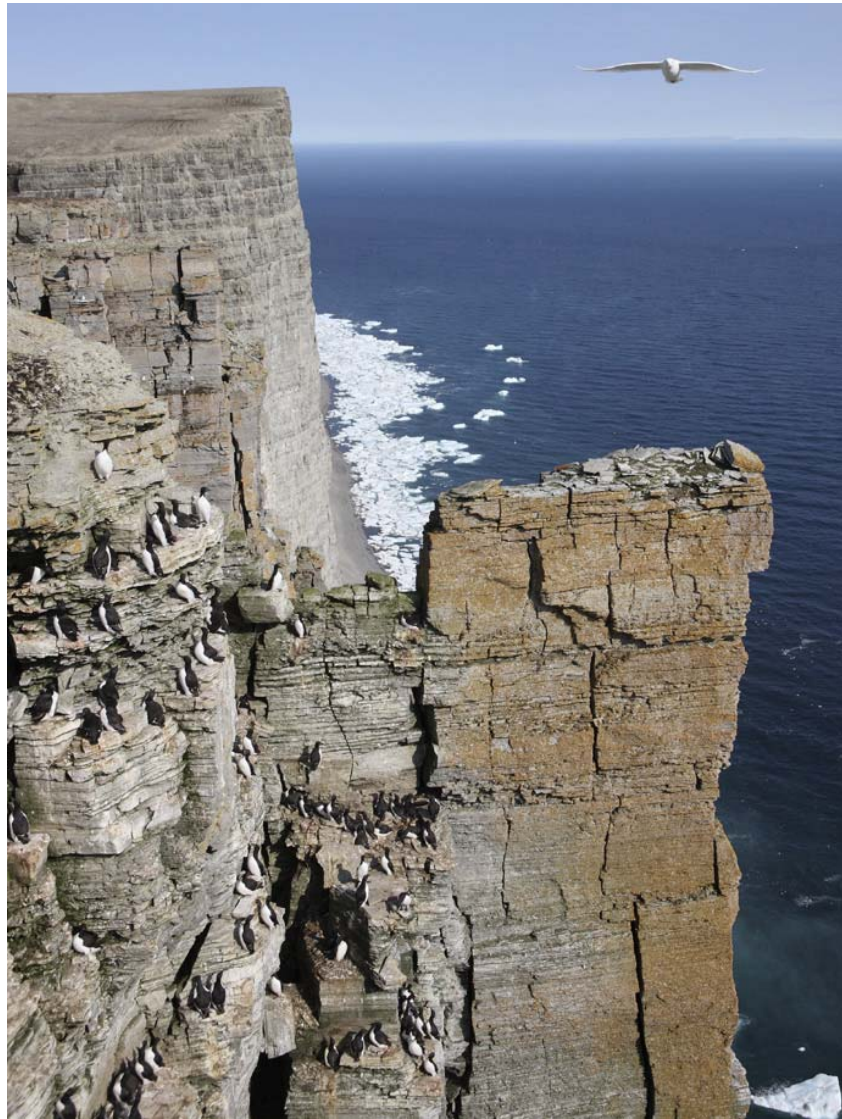


# SEABIRD RESEARCH AT PRINCE LEOPOLD ISLAND IN 2008



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**Cover photo: Glaucous Gull over Plot U, Prince Leopold Island, August 2008**  
**(courtesy T.J.F. Lash)**

**SEABIRD RESEARCH AT PRINCE LEOPOLD ISLAND IN 2008**

**SUMMARY**

1. A field team of three people visited Prince Leopold Island from 14 July – 19 August 2008 to carry out research associated with the International Polar Year, to collect eggs for contaminant analysis and to make routine observations of marine birds as part of ongoing population monitoring.
2. It was a relatively early year for breeding, with median hatching of Thick-billed Murres equaling the earliest observed previously and Black Guillemots hatching earlier than expected. Hatching dates of Black-legged Kittiwakes and Northern Fulmars were normal.
3. Marine bird population trends in recent years at prince Leopold Island have been highly variable: numbers of Thick-billed Murres on monitoring plots, after a 30% increase during 1976-2000, have shown little subsequent change; Northern Fulmar numbers on monitoring plots have gradually decreased since the 1970s; Black-legged Kittiwakes, which appeared fairly stable from 1976-1990 have shown a sharp increase subsequently, with numbers doubling since 1990; Glaucous Gulls, which declined sharply between 1970s and 2000 seem to have declined further, with numbers breeding along the East Cliffs being the lowest recorded to date. Despite that, many non-breeding Glaucous Gulls in adult plumage were seen loafing near the colony throughout the season.
4. Conditions for chick-rearing by Thick-billed Murres and Black-legged Kittiwakes appear to have been good, with frequent deliveries of large fish to nestling murres and relatively high final brood size for kittiwakes. Survival of Glaucous Gull and Northern Fulmar chicks up to our departure from the island was also high.
5. Arctic cod made up >90% of food items delivered to nestling murres and neither capelin nor sandlance was definitely recorded. Many Arctic Cod delivered were > 12 cm long and therefore likely to be 2 yr or older.
6. The cabin was found to be in good condition. All blinds were strengthened and shuttered on departure.

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## 1. Background

A team of biologists visited Prince Leopold Island, Nunavut, between 14 July and 19 August 2008. Some of the research carried out was part of an International Polar Year project; the rest was a repetition of the seabird population monitoring that has been carried out at this site since 1975. The main study species are Thick-billed Murres, Black-legged Kittiwakes, Glaucous Gulls and Northern Fulmars.

The following people took part in this year's research: Tony Gaston (EC, National Wildlife Research Centre, throughout), Rob Rankin (Graduate Student, University of Lund, Sweden, throughout), and Tim Lash (contract biologist, 24 July - 19 August). Stephen Smith and Julia Szucs (Meltwater Media) stayed with the camp from 14-24 July to shoot material for an IPY-sponsored movie on the research being carried out by the IPY project.

Accommodation consisted of a plywood cabin, erected in 2003 and used for sleeping and working and a Weatherhaven used for cooking and eating. A small outhouse is situated close to the airstrip. Observations were conducted from four plywood blinds (at D, G, S1 and U). All wooden structures were checked for soundness, renovated where necessary and left in place at the end of the season, suitably guyed down. The Weatherhaven was stored inside the hut, except for the door end-wall which was removed to Resolute Bay for repair. The door to the cabin requires a new handle when the camp is next used.

Transportation to and from the site was by Polar Continental Shelf's Twin-otter from Resolute Bay. Five flights were made altogether, one on 14 July (start-up), one on 24 July (brought in boat and motor; Meltwater Media leave, Lash arrives), one on 25 July (to retrieve Rob Rankin and bring in water after a water-supply flight made the previous day could not land because of fog moving in unexpectedly), and two flights on 19 August to remove the crew and equipment, as well as substantial quantities of junk-lumber that had accumulated over the past decade.

Weather at camp was recorded at 0700-0800 and 1800-1900 h daily. The summer of 2008 was exceptional for the amount of rainfall, with significant precipitation taking place on. Ice storms

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occurred on 22 July and 13-14 August, making everything extremely slippery. Rain, sleet or heavy fog occurred on 24 other days, giving 27/37 days with precipitation over the whole season. Winds of 30 km/h were recorded at 18.00 h on 5 days in July and 3 days in August. The maximum wind speed recorded was 85 km/h on 14 July. Conditions for observing birds were poor (visibility <0.5 km in morning and evening) on 5 days in July and 5 days in August. Evening counts of murre study plots were impossible on 3 days in July and 4 days in August. Minimum temperatures ranged from -3° C in late August to +8°C on 21 July and the maximum from 0°C on 17 August to +18°C on 20 July.

A brief description of the field work carried out on the different study species and some preliminary results follow.

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## 2. Thick-billed Murre *Uria lomvia*



Photo: T.J.F. Lash

### 2.1 Timing of breeding and reproductive success

Timing of breeding and reproductive success were measured by making daily observations (weather permitting) of pairs breeding at plots S1 and U between 16 July and 18 August. At plot U, 50 pairs and at plot S1, 157 pairs were known to have laid eggs. The first hatch occurred on 22 July on plot S1; the earliest on plot U was on 27 July. Median date of hatching among eggs for which laying was recorded to within 48 h (S1 and U combined), was 30 July (mean 31 July  $\pm$  4 d [SD]), with 50% of hatching between 28-31 July (Fig. 1). Sixty-two chicks from the study plots (32% of possible departures) left the colony before observations were terminated on 18 August. The median date of hatching was equal to those observed in 1975 and 1976, the earliest years on record, and somewhat earlier than expected on the basis of the position of the ice edge relative to the colony on 25 June (Fig. 2).

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Figure 1

Date of hatching ( $\pm 24$  h) for nestling Thick-billed Murres at plots S1 and U in 2008

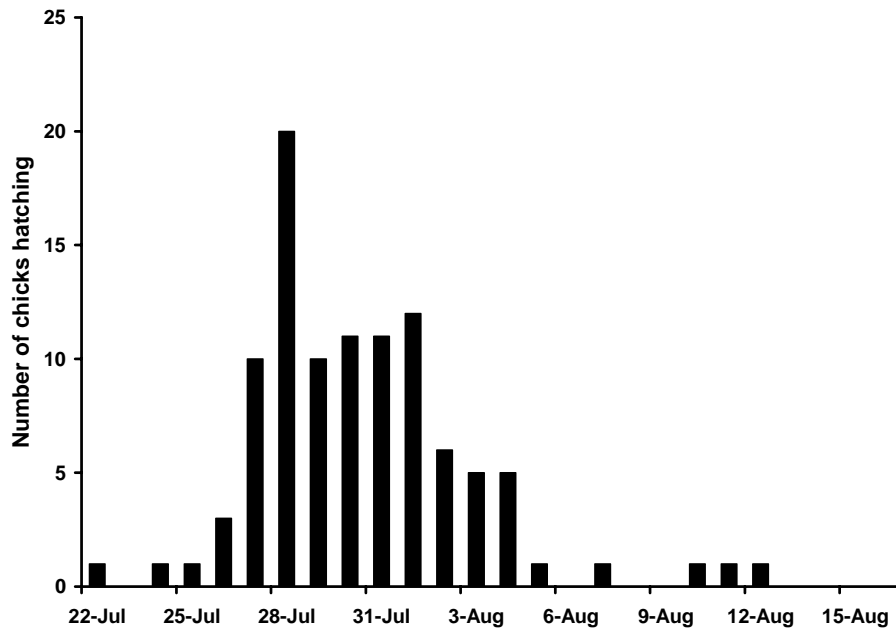
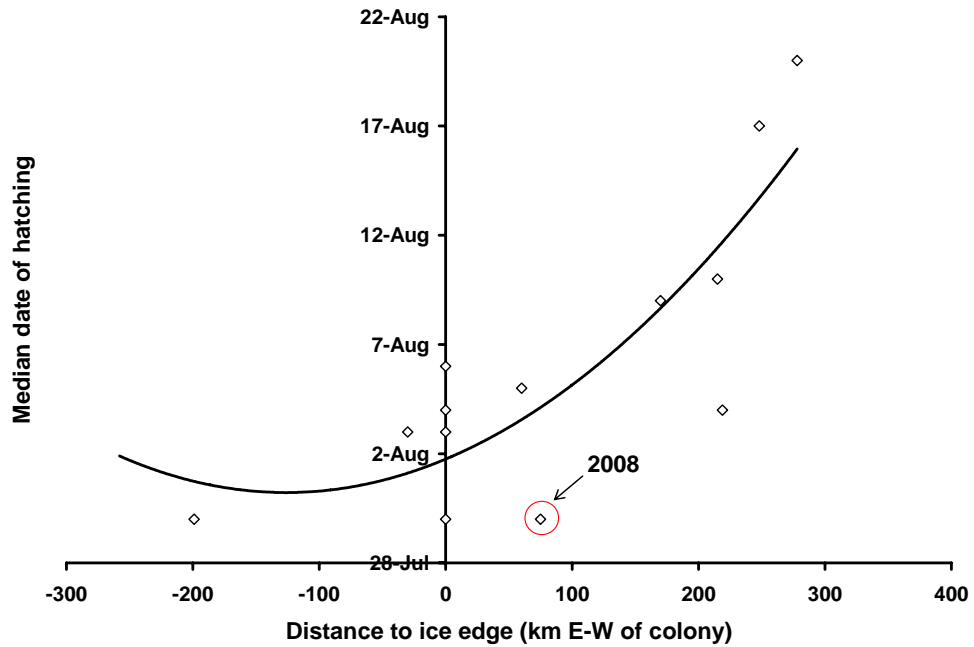


Figure 2

Timing of breeding (median date of hatching) in relation to the position of the ice edge in Parry Channel relative to Prince Leopold Island since 1975



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**Table 1**  
**Summary of breeding success at plots U and S1 in 2008**

Plot	Laid	Hatched	Alive or fledged on 18 August	Hatched (%)	Maximum breeding success (%)
S1	157	147	146	93.6	93.0
U	50	46	43	92.0	86.0
Totals	207	193	189	93.2	91.3

Of the 207 eggs present at the beginning of observations (16 July), 14 were lost before hatching (maximum hatching success 93%; Table 1). Only five chicks disappeared before 19 August, at which date all but 11 chicks were >10 d old. The maximum breeding success, if all chicks survived, was 91% (Table 1). Birds were present on more than 85% of days at 23 sites where no eggs were known to have been laid. If all these pairs laid eggs that were lost before being observed (see Gaston et al. 1983) the true hatching success of the combined plots would have been  $193/(207+23) = 85\%$  and maximum breeding success 83%. These estimates are high compared to those reported in earlier years (Table 2).

**Table 2**  
**Estimates of breeding success for Thick-billed Murres at plots S1 and U on Prince Leopold Island since 1975**

	1975	1976	1977	2000	2001	2002	2003	2008
N	246	241	231	75	185	190	93	230
% Hatched	83%	78%	79%	76%	81%	72%	74%	85%
% Departed	93%	93%	94%	98%	91%	97% <sup>1</sup>	80%	98%
<b>% Success</b>	77%	72%	74%	75%	73%	69%	59%	83%

<sup>1</sup> Although many chicks reached the criterion age for successful departure (14 d) in 2002 we believe that few survived to actually depart (Gaston et al. 2005a)

The estimate of 230 pairs laying on plots U and S1 in 2008 is higher than the estimate for 2002 (219 pairs), but lower than those for 2001 (249 pairs) and 2000 (269 pairs). Overall, the numbers breeding on these two plots seem to have remained stable for the past decade. This result is

concordant with the daily counts at the same and other plots (see below). Together, the evidence suggests no recent change in the breeding population.

## 2.2 Egg size and chick growth

Fifty-three eggs were measured (length and maximum breadth) at plot S2 and nearby on 20 July (Appendix 1). The mean length of these eggs was 76.7 mm  $\pm$  3.0 (range 70.0-83.0 mm), mean breadth was 48.5 mm  $\pm$  1.6 (range 45.6-51.6) and mean volume index (length \* breadth<sup>2</sup>) was 180.9 cm<sup>3</sup> + 16.2 (range 149.9-215.9). Because of constant rain and/or freezing rain after early August it was not possible to weigh chicks regularly. A sample of seven chicks was weighed on 16 August and their wing-length measured. Date of hatch was assigned on the basis of wing-length (using Figure 75 in Gaston and Nettleship 1981). Their mean mass at 10 days was estimated from the regression of mass on age as 145 g. Mass at 10 days was 150 g in 1975, 155 g in 1976, 165 g in 1977, 169 g in 2000, 140 g in 2001 and 98 g in 2002. Given the small sample size, little can be concluded, but clearly growth in 2008 was within the normal range.

## 2.3 Chick feeding rates and diets

Watches to estimate rates at which nestlings were fed and to identify the prey items delivered, were carried out at plot U on 4, 10 and 16 August. The first two watches were from 3:00 to midnight (21 h) and the third from 5:00 to 23:00 (18 h).

Out of 366 items delivered during the watches, 53% were identified. As usual, Arctic cod *Boreogadus saida* was the most abundant, with sculpins *Triglops* spp., next most abundant (Table 3). There were no definite identifications of other taxa except for two deliveries of amphipods. Two possible capelin *Mallotus* were seen, but neither was definitely identified so the presence of that species cannot be confirmed in 2008. Arctic cod has been the dominant species delivered to nestling murrelets throughout the period of studies at Prince Leopold Island (Fig. 3).

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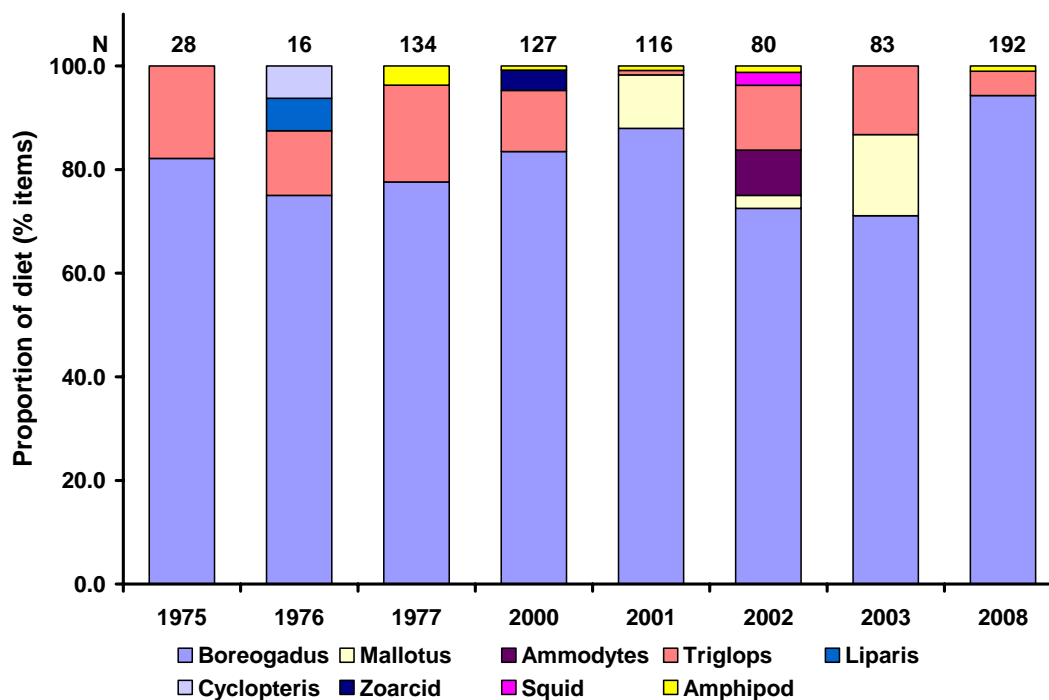
Table 3

Prey items delivered to nestling Thick-billed Murres at Plot U in 2008

	3-Aug	10-Aug	16-Aug	Total	% of identified deliveries	% all deliveries
N (chicks)	36	42	39			
Arctic cod	60	67	54	180	92.31	49.18
Arctic cod (?)	0	0	0	0	0.00	0.00
Capelin	0	0	0	0	0.00	0.00
Capelin (?)	2	1	0	3	1.54	0.82
Sculpin	4	4	1	9	4.62	2.46
Amphipod		1	1	2	1.03	0.55
Unknown	64	65	42	171		46.72
Total identified	66	73	56	195		
Total	130	138	98	366		
Feeds/chick	3.61	3.29	2.51			
Feeds/chick/24 h	4.13	3.75	3.35			

Figure 3

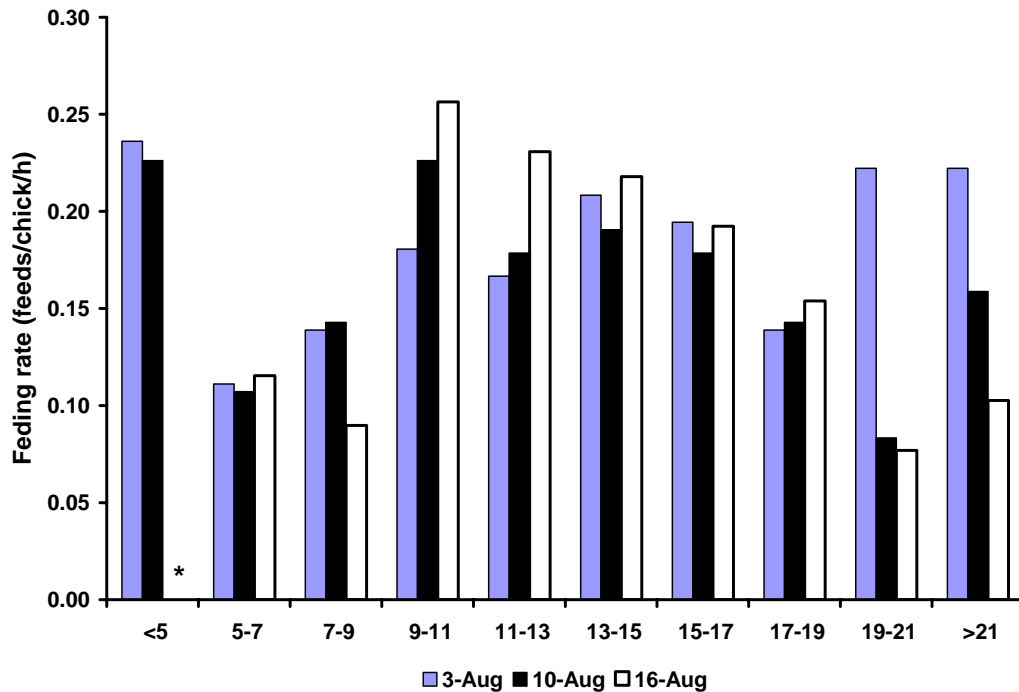
Diet of nestling Thick-billed Murres at Prince Leopold Island since 1975



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The rate of feeding deliveries to chicks in 2008 varied from 3.35 – 4.16 feeds/chick/day. Examination of feeding rates in relation to time of day (Fig. 4) showed a fairly consistent pattern of lower feeding rates between 5:00-9:00 and again between 17:00-21:00. Peak feeding rates occurred on all three watches between 9:00-15:00 and before 5:00 (3 and 10 August). The watch on 16 August began only at 5:00, so the early peak was missed. Consequently the feeding rate estimated for the 16 August may be somewhat lower than the true rate. Peaks of feeding in the middle of the day and the middle of the ‘night’ (no sunset at Prince Leopold until 15 August) appear to correspond with peaks in brooding duty change-overs, with males arriving in the middle of the day and brooding the chicks in the afternoon and evening and females arriving about midnight and brooding in the mornings (data from temperature loggers).

**Figure 4**  
Feeding rates to chicks in relation to time of day on three watches at Plot U, Prince Leopold Island in 2008.  
\* = no watch during that period



### 2.4 Adult capture

Birds were captured (using noose poles), weighed and measured at plot S2, and at plot U and nearby areas. Four had been banded in previous years. All were taken while brooding chicks.

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Details are given in Appendix 2. Geolocator tags were attached to bands on the feet of 30 birds. These will need to be retrieved in 2009 to be downloaded. Fifteen time/depth/temperature loggers (Lotek LTD-1100) were deployed, of which all but one were retrieved and successfully downloaded to give information on time budgets and dive depths over an approximately 54 h period. Blood samples for sexing and blood parasite analysis were collected from birds on which devices were deployed.

The mean mass of birds caught brooding chicks was  $882 \text{ g} \pm 50$  (N=31), compared to  $908 \text{ g} \pm 74$  (N=19) in 2000,  $875 \text{ g} \pm 49$  in 2001, (N=8) and  $840 \text{ g} \pm 63$  (N=32) in 2002.

### 2.5 Attendance

Daily counts were carried out on seven Thick-billed Murre study plots between 17.00-18.00 h between 16 July and 17 August, weather permitting (Appendix 3). As in 2002, the highest count recorded was on 20 July (1509) and the lowest on 12 August (1125). There was little seasonal trend in numbers (Fig. 5).

The mean of counts during 16 July - 10 August (late incubation and chick-rearing periods) was  $1345 \pm 83$  (N=18). That is higher than mean counts in 2001 (1194) and 2002 (1107), but similar to those in 2000 (1369) and 2003 (1311). Comparison of counts made over the same period in twelve years between 1976 and 2008 suggests an increase in numbers from 1976-2000, since when numbers appear to have been roughly stable (Fig. 6). The timing of breeding and chick mass at 14 d in 2008 suggest that conditions for feeding were good this year, leading to high numbers of non-breeders attending the colony.

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Figure 5  
Total count for plots G1, G4, N, Q1, Q4, S1 and U

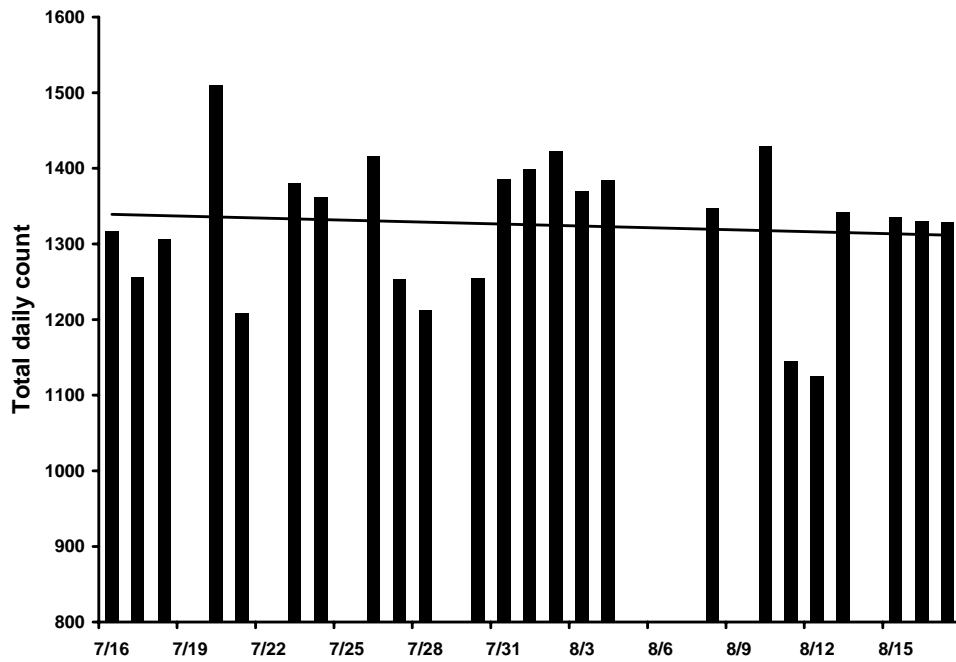
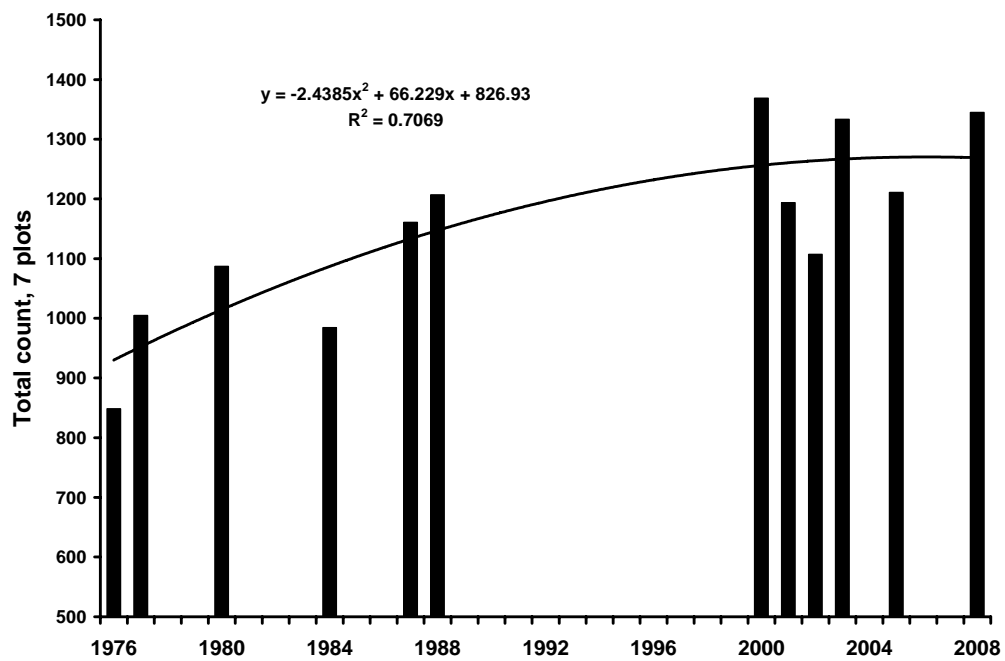


Figure 6  
Trend in plot counts at Prince Leopold Island since 1976





### 3. Black-legged Kittiwake *Rissa tridactyla*



Photo: T.J.F. Lash

#### 3.1 Timing and success of breeding

Timing of breeding and breeding success were measured by making daily observations at plots E and G between 16 July and 17 August. Additional observations were made at plots M, Q<sub>south(upper)</sub>, Q<sub>south(lower)</sub>, S and T. All plots were checked for brood size on 13 August. Observations were not possible on some days because of thick fog.

First hatching was observed on 22 July and median hatching based on eggs seen within a maximum of 48 h was 28 July (N = 83). The latest hatching date observed was on 13 August (Fig. 7). In other years for which data are available (Table 4), median hatching ranged over 14 days, from 23 July (2000) to 5 August (2001), so this year's timing was in the middle of the range for the species at Prince Leopold Island. The range in timing of breeding for Black-legged Kittiwakes at Prince Leopold Island appears similar to that for Thick-billed Murres, which showed median hatch ranging from 31 July – 10 August (11 days) over the same sample of years. Both show similar trends in relation to ice break-up in Parry Channel although median hatching for kittiwakes occurs approximately 7 days earlier than for murres (Fig. 8).

Figure 7  
 Dates of hatching for Black-legged Kittiwakes at Prince Leopold Island in 2008

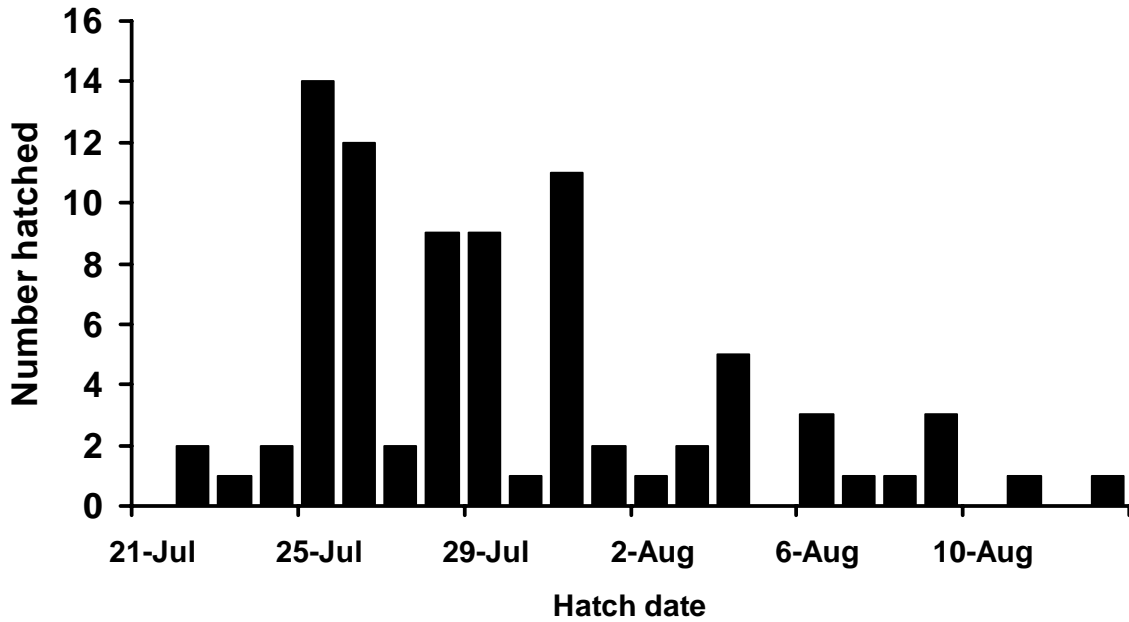
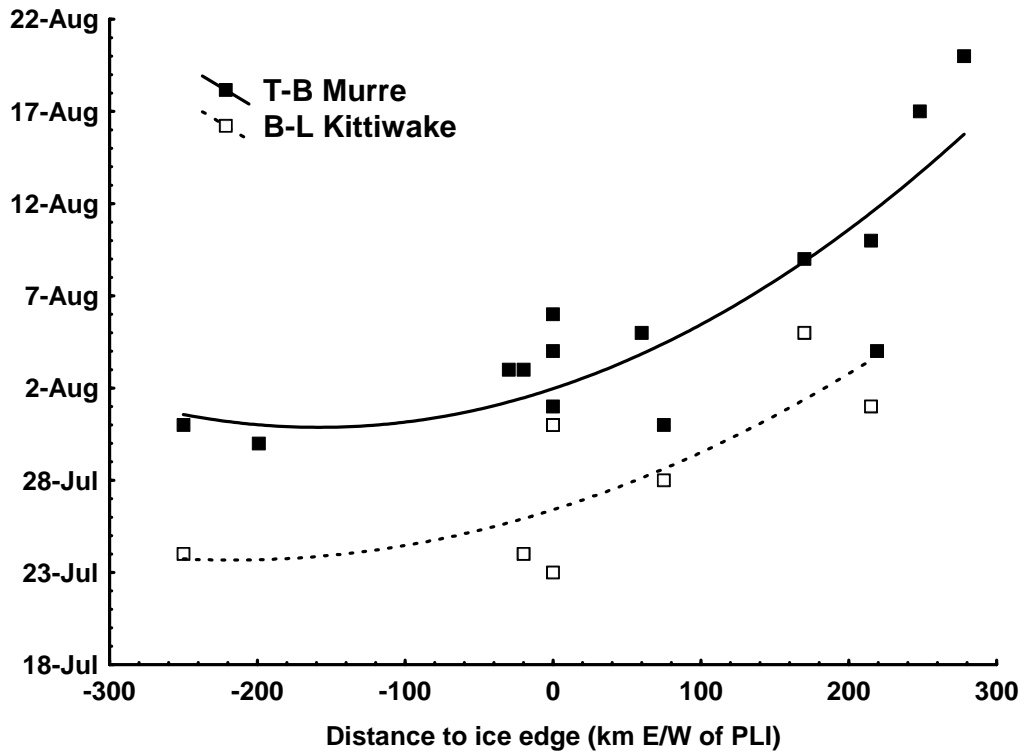


Figure 8  
 Timing of median hatching for Thick-billed Murres and Black-legged Kittiwakes at Prince Leopold Island in relation to the position of the ice edge in Parry Channel on 25 June



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Clutch size was observed at plots E and G. A total of 130 nests on plots E and G were occupied throughout the period of observation and all these pairs were assumed to have attempted to breed. Clutches of 1 egg made up 46% and 2-egg clutches made up 54% of the total (N = 113), giving a mean clutch size of 1.54 eggs: similar to clutches in 2000, and larger than those observed in 2001 and 2002 (Table 4). No three-egg clutches were seen in 2008.

Among broods still existing on 17 August, 77% (N=84) consisted of a single chick and 23% of two chicks, giving a maximum chick production of 0.91 chicks/pair for pairs known to have laid and 0.79 chicks/pair for the whole sample of breeding pairs. These numbers are little lower than observed in 2000 and 2003, but higher than 2001 and much higher than 2002 (Table 4).

**Table 4**  
**Timing and success of breeding for Black-legged Kittiwakes at Prince Leopold Island, 2000-2008**

	1988 Plot G	2000 Plot G	2001 Plot G Other	2002 Plot G	2003 Plot G Other	2005 Plot G+E	2008 Plot G+E		
Sites occupied		?	102	275	119	107	354	115	130
Median hatching <sup>1</sup>		23-Jul	5-Aug	1-Aug	24-Jul		24-Jul	28-Jul	
Clutch % >1 egg <sup>2</sup>		62	19		9	69		82	54
Mean clutch size		1.64	1.19		1.16	1.69		1.82	1.54
Fledged chicks/pair		?	0.73	0.54	0.38	0.97	0.92		0.79
Brood size at fledging (1+ = 1)		1.49	1.15	1.07	1.00	1.26	1.22		1.23

<sup>1</sup> In 1988, 31 July at plot G (Nettleship et al. 1990)

<sup>2</sup> In 1988, 1.70 at plot G (Nettleship et al. 1990)

### 3.2 Adult banding

Twenty-seven adult Black-legged Kittiwakes were trapped and banded: 12 at plot E, 4 at plot F, 1 at S and 10 on the South-east Spit, netted while flying towards the colony on 5 August. Band

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combinations of birds trapped at plot E in previous years were also recorded. The mean mass of birds captured while rearing chicks was  $404 \text{ g} \pm 37$  (SD, N=10), significantly higher than in 2001 and 2002, but not significantly different from 2000 (Table 5; for full details see Appendix 4).

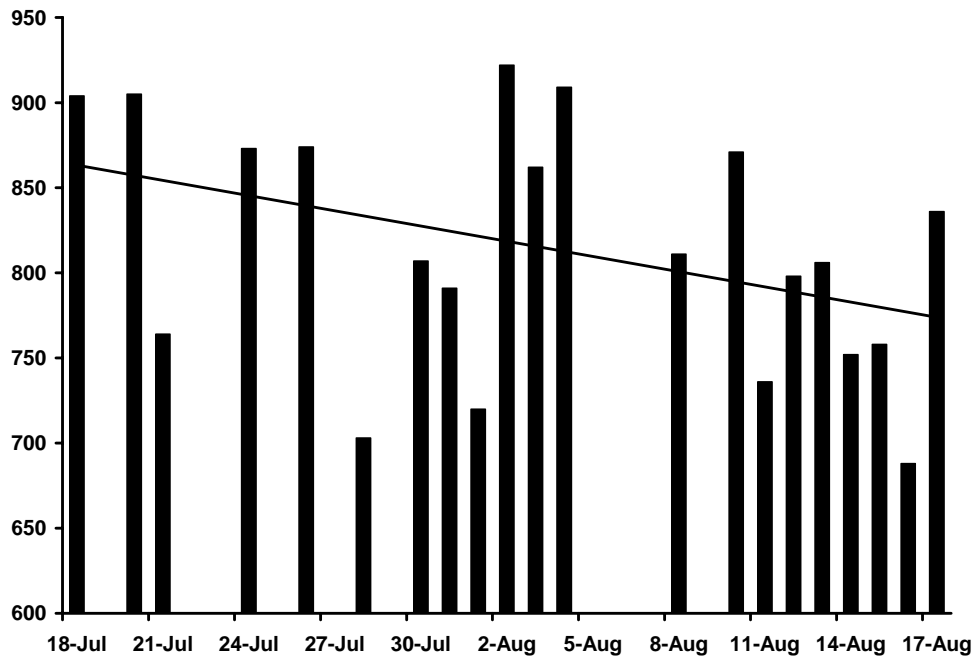
**Table 5**  
**Mass of adult Black-legged Kittiwakes trapped while rearing chicks at Prince Leopold Island in four years.**  
**ANOVA:  $F_3 = 4.48$ ,  $P = 0.009$**

YEAR	Mean	N	Std.Dev.	Differs from (Duncan test)
2000	374	13	35	
2001	360	8	41	
2002	342	8	36	
2008	404	10	37	2001 (0.02), 2002 (0.001)
All years	372.3	39	41.8	

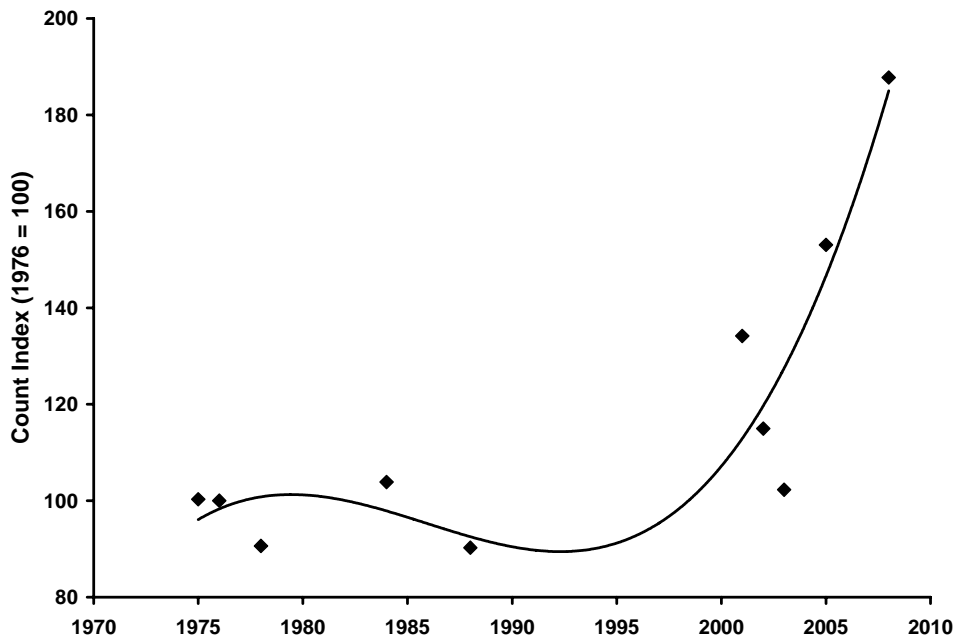
### 3.3 Population monitoring

Counts were made daily at 17:00 – 19:00 h at plots G, M, Q<sub>south</sub> (upper and lower), Q<sub>north</sub>, S and T. Numbers counted declined over the period of observations, although the highest count occurred on 2 August (Fig. 9). Full details are given in Appendix 5. The mean total for the period 20 July – 6 August was  $830 \pm 77$  birds, a 23% increase over the same period in 2005 and an 84% increase over 2003. This suggests an annual rate of increase since 2003 of 13%. Counts since 1976 suggest a fairly static population up to some time between 1988-2000, followed by a rapid expansion since then (Figure 10).

**Figure 9**  
 Daily counts of adult Black-legged Kittiwakes present on monitoring plots at Prince Leopold Island in 2008



**Figure 10**  
 Changes in monitoring counts of Black-legged Kittiwakes (20 July – 6 August) at Prince Leopold Island during 1975-2008



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#### 4. Northern Fulmar *Fulmarus glacialis*



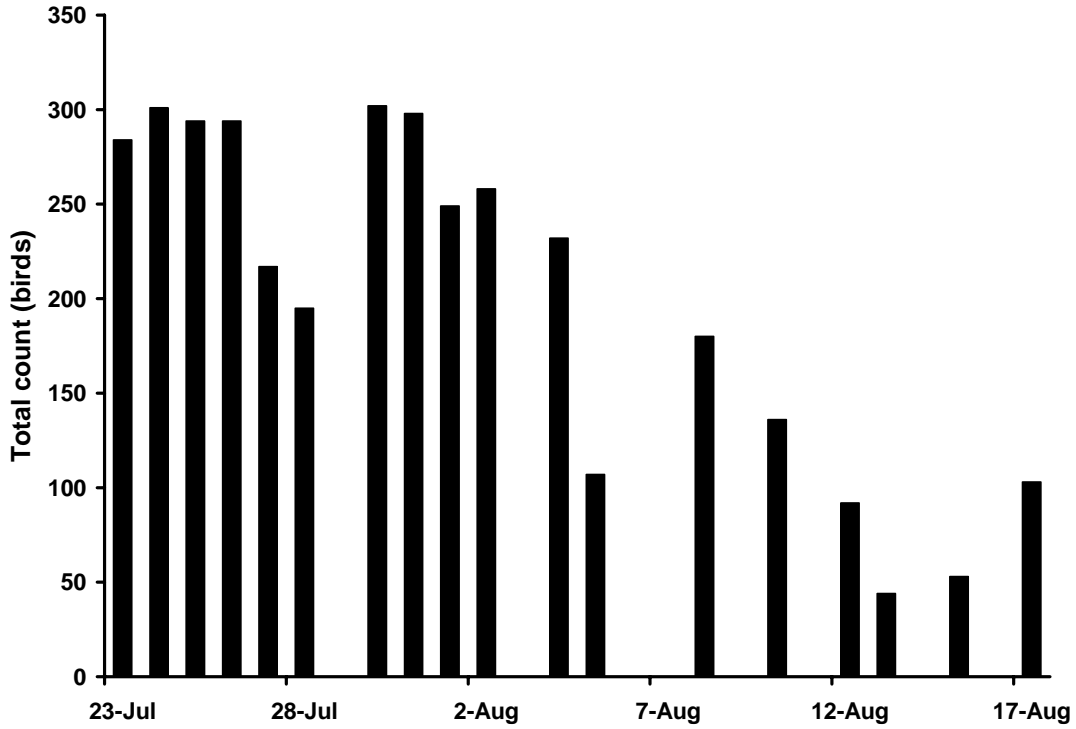
Photo: T.J.F. Lash

##### 4.1 Attendance

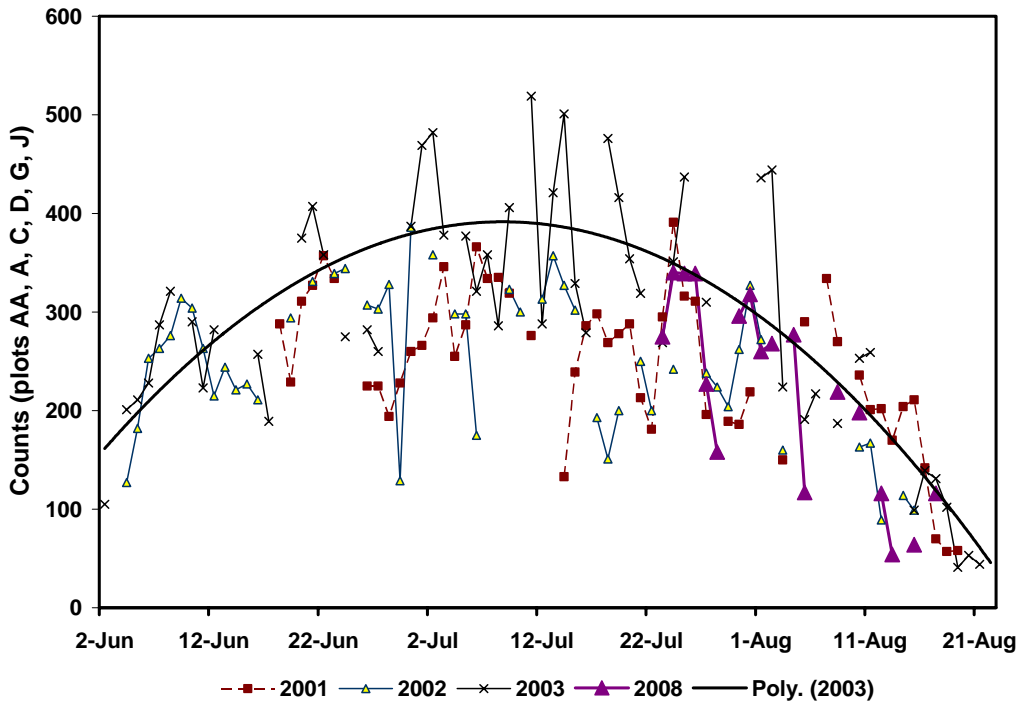
Counts were made daily at 17.00-19.00 h at study plots AA, A, C, D, G, H and J. Sites with single birds and with pairs present were counted separately. As in previous years, attendance was highly variable (Fig. 11, Appendix 6). Peak numbers occurred in July. Numbers decreased rapidly after early August, with all chicks being deserted by 12 August. Numbers were generally lower than in 2003 (Fig. 12) and a comparison of counts during the period 17 July – 7 August suggests that there has been a small, but steady contraction in numbers visiting the study plots at Prince Leopold Island since the 1970s (Fig. 13).

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**Figure 11**  
Sum of daily counts of Northern Fulmars at seven study plots: AA, A, C, D, G, H, J

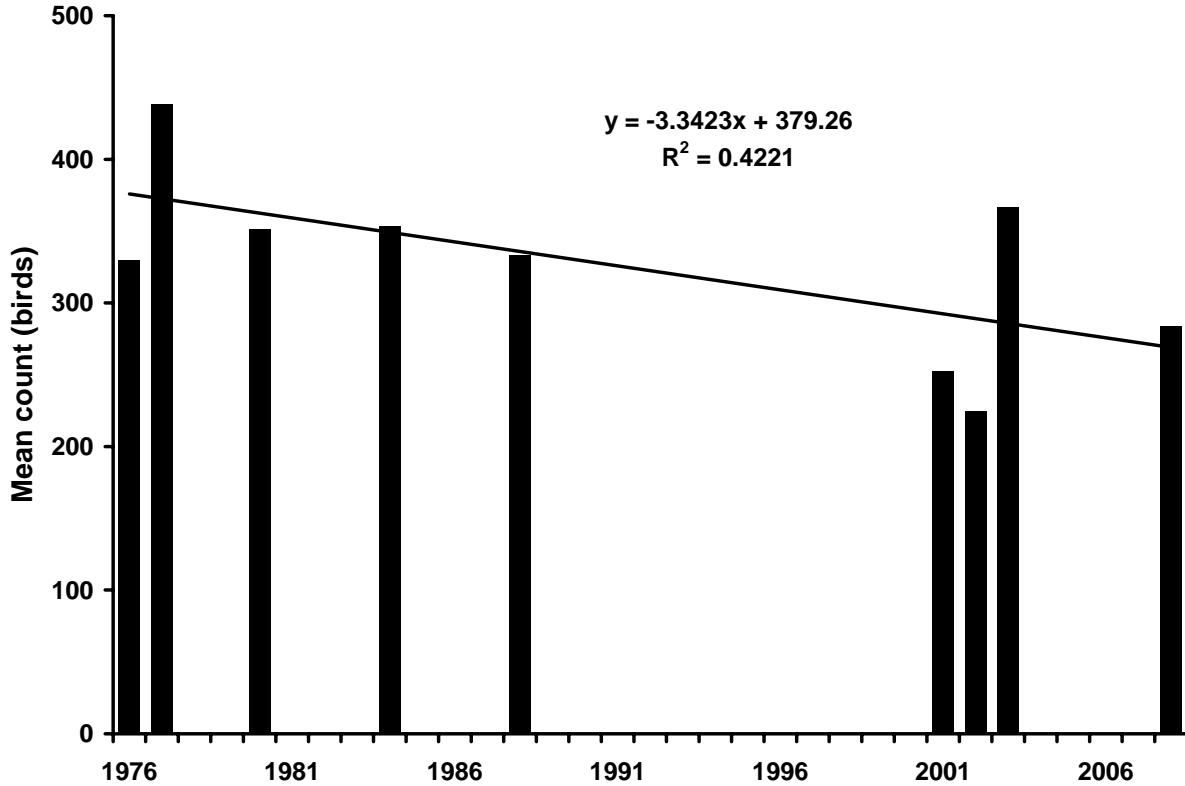


**Figure 12**  
Daily counts at study plots AA, A, C, D, G and J since 2001, with the 2008 season highlighted. The fitted polynomial is for 2003.





**Figure 13**  
**Mean daily counts of Northern Fulmars present at plots AA, A, C, D, G and J during 19 July – 7 August,**  
**with linear trend fitted**



Counts during the incubation period in 1976 showed a very strong cyclical periodicity with a peak-peak interval of 5-6 d (Hatch and Nettleship 1998). This cyclical variation in numbers was not apparent in 2001 or 2002, although a weak 10-11 d cycle was found in both years (Gaston et al. 2006). Data for 1988 was available only for 19 July - 7 August, but over that period a weak 11 d cycle was also apparent. In 2008 there was evidence of an approximately 8-day periodicity, with troughs in numbers unrelated to weather conditions on 28 July and 5 and 13 August (Fig. 8). Although cyclical attendance by non-breeders appears to be a characteristic of the fulmars at Prince Leopold Island the cause is unknown and the periodicity seems highly variable, so it provides little potential for use as a predictive factor.

#### 4.2 Timing and success of breeding

Timing of hatching was measured by making daily observations at plots AA, A, C, D, G and J between 23 July and 17 August. The presence or absence of one or two birds was recorded daily for each site marked on previous maps of the study plots. Observations were not possible on several days because of thick fog or snow. Although observations were less intensive than in earlier years, it appears that reproductions was more successful than usual, with chicks present at 50% of occupied sites on 17 August, the last date of observations.

**Table 6**  
**Reproductive success in Northern Fulmars**

Year	Sites used <sup>1</sup>	Occupied sites <sup>2</sup>	Eggs or chicks seen	Chicks hatched	Chicks alive, 20 Aug	Max. number hatched (%)	Max. chicks fledged/pair (%)	Probable chicks fledging/pair (%)
2001	344	172	127	103	43	81	34	25
2002	240	138	87	40	17	46	20	12
2003	223	130	100	40	27	40	27	21
2008	302	208	139	124	104	89	75	50

<sup>1</sup> All sites where birds were observed at least once

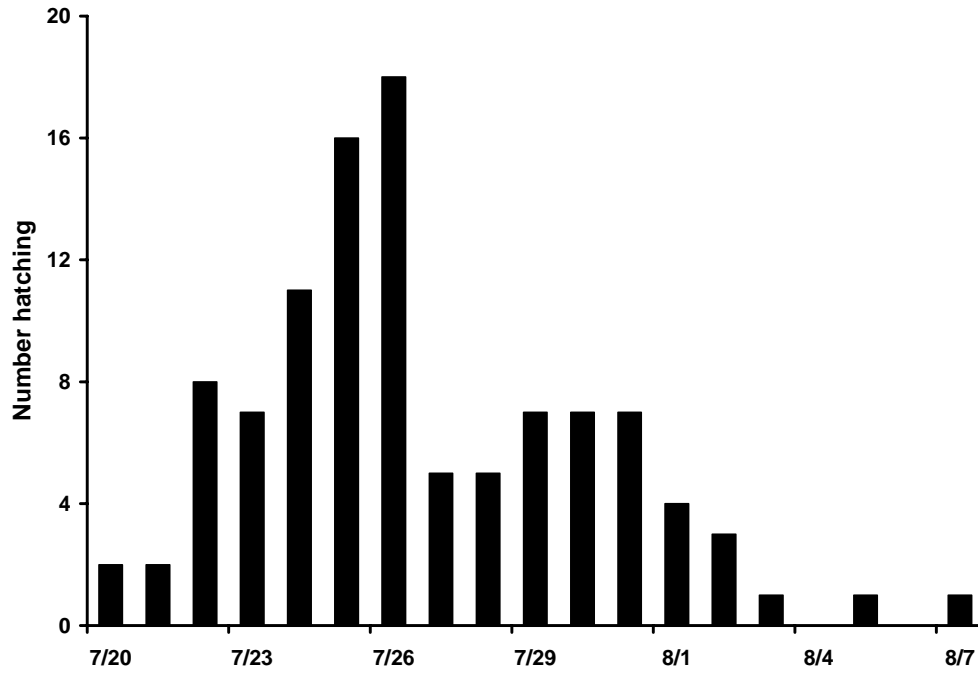
<sup>2</sup> Sites where one or more adult was present on >70% of days during 15 June – 17 July (2001-2003) or >80% during 20-30 July 2008.

Out of 124 chicks known to have hatched, 104 (84%) were still alive when observations terminated on 23 August. The maximum reproductive success, considering all pairs occupying sites was therefore estimated as 0.50 chick/pair (Table 6).

Timing of breeding was estimated from dates at which chicks were first seen without parents. We derived approximate dates of hatching from these by subtracting 10 d (Hatch and Nettleship 1998). Mean date of desertion for chicks was 6 August, giving an estimate of 27 July  $\pm$  3.6 d (SD, range 20 July - 17 August, N=102, Fig. 14) for date of hatching, the same as in 2001. Median hatching during 1975-77 fell between 25-28 July (Hatch and Nettleship 1998), so this

year's observations confirm that timing of breeding of Northern Fulmars at Prince Leopold Island is extremely constant.

**Figure 14**  
**Distribution of dates of hatching estimated for Northern Fulmars in 2008**



## 5. Glaucous Gull

The number of Glaucous Gull nests found along the East cliff colony, and their contents, were recorded periodically throughout the study period. Altogether, 19 pairs were present on the upper half of the East Cliff colony, one pair on the cliffs immediately south of camp and three pairs on the lower cliffs just south of AA. Three adults inland from G, in the valley beyond the red moss patch, were accompanied by a single half-grown chick on 16 July. Of the 19 pairs on the East Cliffs, at least 16 produced chicks and 14 still had chicks on 12 August, by which time most were either fledged or close to fledging. Final brood sizes were eight 1-chick and seven 2-chick. No 3-chick broods were seen in 2008, but single eggs were removed from nine nests in June by a team collecting eggs for contaminants analysis. Consequently, the mean productivity of 22/19 = 1.16 chicks/pair for the East Cliffs gulls may be lower than would otherwise have been the case. This compares with 1.47 chicks/pair in 2003 (N=17), 0.33 chicks/pair in 2002 (N=21), 0.73 chicks/pair (N=26) in 2001.

**Table 7**  
**Timing and success of breeding for Glaucous Gulls nesting along the east Cliff colony since 2000**

	2000	2001	2002	2003	2008
Nests	25	26	21	19	19
First egg laid			8 Jun	5 June	
Median hatching		9 Jul	13 Jul	5 Jul	6 July
Final brood					
1	3	5	3	3	8
2	3	4	2	8	7
3	1	3	0	3	0
Mean brood at fledging	1.71	1.83	1.4	2	1.47
Mean fledge/pr	0.48	0.85	0.33	1.47	1.16

All but one brood had hatched at the first survey (15 July) and the mean age of chicks on that date was estimated at approximately 10 days, suggesting mean hatching about 6 July.

Throughout August a flock of adult-plumaged Glaucous Gulls congregated on the SE Spit, around the fresh-water ponds. There were seldom less than 20 birds present and on 12 August, when most breeders were still present on their breeding territories along the cliffs, 70 birds were

present. The presence of such a large number of adult-plumaged birds seems puzzling in view of the continuing decline in numbers of pairs breeding at Prince Leopold Island – down from 26 pairs in 2001 to 19 pairs this year. However, by 12 August they may have included migrants from further north.

## **6. Black Guillemot**

Ten Black Guillemot eggs were collected for contaminant analysis on 19 July 2008. These were taken from the numbered sites along the South Cliffs. Among 27 nests examined, six contained chicks and ten contained eggs, of which two were pipping. This suggests that median hatching would have occurred on or close to 21 July. The easternmost part of the colony appears to be deserted. The first numbered site that was occupied was site 13. No further observations of guillemots were made in 2008, although they were seen close to shore whenever we visited the SE Spit.

## **7. Parasitic Jaeger *Stercorarius parasiticus***

Up to four, all of the pale morph, were seen on the Southeast Spit and one on the North Spit. No evidence of breeding was found, although some birds flew close to observers and might have been attempting to lead us away from nests. However, the behaviour was not conclusive.

## **8. Observations of other species**

### **8.1 Birds**

Apart from the 5 species listed above, we recorded 11 other species of birds on the island. Snow Buntings and Common Ravens were seen daily in areas adjacent to the East Cliff. Up to six ravens were seen and a family party of four was present on most days between camp and J. Single Lapland Longspurs were seen on five dates and single Chipping Sparrows (presumably the same individual) on three dates. An American Pipit was seen on 16 July and a White-crowned Sparrow on several dates in July. No falcons were seen. Baird's Sandpipers were seen

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on 6 dates from 26 July and on 27 July RR found a brood of two 3-4 d old chicks about 400 m inland from M. One young close to flying was seen on 10 August, suggesting that at least one would fledge. A Common Eider nest containing pipping eggs and small ducklings was found on SE Spit on 2 August and a flock of 35 King Eiders flew east past the spit on the same day.

### **8.2 Mammals**

A single polar bear was seen on the SE Spit on 24 July and a female with one second year cub in the same area on 1 August. The latter seems to have rummaged through our boat cache on the beach, but nothing was damaged seriously. No arctic foxes or arctic hares were seen in 2008.

Beluga were seen on five dates between 15 - 25 July, mostly in small pods of <10. They were accompanied by narwal on 15-16 July. A group of about 15 harp seals swam past the SE Spit on 20 July and one walrus was seen on 5 August, along with a possible bearded seal. One bowhead whale surfaced twice while cruising north about 200 m off the east cliffs on 25 July.

On 19 July at least 50 and perhaps as many as 100 beluga were actively feeding close to the south shore of the island, within 200 m of the Black Guillemot cliffs. This group included many mother-calf pairs. They dived steeply, often showing flukes (especially the calves), going down for only short periods suggesting that the water was shallow. They were accompanied by several hundred Northern Fulmars which were clearly taking advantage of the same food concentration. However, neither Thick-billed Murres nor Black-legged Kittiwakes aggregated in the same area, although many flew past the apparent feeding frenzy.

## 9. Acknowledgements

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### Appendix 1 Thick-billed Murre eggs measured at plot S2 in 2008

Date	Length(mm)	Width (mm)	Vol. index
20-Jul-08	71.0	46.8	155.5
20-Jul-08	77.4	47.9	177.6
20-Jul-08	76.7	49.1	184.9
20-Jul-08	82.0	50.0	205.0
20-Jul-08	78.6	47.1	174.4
20-Jul-08	77.3	48.5	181.8
20-Jul-08	73.1	46.8	160.1
20-Jul-08	76.1	48.5	179.0
20-Jul-08	78.1	49.7	192.9
20-Jul-08	75.4	46.6	163.7
20-Jul-08	71.8	45.8	150.6
20-Jul-08	78.0	48.9	186.5
20-Jul-08	78.6	50.3	198.9
20-Jul-08	78.1	50.0	195.3
20-Jul-08	79.2	46.1	168.3
20-Jul-08	70.0	50.7	179.9
20-Jul-08	77.9	50.1	195.5
20-Jul-08	72.0	46.1	153.0
20-Jul-08	76.0	46.7	165.7
20-Jul-08	73.8	47.2	164.4
20-Jul-08	76.0	51.2	199.2
20-Jul-08	80.1	51.6	213.3
20-Jul-08	78.3	51.5	207.7
20-Jul-08	73.3	47.4	164.7
20-Jul-08	79.3	49.0	190.4
20-Jul-08	76.0	45.6	158.0
20-Jul-08	83.0	49.9	206.7
20-Jul-08	75.1	48.7	178.1
20-Jul-08	78.1	47.1	173.3
20-Jul-08	77.0	47.6	174.5
20-Jul-08	77.1	46.2	164.6
20-Jul-08	74.0	49.8	183.5
20-Jul-08	74.6	50.3	188.7
20-Jul-08	75.6	48.3	176.4
20-Jul-08	72.6	49.4	177.2
20-Jul-08	76.9	47.4	172.8
20-Jul-08	79.2	46.5	171.3
20-Jul-08	80.9	48.8	192.7
20-Jul-08	76.4	48.7	181.2
20-Jul-08	77.6	50.1	194.8
20-Jul-08	80.2	49.1	193.3
20-Jul-08	77.6	49.9	193.2
20-Jul-08	77.5	48.2	180.1
20-Jul-08	80.4	50.8	207.5
20-Jul-08	72.1	45.6	149.9
20-Jul-08	80.8	47.8	184.6

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20-Jul-08	74.2	47.3	166.0
20-Jul-08	82.7	51.1	215.9
20-Jul-08	73.9	48.2	171.7
20-Jul-08	75.0	49.1	180.8
20-Jul-08	74.9	48.4	175.5
20-Jul-08	77.1	49.8	191.2
20-Jul-08	74.1	49.0	177.9
Mean	76.7	48.5	180.9
St. Dev.	3.0	1.6	16.2

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**Appendix 2**  
**Details of adult Thick-billed Murres trapped at Prince Leopold Island in 2008**

Date	Time <sup>1</sup>	Stat	Band number	Plot	Site	Mass	Breed status	Chick age (d)	Depth logger	Date recap	Time recap.	Recap mass (g)	Geo locator	Bander
4-Aug	11:00	N	78555246	S2		830	C		11403	8-Aug	12:07		BAS-4405	AG
4-Aug	11:10	N	78555247	S2		850	C		11405	8-Aug	16:50	870	BAS-5674	AG
4-Aug	11:25	N	78555248	S2		820	C		11765	8-Aug	9:23		BAS-8174	AG
4-Aug	11:40	N	78555249	S2		840	C		10243	8-Aug	10:00		BAS-4413	AG
8-Aug	17:20	N	78555250	U	3	860	C	8	11403	11-Aug	10:39	780	BAS-5676	AG
8-Aug	17:25	N	78550953	U	7	920	C	5	11765	12-Aug	16:29	970	BAS-4403	AG
8-Aug	17:30	N	78550954	U	6	940	C	8	11397	11-Aug	10:53	890	BAS-5695	AG
8-Aug	17:40	N	78550955	U	5	860	C	5	10243	11-Aug	17:35	840	BAS-4404	AG
12-Aug	15:40	N	78550965	U	34	910	C	16	10243	15-Aug	15:36	880	BAS-5691	AG
12-Aug	15:47	N	78550985	U	33	920	C	16	11767	15-Aug	17:44	940	BAS-5663	AG
12-Aug	15:55	N	78550990	U	38	850	C	7	11405	retrieved				AG
12-Aug	16:03	N	78550989	U	6	930	C	12	11397	16-Aug	4:55	920	BAS-??	AG
12-Aug	16:11	N	78550966	U	4	850	C	13	11403	15-Aug	14:50	840	BAS-5693	AG
15-Aug	14:58	N	78550967	U	L of U	1010	C						BAS-8194	AG
15-Aug	15:09	N	78550968	U	L of U	880	C						BAS-8170	AG
15-Aug	15:24	N	78550969	U	L of U	890	C						BAS-8185	AG
15-Aug	16:12	N	78550970	U	R of U	820	C						Lotek-548	AG
15-Aug	16:24	N	78550971	U	R of U	840	C						Lotek-552	AG
15-Aug	16:33	N	78550972	U	R of U	940	C						Lotek-556	AG
15-Aug	16:47	N	78550986	U	R of U	880	C						Lotek-545	AG
15-Aug	17:00	N	78550983	U	R of U	870	C						Lotek-554	AG
15-Aug	17:11	N	78550979	U	R of U	930	C						Lotek-546	AG
15-Aug	17:19	N	78550974	U	R of U	930	C						BAS-8178	AG
15-Aug	17:28	N	78550991	U	R of U	850	C						BAS-8147	AG
15-Aug	17:35	N	78550993	U	R of U	890	C						BAS-??	AG
15-Aug	17:55	N	78550994	U	R of U	800	C						BAS-5687	AG
16-Aug	17:15	N	78550996	S2		890	C						BAS-5606	AG
4-Aug	11:05	R	190520004	S2		960	C		11767	8-Aug	17:40		BAS-5688	AG
4-Aug	11:35	R	190520053	S2		830	C		11397	8-Aug	9:45		BAS-8172	AG
15-Aug	15:46	R	240615070	U	L of U	810	C						BAS-8170	AG
15-Aug	15:57	R	240615057	U	L of U	930	C						BAS-5694	AG

<sup>1</sup> times highlighted are approximate

**Appendix 3**  
**Daily counts at Thick-billed Murre monitoring plots, 2008**

<b>Date</b>	<b>G1</b>	<b>G4</b>	<b>N</b>	<b>N+</b>	<b>Q1</b>	<b>Q4</b>	<b>S1</b>	<b>S1+</b>	<b>U</b>	<b>Total (7plots )</b>
16-Jul	132	250	221	49	211	92	243	26	92	1316
17-Jul	144	247	213	46	193	80	231	27	75	1256
18-Jul	161	249	213	52	211	92	220	22	86	1306
19-Jul			Fog							
20-Jul	200	259	235	53	255	97	284	25	101	1509
21-Jul	131	203	205	46	207	92	237	22	65	1208
22-Jul			Fog							
23-Jul	195	276	237	46	205	98	227	20	76	1380
24-Jul	183	232	238	51	219	90	247	22	80	1362
25-Jul			Fog							
26-Jul	182	220	243	47	240	97	280	20	86	1415
27-Jul	141	218	219	45	232	88	212	18	80	1253
28-Jul	129	184	219	47	226	92	218	19	78	1212
29-Jul			Fog							
30-Jul	161	180	241	45	217	90	218	20	82	1254
31-Jul	160	234	228	47	256	95	258	20	88	1386
1-Aug	203	248	242	49	230	86	242	22	77	1399
2-Aug	187	240	241	51	237	100	257	20	89	1422
3-Aug	176	232	226	52	239	97	248	19	81	1370
4-Aug	161	229	244	50	238	97	262	22	81	1384
5-Aug			Fog							
6-Aug			Fog							
7-Aug	126	182					210	20	63	
8-Aug	155	249	238	45	219	97	236	23	85	1347
9-Aug			Boat work							
10-Aug	160	264	258	53	249	92	250	21	82	1429
11-Aug	137	205	205	38	180	70	222	21	67	1145
12-Aug	133	186	207	42	180	80	211	22	64	1125
13-Aug	138	216	256	51	231	98	249	22	80	1341
14-Aug			Storm force							
15-Aug	152	226	247	46	225	91	257	21	70	1335
16-Aug	164	208	259	45	220	97	224	21	91	1329
17-Aug	171	214	246	50	232	91	227	20	77	1328
Mean 16 Jul - 10 Aug	162	231	231	49	227	93	241	21	81	1345
St. Dev.	25	28	14	3	18	5	21	2	9	83

**Appendix 4**  
**Details of adult Black-legged Kittiwakes trapped in 2008**

Date	Stat	LBand	RBand	Band No.	Plot	Site	Mass	Wing	Tarsus	Culmen	Depth	BStat	Geolocator	Notes
4-Aug	N	0	M	79460707	S		410					C		Sat tag 83739
25-Jul	N	0		79460708	E	4	470		38	34.4	12	E		Sat tag 83738
25-Jul	N	0	Geo/M	79460709	E		440	307		34.2	11.4	E	BAS	
25-Jul	N	0	Geo/M	79460710	E		380	298	36.3	31.9	11.3	E	BAS	
31-Jul	N	0	Geo/M	79460711	F		420	304	40.5	32.2	10.2	C	Lotek 0557	
31-Jul	N	0	Geo/M	79460712	F		400	302	42	30.2	11	C	BAS 8177	
31-Jul	N	0	Geo/M	79460713	F		460	304	38.2	31.5	10.8	C	BAS	
2-Aug	N	0	Geo/M	79460714	E	1	400	309	37.9	32.3	11.5	C	Lotek 0549	
2-Aug	N	0	Geo/M	79460715	E	9	380	312	38	32.4	11.6	C	Lotek 0547	
5-Aug	N	0	M	79460716	S Spit				38.3	34.5	11.2	?		
5-Aug	N	0	M	79460717	S Spit				37.6	34.7	10.5	C		Regurgitation
5-Aug	N	0	M	79460718	S Spit				36	31.5	10.7	?		
5-Aug	N	0	M	79460719	S Spit				36	32.4	10.9	C		Regurgitation
5-Aug	N	0	M	79460720	S Spit				37.2	34.6	10.4	C		Regurgitation
5-Aug	N	0	M	79460721	S Spit				37.9	32	10.8	?		
5-Aug	N	0	M	79460722	S Spit				35.2	32	10.8	C		Regurgitation
5-Aug	N	0	M	79460723	S Spit				37.3	33.1	11.1	?		
5-Aug	N	0	M	79460724	S Spit				37.2	32.2	11.4	?		
5-Aug	N	0	M	79460725	S Spit				37.6	32.7	11	C		Regurgitation
22-Jul	R	DB/R	DG/M	79460094	E	3	380		35.1	31.9	10.8	E		DG band removed, no tag attached
22-Jul	R	OR/R	DG/M	79460093	E	4								Satellite tag 83737
25-Jul	R		Geo/M	79460055	E	8	430	301	33.6	31.7	11.1	E	BAS	
25-Jul	R	Y/OR	Geo/M	69460099	E		390	300	35.3	31	10.4	E	BAS	
31-Jul	R		Geo/M	69460019	F		420	305	39.8	34.4	11.4	C	Lotek 0547	
2-Aug	R	LB/DB	Geo/M	69460056	E		450	300	38.9	34.5	11.3	C	Lotek 0555	
2-Aug	R	OR/OR	Geo/M	69460057	E		350	299	38	30.3	10.5	C	Lotek 0558	
2-Aug	R	Y/R	Geo/M	69460045	E		350	288	35.4	33.8	11	C	Lotek 0542	

Stat(us) N = New, R = Retrap  
L-BAND, R-BAND BK = Black, DB = Dark Blue, LB = Light Blue, LG = Light Green, OR = Orange, R = Red, BR = Brown, Y = Yellow, Geo = geolocator tag  
STAT E = with egg, C = with chick, ? = unknown

**Appendix 5**  
**Counts of Black-legged Kittiwake population monitoring plots at Prince Leopold Island in 2008**

<b>Date</b>	<b>G</b>	<b>M</b>	<b>Q<sub>SU</sub></b>	<b>Q<sub>SL</sub></b>	<b>S</b>	<b>Q<sub>N</sub></b>	<b>T</b>	<b>Totals</b>
16-Jul		79		128	87	107	197	
17-Jul	141		117	112	78	106	186	
18-Jul	144	81	150	142	78	114	195	904
19-Jul								
20-Jul	153	76	136	129	77	116	218	905
21-Jul	138	69	111	116	62	99	169	764
22-Jul								
23-Jul								
24-Jul	140	69	139	135	72	113	205	873
25-Jul								
26-Jul	137	69	150	133	79	111	195	874
27-Jul	134	70	113					
28-Jul	105	53	91	113	62	92	187	703
29-Jul								
30-Jul	138	66	120	120	70	106	187	807
31-Jul	138	72	115	115	70	105	176	791
1-Aug	125	63	110	105	68	99	150	720
2-Aug	151	78	140	138	85	124	206	922
3-Aug	143	73	142	123	64	107	210	862
4-Aug	154	84	126	142	86	113	204	909
5-Aug								
6-Aug								
7-Aug	103							
8-Aug	125	62	128	133	69	101	193	811
9-Aug								
10-Aug	141	77	143	133	82	108	187	871
11-Aug	117	69	114	98	56	115	167	736
12-Aug	119	73	123	125	67	109	182	798
13-Aug	134	75	120	123	66	110	178	806
14-Aug	133	73	126	106	64	108	142	752
15-Aug	127	65	120	104	65	94	183	758
16-Aug	114	59	99	105	60	95	156	688
17-Aug	122	66	147	123	78	110	190	836

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Appendix 6  
Daily counts of singles (s) and pairs (p) at Northern Fulmar monitoring plots, 2008

Date	AA		A		C		D		G		H		J		Total		Grand total
	s	p	s	p	s	p	s	p	s	p	s	p	s	p	s	p	
23-Jul	39	4	7	0	29	4	70	8	50	10	63	4	26	1	284	31	346
24-Jul	34	6	5	3	29	12	70	14	70	9	61	15	32	6	301	65	431
25-Jul	34	4	7	4	34	8	74	11	51	18	69	10	25	12	294	67	428
26-Jul	34	4	7	4	34	8	74	11	51	18	69	10	25	12	294	67	428
27-Jul	26	1	5	2	20	3	45	4	47	14	50	2	24	6	217	32	281
28-Jul	18	0	3	0	20	1	49	0	41	3	45	0	19	0	195	4	203
29-Jul	Fog																
30-Jul	30	3	9	2	33	4	75	5	60	10	66	10	29	6	302	40	382
31-Jul	28	6	5	2	28	5	76	5	76	12	56	10	29	8	298	48	394
1-Aug	23	6	3	0	31	4	61	8	59	6	47	5	25	5	249	34	317
2-Aug	20	5	5	0	31	4	69	8	60	7	48	5	25	5	258	34	326
3-Aug	Fog																
4-Aug	19	4	5	0	29	8	54	9	54	17	41	9	30	5	232	52	336
5-Aug	8	0	2	0	12	3	20	1	29	5	18	4	18	5	107	18	143
6-Aug									24	2							
7-Aug									24	2							
8-Aug	30	6	4	0	24	6	42	7	34	10	27	9	19	4	180	42	264
9-Aug	Boat day																
10-Aug	24	10	7	1	22	7	29	7	20	10	20	4	14	6	136	45	226
11-Aug	12	0	2	1	15	1			23	2			13	3			
12-Aug	7	2	5	2	17	2	19	7	20	3	16	2	8	4	92	22	136
13-Aug	4	1	1	0	8	1	14	2	3	2	4	0	10	1	44	7	58
14-Aug	3	0			10	1			6	1	7	2					
15-Aug	4	0	0	0	11	1	16	3	10	2	5	3	7	2	53	11	75
16-Aug					10	1	21	2					8	2			
17-Aug	1	0	15	3	10	4	24	1	32	2	11	8	10	2	103	20	143