Table S1 Cytocrome c oxidase I (COI) sequences used in the current study. AGDR = Aotearoa Genomic Data Repository. UK OT = United Kingdom Overseas. Territory. "XXX" will be deposited in NCBI GenBank upon publication.

	Sample ID	***Genus***	***Species***	**Country**	**Location**	**Year**	**Life stage**	**Database**	**Original names in assemblies**
1	AM12	*Geotria*	*australis*	New Zealand	Mangakino Stream	2017	larvae	AGDR	
2	AM17	*Geotria*	*australis*	New Zealand	Mangakino Stream	2017	larvae	AGDR	
3	AP13	*Geotria*	*australis*	New Zealand	Piha Stream	2017	larvae	AGDR	
4	AP5	*Geotria*	*australis*	New Zealand	Piha Stream	2017	larvae	AGDR	
5	CS2	*Geotria*	*australis*	New Zealand	Styx River	2017	larvae	AGDR	
6	CS22	*Geotria*	*australis*	New Zealand	Styx River	2017	larvae	AGDR	
7	CW22	*Geotria*	*australis*	New Zealand	Waikawa River	2018	larvae	AGDR	
8	CW27	*Geotria*	*australis*	New Zealand	Waikawa River	2018	larvae	AGDR	
9	MOXXX71	*Geotria*	*australis*	New Zealand	Mokau River	2015	adult	AGDR	MO7_COI_Assembly_consensus_sequence
10	NZKIN19_M2_T2	*Geotria*	*australis*	New Zealand	Okuti River	2019	adult	AGDR	
11	SP12	*Geotria*	*australis*	New Zealand	Pourakino River	2018	larvae	AGDR	
12	SP22	*Geotria*	*australis*	New Zealand	Pourakino River	2018	larvae	AGDR	
13	SP6	*Geotria*	*australis*	New Zealand	Pourakino River	2018	larvae	AGDR	
14	WK18	*Geotria*	*australis*	New Zealand	Kaniwhaniwha Stream	2017	larvae	AGDR	
15	WK27	*Geotria*	*australis*	New Zealand	Kaniwhaniwha Stream	2017	larvae	AGDR	
16	WP11	*Geotria*	*australis*	New Zealand	Pauatahanui Stream	2017	larvae	AGDR	
17	WP24	*Geotria*	*australis*	New Zealand	Pauatahanui Stream	2017	larvae	AGDR	
18	WW12	*Geotria*	*australis*	New Zealand	Waiau Stream	2018	larvae	AGDR	
19	WW6	*Geotria*	*australis*	New Zealand	Waiau Stream	2018	larvae	AGDR	
20	BIRDis_2	*Geotria*	*australis*	UK OT	Bird Island, South Georgia (in albatross diet)	2019	adult	XXXX	FALK_2
21	BIRDis_3	*Geotria*	*australis*	UK OT	Bird Island, South Georgia (in albatross diet)	2010	adult	XXXX	FALK_3
22	BIRDis_4	*Geotria*	*australis*	UK OT	Bird Island, South Georgia (in albatross diet)	2011	adult	XXXX	FALK_4
23	BIRDis_7	*Geotria*	*australis*	UK OT	Bird Island, South Georgia (in albatross diet)	2002	adult	XXXX	FALK_7
24	HM902462	*Geotria*	*australis*	Australia	Tasmania	–	–	NCBI GenBank	HM902462
25	HM902463	*Geotria*	*australis*	Australia	Tasmania	–	–	NCBI GenBank	HM902463
26	HM902464	*Geotria*	*australis*	Australia	Tasmania	–	–	NCBI GenBank	HM902464

27	HM902560	*Geotria*	*australis*	Australia	Tasmania	–	–	NCBI GenBank	HM902560
28	HQ579006	*Geotria*	*australis*	Australia	Western Australia	–	–	NCBI GenBank	HQ579006
29	HQ579128	*Geotria*	*australis*	Australia	Western Australia, Warren River	–	–	NCBI GenBank	HQ579128
30	HQ579129	*Geotria*	*australis*	Australia	Western Australia, Warren River	–	–	NCBI GenBank	HQ579129
31	HQ579130	*Geotria*	*australis*	Australia	Western Australia, Warren River	–	–	NCBI GenBank	HQ579130
32	JN026711	*Geotria*	*australis*	Australia	Western Australia	–	–	NCBI GenBank	JN026711
33	JN026712	Geotria	australis	Australia	Western Australia	–	–	NCBI GenBank	JN026712
34	JN026713	Geotria	australis	Australia	Western Australia	–	–	NCBI GenBank	JN026713
35	JN026714	Geotria	australis	Australia	Western Australia	–	–	NCBI GenBank	JN026714
36	JN026715	Geotria	australis	Chile	Rio Andalien	–	–	NCBI GenBank	JN026715
37	JN026716	Geotria	australis	Australia	Victoria	–	–	NCBI GenBank	JN026716
38	JN026718	Geotria	australis	Chile	Río Andalien	–	–	NCBI GenBank	JN026718
39	KJ669466	Geotria	australis	Australia	South Australia, Coorong	–	–	NCBI GenBank	KJ669466
40	MT478622	*Geotria*	*macrostoma*	Argentina	Santa Cruz River, Santa Cruz Province	–	–	NCBI GenBank	MT478622
41	MT478623	*Geotria*	*macrostoma*	Argentina	Santa Cruz River, Santa Cruz Province	–	–	NCBI GenBank	MT478623
42	MT478624	*Geotria*	*macrostoma*	Argentina	Santa Cruz River, Santa Cruz Province	–	–	NCBI GenBank	MT478624
43	MT478625	*Geotria*	*macrostoma*	Argentina	Santa Cruz River, Santa Cruz Province	–	–	NCBI GenBank	MT478625
44	MT478626	*Geotria*	*macrostoma*	Argentina	Santa Cruz River, Santa Cruz Province	–	–	NCBI GenBank	MT478626
45	MT478627	*Geotria*	*macrostoma*	Argentina	Santa Cruz River, Santa Cruz Province	–	–	NCBI GenBank	MT478627
46	MT478628	*Geotria*	*macrostoma*	Argentina	Santa Cruz River, Santa Cruz Province	–	–	NCBI GenBank	MT478628
47	MT478629	*Geotria*	*macrostoma*	Argentina	Santa Cruz River, Santa Cruz Province	–	–	NCBI GenBank	MT478629
48	MT478630	*Geotria*	*macrostoma*	Argentina	Santa Cruz River, Santa Cruz Province	–	–	NCBI GenBank	MT478630
49	MT478631	*Geotria*	*macrostoma*	Argentina	Santa Cruz River, Santa Cruz Provinc	–	–	NCBI GenBank	MT478631
50	MT478632	*Geotria*	*macrostoma*	Argentina	Chubut River, Chubut Province	–	–	NCBI GenBank	MT478632

51	MT478633	*Geotria*	*macrostoma*	Argentina	Chubut River, Chubut Province	–	–	NCBI GenBank	MT478633
52	MT478634	*Geotria*	*macrostoma*	Argentina	Chubut River, Chubut Province	–	–	NCBI GenBank	MT478634
53	MT478635	*Geotria*	*macrostoma*	Argentina	Chubut River, Chubut Province	–	–	NCBI GenBank	MT478635
54	MT478636	*Geotria*	*macrostoma*	Argentina	Chubut River, Chubut Province	–	–	NCBI GenBank	MT478636
55	MT478637	*Geotria*	*macrostoma*	Argentina	Chubut River, Chubut Province	–	–	NCBI GenBank	MT478637
56	MT478638	*Geotria*	*macrostoma*	Argentina	Chubut River, Chubut Province	–	–	NCBI GenBank	MT478638
57	MT478639	*Geotria*	*macrostoma*	Argentina	Chubut River, Chubut Province	–	–	NCBI GenBank	MT478639
58	MT478640	*Geotria*	*macrostoma*	Argentina	Chubut River, Chubut Province	–	–	NCBI GenBank	MT478640
59	MT478641	*Geotria*	*macrostoma*	Argentina	Chubut River, Chubut Province	–	–	NCBI GenBank	MT478641
60	MT478642	*Geotria*	*macrostoma*	Argentina	Negro River, Río Negro Province	–	–	NCBI GenBank	MT478642
61	MT478643	*Geotria*	*macrostoma*	Argentina	Negro River, Río Negro Province	–	–	NCBI GenBank	MT478643
62	MT478644	*Geotria*	*macrostoma*	Argentina	Negro River, Río Negro Province	–	–	NCBI GenBank	MT478644
63	RMAYA125	*Geotria*	*australis*	Australia	Western Australia	–	–	NCBI GenBank	RMAYA125_06_Geotria
64	RMAYD194	*Geotria*	*australis*	Australia	Western Australia, Warren River	–	–	NCBI GenBank	RMAYD194_09_Geotria
65	RMAYD195	*Geotria*	*australis*	Australia	Western Australia, Warren River	–	–	NCBI GenBank	RMAYD195_09_Geotria
66	RMAYD196	*Geotria*	*australis*	Australia	Western Australia, Warren River	–	–	NCBI GenBank	RMAYD196_09_Geotria

S2. Annual number of diet samples, number of samples with lamprey and percentage wet mass of lamprey in the diet of grey-headed albatrosses

Year	GHA_all_samples	GHA_lamprey	GHA %m lamprey
1959-61 (Tickell)	111		
1975-76 chicks (Prince)	170	56	
1975-76 adults (Prince)	132	45	10.4
1986 (Reid et al)	40	5	10.72
1994 (Reid et al)	37	1	2.36
1996	35	9	5.2
1997	40	12	3
1998	38	10	7.36
1999	40	19	2.8
2000	120	61	4.54
2001	34	9	3.75
2002	34	18	7.12
2003	30	11	1.75
2004	30	9	3.81
2005	30	12	2.95
2006	30	13	3.55
2007	30	13	1.28
2008	31	11	6.98
2009	30	8	7.91
2010	30	18	0.66
2011	20	7	1.73
2012	30		0
2013	30		0
2014	30	6	0.73
2015	30	8	0
2016	30	2	0.03
2017	30		0
2018	30	4	0.01
2019	30	7	0.04
2020	30		0
2021	30	9	1.72
2022	30	11	0.202

S3. Annual number of diet samples, number of samples with lamprey and percentage wet mass of lamprey in the diet of grey-headed albatrosses

Year	BBA_all_samples	BBA_Lamprey	BBA %m lamprey
1959-61 (Tickell)	109		
1975-76 chicks (Prince)	170	8	
1975-76 adults (Prince)	138	6	1.50
1986 (Reid et al)	43	1	0.94
1994 (Reid et al)	38	0	0.00
1996	20	1	0.28
1997	39		0.00
1998	46		0.00
1999	30	2	0.00
2000	120	4	0.12
2001	31	1	0.65
2002	39	3	2.35
2003	30	1	0.00
2004	30	2	0.05
2005	30	3	2.13
2006	30		0.00
2007	30	1	0.00
2008	27	1	0.60
2009	30	1	0.54
2010	30		0.00
2011	20		0.00
2012	30	1	0.65
2013	30	1	0.00
2014	30	1	0.00
2015	30		0.00
2016	30		0.00
2017	30		0.00
2018	30	1	0.00
2019	30		0.00
2020	30		0.00
2021	30		0.00
2022	30	1	0.00

S4. No. of diet samples and no. samples with lamprey by month and year in diet of grey-headed albatrosses

	total no. diet samples			total with lamprey		
Year	Feb	Mar	Apr	Feb	Mar	Apr
1997	20	10	10	8	3	1
1998	20	18		9	1	
1999	10	10	10	4	7	6
2000	40	40	40	18	26	17
2001	10	14	10	3	6	
2002	13	9	12	11	7	
2003	10	10	10	2	5	4
2004	10	10	10	3	3	3
2005	10	10	10	4	5	3
2006	10	10	10	3	4	6
2007	10	10	10	7	5	1
2008	10	11	10	7	3	1
2009	10	10	10	5	3	
2010	10	10	10	8	7	3
2011	10	10		4	3	
2012	10	10	10			
2013	10	10	10			
2014	10	10	10		4	2
2015	10	10	10	4	2	2
2016	10	10	10	1	1	
2017	10	10	10			
2018	10	10	10	1	3	
2019	10	10	10	5	1	1
2020	10	10	10			
2021	10	10	10	1	4	4
2022	10	10	10	3	6	2

S5. No. of diet samples and no. samples with lamprey by month and year in diet of black-browed albatrosses

	total no. diet samples			total with lamprey		
Year	Feb	Mar	Apr	Feb	Mar	Apr
1997	20	19				
1998	19	17	10			
1999	10	10	10		1	1
2000	40	40	40	1	2	1
2001	10	11	10		1	
2002	19	10	10	2	1	
2003	10	10	10		1	
2004	10	10	10	2		
2005	10	10	10	2		1
2006	10	10	10			
2007	10	10	10			1
2008	10	10	7		1	
2009	10	10	10		1	
2010	10	10	10			
2011	10	10				
2012	10	10	10		1	
2013	10	10	10	1		
2014	10	10	10	1		
2015	10	10	10			
2016	10	10	10			
2017	10	10	10			
2018	10	10	10	1		
2019	10	10	10			
2020	10	10	10			
2021	10	10	10			
2022	10	10	10	1		

S6. Annual consumption of lamprey by grey-headed albatrosses

Year	Est. breeding_pop South Georgia	Br_succ	% mass lamprey	Lamprey consumed by chicks (t)	Lamprey consumed by adults (t)	Lamprey consumed by adults and chicks (t)
1975-76 (Prince)	85795	0.460	10.40%	**179.5**	**358.4**	**538.0**
1986 (Reid et al)	62392	0.590	10.72%	**172.6**	**343.6**	**516.2**
1994 (Reid et al)	50310	0.305	2.36%	**15.8**	**34.1**	**49.9**
1996	74480	0.506	5.20%	**85.7**	**179.5**	**265.1**
1997	49379	0.556	3.00%	**36.0**	**77.1**	**113.1**
1998	57153	0.061	7.36%	**11.2**	**22.9**	**34.1**
1999	68556	0.485	2.80%	**40.7**	**87.3**	**128.1**
2000	35352	0.150	4.54%	**10.5**	**22.2**	**32.7**
2001	50325	0.310	3.75%	**25.6**	**54.4**	**80.0**
2002	50740	0.292	7.12%	**46.2**	**95.1**	**141.3**
2003	45349	0.249	1.75%	**8.6**	**18.7**	**27.4**
2004	47674	0.133	3.81%	**10.6**	**22.5**	**33.1**
2005	39499	0.098	2.95%	**5.0**	**10.7**	**15.7**
2006	40728	0.097	3.55%	**6.1**	**13.1**	**19.2**
2007	38358	0.106	1.28%	**2.3**	**5.0**	**7.3**
2008	39765	0.630	6.98%	**76.5**	**157.6**	**234.1**
2009	38344	0.675	7.91%	**89.6**	**183.0**	**272.5**
2010	34034	0.403	0.66%	**4.0**	**8.7**	**12.6**
2011	29176	0.219	1.73%	**4.8**	**10.5**	**15.3**
2012	34774	0.265	0.00%	**0.0**	**0.0**	**0.0**
2013	25207	0.208	0.00%	**0.0**	**0.0**	**0.0**
2014	28909	0.305	0.73%	**2.8**	**6.2**	**9.0**
2015	33293	0.175	0.00%	**0.0**	**0.0**	**0.0**
2016	21564	0.370	0.03%	**0.1**	**0.2**	**0.3**
2017	21297	0.138	0.00%	**0.0**	0.0	0.0
2018	23593	0.373	0.01%	**0.0**	0.1	0.1
2019	22556	0.336	0.04%	**0.1**	0.3	0.4
2020	22497	0.462	0.00%	**0.0**	0.0	0.0
2021	25029	0.387	1.72%	**7.3**	15.8	23.1
2022	21460	0.361	0.20%	**0.7**	1.5	2.2

S7. Annual consumption of lamprey by black-browed albatrosses

Year	Est. breeding_pop South Georgia	Br_succ	% mass lamprey	Lamprey consumed by chicks (t)	Lamprey consumed by adults (t)	Lamprey consumed by adults and chicks (t)
1975-76 (Prince)	93760	0.490	1.50%	**22.4**	**54.6**	**76.9**
1986 (Reid et al)	93760	0.310	0.94%	**8.9**	**21.8**	**30.6**
1994 (Reid et al)	99167	0.075	0.00%	**0.0**	**0.0**	**0.0**
1996	86337	0.430	0.28%	**3.4**	**8.3**	**11.7**
1997	103438	0.355	0.00%	**0.0**	**0.0**	**0.0**
1998	89390	0.030	0.00%	**0.0**	**0.0**	**0.0**
1999	90467	0.485	0.00%	**0.0**	**0.0**	**0.0**
2000	84480	0.360	0.12%	**1.2**	**2.9**	**4.1**
2001	85811	0.365	0.65%	**6.6**	**16.3**	**22.9**
2002	84386	0.495	2.35%	**31.8**	**77.1**	**109.0**
2003	90809	0.150	0.00%	**0.0**	**0.0**	**0.0**
2004	**75500**	0.275	0.05%	**0.3**	**0.8**	**1.2**
2005	73118	0.265	2.13%	**13.4**	**32.5**	**45.9**
2006	70516	0.195	0.00%	**0.0**	**0.0**	**0.0**
2007	70185	0.495	0.00%	**0.0**	**0.0**	**0.0**
2008	76075	0.495	0.60%	**7.3**	**18.1**	**25.4**
2009	72811	0.520	0.54%	**6.6**	**16.4**	**23.0**
2010	72361	0.190	0.00%	**0.0**	**0.0**	**0.0**
2011	67228	0.350	0.00%	**0.0**	**0.0**	**0.0**
2012	66306	0.320	0.65%	**4.5**	**11.0**	**15.5**
2013	61433	0.411	0.00%	**0.0**	**0.0**	**0.0**
2014	58689	0.403	0.00%	**0.0**	**0.0**	**0.0**
2015	64200	0.518	0.00%	**0.0**	**0.0**	**0.0**
2016	63869	0.238	0.00%	**0.0**	**0.0**	**0.0**
2017	57056	0.168	0.00%	**0.0**	**0.0**	**0.0**
2018	56607	0.293	0.00%	**0.0**	**0.0**	**0.0**
2019	56252	0.249	0.00%	**0.0**	**0.0**	**0.0**
2020	54171	0.253	0.00%	**0.0**	**0.0**	**0.0**
2021	55140	0.508	0.00%	**0.0**	**0.0**	**0.0**
2022	52136	0.438	0.00%	**0.0**	**0.0**	**0.0**

S8. Co-occurrence of lamprey with other prey in the diet of grey-headed and black-browed albatrosses

Predator species	Prey species	Number of diet samples in which occurs	Number of times found in sample with Lamprey
Grey Headed Albatross	Galiteuthis glacialis	637	219
Grey Headed Albatross	Martialia hyadesi	554	187
Grey Headed Albatross	Kondakovia longimana	483	180
Grey Headed Albatross	Gonatus antarcticus	278	109
Grey Headed Albatross	Psychroteuthis glacialis	272	92
Grey Headed Albatross	Moroteuthis knipovitchi	149	69
Grey Headed Albatross	Alluroteuthis antarcticus	129	60
Grey Headed Albatross	Unknown	132	50
Grey Headed Albatross	Histioteuthis B	67	36
Grey Headed Albatross	Chiroteuthis sp.	60	27
Grey Headed Albatross	Chiroteuthis veranyi	35	18
Grey Headed Albatross	Batoteuthis skolops	31	13
Grey Headed Albatross	Mastigoteuthis psychrophila	27	13
Grey Headed Albatross	Taonius sp.	22	13
Grey Headed Albatross	Protomyctophum choriodon	61	24
Grey Headed Albatross	Electrona antarctica	59	20
Grey Headed Albatross	Champsocephalus gunnari	57	13
Grey Headed Albatross	Magnisudis prionosa	33	11
Grey Headed Albatross	Patagonotothen guntheri	23	6
Black Browed Albatross	Galiteuthis glacialis	430	11