

Supporting Information

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Table S1. Annual catch (tonnes) and estimated run size (catch plus escapement, millions) of eastern Kamchatka pink salmon

Year	Catch	Run size
1971	18,829	30.8
1972	1,970	13.1
1973	31,150	20.5
1974	5,700	19.4
1975	40,407	46.8
1976	6,900	23.3
1977	30,100	57.7
1978	9,000	12.5
1979	39,400	59.1
1980	3,500	5.0
1981	41,500	65.0
1982	10,200	17.8
1983	25,700	41.6
1984	11,900	29.8
1985	18,300	24.8
1986	2,500	4.4
1987	34,700	56.3
1988	6,500	9.5
1989	57,500	68.8
1990	17,600	27.5
1991	74,700	97.2
1992	8,600	9.9
1993	52,173	69.8
1994	12,047	21.2
1995	51,244	78.0
1996	10,181	15.9
1997	82,798	99.7
1998	6,778	13.3
1999	83,640	107.6
2000	1,186	1.8
2001	42,714	43.4
2002	2,284	4.7
2003	56,709	66.7
2004	6,037	22.8
2005	47,403	100.5
2006	13,609	22.8
2007	72,712	93.7
2008	7,911	15.9
2009	138,886	173.1
2010	6,838	14.6
2011	182,365	225.3
2012	18,279	28.4

Catch data for 1971–2009 were reported in ref. 1; catch data for 2010–2012 were communicated by G. Khen. Run size for 1971–2005 reported in ref. 2. Run size for 2006–2012 was estimated from the relationship between catch and run size in 1971–2005, where run size = $(0.0012 \times \text{catch}) + 6.42$; $r^2 = 0.90$, $P < 0.0001$.

1. Khen GV, Basyuk EO, Vanin NS, Matveev VI (2013) Hydrography and biological resources in the western Bering Sea. *Deep Sea Res Part II Top Stud Oceanogr* 94:106–120.
2. Ruggerone GT, Peterman RM, Dorner B, Myers KW, Mantua NJ (2010) *Abundance of Adult Hatchery and Wild Salmon by Region of the North Pacific* (School of Aquatic and Fisheries Sciences, Univ of Washington, Seattle), Report SAFS-UW-1001.

Table S2. Seabird breeding parameters in even years and odd years

Island	Guild	Common name	Scientific name	Abbreviation	Years	Clutch size			
						Even	Odd	<i>P</i>	
Buldir Island	Omnivore	Fork-tailed storm-petrel	<i>Oceanodroma furcata</i>	FTSP	1990–2012	na			
		Leach's storm-petrel	<i>Oceanodroma leucorhoa</i>	LESP	1989–2012	na			
		Red-faced cormorant	<i>Phalacrocorax urile</i>	RFCO	2003–2012	2.6 ± 0.21	$2.3 \pm 0.0.28$	0.34	
		Pelagic cormorant	<i>Phalacrocorax pelagicus</i>	PECO	1990–2012	2.1 ± 0.07	2.1 ± 0.10	0.98	
		Black-legged kittiwake	<i>Rissa tridactyla</i>	BLKI	1988–2012	1.7 ± 0.03	1.4 ± 0.04	<0.0001	
		Red-legged kittiwake	<i>Rissa brevirostris</i>	RLKI	1988–2012	na			
		Glaucous-winged gull	<i>Larus glaucescens</i>	GWGU	1997–2012	2.6 ± 0.09	2.4 ± 0.4	0.028	
		Thick-billed murre	<i>Uria lomvia</i>	TBMU	1988–2012	na			
		Horned puffin	<i>Fratercula corniculata</i>	HOPU	1988–2012	na			
		Tufted puffin	<i>Fratercula cirrhata</i>	TUPU	1988–2012	na			
		Planktivore	Parakeet auklet	<i>Aethia psittacula</i>	PAAU	1991–2012	na		
			Least auklet	<i>Aethia pusilla</i>	LEAU	1988–2012	na		
Whiskered auklet	<i>Aethia pygmaea</i>		WHAU	1991–2012	na				
Crested auklet	<i>Aethia cristatella</i>		CRAU	1988–2012	na				
Aiktak Island	Omnivore	Fork-tailed storm-petrel	<i>Oceanodroma furcata</i>	FTSP	1995–2011	na			
		Leach's storm-petrel	<i>Oceanodroma leucorhoa</i>	LESP	1995–2011	na			
		Glaucous-winged gull	<i>Larus glaucescens</i>	GWGU	1995–2011	2.2 ± 0.20	2.2 ± 0.14	0.96	
		Ancient murrelet	<i>Synthliboramphus antiquus</i>	ANMU	1997–2011	2.0 ± 0.02	1.9 ± 0.02	0.22	
		Tufted puffin	<i>Fratercula cirrhata</i>	TUPU	1995–2011	na			
St. George Island	Omnivore	Black-legged kittiwake	<i>Rissa tridactyla</i>	BLKI	1984–2012	1.6 ± 0.06	1.3 ± 0.06	0.011	
		Red-legged kittiwake	<i>Rissa brevirostris</i>	RLKI	1984–2012	na			
		Common murre	<i>Uria aalge</i>	COMU	1985–2012	na			
		Thick-billed murre	<i>Uria lomvia</i>	TBMU	1984–2012	na			
		Least auklet	<i>Aethia pusilla</i>	LEAU	2008–2012	na			
St. Paul Island	Omnivore	Red-faced cormorant	<i>Phalacrocorax urile</i>	RFCO	1987–2012	2.9 ± 0.10	2.9 ± 0.10	0.93	
		Black-legged kittiwake	<i>Rissa tridactyla</i>	BLKI	1984–2012	1.6 ± 0.06	1.4 ± 0.06	0.030	
		Red-legged kittiwake	<i>Rissa brevirostris</i>	RLKI	1984–2012	na			
		Common murre	<i>Uria aalge</i>	COMU	1985–2012	na			
		Thick-billed murre	<i>Uria lomvia</i>	TBMU	1984–2012	na			

Mean \pm SEM; Student *t* test *P*. Data are from refs. 1–4. Parameter values in italics are different at $P \leq 0.10$. na, not applicable because clutch sizes = 1; un, unknown.

1. Warzybok JA, Drummond BA, Williams JC (2013) Biological monitoring at Buldir Island, Alaska in 2012. *U.S. Fish and Wildlife Service Report*, AMNWR 2012/02 (U.S. Fish and Wildlife Service, Alaska Maritime National Wildlife Refuge, Homer, AK). Available at <https://absilcc.org/science/amnwr/sitepages/library.aspx>. Accessed February 25, 2013.
2. Bechaver CA, Gehrig JM (2011) Biological monitoring at Aiktak Island, Alaska in 2011. *U.S. Fish and Wildlife Service Report*, AMNWR 2011/12 (U.S. Fish and Wildlife Service, Alaska Maritime National Wildlife Refuge, Homer, AK). Available at <https://absilcc.org/science/amnwr/sitepages/library.aspx>. Accessed October 19, 2011.
3. Klostermann MR, Drummond BA (2012) Biological monitoring at St. George Island, Alaska in 2012. *U.S. Fish and Wildlife Service Report*, AMNWR 2012/08 (U.S. Fish and Wildlife Service, Alaska Maritime National Wildlife Refuge, Homer, AK). Available at <https://absilcc.org/science/amnwr/sitepages/library.aspx>. Accessed April 26, 2013.
4. Thomson G, Drummond BA (2012) Biological monitoring at St. Paul Island, Alaska in 2012. *U.S. Fish and Wildlife Service Report*, AMNWR 2012/09 (U.S. Fish and Wildlife Service, Alaska Maritime National Wildlife Refuge, Homer, AK). Available at <https://absilcc.org/science/amnwr/sitepages/library.aspx>. Accessed April 26, 2013.

Table S4. Seabird breeding parameter relationships to pink salmon abundance

Island	Years	Clutch size		Hatch date*		Laying success [†]		Hatching success [‡]		Fledging success [§]		Productivity [¶]		
		r ²	P	r ²	P	r ²	P	r ²	P	r ²	P	r ²	P	
Buldir Island	Omnivore													
	BLKI	1988–2012	0.52	<0.0001	0.53	<0.0001	0.32	0.0035	0.37	0.0012	0.0047	0.74	0.19	0.028
	RLKI	1988–2012	na		0.29	0.0065	0.45	0.0002	0.26	0.0093	0.0069	0.69	0.20	0.027
	GWGU	1997–2012	0.28	0.044	0.21	0.27	0.35	0.033	0.025	0.57	un		un	
	TBMU	1988–2012	na		0.51	<0.0001	un		0.042	0.33	0.068	0.21	0.046	0.74
	HOPU	1988–2012	na		0.29	0.0067	un		0.056	0.26	0.093	0.14	0.11	0.10
	TUPU	1988–2012	na		0.51	<0.0001	un		0.43	0.0003	0.16	0.050	0.26	0.0090
	Planktivore													
	PAAU	1991–2012	na		0.0019	0.63	un		0.030	0.54	0.038	0.49	0.0098	0.72
LEAU	1988–2012	na		0.19	0.10	un		0.053	0.41	0.024	0.58	0.062	0.37	
WHAU	1991–2012	na		0.025	0.58	un		0.0029	0.85	0.049	0.43	0.026	0.56	
CRAU	1988–2012	na		0.23	0.067	un		0.023	0.59	0.0024	0.87	0.0015	0.89	
Aiktak Island	Omnivore													
	FTSP	1996–2012	na		0.21	0.076	un		0.20	0.15	un		un	
	ANMU	1997–2012	na		0.0002	0.99	un		0.15	0.15	0.11	0.22	0.10	0.25
TUPU	1995–2012	na		0.0096	0.72	un		0.29	0.031	0.0088	0.73	0.052	0.40	
St. George Island	Omnivore													
	BLKI	1984–2012	0.23	0.0081	0.054	0.23	0.24	0.0073	0.40	0.0002	0.078	0.14	0.33	0.0011
	RLKI	1984–2012	na		0.0001	0.95	0.038	0.21	0.28	0.0036	0.11	0.056	0.32	0.0015
	COMU	1985–2012	na		0.0099	0.62	un		0.0020	0.82	0.0074	0.67	0.0009	0.88
	TBMU	1984–2012	na		0.011	0.60	un		0.0020	0.94	0.0002	0.95	0.0002	0.94
Planktivore														
LEAU	2008–2012	na		0.37	0.27	un		0.094	0.62	0.89	0.015	0.91	0.013	
St. Paul Island	Omnivore													
	RFCO	1987–2012	un		0.0008	0.91	0.0001	0.99	0.067	0.26	0.0076	0.71	0.020	0.52
	BLKI	1984–2012	0.10	0.12	0.10	0.13	0.14	0.062	0.44	0.0003	0.31	0.0040	0.44	0.0002
	RLKI	1984–2012	na		0.0028	0.81	0.031	0.40	0.33	0.0066	0.18	0.056	0.32	0.0019
TBMU	1984–2012	na		0.022	0.48	un		0.0045	0.75	0.064	0.22	0.0001	0.99	

Linear regression; annual salmon run values log normal transformed; slopes of relationships are positive or flat for hatch date and negative or flat for all other parameters. Salmon data are from refs. 1 and 2, and Table S1; seabird data are from refs. 3–6. Parameters with values in italics had differences in mean values between even and odd years at $P \leq 0.10$ (Tables S2 and S3). Parameters for omnivores regressed against eastern Kamchatka pink salmon abundance, and for planktivores against Norton Sound pink salmon abundance. See Tables S2 and S3 for species abbreviations; na, not applicable because clutch sizes = 1; un, unknown.

*Julian day.

[†]Number of nests with eggs per number of nest starts.

[‡]Number of eggs hatching per number of eggs laid.

[§]Number of chicks fledged per number of eggs hatched.

[¶]Number of chicks fledged per number of nest starts.

1. Ruggerone GT, Peterman RM, Dorner B, Myers KW, Mantua NJ (2010) *Abundance of Adult Hatchery and Wild Salmon by Region of the North Pacific* (School of Aquatic and Fisheries Sciences, Univ of Washington, Seattle), Report SAFS-UW-1001.
2. Khen GV, Basyuk EO, Vanin NS, Matveev VI (2013) Hydrography and biological resources in the western Bering Sea. *Deep Sea Res Part II Top Stud Oceanogr* 94:106–120.
3. Warzybok JA, Drummond BA, Williams JC (2013) Biological monitoring at Buldir Island, Alaska in 2012. *U.S. Fish and Wildlife Service Report*, AMNWR 2012/02 (U.S. Fish and Wildlife Service, Alaska Maritime National Wildlife Refuge, Homer, AK). Available at <https://absilcc.org/science/amnwr/sitepages/library.aspx>. Accessed February 25, 2013.
4. Behaver CA, Gehrig JM (2011) Biological monitoring at Aiktak Island, Alaska in 2011. *U.S. Fish and Wildlife Service Report*, AMNWR 2011/12 (U.S. Fish and Wildlife Service, Alaska Maritime National Wildlife Refuge, Homer, AK). Available at <https://absilcc.org/science/amnwr/sitepages/library.aspx>. Accessed October 19, 2011.
5. Klostermann MR, Drummond BA (2012) Biological monitoring at St. George Island, Alaska in 2012. *U.S. Fish and Wildlife Service Report*, AMNWR 2012/08 (U.S. Fish and Wildlife Service, Alaska Maritime National Wildlife Refuge, Homer, AK). Available at <https://absilcc.org/science/amnwr/sitepages/library.aspx>. Accessed April 26, 2013.
6. Thomson G, Drummond BA (2012) Biological monitoring at St. Paul Island, Alaska in 2012. *U.S. Fish and Wildlife Service Report*, AMNWR 2012/09 (U.S. Fish and Wildlife Service, Alaska Maritime National Wildlife Refuge, Homer, AK). Available at <https://absilcc.org/science/amnwr/sitepages/library.aspx>. Accessed April 26, 2013.

Table S5. Numbers of nests built by seabirds on population monitoring plots in even years and odd years

Island	Species	Years	Even years	Odd years	P	Even/odd
Buldir Island	BLKI	1988–1992	5,949 ± 97 (3)	4,442 ± 10 (2)	0.0012	1.34
Buldir Island	RLKI	1988–1992	1,770 ± 69 (3)	1,479 ± 106 (2)	0.092	1.20
St. George Island	BLKI	1986–2011	1,265 ± 136 (6)	768 ± 91 (5)	0.018	1.65
St. George Island	RLKI	1986–2011	2,085 ± 315 (6)	1,695 ± 350 (3)	0.47	1.23
St. Paul Island	NOFU	1985–2011	106 ± 13 (6)	78 ± 5 (7)	0.049	1.36
St. Paul Island	RFCO	1984–2011	158 ± 40 (6)	118 ± 17 (7)	0.36	1.34
St. Paul Island	BLKI	1985–2011	1,343 ± 152 (6)	1,031 ± 177 (6)	0.21	1.30
St. Paul Island	RLKI	1985–2011	69 ± 9.8 (6)	63 ± 17 (6)	0.76	1.10

Mean ± SEM (number of years); Student t test P. Data are from refs. 1–3. See Table S2 for species abbreviations [except NOFU, Northern Fulmar (*Fulmarus glacialis*)].

1. Warzybok JA, Drummond BA, Williams JC (2013) Biological monitoring at Buldir Island, Alaska in 2012. *U.S. Fish and Wildlife Service Report, AMNWR 2012/02* (U.S. Fish and Wildlife Service, Alaska Maritime National Wildlife Refuge, Homer, AK). Available at <https://absilcc.org/science/amnwr/sitepages/library.aspx>. Accessed February 25, 2013.
2. Klostermann MR, Drummond BA (2012) Biological monitoring at St. George Island, Alaska in 2012. *U.S. Fish and Wildlife Service Report, AMNWR 2012/08* (U.S. Fish and Wildlife Service, Alaska Maritime National Wildlife Refuge, Homer, AK). Available at <https://absilcc.org/science/amnwr/sitepages/library.aspx>. Accessed April 26, 2013.
3. Thomson G, Drummond BA (2012) Biological monitoring at St. Paul Island, Alaska in 2012. *U.S. Fish and Wildlife Service Report, AMNWR 2012/09* (U.S. Fish and Wildlife Service, Alaska Maritime National Wildlife Refuge, Homer, AK). Available at <https://absilcc.org/science/amnwr/sitepages/library.aspx>. Accessed April 26, 2013.