

A1.1.1 Breeding Stock D

Absolute abundance estimate

Single platform aerial line transect and land-based surveys yielded an estimated abundance of northward-migrating whales from 2 June to 7 Sep 2008 of 21750 (95% CI: 17550-43000). This is based on an estimate of abundance of surfaced whales of 11850 (9550-23450) and an estimated $g(0)$ (the proportion of whales seen on the survey trackline) of 0.54 (± 0.21). Note the numbers in parenthesis are 95% percentile intervals and that these do not include variance in the estimate of $g(0)$ (Hedley *et al.*, 2008).

Relative abundance estimates

Table A.1: Aerial survey relative abundance estimates (Bannister and Hedley, 2001).

Year	Estimate
1982	10.2
1986	16.2
1988	12.7
1991	23.6
1994	36.0

Table A.2: JARPA surveys conducted during 1989/90-2004/05 austral summer seasons (January and February) alternating survey areas between Area IV (70°E-130°E) and Area V (130°E-170°W), all south of 60°S. Areas IV and V were divided into 2 sectors, western and eastern. Each sector was divided into northern (60°S to 45 nm from ice-edge) and southern (from ice-edge to 45 nm away). Breeding Stock D corresponds to Area IV (Matsuoka *et al.*, in press).

Year	Estimate	CV	Year	Estimate	CV
1989	5325	0.302	1997	10657	0.166
1991	5408	0.188	1999	16751	0.143
1993	2747	0.153	2001	31134	0.123
1995	8066	0.142	2003	27783	0.115

Table A.3: IDCR/SOWER estimates from Branch (in press) (60°E-120°E).

Year	Estimate	CV
1978	1219	0.46
1988	422	0.52
1997	17959	0.17

Table A.4: Catch per unit effort data from four catchers operating on the west coast of Australia from June 25 to August 26 each year (Chittleborough, 1965) (Area IV: 70°E-130°E).

Year	Estimate
1950	0.475
1951	0.424
1952	0.347
1953	0.353
1954	0.351
1955	0.244
1956	0.178
1957	0.146
1958	0.123
1959	0.090
1960	0.062
1961	0.055
1962	0.051

Minimum number of haplotypes

51 (Rosenbaum *et al.*, 2006b)

A1.1.2 Breeding Stock E

Absolute abundance estimate

In 2004 a land-based survey was conducted at Point Lookout on the east coast of Australia over 14 weeks from 25 May to 27 August. The Hermite polynomial method was used to arrive at an absolute abundance estimate of 7090 \pm 660 (95% CI) for 2004 (Noad *et al.*, 2006). Observations from two locations were used to estimate proportions missed from a single location.

Relative abundance estimates

Table A.5: Estimates from land-based surveys conducted at Point Lookout and two other locations. The values give the number of whales passing per 10h during four weeks of the peak migration. (Values provided by M. Noad (*pers. comm.*) and are as used for the assessment in Noad *et al.*, 2008).

Year	Estimate	Year	Estimate
1984	6.12	1994	17.75
1985	5.92	1996	20.91
1986	8.25	1998	28.45
1987	8.53	1999	27.45
1988	9.15	2001	34.67
1989	10.22	2002	37.34
1990	11.58	2004	47.11
1991	12.93	2007	70.73
1992	14.36		

Table A.6: Catch per unit effort data from two catchers operating on the east coast of Australia from June 10 to August 5 each year (Chittleborough, 1965) (Area V: 130°E-170°W).

Year	Estimate
1953	0.97
1954	0.76
1955	0.78
1956	0.70
1957	0.71
1958	0.75
1959	0.74
1960	0.52
1961	0.23
1962	0.69

Table A.7: JARPA surveys conducted during 1989/90-2004/05 austral summer seasons (January and February) alternating survey areas between Area IV (70°E-130°E) and Area V (130°E-170°W), all south of 60°S. Areas IV and V were divided into two sectors, western and eastern. Each sector was divided into northern (60°S to 45 n. miles from ice-edge) and southern (from ice-edge to 45 n. miles away). Breeding Stock E corresponds to Area V (Matsuoka *et al.*, in press).

Year	Estimate	CV
1990	602	0.343
1992	4388	0.623
1994	3678	0.307
1996	1474	0.274
1998	3831	0.430
2000	5128	0.215
2002	2873	0.157
2004	9342	0.337

Table A.8: IDCR/SOWER estimates for the breeding grounds (Branch, in press). Breeding Stock E estimates here correspond to south of 60°S and between 120°E-170°W.

Year	N	CV
1980	995	0.58
1985	622	0.50
1992	3484	0.33
2001	13300	0.22

Minimum number of haplotypes

Total: 108

E2: 60

E3: 48 (Rosenbaum *et al.*, 2006b)

E1: 42 (Olavarría *et al.*, 2006)

A1.1.3 Breeding Stock F

Absolute abundance estimate

Table A.9: The estimate arises from a sighting-resighting analysis of individual identification photos collected from 1999 to 2004. Survey areas were New Caledonia and Tonga (E2 and E3), the Cook Islands and French Polynesia (F) (Baker *et al.*, 2006).

Year	N	CV
2002	3827	0.12

Relative abundance estimates

Table A.10: IDCR/SOWER estimates are given for the breeding grounds (Branch, in press), in which F corresponds to the area south of 60°S and between 170°W-110°W, according to the assumptions of the naïve catch allocation model (IWC, 1998).

Year	N	CV
1983	3240	0.47
1990	2976	0.51
1997	3852	0.22

Minimum number of haplotypes

Total: 230

F1: 131

F2: 99 (Rosenbaum *et al.*, 2006b)

References

- Baker, C. S., Garrigue, C., Rochelle, C., Madon, B., Poole, M., Hauser, N., Clapham, P., Donoghue, M., Russel, K., O'Callahan, T., Paton, D. and Mattila, D. 2006. Abundance of humpbacks in Oceania (South Pacific) 1999 to 2004. Paper SC/A06/HW51 submitted to the IWC Scientific Committee, April 2006 (unpublished). 10pp.
- Branch, T.A. (in press). Humpback whale abundance south of 60°S from three complete circumpolar sets of surveys. *J. Cetacean Res. Manage.* (Special Issue). 45pp.
- Chittleborough, R.G. 1965. Dynamics of two populations of the humpback whale, *Megaptera Novaengliae* (Borowski). *Australian Journal of Marine and Freshwater Research*, 16:33-128.
- Hedley, S.L., Bannister, J.L. and Dunlop, R.A. 2008. Group IV Humpback whales: Abundance estimates from aerial and land-based surveys off Shark Bay, Western Australia, 2008. Paper SC/61/SH23 submitted to the IWC Scientific Committee, April 2008 (unpublished). 17pp.

- Matsuoka, K., Hakamada, T., Kiwada, H., Murase, H. and Nishiwaki, S. (in press). Abundance estimates and trends for humpback whales (*Megaptera novaeangliae*) in Antarctic Areas IV and V based on JARPA sighting data. *Journal of Cetacean Research and Management* (Special Issue).
- Noad, M.J., Paton, D.A. and Cato, D.H. 2006. Absolute and relative abundance estimates of Australian east coast humpback whales (*Megaptera novaeangliae*). Paper SC/A06/HW27 submitted to the IWC workshop on the comprehensive assessment of Southern Hemisphere humpback whales, Hobart, April 2006 (unpublished). 15pp.
- Noad, M.J., Dunlop, R.A., Paton, D. and Cato, D.H. 2008. An update of the east Australian humpback whale population (E1) rate of increase. Paper SC/60/SH31 submitted to the IWC Scientific Committee, April 2008 (unpublished). 13pp.
- Olavarria, C., Anderson, M., Paton, D., Burns, D., Brasseur, M., Garrigue, C., Hauser, N., Poole, M., Caballero, S., Flórez-González, L. and Baker, C.S. 2006. Eastern Australia humpback whale genetic diversity and their relationship with Breeding Stocks D, E, F and G. Paper SC/58/SH25 submitted to the IWC Scientific Committee, April 2006 (unpublished). 6pp.
- Rosenbaum, H.C., Pomilla, C., Olavarria, C., Baker, C.S., Leslie, M. C., Mendez, M. C., Caballero, S., Brassuer, M., Bannister, J., Best, P.B., Bonatto, S., Collins, T., Engel, M.H., Ersts, P.J., Findlay, K.P., Florez-Gonzalez, L., Garrigue, C., Hauser, N., Jenner, C., Meyer, M., Minton, G., Poole, M. and Razafindrakoto, Y. 2006b. A first and preliminary analysis of MTDNA sequences from humpback whales for breeding stocks A-G and X. Paper SC/A06/HW59 submitted to the IWC workshop on the comprehensive assessment of Southern Hemisphere humpback whales, Hobart, April 2006 (unpublished). 4pp.