

Blue Whales in the Perth Canyon

Estimate of Abundance from
Aerial Surveys, 1999- 2005

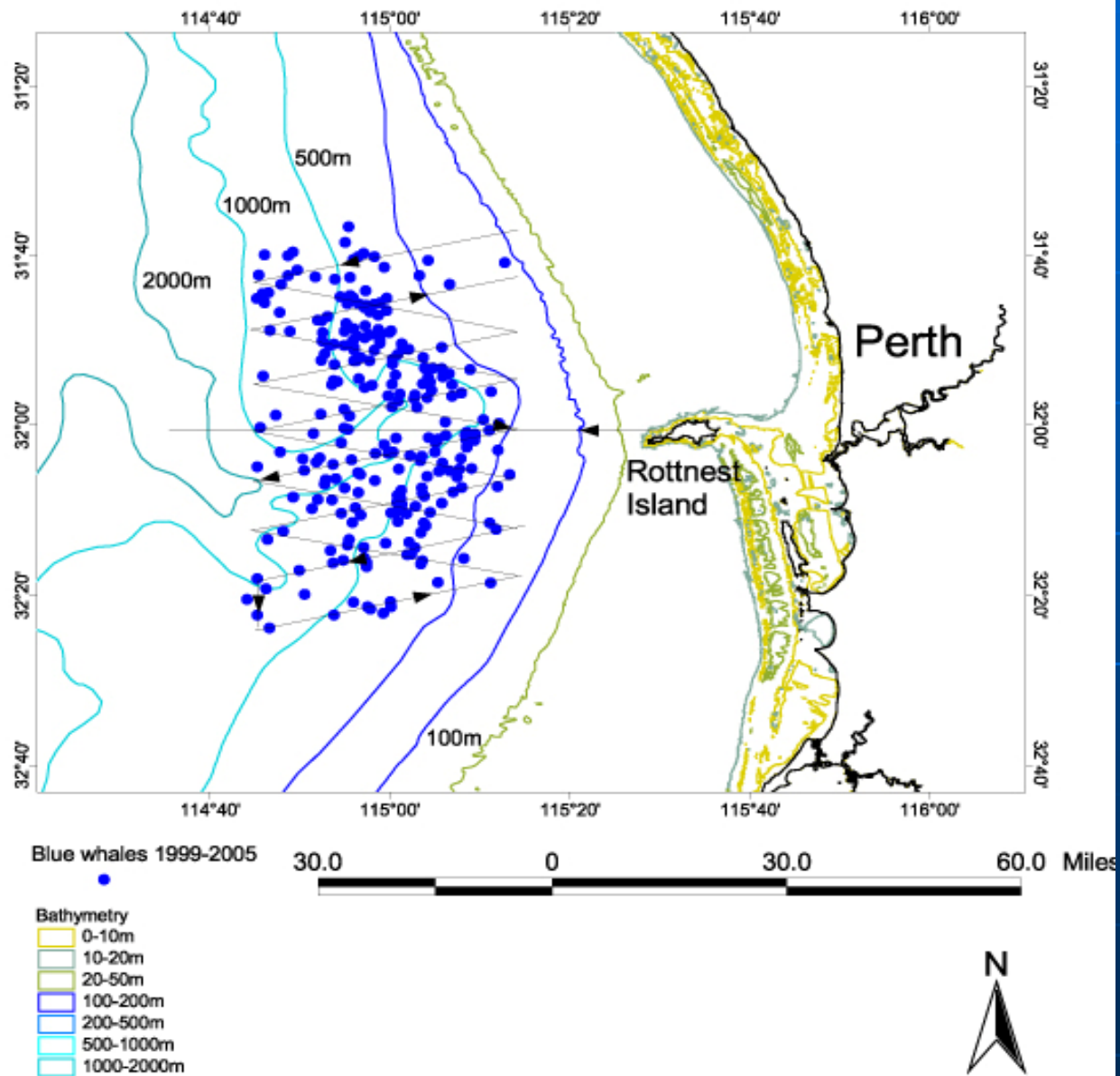
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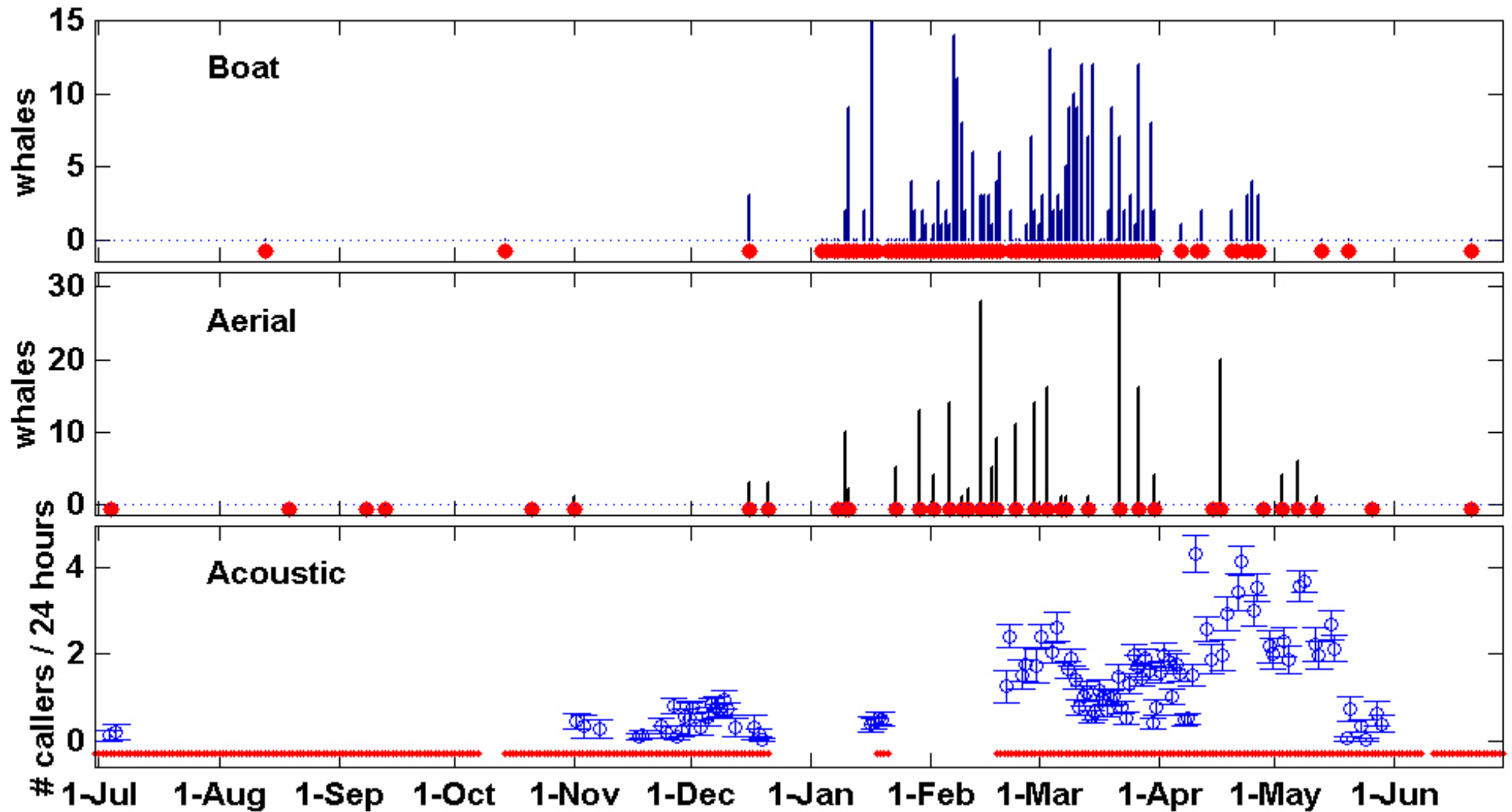
Data

In Perth Canyon area, centred off
Rottneest I, WA

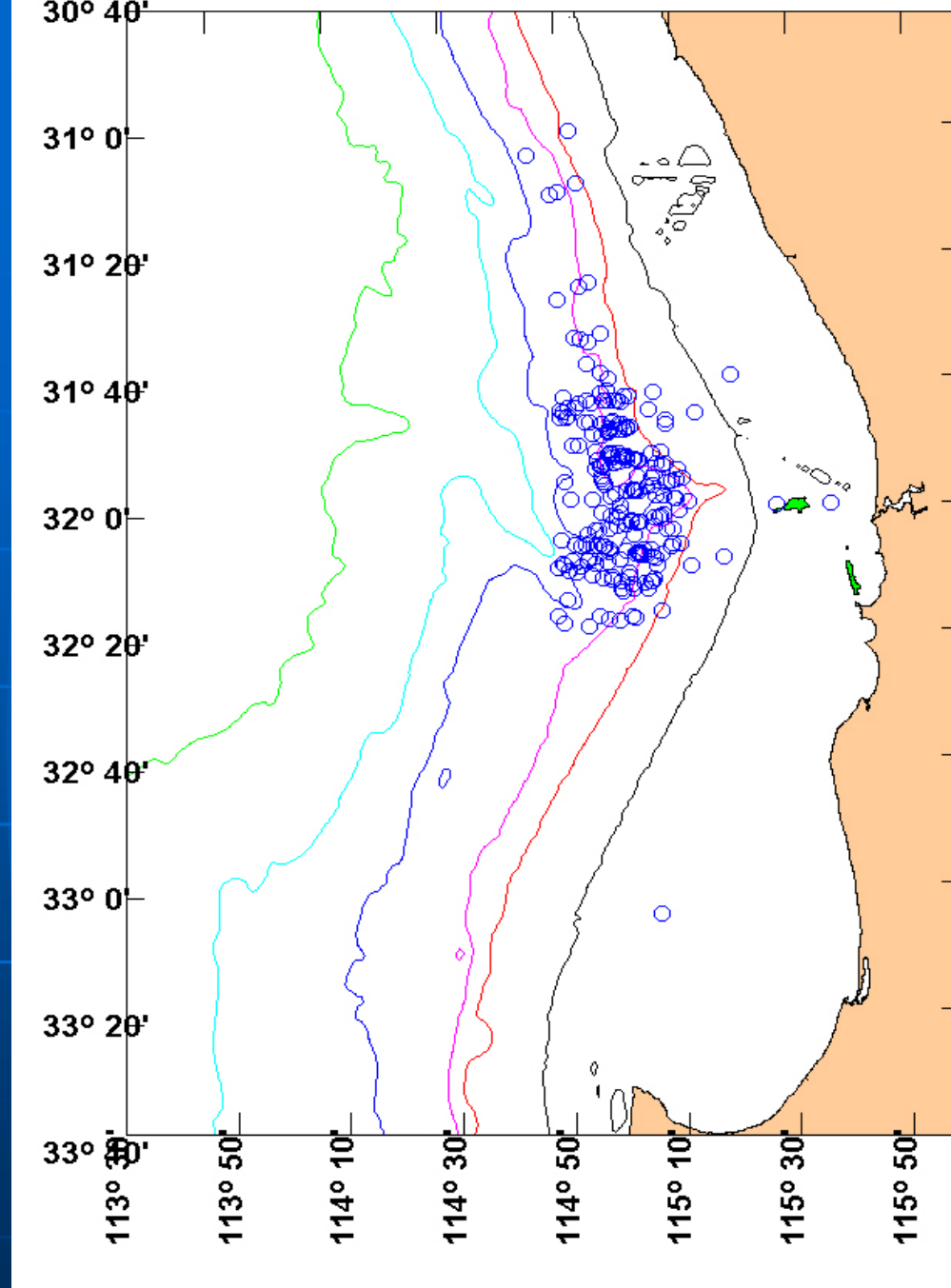
- 41 completed flights, Oct 1999-May 2005
- 281 sightings (250 pods) on effort, over ca 11000 nmiles of trackline
- Data clumped, with most sightings Jan-March (= 'peak season'), tho' for 2004 most sightings Feb-April, and 2005 early April

Total sightings of blue whales Rottneest aerial surveys 1999-2005





Blue whales, Perth Canyon, 1999-2004, occurrence by month, from three data sets



Blue whales off WA, west coast, C Naturaliste-Lancelin, 1999-2004: aerial sightings

Analysis

- Aim: to obtain a 'best' (average) estimate of blue whale abundance, Perth Canyon aerial survey area at the peak season
i.e. the average number present at any one time during that period
(= 'population size')
- Done for overall 'peak season' Jan-March, 2000-2005, but including early April 2005

Line transect

For Peak Season Jan-March 2000-2005

- Effective Strip Half-width: 2.58 km
- Mean Pod Size, by year: 2000 = 1.17 (9.63);
2001 = 1.06 (5.26); 2002 = 1.00; 2003 = 1.12 (4.71); 2004 = 1.10
(2.99); 2005 = 1.20 (10.21)
- Encounter Rate (number/100km): 2000 = 0.739 (24.16);
2001 = 1.562 (47.24); 2002 = 0.262 (72.03);
2003 = 2.340 (14.20); 2004 = 2.509 (14.46); 2005 = 1.616 (11,.40)
- Density (number/ km²): 2000 = 0.167 (26.79);
2001 = 0.320 (47.97); 2002 = 0.051 (72.31);
2003 = 0.506 (16.52); 2004 = 0.534 (16.10)
- Estimated Average Abundance: 2000 = 5 [3, 8]; 2001 = 9 [3, 25];
2002 = 1 [0, 6]; 2003 = 15 [11, 21]; 2004 = 16 (11, 22); 2005 = 11
(8, 15)

*(% Coeff. of Variation in curved brackets)
[95% Confidence Interval in square brackets]*

Correction for diving animals ("g₀" question)

- P (probability of being visible from the aircraft)

$$= \frac{s + t}{s + d}$$

- where s = mean surfacing time (MST), d = mean diving time (MDT), t = window of time animal is in visual range of the observer

Surfacing rate (from boat data)

- 2000: 10 pods; MST 3.167 (s.e. 1.912) mins; MDT 8.941 (3.718)
 - 2001: 28 pods; MST 3.555 (1.653); MDT 8.103 (4.081)
 - 2002: 20 pods; MST 2.770 (1.372); MDT 9.882 (4.264)
 - 2003: 35 pods; MST 3.296 (1.291); MDT 8.895 (3.809)
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- One way ANOVA showed no sig diffs. Pooled results were:

MST 3.304 (1.502), MDT 8.751 (3.916),
i.e. pods spend *ca* 27.41% of their time at the surface

- t obtained from histogram of frequency of sighting distances along the trackline
- most distances recorded abeam of the aircraft, ranging from ca 3 km ahead to ca 2 km behind; overall distance (5 km) is covered (at 120 kt (222.24 km/h)) in 1.350 mins
- then for Peak Period 2000-2003, $P = 0.386$ (= correction factor 2.59)

Estimated Abundance

Year	Area (km²)	Corr. factor	Uncorr. ab*	Adjusted ab*
2000	2909	2.52	5	12 [7, 21]
2001	"	"	9	23 [9, 62]
2002	"	"	1	4 [1, 15]
2003	"	"	15	37 [27, 52]
2004	"	"	16	39 [28, 55]
2005	"	"	11	27 [20, 38]
2000 -2005	"	"	11	27 [17, 44]

** to nearest whole number*

Acknowledgements

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- WA Museum
- DEH/Natural Heritage Trust