

Table S1. The range of population plot count dates included in analyses of black-legged kittiwake and common murre populations in lower Cook Inlet, Alaska, within five days of the range of mid-incubation to start-of-fledge dates from 1995-1999 (Piatt 2002).

Year	Black-legged kittiwake		Common murre	
	Chisik	Gull	Chisik	Gull
1995	4 Jul - 26 Jul	8 Jun - 18 Jul	22 Jul - 5 Aug	26 Jul - 9 Aug
1996	27 Jun - 16 Jul	28 Jun - 18 Jul	23 Jul - 9 Aug	23 Jul - 9 Aug
1997	26 Jun - 8 Jul	28 Jun - 19 Jul	20 Jul - 18 Aug	24 Jul - 14 Aug
1998	23 Jun - 9 Jul	28 Jun - 28 Jul	31 Jul - 26 Aug	20 Jul - 10 Aug
1999	21 Jun - 3 Jul	25 Jun - 18 Jul	31 Jul - 22 Aug	31 Jul - 16 Aug
2016	14 Jul - 18 Jul	20 Jul - 25 Jul	18 Jul - 26 Aug	20 Jul - 28 Aug
2017	2 Jul - 25 Jul	3 Jul - 1 Aug	25 Jul	29 Jul - 18 Aug
2018	27 Jun - 16 Jul	28 Jun - 28 Jul	16 Jul	26 Jul - 21 Aug
2019	29 Jun - 20 Jul	19 Jun - 29 Jul	20 Jul	25 Jul - 19 Aug

Table S2. Marine heatwave events, including duration (number of days), mean intensity (anomaly, °C), mean temperature (°C) in lower Cook Inlet, Alaska, between 1982 and 2021. Events were calculated from daily  $\frac{1}{4}$  ° OISST v2.1 (Huang et al. 2020) using the climatology period between 1983 and 2012 using the methods described in Hobday et al. (2016).

Start Date	Peak Date	End Date	Duration	Mean Intensity	Mean Temperature
8/29/1983	8/30/1983	9/4/1983	7	1.35	12.61
9/16/1983	9/18/1983	9/23/1983	8	1.01	11.45
12/7/1983	12/8/1983	12/11/1983	5	1.07	6.39
1/11/1984	1/19/1984	1/22/1984	12	1.39	5.72
6/7/1984	6/7/1984	6/15/1984	9	1.35	9.04
6/19/1984	6/22/1984	6/24/1984	6	1.2	9.87
9/25/1984	9/27/1984	10/4/1984	10	1.04	10.86
10/17/1984	10/20/1984	10/21/1984	5	0.97	9.42
11/11/1984	11/19/1984	11/19/1984	9	1	7.68
4/1/1987	4/3/1987	4/5/1987	5	0.91	4.55
12/21/1987	12/24/1987	12/25/1987	5	1.08	5.91
1/3/1988	1/7/1988	1/11/1988	9	1.25	5.76
2/22/1988	2/28/1988	3/3/1988	11	1.27	4.97
4/1/1988	4/3/1988	4/8/1988	8	1.18	4.83
6/3/1990	6/5/1990	6/7/1990	5	1.34	8.47
7/16/1993	7/18/1993	7/22/1993	7	1.35	12.02
11/24/1995	11/28/1995	11/29/1995	6	0.97	6.93
7/2/1997	7/6/1997	7/10/1997	9	1.57	11.41

Start Date	Peak Date	End Date	Duration	Mean Intensity	Mean Temperature
7/15/1997	7/16/1997	7/19/1997	5	1.55	12.11
8/4/1997	8/7/1997	8/8/1997	5	1.44	12.8
8/14/1997	8/16/1997	8/20/1997	7	1.43	12.93
8/26/1997	8/29/1997	9/5/1997	11	1.34	12.63
9/9/1997	9/13/1997	9/17/1997	9	1.19	11.96
9/26/1997	9/27/1997	10/4/1997	9	1.03	10.82
11/13/1997	11/20/1997	11/22/1997	10	0.94	7.46
12/23/1997	12/26/1997	12/28/1997	6	1.29	6.05
1/16/1998	1/19/1998	1/20/1998	5	1.14	5.45
1/29/1998	2/12/1998	3/9/1998	40	1.8	5.63
3/20/1998	3/22/1998	5/14/1998	56	1.62	5.71
12/21/1998	12/22/1998	1/5/1999	16	1.24	5.94
1/13/1999	1/14/1999	1/20/1999	8	1.26	5.59
3/6/2000	3/8/2000	3/10/2000	5	1.24	4.87
3/17/2000	3/17/2000	3/21/2000	5	0.94	4.55
2/22/2001	2/26/2001	2/27/2001	6	1.18	4.9
6/16/2001	6/22/2001	6/30/2001	15	1.28	10.08
7/16/2001	7/19/2001	7/21/2001	6	1.47	12.11
9/29/2001	10/3/2001	10/3/2001	5	0.95	10.67
11/7/2002	11/23/2002	11/24/2002	18	1.01	7.65
1/19/2003	1/21/2003	1/23/2003	5	1.51	5.77
1/29/2003	1/30/2003	3/21/2003	52	1.44	5.22
3/31/2003	4/2/2003	4/5/2003	6	0.83	4.47
4/27/2003	5/3/2003	5/4/2003	8	1.17	5.63
6/9/2003	6/10/2003	6/14/2003	6	1.29	9.04
7/6/2003	7/9/2003	7/17/2003	12	1.49	11.72
7/21/2003	7/23/2003	7/26/2003	6	1.53	12.41
8/4/2003	8/9/2003	8/15/2003	12	1.73	13.15
9/6/2003	9/10/2003	9/14/2003	9	1.27	12.19
10/20/2003	10/25/2003	10/29/2003	10	0.98	9.04
11/5/2003	11/6/2003	11/15/2003	11	1.36	8.34
6/24/2004	6/28/2004	6/29/2004	6	1.55	10.65
7/7/2004	7/11/2004	7/19/2004	13	1.87	12.18
8/8/2004	8/16/2004	8/23/2004	16	1.61	13.08
9/6/2004	9/9/2004	9/12/2004	7	1.25	12.21
4/25/2005	7/6/2005	10/4/2005	163	1.74	10.78
10/16/2005	10/19/2005	10/22/2005	7	1.04	9.49
12/11/2005	12/23/2005	12/26/2005	16	1.36	6.33
5/26/2006	6/6/2006	6/8/2006	14	1.25	8.07
10/14/2006	10/16/2006	10/18/2006	5	0.83	9.49
1/25/2014	1/26/2014	1/29/2014	5	1.04	5.2
5/8/2014	5/11/2014	5/12/2014	5	1.2	6.22

Start Date	Peak Date	End Date	Duration	Mean Intensity	Mean Temperature
7/31/2014	8/2/2014	8/10/2014	11	1.53	12.85
8/19/2014	8/22/2014	10/27/2014	70	1.28	11.34
11/4/2014	11/11/2014	11/13/2014	10	1.1	8.17
11/18/2014	12/31/2014	2/6/2015	81	1.67	6.57
2/16/2015	3/6/2015	3/9/2015	22	1.53	5.24
3/20/2015	4/29/2015	5/17/2015	59	1.34	5.5
5/24/2015	5/30/2015	6/7/2015	15	1.46	8.14
6/14/2015	6/26/2015	7/2/2015	19	1.72	10.52
7/26/2015	8/4/2015	8/5/2015	11	1.61	12.79
8/19/2015	8/24/2015	8/27/2015	9	1.31	12.77
10/28/2015	11/6/2015	11/12/2015	16	1.08	8.4
12/2/2015	12/16/2015	12/20/2015	19	1.08	6.33
12/28/2015	5/16/2016	7/23/2016	209	1.93	7.4
7/27/2016	9/3/2016	1/3/2017	161	1.51	10.01
5/31/2017	6/1/2017	6/6/2017	7	1.35	8.3
10/4/2017	10/13/2017	10/20/2017	17	1.01	9.96
10/30/2017	11/4/2017	11/9/2017	11	1.18	8.54
9/18/2018	9/23/2018	9/23/2018	6	1.17	11.55
10/13/2018	10/20/2018	11/5/2018	24	1.04	9.11
11/12/2018	11/29/2018	12/15/2018	34	1.24	7.13
12/23/2018	12/31/2018	1/2/2019	11	2.12	6.83
1/25/2019	2/8/2019	2/12/2019	19	1.38	5.41
3/8/2019	7/6/2019	8/31/2019	177	1.82	9.13
9/5/2019	9/11/2019	9/30/2019	26	1.28	11.8
11/17/2019	11/29/2019	12/3/2019	17	1.1	7.16
12/7/2019	12/17/2019	12/25/2019	19	1.21	6.27
6/9/2020	6/15/2020	6/20/2020	12	1.57	9.6
7/13/2020	7/16/2020	7/24/2020	12	1.97	12.6
8/12/2020	8/16/2020	8/30/2020	19	2.08	13.53
9/9/2020	9/15/2020	10/29/2020	51	1.21	10.67

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