

Blubber fatty acid profiles indicate dietary resource partitioning between adult and juvenile southern elephant seals

China Newland^{1,*}, Iain C. Field^{1,2}, Peter D. Nichols^{3,4}, Corey J. A. Bradshaw^{5,6}, Mark A. Hindell^{1,4}

¹Antarctic Wildlife Research Unit, School of Zoology, University of Tasmania, Private Bag 05, Hobart, Tasmania 7001, Australia

²School for Environmental Research, Institute of Advanced Studies, Charles Darwin University, Darwin, Northern Territory 0909, Australia

³CSIRO Marine and Atmospheric Research, Food Futures Flagship, GPO Box 1538, Hobart, Tasmania 7000, Australia

⁴Antarctic and Climate Ecosystems CRC, Private Bag 80, Hobart, Tasmania 7001, Australia

⁵Research Institute for Climate Change and Sustainability, School of Earth and Environmental Sciences, University of Adelaide, Adelaide, South Australia 5005, Australia

⁶South Australian Research and Development Institute, PO Box 120, Henley Beach, South Australia 5022, Australia

*Email: cnewland@ntas.edu.au

Marine Ecology Progress Series 384:303–312 (2009)

Tables S1-S6 Prey library of 38 fatty acids (FA) found in greater than trace amounts (0.5%) in the tissues of 51 species (fish and squid) assumed to be prey of southern elephant seals. The relative amounts of each FA are presented as a percentage of the total amount of FA identified once data had been adjusted to 100% after exclusion of the fatty acids below 0.5%.

Table S1 Thirty-eight fatty acids (FA) found in greater than trace amounts (0.5%) in the tissues of 9 fish species assumed to be prey of southern elephant seals.

Fatty Acid	<i>Arcrozonus russo</i>	<i>Bathylagus antarcticus (adult)</i>	<i>Borostomias antarcticus (adult)</i>	<i>Champocephalus gunnari</i>	<i>Chauliodus sloani</i>	<i>Cyclothone sp.</i>	<i>Diplophos rebaini</i>	<i>Dissostichus eleginoides</i>	<i>Dissostichus mawsoni</i>
14:0	2.05	1.92	1.68	1.80	3.47	1.21	0.18	3.52	0.90
15:0	0.18	0.47	0.19	0.20	0.31	0.11	0.35	0.41	0.15
16:0	9.46	15.38	8.75	18.90	12.19	5.03	1.87	14.39	16.60
17:0	0.95	0.33	0.99	0.10	0.55	1.27	0.97	0.46	0.24
18:0	2.07	3.97	2.04	2.40	2.18	1.91	0.67	2.98	3.60
20:0	0.32	0.24	0.00	0.00	0.11	0.00	0.00	0.14	0.03
22:0	0.00	0.26	0.32	0.00	0.25	0.42	0.13	0.23	0.02
14:1 ω 5c	0.15	0.01	0.02	0.00	0.11	0.28	0.11	0.16	0.02
16:1 ω 5c	0.49	0.19	0.13	0.00	0.28	0.20	0.06	0.25	0.25
16:1 ω 7c	10.19	4.67	5.63	4.20	9.39	7.50	4.69	8.10	3.09
16:1 ω 7t	0.00	1.14	0.19	0.00	0.41	0.24	0.16	0.48	0.26
16:1 ω 9c	0.13	0.07	0.20	0.00	0.29	0.12	0.23	0.43	0.18
17:1	0.66	0.31	0.24	0.00	0.35	0.36	0.15	0.61	0.02
18:1 ω 5c	0.52	0.57	0.60	0.00	0.70	0.67	0.15	0.68	0.21
18:1 ω 7c	3.50	3.67	4.74	6.00	4.51	6.31	2.86	5.25	5.26
18:1 ω 9c	24.82	18.83	36.91	6.50	31.95	29.70	76.30	32.86	8.77
20:1 ω 7c	0.24	1.58	0.52	0.40	0.30	0.68	0.15	0.62	0.25
20:1 ω 9+11	0.0	0.0	0.0	1.9	0.0	0.0	0.0	0.0	0.0
22:1 ω 7c	0.09	0.36	0.25	0.00	0.19	0.30	0.03	0.24	0.09
22:1 ω 9c	1.22	3.39	1.67	0.00	1.48	1.72	0.30	1.94	0.28
22:1 ω 11c	2.62	4.10	5.04	0.00	3.50	2.96	0.59	3.23	0.24
24:1 ω 11+9	2.25	2.52	2.21	0.00	2.33	2.14	0.45	1.84	0.73
18:2 ω 6	1.79	1.08	1.42	1.30	1.86	1.43	1.21	1.27	0.98
18:3 ω 6	0.39	0.69	0.07	0.00	0.18	0.16	0.04	0.08	0.56
18:4 ω 3	1.75	0.45	0.53	0.00	1.39	1.07	0.23	0.86	0.65
20:4 ω 6	1.26	0.94	0.52	0.00	0.59	0.54	0.51	0.66	2.07
20:5 ω 3	9.25	7.58	2.75	21.60	4.61	8.17	1.09	2.77	17.94
20:3 ω 6	0.27	0.10	0.15	0.00	0.22	0.17	0.09	0.09	0.07
20:4 ω 3	1.14	0.78	0.60	0.20	0.75	0.79	0.31	0.32	0.27
20:2 ω 6	0.66	0.43	0.25	0.00	0.23	0.29	0.13	0.20	0.04
c21 PUFA	0.24	0.49	0.13	0.00	0.13	0.17	0.12	0.14	0.06
22:5 ω 6	0.17	0.25	0.08	0.00	0.16	0.27	0.00	0.10	0.09
22:6 ω 3	14.63	11.40	6.47	31.10	8.07	11.54	1.72	4.80	32.71
22:4 ω 6	0.09	0.14	0.10	0.00	0.05	0.05	0.10	0.04	0.07
22:5 ω 3	1.15	1.14	0.88	0.00	0.71	0.73	0.25	0.32	0.89
20:1 ω 9c	4.78	7.8	11.0		4.7	9.3	2.5	7.4	1.5
20:1 ω 11c	0.0	0.4	1.7		0.6	1.1	0.2	0.7	0.1
19:1	0.1	0.4	0.4		0.3	0.3	0.3	0.4	0.2

Table S2 Thirty-eight fatty acids (FA) found in greater than trace amounts (0.5%) in the tissues of 9 fish species assumed to be prey of southern elephant seals.

Fatty Acid	<i>Echiodon cryomargarites</i>	<i>Electrona antarctica</i>	<i>Electrona carlsbergi</i>	<i>Electrona subaspera</i>	<i>Gymnoscopelus bolini (avg)</i>	<i>Gymnoscopelus braueri</i>	<i>Gymnoscopelus fraseri</i>	<i>Gymnoscopelus nicholsi (large)</i>	<i>Icichthys australis</i>
14:0	2.58	1.71	1.49	2.34	0.85	0.81	1.49	7.57	2.95
15:0	0.41	0.12	0.37	0.26	0.10	0.31	0.38	0.31	0.34
16:0	13.48	5.79	18.12	16.12	4.77	8.48	17.36	16.37	17.17
17:0	1.31	1.21	0.45	0.61	0.59	0.79	0.51	0.39	0.21
18:0	2.18	1.99	3.93	3.32	2.64	2.51	4.33	4.12	3.82
20:0	0.00	0.00	0.21	0.08	0.00	0.00	0.21	0.12	0.22
22:0	0.40	0.21	0.59	0.04	0.09	0.29	0.15	0.03	0.08
14:1 ω 5c	0.04	0.37	0.02	0.08	0.04	0.06	0.02	0.66	0.05
16:1 ω 5c	0.25	0.23	0.23	0.20	0.16	0.19	0.27	0.35	0.13
16:1 ω 7c	5.47	15.98	5.66	5.49	4.96	5.07	3.32	6.43	4.40
16:1 ω 7t	0.22	0.17	0.80	0.00	0.10	0.25	0.62	0.00	0.00
16:1 ω 9c	0.26	0.26	0.07	0.16	0.05	0.14	0.09	0.09	0.29
17:1	0.45	0.51	0.48	0.34	0.38	0.65	0.47	0.25	0.19
18:1 ω 5c	0.64	0.53	0.74	0.49	0.98	0.62	0.72	0.44	0.46
18:1 ω 7c	4.30	3.96	3.90	3.79	7.50	4.69	5.85	8.17	2.50
18:1 ω 9c	25.42	36.64	23.74	23.19	29.62	38.70	17.60	25.14	25.39
20:1 ω 7c	0.33	0.54	0.57	0.38	0.84	0.36	0.46	0.44	0.95
20:1 ω 9+11	0.0	0.0	0.0	0.0	19.3	0.0	0.0	0.0	0.0
22:1 ω 7c	0.35	0.47	0.43	0.17	0.23	0.15	0.28	0.13	0.19
22:1 ω 9c	0.77	1.91	1.93	1.05	1.91	1.20	1.32	0.54	7.09
22:1 ω 11c	1.57	3.38	3.60	2.84	5.15	1.43	2.28	0.86	2.82
24:1 ω 11+9	2.85	2.88	2.75	1.76	3.53	2.63	3.22	0.50	0.18
18:2 ω 6	1.61	1.47	1.42	0.89	1.25	1.82	1.98	0.74	0.13
18:3 ω 6	0.07	0.14	1.10	0.00	0.01	0.12	0.81	0.40	0.05
18:4 ω 3	0.63	1.53	0.39	0.69	0.59	2.08	0.45	0.75	0.45
20:4 ω 6	1.80	0.55	0.66	1.14	0.70	0.76	0.65	0.40	1.84
20:5 ω 3	9.24	4.10	6.54	7.75	2.76	5.34	7.09	5.40	6.72
20:3 ω 6	0.19	0.17	0.12	0.11	0.35	0.15	0.16	0.20	0.06
20:4 ω 3	0.45	0.42	0.38	0.64	1.41	0.70	1.12	0.88	0.19
20:2 ω 6	0.16	0.25	0.29	0.49	1.24	0.33	0.44	0.05	0.20
c21 PUFA	0.36	0.10	0.19	0.24	0.15	0.19	0.13	0.23	0.12
22:5 ω 6	0.26	0.14	0.16	0.25	0.06	0.12	0.22	0.02	0.20
22:6 ω 3	14.49	6.71	10.62	17.03	5.93	12.31	11.42	6.28	12.77
22:4 ω 6	0.05	0.03	0.03	0.00	0.05	0.06	0.06	0.04	0.07
22:5 ω 3	0.84	0.41	0.50	1.26	0.68	0.57	0.67	0.43	0.79
20:1 ω 9c	4.5	3.4	4.8	6.10		4.3	11.0	10.64	6.02
20:1 ω 11c	0.5	0.6	0.7	0.0		0.6	0.5	0.0	0.0
19:1	0.4	0.3	0.4	0.1		0.5	0.5	0.2	0.3

Table S3 Thirty-eight fatty acids (FA) found in greater than trace amounts (0.5%) in the tissues of 9 fish species assumed to be prey of southern elephant seals.

Fatty Acid	<i>Krefflichthyes anderssoni</i>	<i>Krefflichthyes anderssoni</i>	<i>Labichthys yanoi</i>	<i>Lampanyctus archirus</i>	<i>Melanostigma gelatinosum</i>	<i>Pagothenia borchgrevinki</i>	<i>Paradiplospinus gracilis</i>	<i>Phosichthys argenteus</i>	<i>Pleuragramma antarcticum</i>
14:0	0.50	0.50	1.33	1.60	2.25	4.30	3.85	1.32	15.70
15:0	0.10	0.10	0.11	0.34	0.55	0.00	0.39	0.54	0.30
16:0	2.40	2.40	3.99	17.39	16.10	11.50	18.74	20.74	16.30
17:0	0.00	0.00	1.02	0.34	0.65	0.00	0.56	0.93	0.20
18:0	0.60	0.60	1.31	4.06	4.44	2.10	3.22	6.11	0.90
20:0	0.00	0.00	0.00	0.09	0.55	0.00	0.28	0.07	0.00
22:0	0.00	0.00	0.26	0.07	0.22	0.00	0.26	0.68	0.00
14:1 ω 5c	0.00	0.00	0.07	0.07	0.10	0.00	0.14	0.01	0.40
16:1 ω 5c	0.00	0.00	0.12	0.22	0.40	0.00	0.29	0.13	0.00
16:1 ω 7c	13.80	13.80	8.25	5.84	6.43	8.80	7.42	2.77	9.70
16:1 ω 7t	0.00	0.00	0.13	0.40	0.54	0.00	0.00	0.24	0.00
16:1 ω 9c	0.00	0.00	0.17	0.17	0.23	0.00	0.00	0.21	0.00
17:1	0.00	0.00	0.19	0.66	0.82	0.00	0.44	0.60	0.00
18:1 ω 5c	0.00	0.00	0.60	0.49	0.67	0.00	0.57	0.30	0.00
18:1 ω 7c	10.60	10.60	4.81	4.07	5.09	3.90	4.15	3.74	9.40
18:1 ω 9c	52.90	52.90	43.16	22.84	19.64	17.70	25.20	17.87	26.40
20:1 ω 7c	0.00	0.00	1.24	0.35	0.40	1.00	0.35	0.20	1.90
20:1 ω 9+11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.1
22:1 ω 7c	0.00	0.00	0.32	0.20	0.00	0.00	0.39	0.14	0.00
22:1 ω 9c	0.00	0.00	1.48	0.88	0.89	1.80	1.80	0.58	0.00
22:1 ω 11c	0.80	0.80	2.72	2.08	0.70	0.00	4.29	1.07	0.00
24:1 ω 11+9	0.10	0.10	2.63	2.66	2.27	0.70	2.70	4.53	0.40
18:2 ω 6	3.20	3.20	1.26	1.00	1.38	0.90	0.97	0.86	0.20
18:3 ω 6	0.00	0.00	0.00	0.22	0.00	0.00	0.09	0.04	0.00
18:4 ω 3	0.00	0.00	0.18	0.41	1.78	1.30	0.97	0.53	0.80
20:4 ω 6	0.00	0.00	0.83	1.08	1.43	0.00	0.66	1.59	0.00
20:5 ω 3	1.00	1.00	3.19	5.24	7.36	12.70	4.33	3.97	6.00
20:3 ω 6	0.00	0.00	0.19	0.11	0.04	0.00	0.18	0.09	0.00
20:4 ω 3	0.00	0.00	0.71	0.53	0.60	0.00	0.76	0.43	0.00
20:2 ω 6	0.00	0.00	0.30	0.17	0.41	0.00	0.14	0.20	0.00
c21 PUFA	0.00	0.00	0.16	0.25	0.29	0.00	0.21	0.37	0.00
22:5 ω 6	0.00	0.00	0.08	0.14	0.07	0.00	0.06	0.13	0.00
22:6 ω 3	2.40	2.40	6.27	17.26	15.11	8.90	6.74	24.48	2.30
22:4 ω 6	0.00	0.00	0.09	0.08	0.00	0.00	0.04	0.03	0.00
22:5 ω 3	0.00	0.00	0.92	0.78	0.72	0.00	0.87	1.09	0.00
20:1 ω 9c	3.5	3.5	8.7	5.6	6.0	7.7	8.16	2.4	
20:1 ω 11c			1.8	0.5	0.5	2.9	0.0	0.3	
19:1			0.6	0.3	0.7		0.1	0.4	

Table S4 Thirty-eight fatty acids (FA) found in greater than trace amounts (0.5%) in the tissues of 9 fish species assumed to be prey of southern elephant seals.

Fatty Acid	<i>Poromitra crassiceps</i>	<i>Protomyctophum bolini</i>	<i>Salilolita australis</i>	<i>Sternoptyx sp.</i>	<i>Stomias boa boa</i>	<i>Stomias gracilis (adult)</i>	<i>Trematomus bernacchi</i>	<i>Trematomus hansonii</i>	<i>Trematomus newnesi</i>
14:0	1.47	4.46	0.74	1.62	1.26	5.24	2.40	2.80	5.50
15:0	0.33	0.50	0.25	0.55	0.28	0.39	0.00	0.00	0.00
16:0	17.37	20.39	16.36	19.84	11.41	14.90	13.10	10.90	12.30
17:0	0.48	0.68	0.34	0.62	0.74	0.49	0.00	0.00	0.00
18:0	5.27	3.20	5.18	4.70	2.16	2.03	3.50	2.20	2.00
20:0	0.32	0.14	0.05	0.09	0.09	0.12	0.00	0.00	0.00
22:0	0.20	0.29	0.01	0.10	0.17	0.08	0.00	0.00	0.00
14:1 ω 5c	0.03	0.11	0.00	0.02	0.06	0.14	0.00	0.00	0.00
16:1 ω 5c	0.25	0.35	0.15	0.28	0.19	0.26	0.00	0.00	0.00
16:1 ω 7c	2.61	8.05	2.10	2.41	7.02	8.42	6.50	6.80	6.50
16:1 ω 7t	0.06	0.31	0.00	0.28	0.40	0.39	0.00	0.00	0.00
16:1 ω 9c	0.13	0.21	0.43	0.19	0.17	0.25	0.00	0.00	0.00
17:1	0.29	0.37	0.31	0.73	0.69	0.38	0.00	0.00	0.00
18:1 ω 5c	0.56	0.82	0.46	0.55	0.62	0.73	0.00	0.00	0.00
18:1 ω 7c	3.72	5.20	3.03	4.23	5.80	5.22	8.60	4.00	6.00
18:1 ω 9c	11.72	22.11	15.23	14.47	39.94	34.41	11.10	15.40	16.80
20:1 ω 7c	0.43	0.40	0.25	0.32	0.56	0.44	1.80	1.20	0.60
20:1 ω 9+11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22:1 ω 7c	0.43	0.30	0.08	0.17	0.18	0.15	0.00	0.00	0.00
22:1 ω 9c	0.70	1.24	0.46	0.38	1.40	1.44	1.30	2.00	1.10
22:1 ω 11c	1.06	2.16	0.44	0.19	3.10	3.36	0.00	0.00	0.00
24:1 ω 11+9	4.19	2.68	1.60	2.55	1.60	2.08	1.20	1.00	0.80
18:2 ω 6	0.79	1.41	0.66	1.97	1.66	1.70	0.90	0.90	1.10
18:3 ω 6	0.18	0.08	0.31	0.55	0.09	0.12	0.00	0.00	0.00
18:4 ω 3	0.37	1.00	0.31	0.44	0.95	1.05	0.00	0.00	0.00
20:4 ω 6	2.83	0.47	4.19	2.15	0.40	0.36	0.00	0.00	0.00
20:5 ω 3	9.10	5.60	8.83	7.63	2.21	2.43	18.30	15.90	13.90
20:3 ω 6	0.14	0.12	0.06	0.16	0.14	0.16	0.00	0.00	0.00
20:4 ω 3	0.36	0.35	0.33	0.62	0.46	0.47	0.00	0.00	0.00
20:2 ω 6	0.17	0.17	0.19	0.34	0.27	0.27	0.00	0.00	0.00
c21 PUFA	0.69	0.10	0.20	0.18	0.07	0.09	0.00	0.00	0.00
22:5 ω 6	0.26	0.21	0.36	0.21	0.17	0.07	3.20	1.20	1.50
22:6 ω 3	27.29	8.83	31.70	26.48	3.74	2.95	13.50	15.50	17.90
22:4 ω 6	0.02	0.02	0.43	0.11	0.00	0.01	0.00	0.00	0.00
22:5 ω 3	1.14	0.41	2.28	1.00	0.31	0.31	0.00	0.00	0.00
20:1 ω 9c	1.8	5.7	1.77	1.5	8.3	7.4	5.5	11.9	7.1
20:1 ω 11c	0.2	0.5	0.0	0.1	1.0	0.7	1.3	4.2	2.8
19:1	0.7	0.4	0.1	0.6	0.4	0.3			

Table S5 Thirty-eight fatty acids (FA) found in greater than trace amounts (0.5%) in the tissues of 8 squid species assumed to be prey of southern elephant seals.

Fatty Acid	<i>Brachioteuthis</i> <i>spp.</i>	<i>Galiteuthis</i> <i>glacialis</i>	<i>Gonatus</i> <i>antarcticus</i>	<i>Histioteuthis</i> <i>eltaninae</i>	<i>Kondakovia</i> <i>longimana</i>	<i>Loligo</i> <i>gahi</i>	<i>Martialia</i> <i>hyadesi</i>	<i>Mastigoteuthis</i> <i>sp.</i>
14:0	0.70	2.68	2.35	0.77	3.34	2.45	0.00	0.72
15:0	0.09	0.37	0.13	0.23	0.48	0.43	0.00	0.24
16:0	12.69	24.91	4.74	12.68	27.48	23.69	13.36	16.53
17:0	0.34	0.41	0.26	0.48	0.67	0.65	1.56	0.61
18:0	3.43	2.39	1.67	3.49	2.36	3.66	7.87	4.30
20:0	0.15	0.00	0.22	0.29	0.17	0.03	0.00	0.23
22:0	0.00	0.00	0.15	0.06	0.00	0.00	0.00	0.08
14:1 ω 5c	0.00	0.19	0.06	0.06	0.07	0.15	0.00	0.05
16:1 ω 5c	0.11	0.19	0.14	0.24	0.40	0.30	0.00	0.12
16:1 ω 7c	0.77	1.64	4.70	3.21	4.30	0.70	0.65	2.16
16:1 ω 7t	0.00	0.00	0.00	0.24	0.44	0.00	0.00	0.14
16:1 ω 9c	1.48	0.49	0.33	6.28	0.57	0.12	0.00	2.71
17:1	0.13	0.00	0.27	0.33	0.61	0.10	0.00	0.22
18:1 ω 5c	0.37	0.34	0.25	0.72	1.15	0.41	0.00	0.59
18:1 ω 7c	3.96	3.52	5.05	3.73	3.36	2.43	2.03	3.90
18:1 ω 9c	24.10	5.31	30.36	13.28	20.50	3.25	9.79	13.14
20:1 ω 7c	0.37	0.18	0.71	0.41	0.49	0.10	0.00	0.64
20:1 ω 9+11	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22:1 ω 7c	0.13	0.08	0.00	5.95	0.52	0.06	0.00	1.25
22:1 ω 9c	1.45	1.03	2.99	3.06	0.84	0.24	0.85	4.30
22:1 ω 11c	3.43	0.18	7.87	3.40	0.83	0.05	0.58	3.00
24:1 ω 11+9	2.00	0.24	0.00	1.52	0.51	0.24	0.61	2.01
18:2 ω 6	0.75	0.31	1.48	0.70	1.26	0.38	0.83	0.70
18:3 ω 6	0.00	0.00	0.00	0.02	0.15	0.26	0.79	0.33
18:4 ω 3	0.28	0.00	0.56	0.50	2.14	0.17	0.00	0.05
20:4 ω 6	1.60	1.89	0.77	0.93	0.52	1.71	3.45	1.07
20:5 ω 3	11.82	19.26	5.75	9.87	9.45	18.15	17.70	10.19
20:3 ω 6	0.93	0.00	0.28	0.11	0.16	0.05	0.00	0.14
20:4 ω 3	1.01	0.17	0.97	0.48	0.56	0.16	0.62	0.40
20:2 ω 6	0.68	0.47	0.58	0.94	0.49	0.30	1.15	0.76
c21 PUFA	0.29	0.00	1.11	0.18	0.07	0.16	0.29	0.18
22:5 ω 6	0.00	0.00	0.12	0.18	0.00	0.19	0.49	0.17
22:6 ω 3	8.48	25.60	8.90	14.11	8.20	33.09	29.99	13.59
22:4 ω 6	0.00	0.00	0.06	0.14	0.50	0.04	0.00	0.12
22:5 ω 3	0.71	0.32	1.11	0.80	0.29	0.46	0.71	0.67
20:1 ω 9c	17.18	6.3	15.8	7.8	4.5	5.29	6.67	12.0
20:1 ω 11c	0.0	1.2	0.0	1.4	0.6	0.0	0.0	1.0
19:1	0.2	0.0	0.2	0.4	0.5	0.1	0.0	0.6

Table S6 Thirty-eight fatty acids (FA) found in greater than trace amounts (0.5%) in the tissues of 7 squid species assumed to be prey of southern elephant seals.

Fatty Acid	<i>Mesonychoteuthis hamiltoni</i>	<i>Moroteuthis ingens</i>	<i>Moroteuthis knipovitchi</i>	<i>Moroteuthis robsoni</i>	<i>Onychoteuthid spp.</i>	<i>Psychroteuthis glacialis</i>	<i>Todarodes spp.</i>
14:0	1.69	3.10	1.50	3.45	13.04	3.55	1.75
15:0	0.35	0.39	0.20	0.44	0.32	0.14	0.36
16:0	11.85	19.22	14.30	16.22	15.84	6.38	12.69
17:0	0.34	0.44	0.36	0.35	0.28	0.77	0.57
18:0	3.09	3.58	3.08	3.52	2.54	0.81	4.05
20:0	0.17	0.13	0.25	0.27	0.10	0.10	0.16
22:0	0.16	0.05	0.00	0.00	0.03	0.00	0.01
14:1 ω 5c	0.03	0.10	0.02	0.07	0.02	0.25	0.04
16:1 ω 5c	0.17	0.25	0.14	0.25	0.25	0.25	0.16
16:1 ω 7c	4.48	4.07	2.67	4.10	5.36	6.85	2.78
16:1 ω 7t	0.00	0.62	0.00	0.00	0.00	0.00	0.00
16:1 ω 9c	0.06	0.45	2.14	0.37	0.35	5.35	1.23
17:1	0.52	0.34	0.21	0.32	0.30	0.16	0.32
18:1 ω 5c	0.48	0.66	0.66	0.71	0.71	0.38	0.46
18:1 ω 7c	4.28	4.01	4.99	4.47	3.73	5.77	3.21
18:1 ω 9c	27.34	19.32	20.73	19.77	22.56	19.42	18.86
20:1 ω 7c	0.90	0.53	0.66	0.64	0.42	0.71	0.67
20:1 ω 9+11	0.0	0.0	0.0	0.0	0.0	0.0	0.0
22:1 ω 7c	0.62	0.40	0.30	0.41	0.74	0.26	1.11
22:1 ω 9c	1.66	1.59	3.08	2.54	1.08	3.01	1.82
22:1 ω 11c	4.33	2.38	7.21	5.25	2.47	7.80	3.34
24:1 ω 11+9	1.34	1.29	3.27	4.08	0.65	1.45	2.03
18:2 ω 6	0.99	0.96	1.02	1.17	1.09	1.36	0.85
18:3 ω 6	0.23	0.03	0.12	0.66	0.34	0.12	0.53
18:4 ω 3	0.17	0.75	0.41	0.31	0.55	0.59	0.31
20:4 ω 6	1.08	1.00	0.79	0.67	0.81	0.41	1.21
20:5 ω 3	4.32	8.60	4.89	5.70	7.08	6.72	7.87
20:3 ω 6	0.16	0.15	0.23	0.17	0.24	0.08	0.20
20:4 ω 3	0.83	0.63	0.45	0.83	0.55	0.25	0.94
20:2 ω 6	0.07	0.44	0.62	0.49	0.05	0.25	0.59
c21 PUFA	0.15	0.24	0.06	0.12	0.23	0.21	0.26
22:5 ω 6	0.20	0.15	0.10	0.13	0.11	0.14	0.28
22:6 ω 3	8.01	13.30	9.86	9.03	8.58	3.93	17.43
22:4 ω 6	0.13	0.09	0.00	0.05	0.05	0.00	0.05
22:5 ω 3	0.99	0.71	0.53	0.75	0.53	0.40	1.12
20:1 ω 9c	16.70	7.9	13.68	10.78	7.21	14.76	10.66
20:1 ω 11c	0.0	0.9	0.0	0.0	0.0	0.0	0.0
19:1	0.3	0.4	0.2	0.1	0.1	0.0	0.1

Tables S7-S17 Twenty-eight fatty acids (FA) found in greater than trace amounts (0.5%) in the blubber of 122 juvenile (1-4 years old) southern elephant seals sampled in summer 1999 and winter 2000 at Macquarie Island. The relative amounts of each FA are presented as a percentage of the total amount of FA identified once data had been adjusted to 100% after exclusion of the fatty acids below 0.5%.

Table S7 Twenty-eight fatty acids (FA) found in greater than trace amounts (0.5%) in the blubber of 1-year old juvenile female southern elephant seals sampled in winter 2000 at Macquarie Island.

Seal ID	P034	P052	P093	P094	P147	P270	P463	P498	P517	P644
Age (years)	1	1	1	1	1	1	1	1	1	1
Sex	female	female	female	female	female	female	female	female	female	female
Year	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
14:0	2.1	3.4	3.0	3.5	4.0	4.2	4.5	3.2	2.7	2.3
16:1 ω 9c	0.3	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3
16:1 ω 7c	7.9	7.3	7.4	8.5	8.5	9.2	7.7	11.4	7.0	6.8
16:0	12.0	12.9	12.1	13.5	13.6	14.3	13.5	14.1	12.4	12.2
br17:1	0.3	0.3	0.4	0.3	0.4	0.3	0.3	0.3	0.3	0.2
i17:0	0.2	0.3	0.3	0.2	0.2	0.2	0.3	0.2	0.2	0.2
17:1 ω 8+a17:0	0.6	0.6	0.6	0.6	0.4	0.5	0.6	0.7	0.5	0.5
17:0	0.2	0.3	0.3	0.3	0.3	0.2	0.3	0.4	0.4	0.2
18:4 ω 3	0.6	1.1	0.8	1.0	1.2	1.3	1.0	0.4	1.2	0.8
18:2 ω 6	1.3	2.5	1.4	1.5	1.5	1.6	1.6	1.3	1.8	1.5
18:1 ω 9c	33.2	31.9	29.2	29.5	27.9	26.0	28.5	28.7	29.1	29.5
18:1 ω 7c	6.0	6.4	7.0	6.7	6.8	6.4	7.6	5.6	8.1	6.8
18:1 ω 5c	0.7	0.1	0.5	0.7	0.7	0.7	0.6	0.6	0.7	0.6
18:0	2.6	3.0	2.8	2.8	2.8	3.0	3.1	2.4	2.9	3.1
19:1b	0.3	0.2	0.2	0.1	0.0	0.0	0.0	0.0	0.0	0.4
20:4 ω 6	0.5	0.4	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.5
20:5 ω 3	4.8	5.8	5.8	6.8	7.2	7.8	6.3	3.9	7.8	6.6
20:4 ω 3	0.6	0.5	0.7	0.7	0.6	0.7	0.5	0.8	0.6	0.7
20:2 ω 6	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.3	0.3
20:1 ω 9+11	11.0	8.6	11.9	8.2	7.7	7.5	8.4	8.6	8.8	10.0
20:1 ω 7	0.6	0.5	0.7	0.5	0.5	0.6	0.6	0.4	0.5	0.6
22:6 ω 3	6.6	6.5	6.3	7.0	7.4	7.5	6.6	7.5	7.5	7.7
22:5 ω 3	1.8	1.5	1.6	1.7	1.9	1.7	1.7	1.7	1.8	2.2
22:1 ω 11+13c	2.2	2.1	2.5	2.0	2.0	2.2	1.9	2.8	1.8	2.4
22:1 ω 9c	1.1	1.0	1.2	0.9	1.0	0.9	1.0	1.2	0.9	1.2
22:1 ω 7c	0.1	0.2	0.2	0.0	0.2	0.0	0.2	0.2	0.0	0.2
24:1 ω 11+13c	0.3	0.3	0.4	0.2	0.3	0.3	0.3	0.5	0.3	0.3
24:1 ω 9c	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.6	0.4	0.5

Table S8 Twenty-eight fatty acids (FA) found in greater than trace amounts (0.5%) in the blubber of 1-year old juvenile female southern elephant seals sampled in winter 2000 at Macquarie Island.

Seal ID	P648	P772	P730	P787	P903	P534	P819	P829	P897	P935
Age (years)	1	1	1	1	1	1	1	1	1	1
Sex	female	female	female	female	female	female	female	female	female	female
Year	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
14:0	1.3	1.3	1.9	3.2	2.2	3.0	2.5	3.8	2.9	2.5
16:1 ω 9c	0.0	0.0	0.3	0.0	0.3	0.3	0.0	0.3	0.4	0.0
16:1 ω 7c	6.1	7.2	7.0	8.1	5.4	6.6	8.7	7.4	8.5	7.4
16:0	11.0	11.1	12.0	13.2	12.1	11.6	12.2	12.4	11.8	12.0
br17:1	0.0	0.3	0.3	0.3	0.4	0.3	0.4	0.3	0.3	0.3
i17:0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.0	0.3
17:1 ω 8+a17:0	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.4	0.6	0.6
17:0	0.0	0.3	0.3	0.2	0.3	0.2	0.2	0.2	0.3	0.3
18:4 ω 3	0.8	0.6	0.8	1.2	0.7	0.5	1.0	0.9	0.8	0.9
18:2 ω 6	1.8	1.6	1.6	1.6	1.3	1.5	1.6	1.7	1.8	1.6
18:1 ω 9c	30.6	33.9	31.6	26.4	27.5	30.3	30.2	29.9	32.3	31.6
18:1 ω 7c	8.3	7.3	7.2	6.8	7.1	7.9	6.6	8.3	7.9	7.1
18:1 ω 5c	0.6	0.6	0.7	0.8	0.6	0.6	0.8	0.5	0.5	0.8
18:0	3.1	2.8	3.1	2.9	3.9	3.2	2.5	3.0	2.6	3.1
19:1b	0.0	0.0	0.2	0.0	0.0	0.3	0.2	0.3	0.0	0.4
20:4 ω 6	0.2	0.5	0.4	0.6	0.5	0.4	0.5	0.5	0.5	0.5
20:5 ω 3	7.5	5.6	5.3	7.7	5.2	5.0	6.3	6.2	6.4	5.4
20:4 ω 3	0.7	0.6	0.5	0.6	0.6	0.5	0.6	0.6	0.8	0.6
20:2 ω 6	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3
20:1 ω 9+11	12.0	11.5	11.3	9.5	13.7	13.3	9.8	9.9	9.3	9.9
20:1 ω 7	0.8	0.6	0.6	0.6	0.8	0.6	0.7	0.5	0.6	0.6
22:6 ω 3	7.3	6.3	5.9	7.4	6.4	5.4	6.7	5.9	6.4	6.5
22:5 ω 3	1.8	1.6	1.6	1.7	1.7	1.5	1.7	1.5	1.8	1.7
22:1 ω 11+13c	2.2	2.2	2.6	2.5	3.6	2.5	2.2	1.7	1.5	2.1
22:1 ω 9c	1.2	1.1	1.2	1.3	1.7	1.1	1.2	0.9	0.7	1.1
22:1 ω 7c	0.0	0.1	0.2	0.2	0.4	0.2	0.1	0.2	0.0	0.2
24:1 ω 11+13c	0.0	0.3	0.4	0.3	0.7	0.4	0.3	0.3	0.0	0.3
24:1 ω 9c	0.8	0.5	0.6	0.5	0.8	0.5	0.5	0.5	0.4	0.5

Table S9 Twenty-eight fatty acids (FA) found in greater than trace amounts (0.5%) in the blubber of 1-year old juvenile male southern elephant seals sampled in winter 2000 and summer 1999 at Macquarie Island.

Seal ID	E701	P069	P159	P189	P255	P281	P284	P315	P544	P993	P764	P774
Age (years)	1	1	1	1	1	1	1	1	1	1	1	1
Sex	male	male	male	male	male	male	male	male	male	male	male	male
Year	1999	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
14:0	1.7	4.1	2.9	3.1	3.0	3.7	3.3	1.2	2.6	1.6	2.5	3.9
16:1 ω 9c	0.0	0.3	0.3	0.3	0.0	0.4	0.2	0.3	0.3	0.0	0.3	0.3
16:1 ω 7c	8.4	7.8	7.5	7.7	9.1	8.3	7.5	6.5	8.5	7.3	6.9	7.2
16:0	10.8	12.2	11.7	12.6	11.8	12.2	12.9	11.9	11.1	11.6	13.6	12.0
br17:1	0.3	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.3
i17:0	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.5	0.1	0.2	0.2	0.2
17:1 ω 8+a17:0	0.6	0.5	0.6	0.6	0.5	0.5	0.5	1.0	0.5	0.5	0.5	0.6
17:0	0.2	0.3	0.3	0.2	0.4	0.2	0.4	0.5	0.2	0.2	0.2	0.3
18:4 ω 3	0.5	0.9	1.0	1.1	1.0	0.9	1.0	0.3	0.8	0.9	1.1	0.8
18:2 ω 6	1.8	1.7	1.4	1.6	1.6	1.7	1.4	1.5	1.7	1.5	1.8	1.4
18:1 ω 9c	36.3	30.2	29.9	28.1	29.7	31.9	30.0	36.0	30.3	31.7	31.1	29.7
18:1 ω 7c	7.3	8.0	7.1	6.9	7.1	7.9	7.0	7.6	8.2	7.0	8.5	7.7
18:1 ω 5c	0.5	0.6	0.8	0.7	0.7	0.6	0.6	0.4	0.5	0.8	0.8	0.7
18:0	2.5	2.8	2.7	3.0	2.4	2.7	2.9	4.5	2.7	3.0	3.3	3.0
19:1b	0.0	0.1	0.4	0.0	0.0	0.0	0.0	0.8	0.0	0.0	0.0	0.3
20:4 ω 6	0.7	0.5	0.5	0.5	0.6	0.5	0.5	0.6	0.5	0.4	0.1	0.5
20:5 ω 3	4.0	5.8	6.4	7.0	6.9	6.2	6.8	2.8	5.7	5.7	6.7	4.9
20:4 ω 3	0.6	0.5	0.6	0.6	0.6	0.6	0.8	0.5	0.5	0.6	0.6	0.5
20:2 ω 6	0.3	0.2	0.3	0.2	0.3	0.2	0.3	0.3	0.3	0.3	0.2	0.3
20:1 ω 9+11	11.2	9.9	10.1	9.5	8.8	8.8	9.0	10.1	11.5	11.7	8.8	12.3
20:1 ω 7	0.6	0.5	0.7	0.6	0.7	0.5	0.6	1.1	0.6	0.7	0.5	0.7
22:6 ω 3	6.3	5.9	7.1	7.3	7.5	6.1	7.2	5.6	5.8	6.0	5.7	5.1
22:5 ω 3	2.0	1.6	1.8	1.7	1.8	1.6	1.7	1.8	1.9	1.5	1.6	1.4
22:1 ω 11+13c	1.5	1.8	1.9	2.3	1.8	1.4	1.9	1.4	2.2	2.6	1.7	2.4
22:1 ω 9c	0.9	0.9	1.0	1.2	1.0	0.8	1.0	1.0	1.1	1.3	0.8	1.2
22:1 ω 7c	0.0	0.2	0.2	0.2	0.0	0.0	0.2	0.0	0.2	0.2	0.2	0.1
24:1 ω 11+13c	0.0	0.3	0.3	0.3	0.3	0.2	0.2	0.0	0.3	0.3	0.2	0.4
24:1 ω 9c	0.4	0.4	0.4	0.5	0.5	0.3	0.4	0.6	0.4	0.5	0.4	0.5

Table S10 Twenty-eight fatty acids (FA) found in greater than trace amounts (0.5%) in the blubber of 1-year old juvenile male southern elephant seals sampled in winter 2000 at Macquarie Island.

Seal ID	P873	P020	P037	P089	P179	P457	P492	P536	P769	P864	P978
Age (years)	1	1	1	1	1	1	1	1	1	1	1
Sex	male	male	male	male	male	male	male	male	male	male	male
Year	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
14:0	3.5	2.0	2.4	2.7	3.4	2.2	3.1	3.1	2.9	3.2	2.6
16:1 ω 9c	0.3	0.3	0.2	0.3	0.3	0.3	0.0	0.3	0.3	0.0	0.2
16:1 ω 7c	7.3	9.0	8.4	6.7	7.7	7.1	7.9	7.2	9.4	7.7	6.4
16:0	12.2	12.5	12.8	13.2	12.4	12.7	12.8	13.1	12.2	11.9	13.0
br17:1	0.2	0.3	0.4	0.4	0.3	0.4	0.3	0.3	0.4	0.3	0.3
i17:0	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2	0.3	0.1	0.2
17:1 ω 8+a17:0	0.4	0.7	0.6	0.5	0.5	0.5	0.6	0.5	0.7	0.5	0.5
17:0	0.2	0.4	0.3	0.3	0.2	0.3	0.2	0.3	0.2	0.4	0.3
18:4 ω 3	0.8	0.4	0.8	1.1	0.8	0.9	1.3	1.1	1.0	0.8	1.4
18:2 ω 6	1.6	1.4	1.4	1.4	1.8	1.4	1.6	1.5	1.5	1.7	1.4
18:1 ω 9c	31.3	31.8	30.8	29.1	30.0	28.0	26.3	29.7	29.1	31.0	25.0
18:1 ω 7c	7.9	6.1	5.8	7.0	7.4	5.5	6.7	7.3	5.9	7.9	6.5
18:1 ω 5c	0.6	0.7	0.7	0.8	0.6	0.9	0.7	0.5	0.6	0.7	0.6
18:0	3.0	2.6	2.7	3.4	3.2	3.4	3.1	3.0	2.4	3.0	3.5
19:1b	0.2	0.4	0.2	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0
20:4 ω 6	0.5	0.5	0.5	0.5	0.5	0.5	0.2	0.2	0.6	0.5	0.2
20:5 ω 3	5.4	3.4	6.1	7.1	5.5	5.6	8.0	7.0	7.1	5.9	8.4
20:4 ω 3	0.6	0.7	0.5	0.6	0.6	0.6	0.7	0.7	0.8	0.6	0.8
20:2 ω 6	0.3	0.3	0.3	0.2	0.3	0.3	0.2	0.3	0.3	0.3	0.3
20:1 ω 9+11	10.8	11.0	9.5	9.2	10.3	9.5	9.3	9.2	8.3	10.3	9.7
20:1 ω 7	0.6	0.5	0.7	0.6	0.6	0.7	0.7	0.6	0.6	0.6	0.7
22:6 ω 3	5.6	6.8	6.9	6.7	6.4	8.4	7.7	7.1	8.1	6.2	8.7
22:5 ω 3	1.6	1.8	1.7	1.7	2.0	2.5	1.9	1.9	2.0	1.8	1.9
22:1 ω 11+13c	1.7	2.6	2.3	2.4	2.1	3.3	2.7	1.8	2.0	1.7	2.9
22:1 ω 9c	1.0	1.2	1.2	1.3	1.0	1.7	1.4	1.0	1.1	0.9	1.5
22:1 ω 7c	0.1	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.0	0.1	0.3
24:1 ω 11+13c	0.3	0.4	0.3	0.4	0.4	0.6	0.4	0.3	0.2	0.3	0.4
24:1 ω 9c	0.4	0.5	0.5	0.6	0.5	0.8	0.5	0.4	0.4	0.4	0.6

Table S11 Twenty-eight fatty acids (FA) found in greater than trace amounts (0.5%) in the blubber of 2-year old juvenile female southern elephant seals sampled in summer 1999 at Macquarie Island.

Seal ID	D126	D455	D627	D666	D791
Age (years)	2	2	2	2	2
Sex	female	female	female	female	female
Year	1999	1999	1999	1999	1999
14:0	1.4	3.3	2.6	1.1	2.8
16:1 ω 9c	0.2	0.3	0.0	0.0	0.3
16:1 ω 7c	6.9	7.1	7.5	5.0	6.9
16:0	11.5	12.5	12.9	9.8	12.8
br17:1	0.3	0.3	0.3	0.3	0.3
i17:0	0.2	0.2	0.2	0.3	0.2
17:1 ω 8+a17:0	0.6	0.5	0.5	0.6	0.5
17:0	0.3	0.3	0.3	0.3	0.3
18:4 ω 3	0.6	0.5	0.6	0.5	0.8
18:2 ω 6	1.5	1.6	1.6	1.5	1.6
18:1 ω 9c	33.2	31.3	30.2	33.3	30.2
18:1 ω 7c	6.7	7.6	6.7	7.8	7.1
18:1 ω 5c	0.8	0.6	0.7	0.7	0.5
18:0	3.0	3.3	3.4	3.6	3.5
19:1b	0.3	0.0	0.0	0.3	0.0
20:4 ω 6	0.5	0.5	0.5	0.5	0.5
20:5 ω 3	5.2	4.7	4.6	3.8	5.1
20:4 ω 3	0.6	0.6	0.6	0.6	0.6
20:2 ω 6	0.3	0.3	0.3	0.4	0.3
20:1 ω 9+11	10.4	11.3	10.8	15.7	10.7
20:1 ω 7	0.6	0.6	0.6	0.8	0.6
22:6 ω 3	7.5	5.8	6.8	5.5	6.9
22:5 ω 3	1.9	1.7	1.8	1.6	1.9
22:1 ω 11+13c	2.0	2.0	2.5	2.7	2.1
22:1 ω 9c	1.0	0.9	1.2	1.3	1.0
22:1 ω 7c	0.2	0.0	0.2	0.2	0.0
24:1 ω 11+13c	0.2	0.3	0.4	0.4	0.4
24:1 ω 9c	0.5	0.4	0.6	0.6	0.6

Table S12 Twenty-eight fatty acids (FA) found in greater than trace amounts (0.5%) in the blubber of 2-year old juvenile male southern elephant seals sampled in summer 1999 at Macquarie Island.

Seal ID	D008	D511	D102	D214	D261	D474	D517	D632	D799	D826	D862	D886
Age (years)	2	2	2	2	2	2	2	2	2	2	2	2
Sex	male	male	male	male	male	male	male	male	male	male	male	male
Year	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999
14:0	1.7	2.8	1.5	2.1	2.6	3.2	2.0	1.8	2.3	2.0	2.2	2.8
16:1 ω 9c	0.1	0.3	0.3	0.4	0.3	0.2	0.3	0.3	0.0	0.3	0.3	0.0
16:1 ω 7c	8.9	6.8	5.6	7.8	7.3	7.6	7.2	6.7	7.8	6.4	5.0	7.1
16:0	11.2	11.7	10.5	10.6	10.9	11.6	11.1	11.7	11.1	11.5	9.8	11.0
br17:1	0.4	0.2	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2
i17:0	0.2	0.2	0.2	0.3	0.2	0.2	0.3	0.2	0.3	0.2	0.2	0.2
17:1 ω 8+a17:0	0.5	0.5	0.6	0.8	0.5	0.6	0.6	0.6	0.6	0.5	0.6	0.5
17:0	0.3	0.3	0.4	0.3	0.3	0.2	0.3	0.2	0.3	0.3	0.3	0.2
18:4 ω 3	0.6	0.6	0.4	0.6	0.5	0.6	0.8	0.5	0.5	0.7	0.4	0.6
18:2 ω 6	1.8	1.7	1.5	1.5	1.6	1.5	1.5	1.7	1.7	1.5	1.3	1.8
18:1 ω 9c	33.9	30.5	32.8	36.8	31.7	30.2	31.1	32.8	33.5	29.9	30.0	31.7
18:1 ω 7c	7.3	7.8	7.8	6.8	7.6	7.2	7.2	7.7	7.7	6.7	7.3	8.2
18:1 ω 5c	0.7	0.7	0.5	0.6	0.4	0.6	0.7	0.5	0.6	0.7	0.6	0.6
18:0	2.8	3.7	3.3	3.0	2.9	2.9	2.9	3.7	3.0	3.5	3.7	3.2
19:1b	0.0	0.2	0.4	0.3	0.0	0.0	0.4	0.3	0.0	0.2	0.5	0.0
20:4 ω 6	0.6	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.2	0.5	0.4	0.5
20:5 ω 3	5.6	5.0	3.5	3.6	4.2	5.0	5.7	4.7	5.6	4.8	2.7	5.4
20:4 ω 3	0.5	0.7	0.6	0.7	0.6	0.6	0.6	0.6	0.7	0.7	0.6	0.6
20:2 ω 6	0.3	0.3	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.5	0.3
20:1 ω 9+11	8.6	10.7	15.2	8.7	12.2	12.6	11.8	11.4	11.1	12.1	18.1	11.2
20:1 ω 7	0.6	0.7	0.7	0.7	0.7	0.6	0.7	0.6	0.6	0.7	0.8	0.6
22:6 ω 3	6.9	6.5	5.4	6.1	6.8	6.0	6.6	5.8	6.1	7.4	4.9	6.2
22:5 ω 3	1.9	2.3	1.7	1.6	2.2	1.6	1.9	1.9	1.9	2.1	1.6	1.9
22:1 ω 11+13c	1.7	1.9	2.8	2.2	2.0	2.5	1.9	1.9	1.7	2.5	3.6	1.8
22:1 ω 9c	0.9	1.1	1.2	1.1	1.1	1.2	1.0	1.0	0.9	1.2	1.5	1.0
22:1 ω 7c	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.2	0.3	0.2
24:1 ω 11+13c	0.3	0.3	0.4	0.3	0.3	0.3	0.2	0.3	0.0	0.4	0.5	0.0
24:1 ω 9c	0.4	0.6	0.6	0.5	0.5	0.5	0.4	0.5	0.4	0.6	0.7	0.7

Table S13 Twenty-eight fatty acids (FA) found in greater than trace amounts (0.5%) in the blubber of 2-year old juvenile female southern elephant seals sampled in winter 2000 at Macquarie Island.

Seal ID	D049	D482	D483	D777	D982	M449	D093	D232	D272	D281	D341	D392	D547	D552
Age (years)	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Sex	female	female	female	female	female	female	female	female	female	female	female	female	female	female
Year	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
14:0	3.2	2.7	3.2	3.8	4.0	2.7	0.0	2.8	2.3	2.3	3.4	3.3	2.7	2.2
16:1 ω 9c	0.3	0.3	0.0	0.3	0.3	0.3	0.0	0.2	0.4	0.0	0.3	0.3	0.3	0.0
16:1 ω 7c	8.6	7.0	8.7	8.7	9.3	6.8	6.1	7.2	7.7	7.7	7.3	8.0	7.6	7.0
16:0	11.4	9.9	13.8	10.6	13.0	10.6	10.1	11.1	10.6	11.0	13.1	10.5	11.9	11.1
br17:1	0.3	0.3	0.3	0.2	0.3	0.2	0.3	0.2	0.2	0.2	0.3	0.2	0.4	0.3
i17:0	0.2	0.2	0.3	0.2	0.2	0.2	0.0	0.2	0.0	0.2	0.2	0.2	0.2	0.0
17:1 ω 8+a17:0	0.6	0.6	0.6	0.5	0.6	0.5	0.0	0.5	0.4	0.5	0.6	0.6	0.5	0.4
17:0	0.3	0.3	0.3	0.2	0.2	0.2	0.5	0.2	0.0	0.2	0.3	0.3	0.2	0.5
18:4 ω 3	0.7	0.3	1.0	0.5	1.0	0.6	0.6	0.7	0.6	0.5	1.1	0.5	0.9	0.7
18:2 ω 6	1.8	1.4	1.4	1.6	1.7	1.5	1.9	1.8	1.8	1.6	1.5	1.7	1.5	1.7
18:1 ω 9c	33.2	32.2	29.3	31.1	30.5	31.3	34.6	31.8	32.6	32.2	27.0	33.2	31.2	32.3
18:1 ω 7c	7.3	7.8	6.0	7.8	7.0	8.2	8.2	8.5	6.4	7.8	7.2	8.2	7.3	8.3
18:1 ω 5c	0.5	0.6	0.6	0.5	0.6	0.7	0.5	0.6	0.6	0.5	0.7	0.5	0.5	0.6
18:0	2.8	2.9	3.0	2.6	2.7	2.8	3.2	3.0	3.0	2.8	3.0	2.5	3.0	3.2
19:1b	0.0	0.4	0.0	0.1	0.0	0.4	0.0	0.4	0.0	0.4	0.0	0.0	0.0	0.0
20:4 ω 6	0.5	0.4	0.6	0.4	0.5	0.4	0.9	0.5	0.0	0.4	0.6	0.5	0.5	0.4
20:5 ω 3	5.0	2.8	7.3	4.4	6.5	4.7	5.9	5.1	4.9	4.5	7.0	4.9	6.1	4.5
20:4 ω 3	0.6	0.5	0.6	0.5	0.6	0.6	0.7	0.6	0.8	0.5	0.7	0.6	0.7	0.9
20:2 ω 6	0.3	0.4	0.3	0.4	0.3	0.4	0.3	0.3	0.3	0.3	0.2	0.3	0.3	0.3
20:1 ω 9+11	10.1	15.8	7.2	12.4	8.5	13.7	12.3	12.1	13.5	13.2	9.0	11.7	10.6	12.2
20:1 ω 7	0.6	0.7	0.6	0.7	0.5	0.7	0.8	0.6	0.7	0.6	0.6	0.6	0.6	0.7
22:6 ω 3	5.9	3.9	8.2	5.1	6.2	5.3	7.3	4.8	5.0	5.1	7.8	5.1	6.3	5.2
22:5 ω 3	1.7	1.3	1.8	1.5	1.5	1.5	1.9	1.5	1.4	1.5	2.0	1.6	1.7	1.5
22:1 ω 11+13c	1.6	3.1	2.1	2.4	1.7	2.2	2.1	2.1	2.7	2.5	2.3	1.7	2.1	2.2
22:1 ω 9c	0.9	1.4	1.1	1.1	0.8	1.1	1.1	1.0	1.3	1.0	1.2	0.9	1.1	1.3
22:1 ω 7c	0.0	0.2	0.1	0.2	0.0	0.2	0.0	0.2	0.2	0.0	0.2	0.0	0.1	0.7
24:1 ω 11+13c	0.0	0.5	0.3	0.4	0.2	0.3	0.0	0.3	0.5	0.5	0.4	0.3	0.3	0.3
24:1 ω 9c	0.6	0.6	0.5	0.5	0.4	0.4	0.5	0.4	0.5	0.5	0.5	0.4	0.5	0.6

Table S14 Twenty-eight fatty acids (FA) found in greater than trace amounts (0.5%) in the blubber of 2-year old juvenile male southern elephant seals sampled in winter 2000 at Macquarie Island.

Seal ID	D363	D490	D533	D731	D210	D427	D489	D574	D589	D699	D955	D874	D598	D834
Age (years)	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Sex	male	male	male	male	male	male	male	male	male	male	male	male	female	female
Year	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
14:0	4.2	4.9	4.0	4.5	2.0	4.0	2.9	4.3	1.8	1.7	3.0	4.6	3.1	2.3
16:1 ω 9c	0.3	0.4	0.3	0.3	0.0	0.3	0.1	0.0	0.2	0.2	0.2	0.0	0.2	0.3
16:1 ω 7c	9.7	9.0	7.6	9.0	8.3	8.0	6.1	11.7	7.0	6.6	8.1	7.7	8.6	5.7
16:0	11.6	12.2	13.1	11.6	12.5	11.0	11.3	12.9	11.5	11.2	12.5	13.2	12.8	10.0
br17:1	0.0	0.3	0.3	0.0	0.3	0.3	0.3	0.0	0.3	0.4	0.3	0.3	0.3	0.2
i17:0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.0	0.2	0.3	0.3	0.3	0.2	0.2
17:1 ω 8+a17:0	0.6	0.5	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.5	0.6	0.5
17:0	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.3	0.3	0.3	0.2	0.2	0.2
18:4 ω 3	0.8	1.0	0.8	0.7	0.9	0.8	0.6	1.0	0.7	1.1	1.0	1.2	0.8	0.4
18:2 ω 6	1.9	1.6	1.6	1.8	1.7	1.6	1.4	2.1	1.5	1.5	1.6	1.5	1.6	1.5
18:1 ω 9c	32.1	29.2	29.0	33.7	32.2	29.9	29.2	32.2	31.2	29.5	28.4	28.1	29.9	30.7
18:1 ω 7c	8.2	7.2	7.1	8.0	7.0	7.6	8.0	8.6	6.5	6.9	6.9	7.9	6.5	8.6
18:1 ω 5c	0.4	0.6	0.6	0.6	0.6	0.6	0.6	0.4	0.6	0.7	0.8	0.6	0.6	0.6
18:0	2.7	2.5	3.4	2.7	3.4	2.8	3.4	2.3	3.1	3.1	2.9	2.7	2.9	3.1
19:1b	0.0	0.3	0.0	0.2	0.0	0.2	0.4	0.0	0.4	0.0	0.0	0.0	0.2	0.4
20:4 ω 6	0.5	0.5	0.4	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.2	0.1	0.5	0.4
20:5 ω 3	5.4	5.9	6.0	5.8	6.8	5.3	5.4	6.5	5.4	6.9	7.2	7.9	7.1	3.7
20:4 ω 3	0.9	0.6	0.6	0.7	0.7	0.6	0.6	0.4	0.6	0.7	0.6	0.6	0.7	0.6
20:2 ω 6	0.3	0.2	0.3	0.2	0.2	0.3	0.3	0.0	0.3	0.3	0.2	0.2	0.3	0.4
20:1 ω 9+11	10.1	8.7	9.9	8.3	8.3	11.7	13.7	5.5	10.9	10.7	9.0	8.8	7.6	16.6
20:1 ω 7	0.6	0.5	0.6	0.5	0.5	0.7	0.7	0.5	0.7	0.7	0.6	0.6	0.5	0.8
22:6 ω 3	4.5	6.8	6.3	5.3	6.9	5.7	5.5	5.2	7.2	7.5	7.5	6.7	7.6	4.5
22:5 ω 3	1.4	1.8	1.7	1.7	1.9	1.5	1.4	1.8	1.9	1.9	2.0	1.4	2.1	1.5
22:1 ω 11+13c	1.6	1.7	2.2	1.0	1.7	2.2	2.8	1.3	2.6	2.5	2.2	1.9	1.8	3.1
22:1 ω 9c	0.9	0.9	1.1	0.7	1.0	1.3	1.3	0.9	1.3	1.4	1.1	0.9	0.9	1.3
22:1 ω 7c	0.0	0.1	0.2	0.0	0.2	0.2	0.2	0.0	0.2	0.3	0.2	0.0	0.1	0.3
24:1 ω 11+13c	0.0	0.2	0.4	0.0	0.3	0.3	0.4	0.0	0.4	0.3	0.3	0.0	0.3	0.5
24:1 ω 9c	0.4	0.4	0.6	0.2	0.5	0.5	0.6	0.4	0.6	0.6	0.5	0.7	0.4	0.6

Table S15 Twenty-eight fatty acids (FA) found in greater than trace amounts (0.5%) in the blubber of 3-year old juvenile female southern elephant seals sampled in summer 1999 at Macquarie Island.

Seal ID	K068	K130	K147	K216	K222	K266	K302	K400	K439	K685	K879	K931	K957
Age (years)	3	3	3	3	3	3	3	3	3	3	3	3	3
Sex	female	female	female	female	female	female	female	female	female	female	female	female	female
Year	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999
14:0	2.3	1.5	2.5	1.6	2.6	2.7	3.8	2.6	3.4	2.5	3.5	1.7	4.3
16:1 ω 9c	0.3	0.2	0.3	0.0	0.3	0.3	0.3	0.2	0.3	0.3	0.3	0.3	0.1
16:1 ω 7c	7.5	5.7	6.8	7.0	8.8	7.1	10.2	6.8	7.7	5.6	7.1	7.7	9.2
16:0	10.4	9.8	10.1	10.4	9.7	12.4	11.1	12.8	10.8	10.5	11.1	10.4	11.2
br17:1	0.2	0.2	0.2	0.3	0.2	0.3	0.2	0.4	0.2	0.3	0.2	0.3	0.2
i17:0	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2
17:1 ω 8+a17:0	0.5	0.5	0.6	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.5	0.6	0.5
17:0	0.3	0.3	0.2	0.4	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.3	0.2
18:4 ω 3	0.4	0.3	0.4	0.5	0.6	0.4	0.7	0.6	0.4	0.3	0.3	0.4	0.7
18:2 ω 6	1.7	1.5	1.4	1.9	1.8	1.5	1.9	1.4	1.6	1.5	1.6	1.5	1.9
18:1 ω 9c	34.0	30.9	32.8	32.4	33.8	32.0	31.0	30.7	32.6	31.9	31.3	33.5	31.4
18:1 ω 7c	8.0	9.1	7.8	8.7	8.5	7.1	8.1	6.3	7.9	8.4	8.6	7.0	8.2
18:1 ω 5c	0.5	0.6	0.5	0.6	0.6	0.6	0.6	0.7	0.5	0.5	0.5	0.7	0.5
18:0	2.8	2.8	2.9	3.4	2.5	3.4	2.6	3.3	2.9	3.4	3.1	2.7	2.6
19:1b	0.4	0.5	0.4	0.0	0.4	0.0	0.0	0.4	0.4	0.4	0.3	0.4	0.3
20:4 ω 6	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.4	0.4	0.5
20:5 ω 3	4.1	4.0	3.6	4.0	4.8	4.1	4.9	4.8	4.1	3.0	4.2	3.6	5.1
20:4 ω 3	0.6	0.6	0.5	0.5	0.6	0.5	0.6	0.6	0.6	0.5	0.6	0.6	0.6
20:2 ω 6	0.3	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.4	0.5	0.4	0.4	0.3
20:1 ω 9+11	12.2	17.1	14.4	13.8	11.6	11.9	9.1	10.7	13.0	16.7	13.8	13.2	9.9
20:1 ω 7	0.6	0.8	0.8	0.8	0.6	0.6	0.6	0.7	0.6	0.8	0.6	0.7	0.6
22:6 ω 3	5.3	4.6	4.9	4.9	4.8	5.8	5.8	7.1	4.9	4.0	4.2	5.5	5.3
22:5 ω 3	1.5	1.6	1.7	1.6	1.6	1.6	1.9	1.8	1.6	1.3	1.4	1.4	1.7
22:1 ω 11+13c	2.0	2.8	2.5	2.5	1.5	2.2	1.7	2.3	1.8	2.8	2.2	3.0	1.5
22:1 ω 9c	1.1	1.3	1.2	1.1	0.9	1.1	0.9	1.2	0.9	1.3	1.1	1.3	0.9
22:1 ω 7c	0.2	0.2	0.2	0.0	0.1	0.2	0.2	0.1	0.2	0.3	0.2	0.2	0.2
24:1 ω 11+13c	0.3	0.4	0.4	0.4	0.2	0.4	0.2	0.3	0.3	0.4	0.3	0.4	0.2
24:1 ω 9c	0.5	0.6	0.5	0.6	0.4	0.5	0.4	0.6	0.4	0.5	0.4	0.6	0.4

Table S16 Twenty-eight fatty acids (FA) found in greater than trace amounts (0.5%) in the blubber of 3-year old juvenile male southern elephant seals sampled in summer 1999 at Macquarie Island.

Seal ID	N453	K018	K077	K080	K101	K159	K395	K528	K570	K785	K861
Age (years)	3	3	3	3	3	3	3	3	3	3	3
Sex	male	male	male	male	male	male	male	male	male	male	male
Year	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999	1999
14:0	2.3	2.2	2.0	1.3	3.7	1.3	2.8	4.4	2.6	3.7	1.9
16:1 ω 9c	0.4	0.3	0.3	0.3	0.3	0.3	0.3	0.0	0.3	0.3	0.0
16:1 ω 7c	6.7	8.7	6.0	6.8	8.3	6.2	7.7	7.7	5.9	8.6	6.9
16:0	12.2	11.9	11.0	11.1	11.8	11.3	11.0	13.9	11.2	11.6	10.3
br17:1	0.4	0.4	0.3	0.4	0.3	0.5	0.4	0.3	0.5	0.2	0.5
i17:0	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.2	0.3	0.3	0.0
17:1 ω 8+a17:0	0.8	0.6	0.5	0.8	0.6	0.9	0.6	0.5	0.7	0.6	0.6
17:0	0.6	0.3	0.2	0.4	0.2	0.6	0.4	0.2	0.5	0.3	0.2
18:4 ω 3	0.5	0.5	0.5	0.8	0.7	0.3	0.7	0.9	0.3	0.7	0.4
18:2 ω 6	1.7	1.7	1.6	1.6	1.8	1.5	1.6	1.8	1.4	1.8	1.7
18:1 ω 9c	40.6	36.8	30.6	35.0	32.3	42.3	32.3	26.8	32.6	30.6	32.8
18:1 ω 7c	6.3	7.7	8.2	6.9	7.5	5.6	7.3	7.8	7.1	8.4	8.1
18:1 ω 5c	0.4	0.5	0.7	0.5	0.5	0.4	0.6	0.8	0.5	0.6	0.6
18:0	4.4	3.0	3.5	3.4	3.2	4.1	2.9	3.5	3.8	2.9	3.0
19:1b	0.3	0.2	0.4	0.5	0.2	0.3	0.0	0.2	0.3	0.2	0.0
20:4 ω 6	0.7	0.5	0.5	0.7	0.6	0.7	0.5	0.5	0.5	0.5	0.6
20:5 ω 3	3.0	3.8	4.6	4.8	4.9	2.6	4.8	6.4	2.8	4.9	4.3
20:4 ω 3	0.4	0.5	0.6	0.7	0.6	0.4	0.6	0.6	0.6	0.6	0.5
20:2 ω 6	0.2	0.2	0.3	0.3	0.3	0.2	0.3	0.2	0.4	0.3	0.4
20:1 ω 9+11	6.4	9.2	13.6	7.7	9.2	7.8	10.6	8.6	13.4	9.8	14.0
20:1 ω 7	0.6	0.6	0.7	0.7	0.6	0.6	0.7	0.5	0.8	0.6	0.8
22:6 ω 3	4.6	4.5	5.7	8.7	5.7	5.0	6.7	6.3	5.5	6.0	5.2
22:5 ω 3	1.5	1.4	1.7	2.2	1.8	1.3	1.8	1.9	1.8	1.8	1.5
22:1 ω 11+13c	1.1	1.4	2.5	1.5	1.4	1.6	1.9	2.0	2.5	1.7	2.6
22:1 ω 9c	1.2	0.9	1.3	0.9	1.0	1.2	1.1	1.1	1.3	0.9	1.4
22:1 ω 7c	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
24:1 ω 11+13c	0.0	0.2	0.4	0.0	0.2	0.2	0.3	0.4	0.4	0.3	0.4
24:1 ω 9c	0.9	0.4	0.6	0.5	0.4	0.9	0.5	0.5	0.7	0.4	0.5

Table S17 Twenty-eight fatty acids (FA) found in greater than trace amounts (0.5%) in the blubber of 3-year old juvenile female and male southern elephant seals sampled in winter 2000 at Macquarie Island.

Seal ID	K538	K186	K633	K841	K894	K022	K475	K597	K443	K836
Age (years)	3	3	3	3	3	3	3	3	3	3
Sex	female	female	female	male	male	male	male	male	male	male
Year	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
14:0	3.8	1.3	3.4	3.2	7.0	2.4	1.5	1.4	3.8	1.5
16:1 ω 9c	0.3	0.0	0.3	0.0	0.3	0.0	0.3	0.4	0.0	0.0
16:1 ω 7c	9.5	7.8	7.9	8.9	11.5	9.1	6.8	6.7	12.6	8.4
16:0	11.3	10.6	12.3	13.1	13.9	11.6	13.1	11.7	12.8	10.8
br17:1	0.2	0.0	0.4	0.3	0.2	0.2	0.4	0.5	0.0	0.3
i17:0	0.2	0.2	0.3	0.2	0.1	0.2	0.4	0.4	0.0	0.3
17:1 ω 8+a17:0	0.6	0.6	0.5	0.6	0.4	0.5	0.9	1.2	0.6	0.7
17:0	0.2	0.2	0.2	0.3	0.2	0.2	0.4	0.5	0.0	0.2
18:4 ω 3	0.7	0.7	0.9	0.6	1.0	0.9	0.6	0.4	1.0	0.6
18:2 ω 6	1.9	2.2	1.6	1.6	2.0	2.0	1.4	1.2	2.6	1.8
18:1 ω 9c	32.0	34.4	30.5	33.0	30.8	34.8	32.8	35.1	32.6	36.1
18:1 ω 7c	7.8	9.3	7.9	7.0	8.7	8.9	6.3	6.7	9.8	7.4
18:1 ω 5c	0.6	0.5	0.6	0.6	0.5	0.6	0.6	0.5	0.6	0.5
18:0	2.4	2.6	2.9	3.0	2.2	2.5	4.1	4.3	2.1	2.8
19:1b	0.4	0.0	0.0	0.0	0.0	0.0	0.5	0.6	0.0	0.0
20:4 ω 6	0.5	0.5	0.5	0.5	0.2	0.5	0.7	0.9	0.0	0.6
20:5 ω 3	5.1	5.5	5.9	5.4	6.1	5.5	4.0	3.4	7.7	5.5
20:4 ω 3	0.5	0.6	0.7	0.5	0.5	0.5	0.8	0.8	0.7	0.6
20:2 ω 6	0.3	0.3	0.3	0.3	0.2	0.2	0.3	0.4	0.0	0.3
20:1 ω 9+11	9.2	10.4	9.8	8.3	5.1	7.5	7.7	8.8	4.8	9.3
20:1 ω 7	0.5	0.7	0.5	0.6	0.5	0.6	0.7	0.9	0.5	0.6
22:6 ω 3	5.6	5.5	6.0	6.3	4.2	5.2	9.1	7.1	4.7	6.1
22:5 ω 3	1.7	1.8	1.5	1.8	1.4	1.7	2.3	1.8	1.5	2.1
22:1 ω 11+13c	1.7	1.9	1.8	1.7	0.9	1.5	1.2	1.3	0.9	1.5
22:1 ω 9c	0.9	1.2	0.9	0.8	0.7	1.0	0.8	0.8	0.7	0.8
22:1 ω 7c	0.2	0.2	0.2	0.0	0.1	0.3	0.1	0.1	0.0	0.0
24:1 ω 11+13c	0.2	0.0	0.3	0.2	0.0	0.0	0.0	0.0	0.0	0.0
24:1 ω 9c	0.4	0.7	0.4	0.4	0.2	0.6	0.6	0.6	0.0	0.6