracks
Western side	12 tracks

These tracks could not be identified because of low light and the hight and speed of the plane as it was not part of the survey work.

2000

AERIAL SURVEY OF COASTAL BEACHES & ISLANDS FOR TURTLE ACTIVITY

NORTHERN RUM

OTHER TRACKS WERE FRESH

DOWNIES IS JUST OUT OF S Co

PT HEDLAND HAD 12 TRACKS

BELLS BEACH AT WICKHAM HAD 4 FRESH TRACKS

Beagle Reef

Inadequately Surveyed (see Note)

4 OLD NESTS POSSIBLE 04

DEC 2 TRACKS

Reef

Cossigny

12

058

TOWER

Well

COWRIE BEACH

VICTORY BEACH

SEPT 2 TRACKS

ISL

DEC 4 OLD NESTS NO TRACKS

Ronsard I (21)

KNOT

Extensive

swamps

SEPT 1 TRACK

DEC 0

Forestier Bay

see Plan

FORESTIER

Sable I (W Forestier I)

Breaks

Black Rk (dr 3.9m)

North Pt

Depuch I 13

Anchor Hill

153

West Moore I (13)

Sandy I D(3)

East Moore I (12)

Balla Balla Cr

Balla Balla Hr

S.Co

Swamp

Sherlock

swamps

Tidal Streams refered to HW at PORT HEDLAND

		ⓓ 20°35'S 117°13'E			ⓔ 19°59'S 118°30'E		
Hours		Dir	Rate (kn) Sp	Np	Dir	Rate (kn) Sp	Np
Before HW	6	105	0·6	0·2	157	0·4	0·1
	5	132	1·1	0·3	138	1·1	0·3
	4	143	1·1	0·3	136	1·3	0·3
	3	159	1·0	0·3	130	1·2	0·3
	2	177	0·7	0·2	125	1·0	0·3
	1	204	0·5	0·1	105	0·4	0·1

Tidal Levels referred to Datum of Soundings

Place	Lat S	Long E	Heights in metres above datum				
			MHWS	MHWN	MSL	MLWN	MLWS
Depuch I	20°38'	117°44'	5.4	3.3	2.9	2.5	0.4
Port Hedland	20 18	118 35	6.8	4.8	4.1	3.4	1.4

PILOTAGE

RELIABILITY DIAGRAM

30' 116' 30'

CE(20)770 CE(15)450 CE(10)250 CE(20) 550 CE CE(20) 450 CE(10) RE CE(10) 240 CE(10)120 CE(5) 200 CE(5) 110 CE(20) 850 CE(10)370 CE(10)450 CE(10) 250 CE(10) 110 CE(10)350 CE(20) 1350 CE(5) 200 CE(5) 160 CE(10)420 Aus 53 Port Hedland Cape Thouin RE see Aus 55 CE(10)600 CE(10)110 Depuch I CE(5)35 C Lambert CE(10)220

20' 30' 118' 30'

KEY TO SYMBOLS

POR

POR

Depths
which is
Water.

Heights
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Position
(1966); (

Navigat
Region

Projecti

Sources
R.A.N. H
figures a

TRAFFIC RE
Inward bound vesse
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draught, are to us
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depth is 10.2 metres
25 and 35 and ensure

2004 SEASON

AERIAL SURVEY OF BEACH & ISLANDS BETWEEN DAMPIER & ONSLOW IN SEPTEMBER AND DECEMBER 2004

SOUTHERN FLIGHT STREET

SOME ISLANDS WERE USED MORE THROUGHT THE SEASON

FORTESCUE I. 30+ SEASONAL TRACKS

SHALL I. 20+ " "

LACEY I. 50+ " "

GREAT SANDY I. 25+ " "

MIDDLE MANGROVE I. 20+ " "

SEPT - 6 TRACKS
DEC - 3 TRACKS

SEPT - 5 TRACKS
3 NIGHTS
DEC - 1 TRACK

SEPT - 6 TRACKS
DEC - 2 TRACKS

SEPT - 2 TRACKS
DEC - 50+ TRACKS

DEC - 1 TRACK
GREEN TURTLE

DEC - 1 TRACK

GREAT SANDY
SEPT - 3 TRACKS
DEC 1 TRACK

Tidal Levels referred to Datum of

Place	Lat S.	Long E.	Heights in metres above datum			
			MHWS	MHWN	MLWN	M
Serrurier I	21°36'	114°41'	1·8	1·3	0·8	
Onslow (Beadon Pt.)	21 38	115 06	2·0	1·4	0·8	
Large Islet	21 18	115 30	3·3	2·2	1·4	
Fortescue Rd	21 00	116 06	3·8	2·6	1·5	
Steamboat I.	20 49	116 04	3·8	2·7	1·6	

2004 SEASON

DEMAL - SURVEY

DAMPIER - ONSLOW

SOUTHERN Flight SHEET 2

AUSTRALIA—NORTH WEST COAST

WESTERN AUSTRALIA

BARROW ISLAND TO ONSLOW

DEPTHS IN METRES

SCALE 1:150 000 at lat 21°15'

INCOMPLETELY SURVEYED

Mariners' attention is drawn to the areas shown in blue on the reliability diagram which are the areas preferred for navigation on this chart. The information shown as surveyed but not shaded blue in the reliability diagram has mainly been derived from leadline and reconnaissance surveys and undiscovered shoals or less water may exist; the area is believed to be subject to sandwaves.

OIL AND GAS PIPELINES

In many cases submarine pipelines carrying flammable oil or gas are not buried in the seabed and depths may be up to two metres less than charted. Gas pipelines carry natural

Depths are in metres and are reduced to Chart Datum, which is approximately the level of Indian Spring Low Water

Heights are in metres. Underlined figures are drying heights in metres and decimetres, above chart datum; all other heights are above Mean High Water Springs.

Projection: Mercator. Positions are related to the Australian Geodetic Survey.

Authorities: R.A.N. surveys to 1974, R.N. surveys of 1899—1900 and contracted surveys of 1962. Soundings in upright figures are from earlier surveys.

PREFERRED ROUTES

Tracks shown – < – – > – – – – – have not been surveyed in accordance with

DEC - 2

DEC - 2 tracks

DEC - 2 tracks

SEPT - 0

DEC - 10 tracks

D - 2 tracks

S - 0

D - 3 tracks

about 2' annually

Mag Var 0°00'E(1979)