

What I learned from Limpus, Carter
and Hamann (2001) and

~~Quantifying a Nesting Season~~ ~~Identifying~~

Sussing out



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The Green Turtle, *Chelonia mydas*, in Queensland, Australia: the Bramble Cay Rookery in the 1979–1980 Breeding Season

COLIN J. LIMPUS¹, DAVID CARTER^{2,3}, AND MARK HAMANN^{1,4}

- Whole of season monitoring Bramble Cay
 - Track counts
 - Nesting success
 - Tagging of individuals
 - Marking nests
 - Hatching success

Figure 5 Nightly successful nesting and unsuccessful tracks

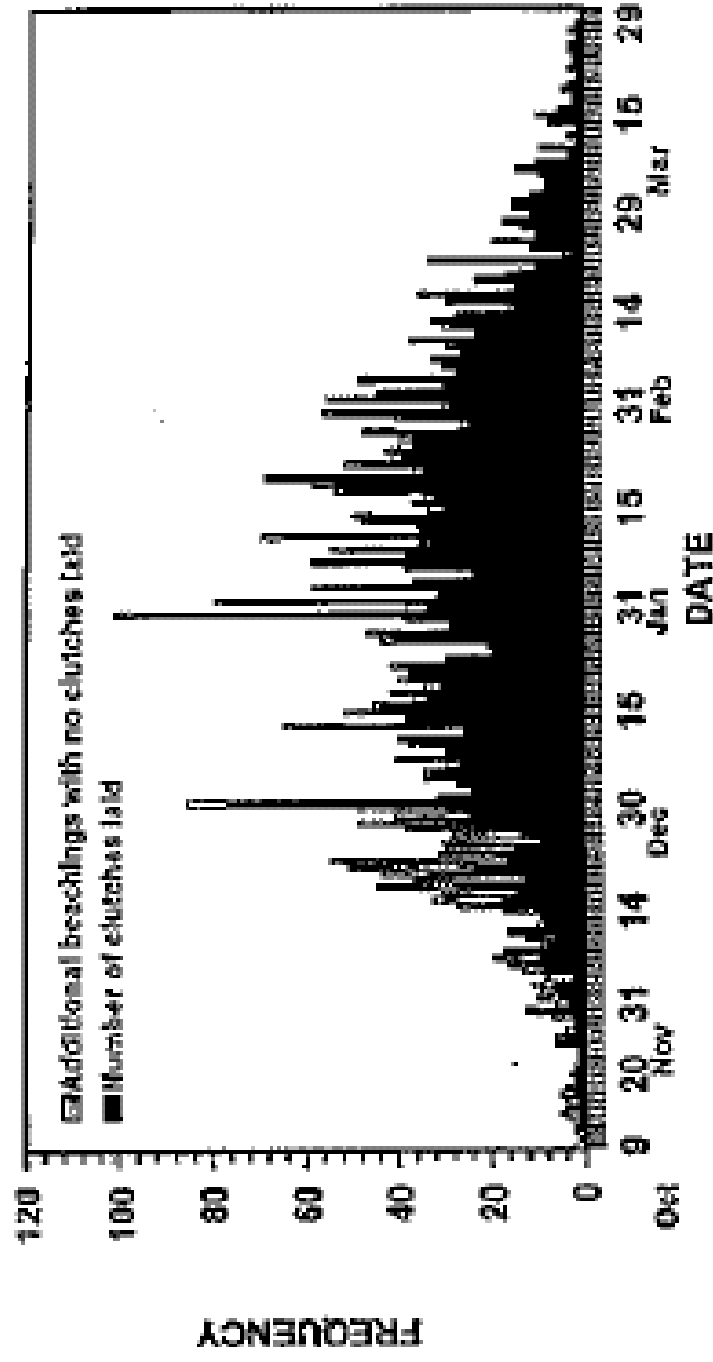


Figure 5. Nightly census of nesting green turtles, *Chelonia mydas*, at Bramble Cay, 1979-80 breeding season.

Figure 6 Cumulative arrivals and departures of nesters with available nesters at any time

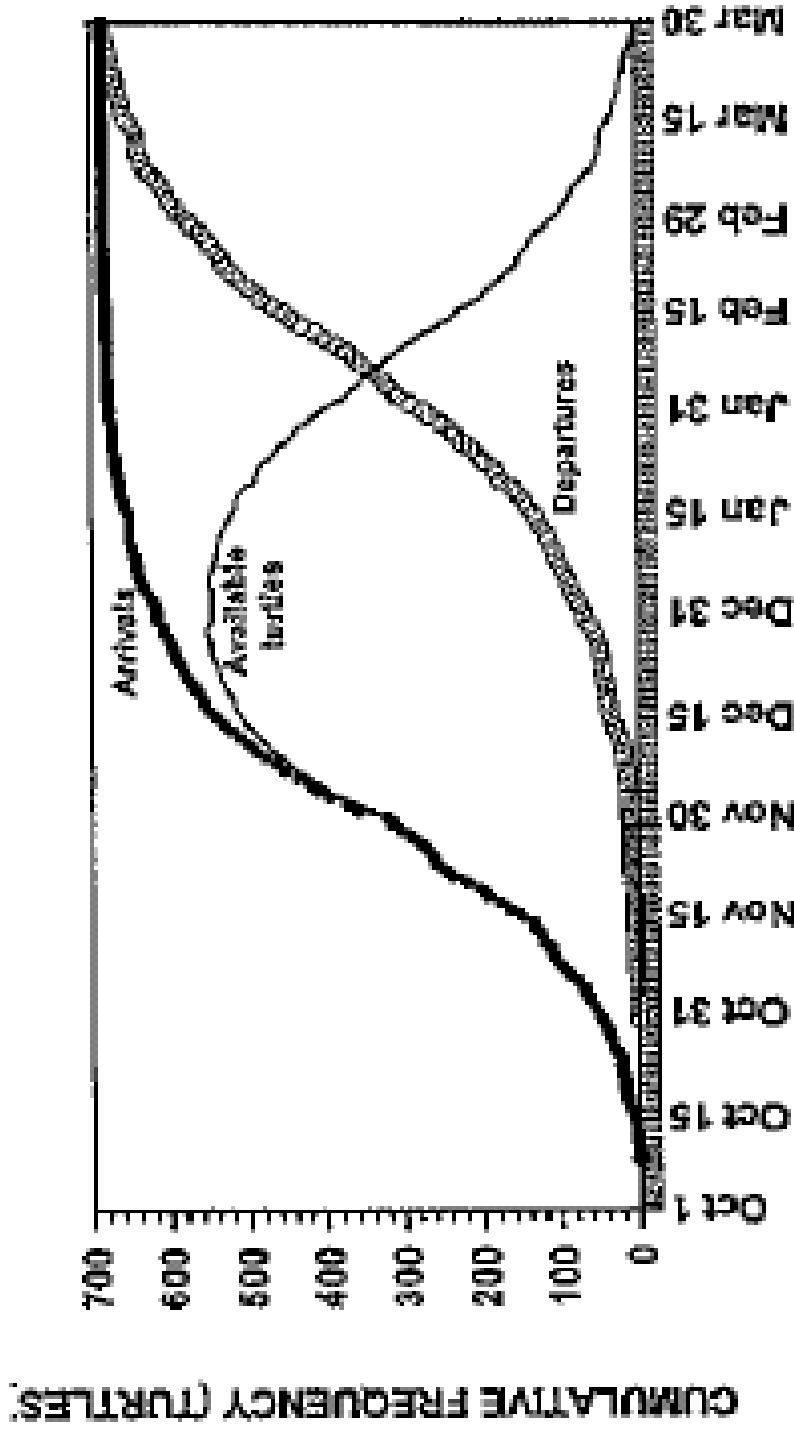


Figure 6. Cumulative arrival and departure of nesting female green turtles, *Chelonia mydas*, at Bramble Cay, 1979–80 breeding season.

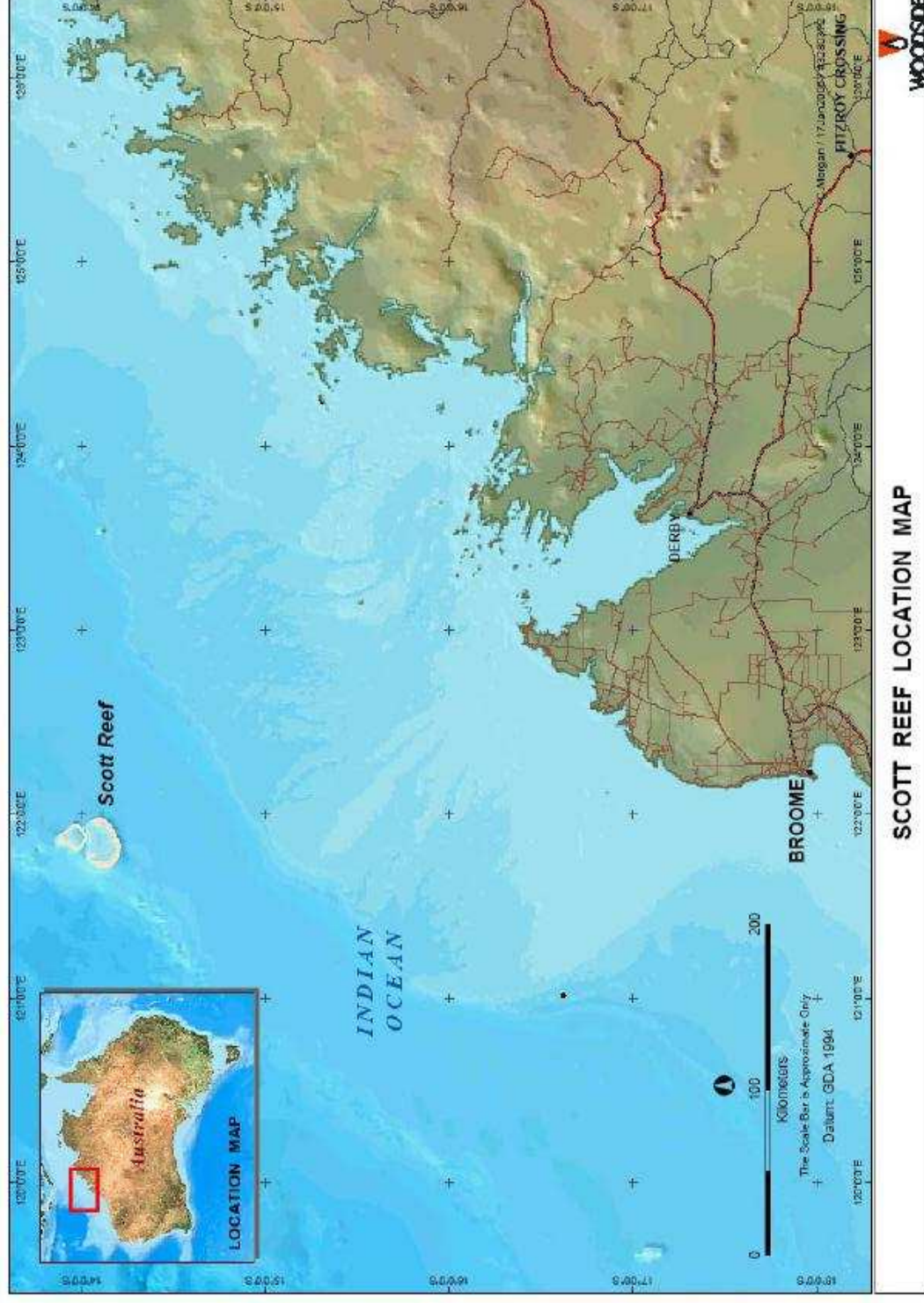
Nesting Season at Scott Reef

- Location Sahul Shelf
- Previous reports
- Bob Prince early 1990s
- Kellie Pendoley early 1990s and 2000s

Nesting numbers highly variable –
seasonality poorly defined

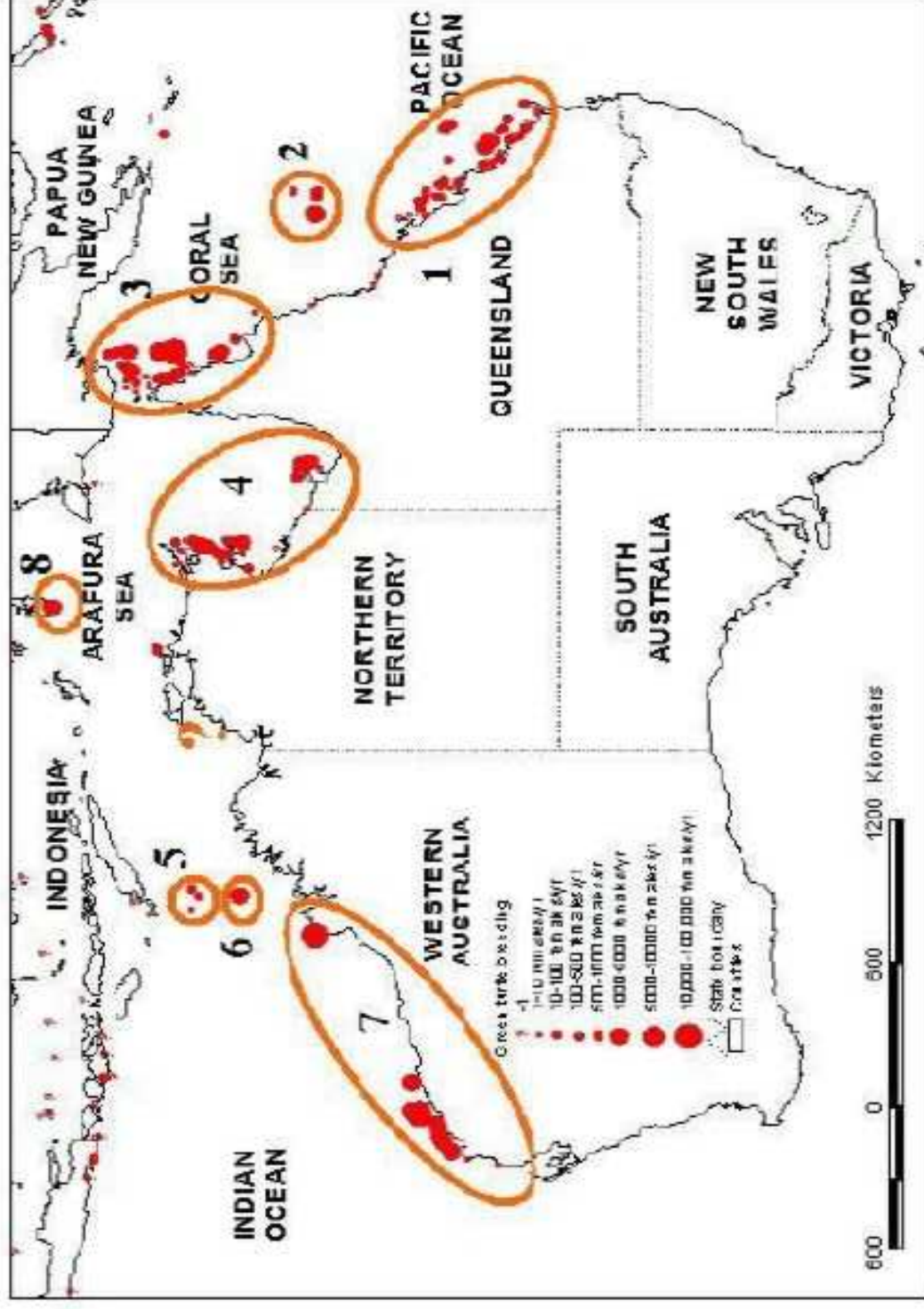
- Mick Guinea 1994, 2006, 2008, 2009, 2010, 2012

Sandy Islet, Scott Reef, Indian Ocean



Genetic Stocks of Australian Breeding Green Turtles :

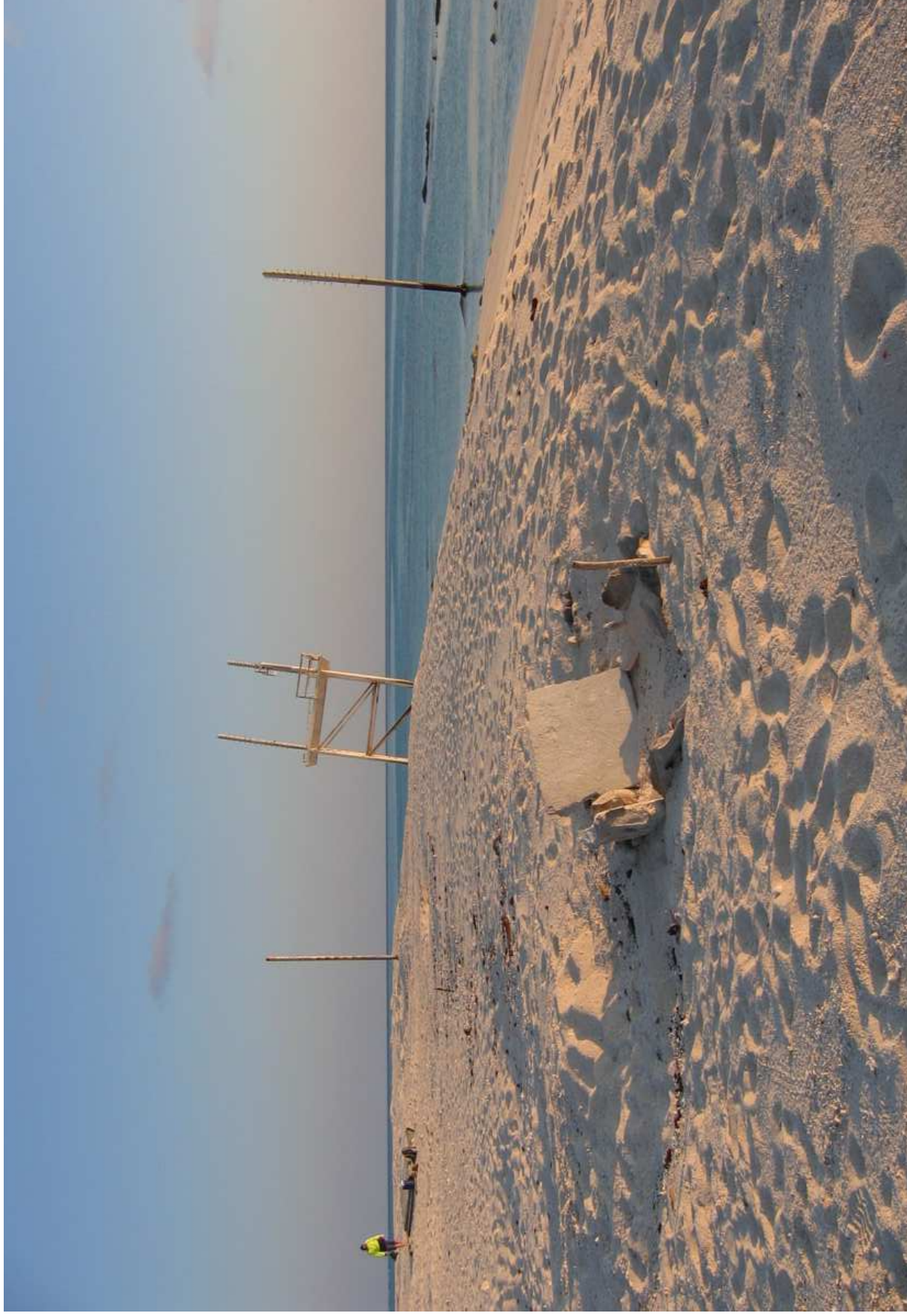
1 = southern GBR; 2 = Coral Sea; 3 = northern GBR; 4 = Gulf of Carpentaria; 5 = Ashmore Reefs; 6 = Scott Reef; 7 = Northwest Shelf. 8 = The Aru Islands Indonesian breeding stock (Dutton et al. 2002).



Sandy Islet (300 m x 70 m)



Sandy Islet Structures

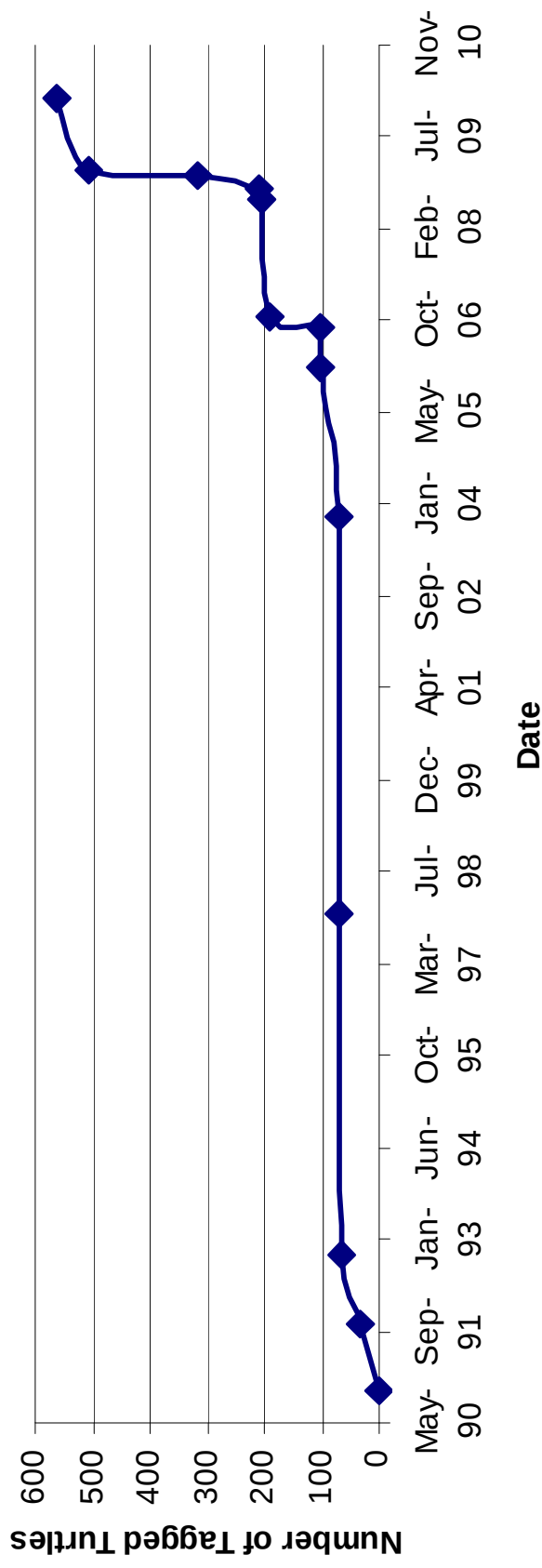


Population of greens and hawksbills



Time Line of Green Turtle Tagging at Sandy Islet, Scott Reef

Cumulative Number of Green Turtles tagged



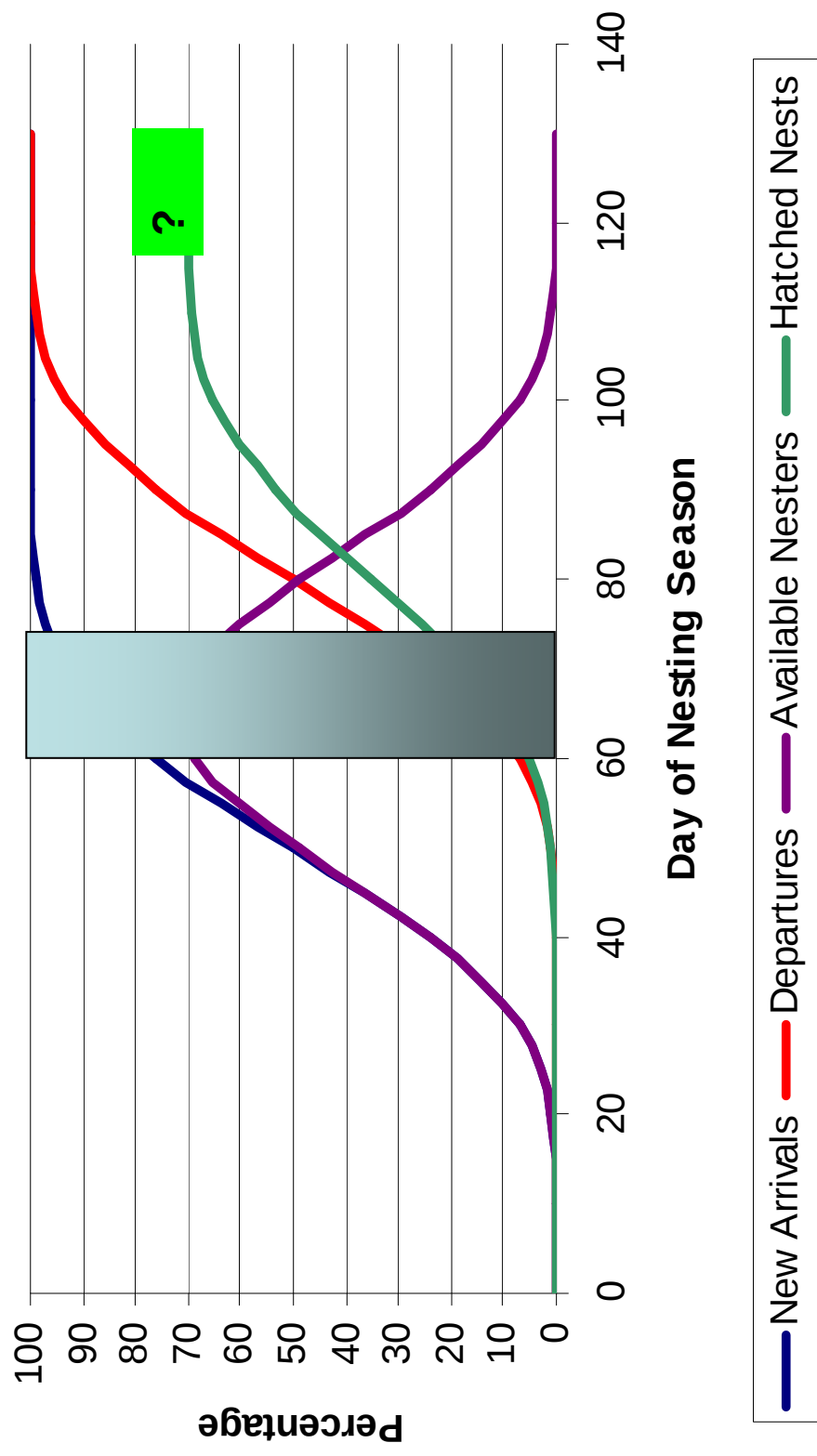
Surveys 2006 – 2010

(WEL Surveys)

Date	Number of nights	Time Ashore (hr)	#Green Turtles tagged	Mean # of tracks /night $\pm$ sd
15 – 25 Feb-06	3	24.0	29	16.2 $\pm$ 4.87
2 – 10 Sep-06	1	9.0	0	0
23 – 29 Nov-06	5	45.0	92	23.6 $\pm$ 7.57
27 – 31 Aug-08	2	26.0	10	9.3 $\pm$ 1.15
28 Sep- 3 Oct 08	6	35.0	4	7.8 $\pm$ 5.89
10 – 16 Dec-08	7	46.5	107	53.1 $\pm$ 16.87
25 Jan – 1 Feb 2009	7	67.5	193	71.9 $\pm$ 6.98
29 Jan – 11 Feb 2010	13	81.75	54	13.2 $\pm$ 5.43
Total	44	334.75	489	



Maximum information is gained by a 14 day survey in the middle of the nesting season
When is the middle of the season?
Which turtles are the new arrivals?



Need to suss out the Nesting Season

- Cumulative Frequency Distributions
 - Normal curve
 - Sigmoid curve
 - Logistic equation

Which data sets are useful?

How best to do it?

Solver (add in) Excel

Microsoft Excel - Scott Reef nests 2008_2009

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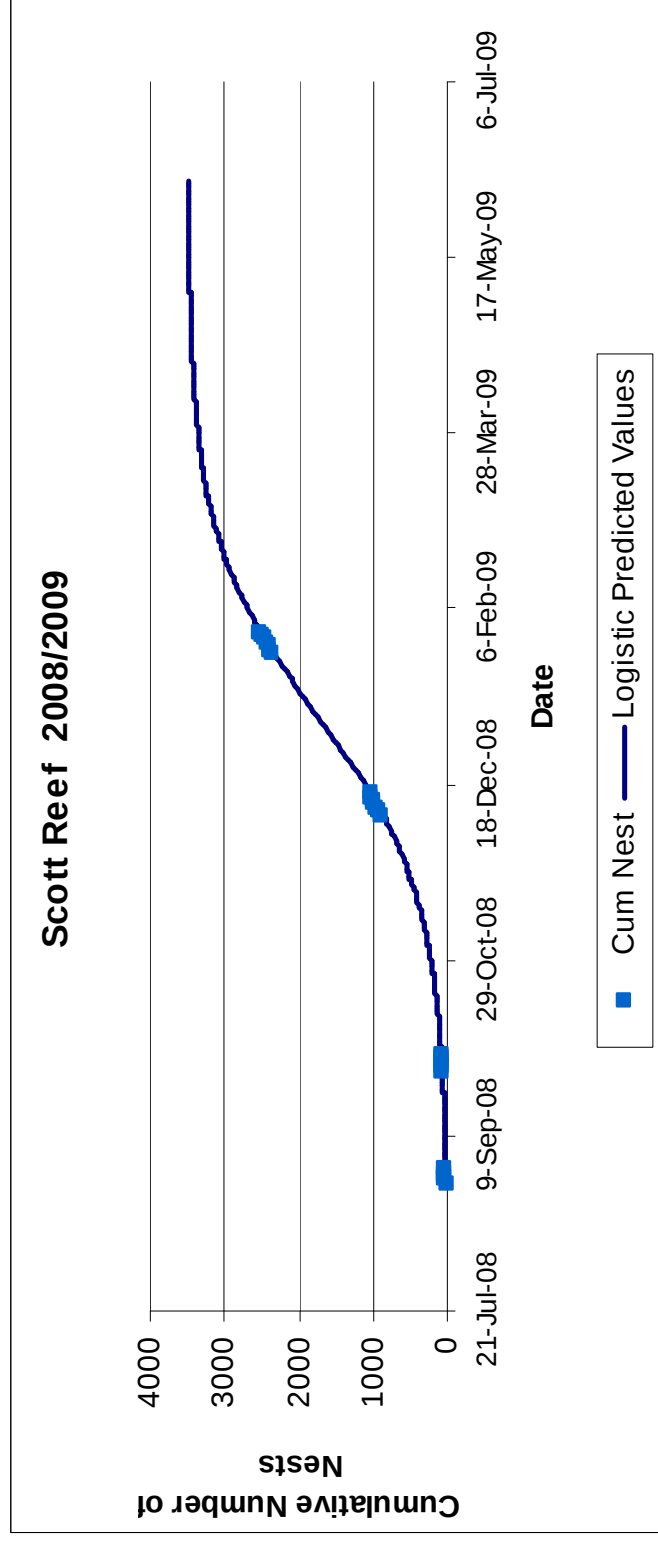
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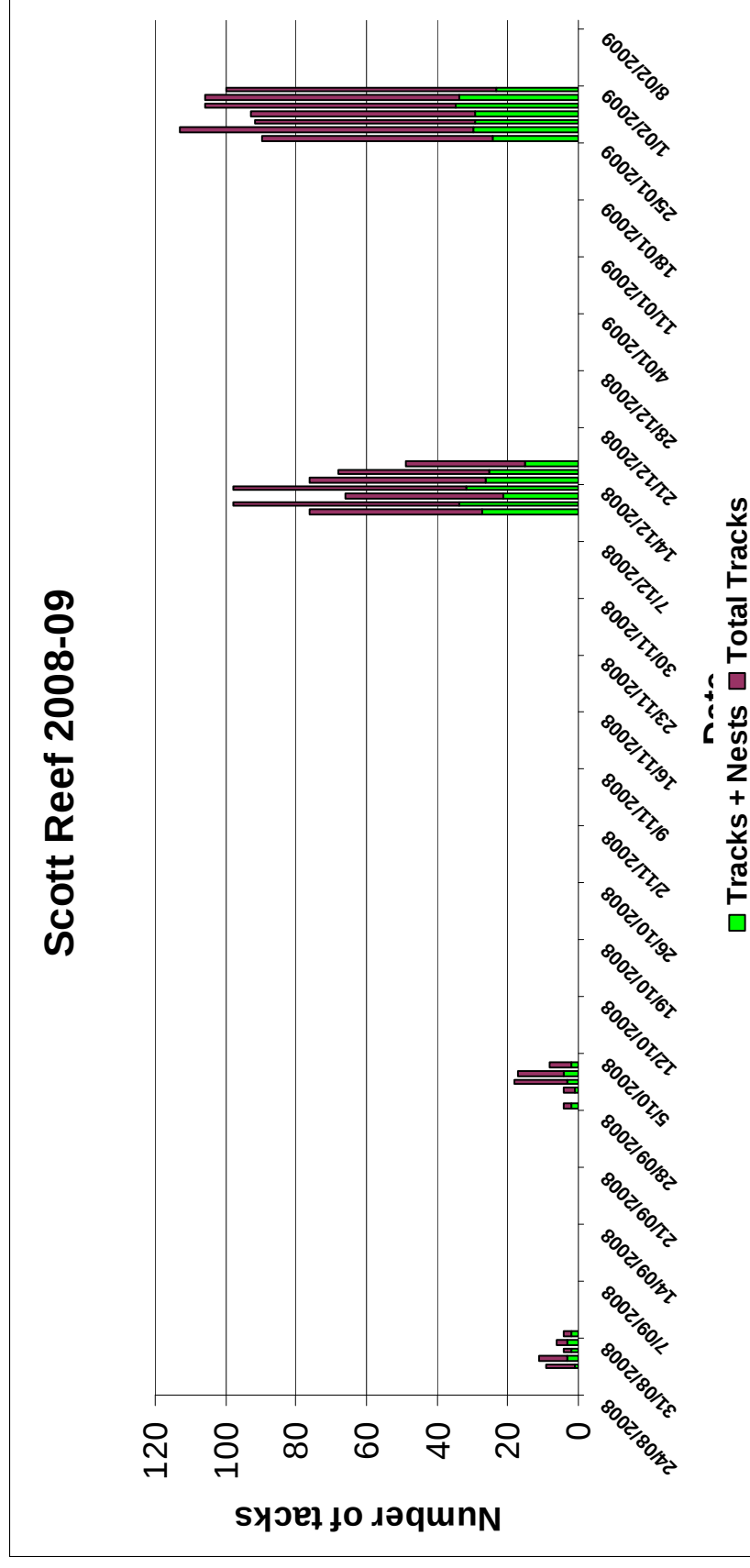
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Scott Reef 2008-9 Season



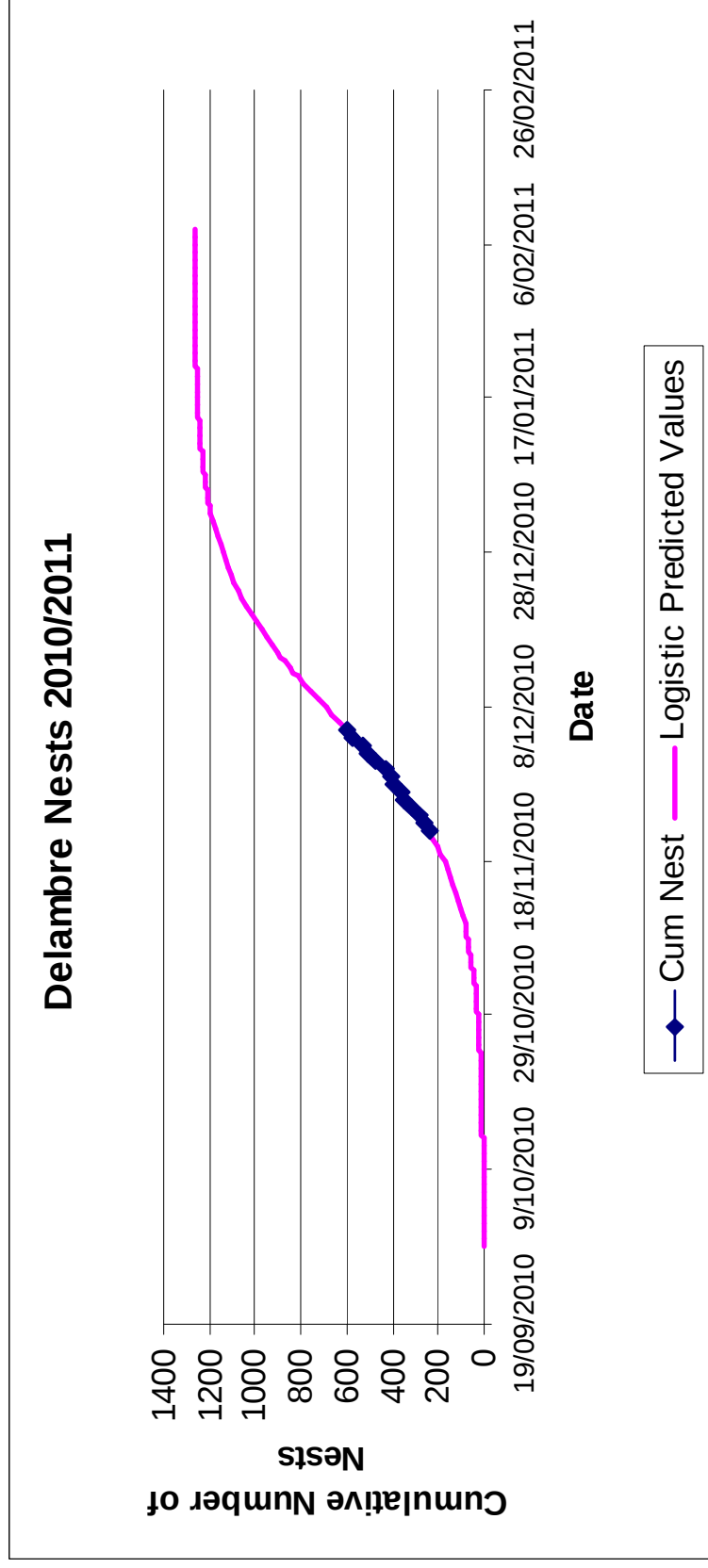
Track and Nest Data



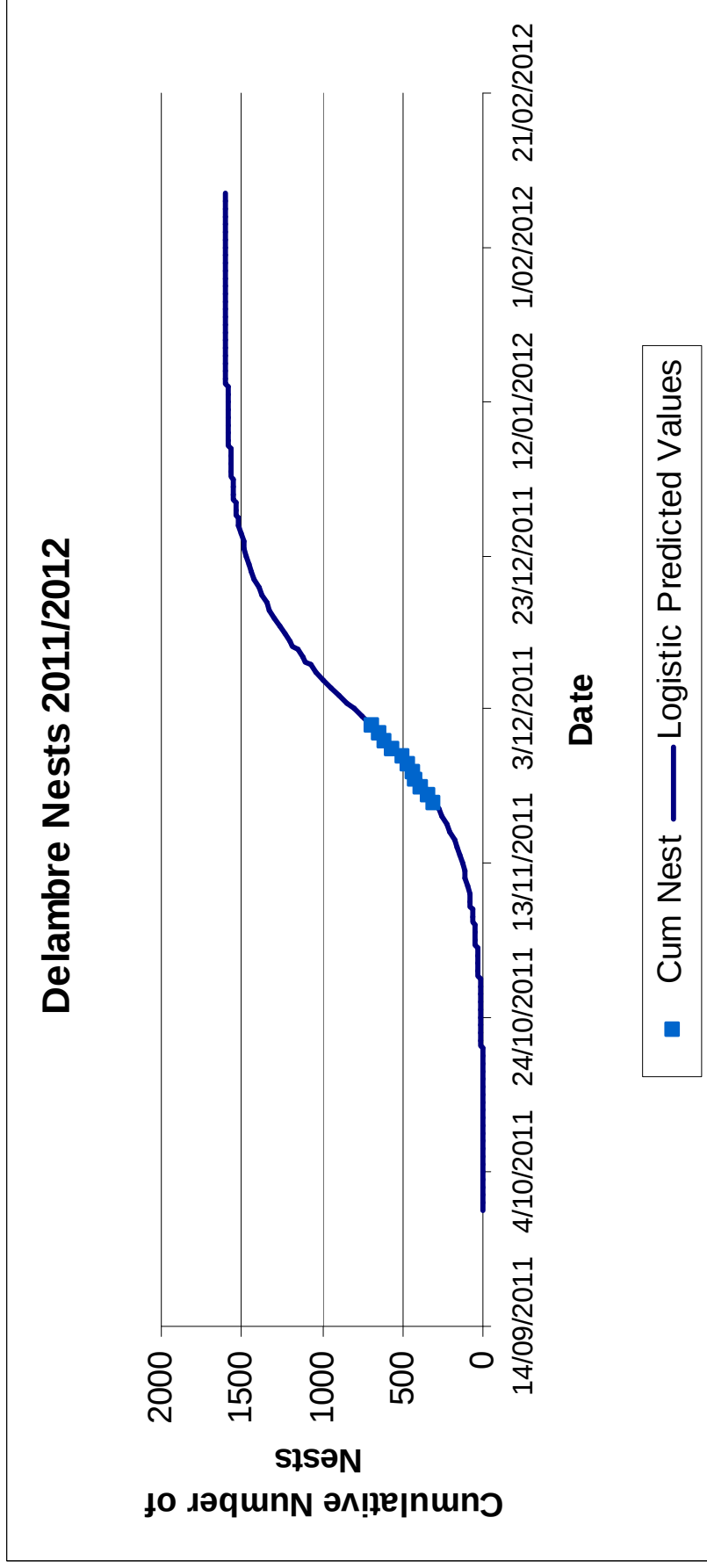
Delambre Island, Pilbara, WA



Pronounced summer nesting Flatback population



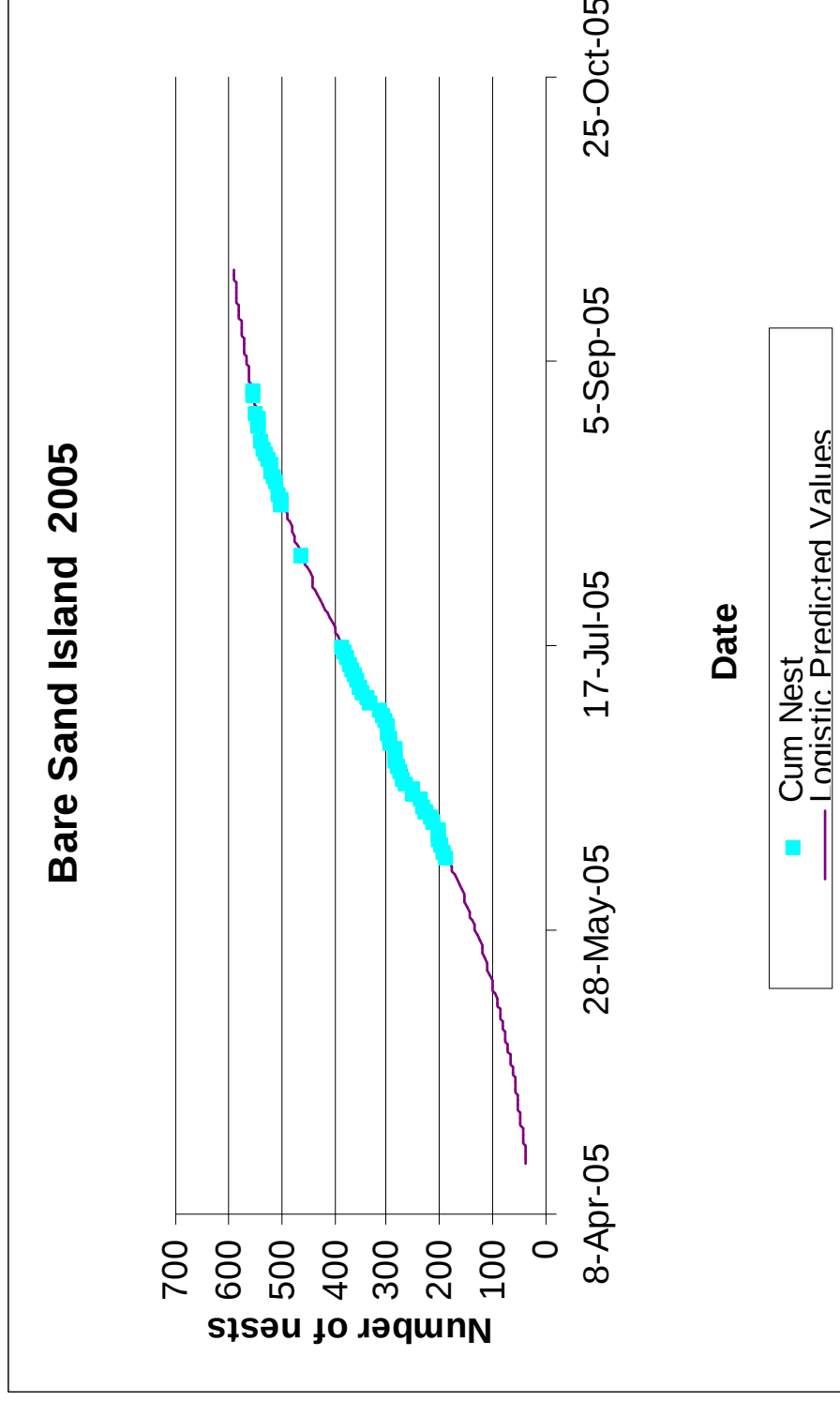
Flatbacks



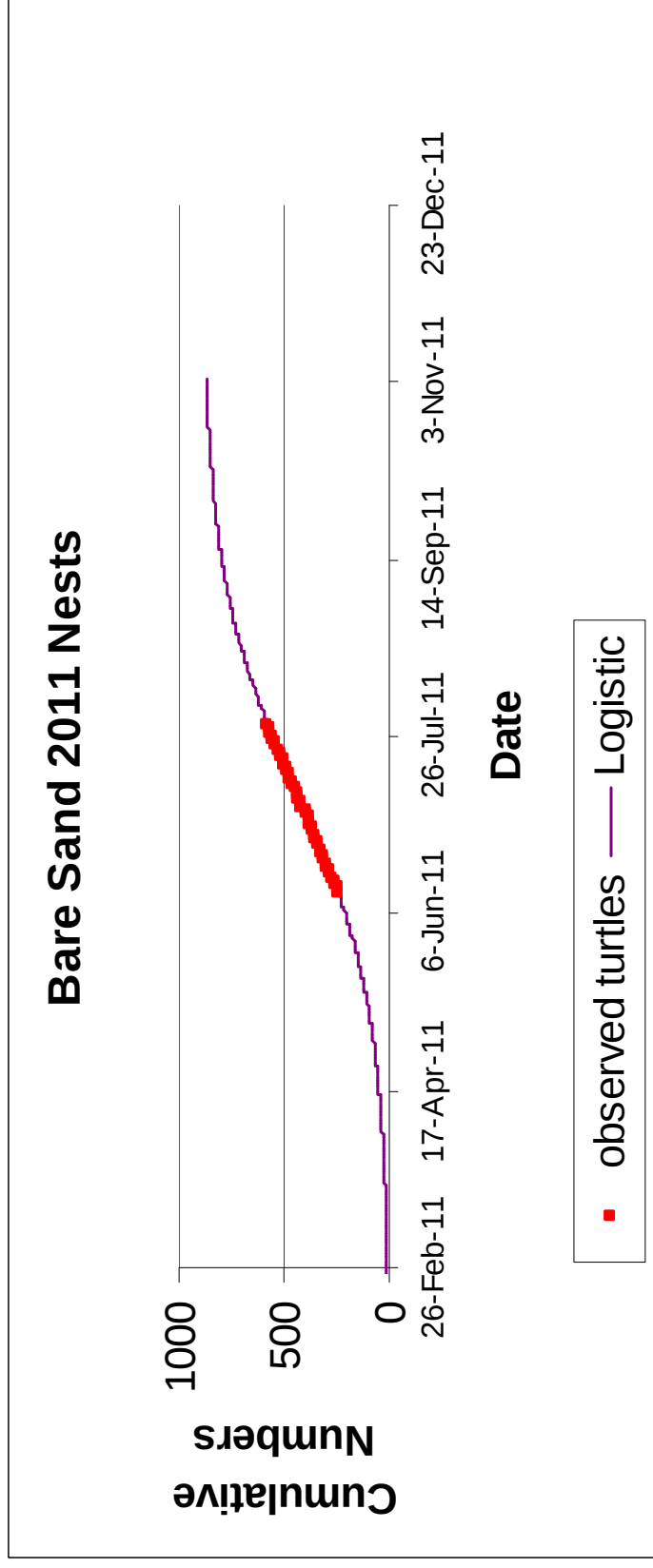
Bare Sand Island, NT



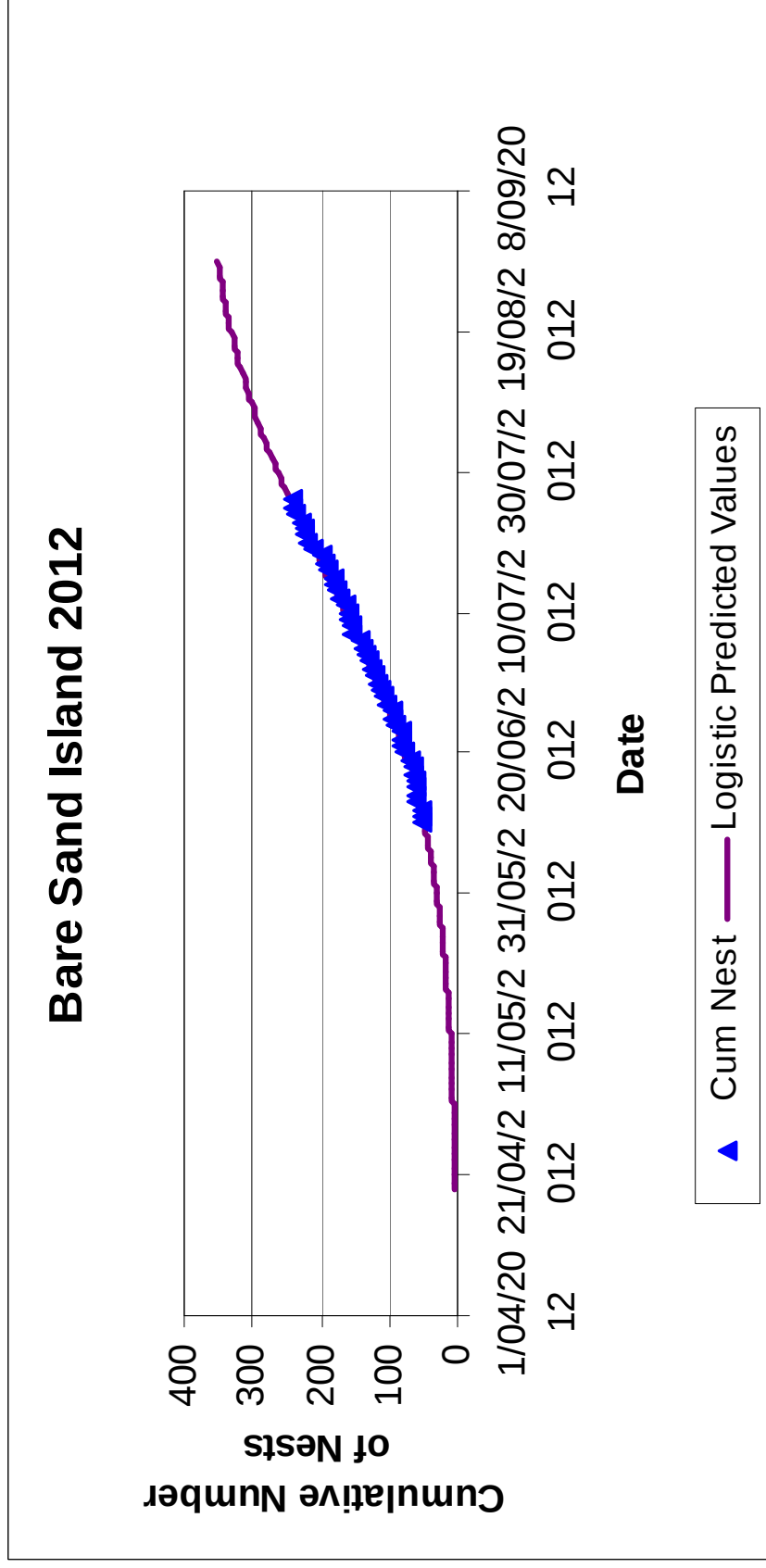
Protracted winter nesting population



Flatback (average nesting numbers)



Flatback (low nesting numbers)



Estimating the nesting population

- Number of nests per female per season
- Inter seasonal changes in internesting interval – warm years vs cool years
- Intra seasonal changes in internesting interval
 - early vs middle vs late in season
- Weather conditions
 - warm calm seas = short interval (10 days)
 - cool choppy seas = longer interval (21 days)

Is the logistic equation a useful descriptor of the nesting population?

- How much noise is in this metric?
- # Tracks > # nests > # turtles
- And what are we trying to measure?
- Is it the number of tracks? - crude metric
- Or number of nests? – less crude metric
- Or number of turtles? – better metric but difficult
- Or the contribution the nesting beach makes to the population i.e. nesting, hatching and emergence success?

My final 2 cents worth

- **Change is inevitable!**
- Keep on recording (record heaps)
- Be alert to changes
- Move off your patch once and a while
- If every nesting season was the same we would learn nothing new.

Thank You and thanks to

- The authors Col Limpus, Dave Carter and Mark Hamann,
- The late Daryl Riseley who left his delightful scribbles of the logistic equation on serviettes, table napkins, backs of envelopes and on my mind
- Volunteers, beach walkers, turtle whispers, and flatback fondlers of Bare Sand and Delambre Islands
- Rio Tinto Ltd Cape Lambert
- Woodside Energy Limited
- AusTurtle Inc