Figure 9.2-9

Range and Locations of Satellite-collared Dolphin and Union Caribou Herd during Winter (9 December to 16 April),1999 to 2004 and 2015 to 2016

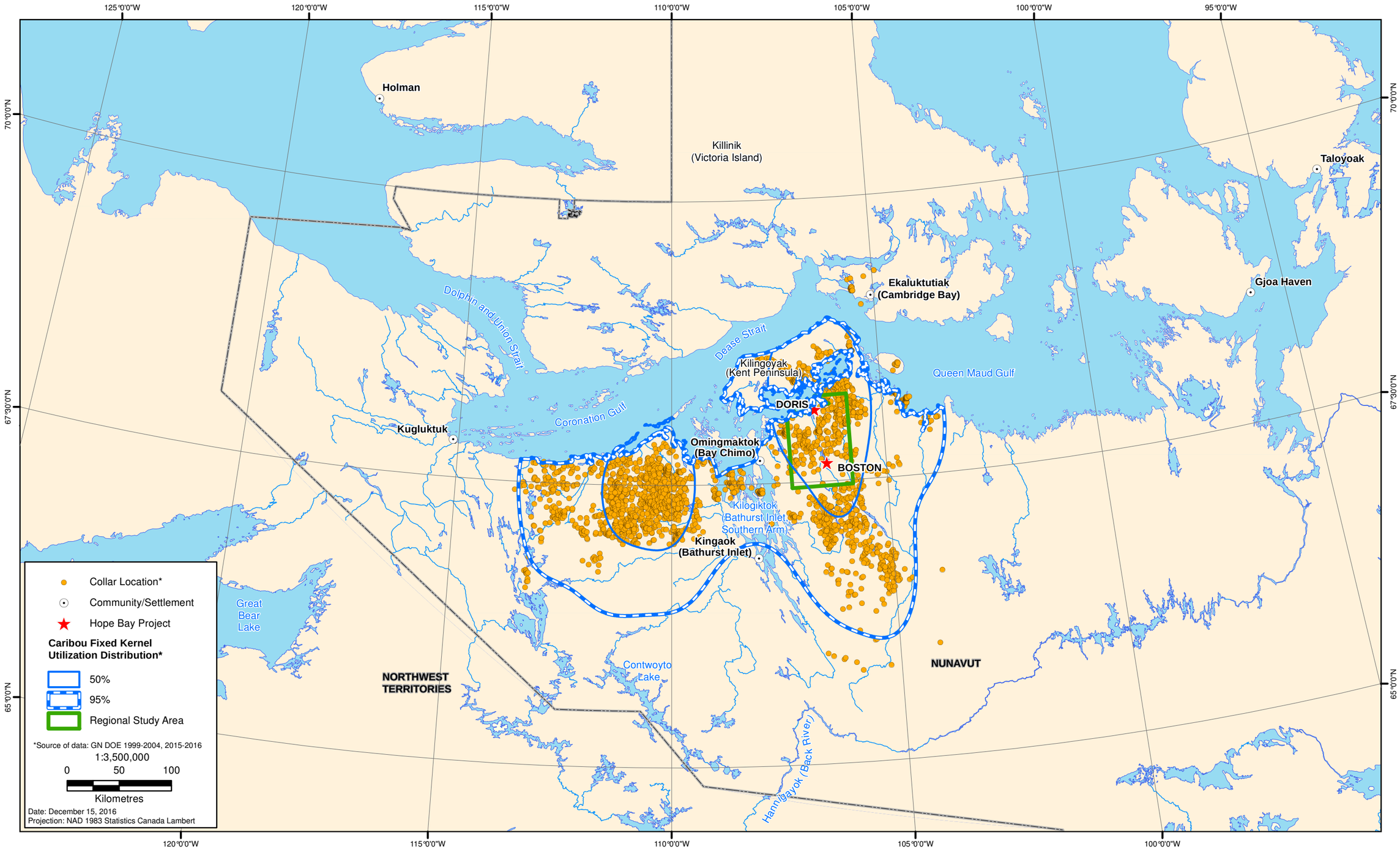


Figure 9.2-10
Locations of Satellite-collared Dolphin and Union Caribou Herd during the Northward Spring Migration (17 April to 29 June), 1999 to 2004 and 2015 to 2016

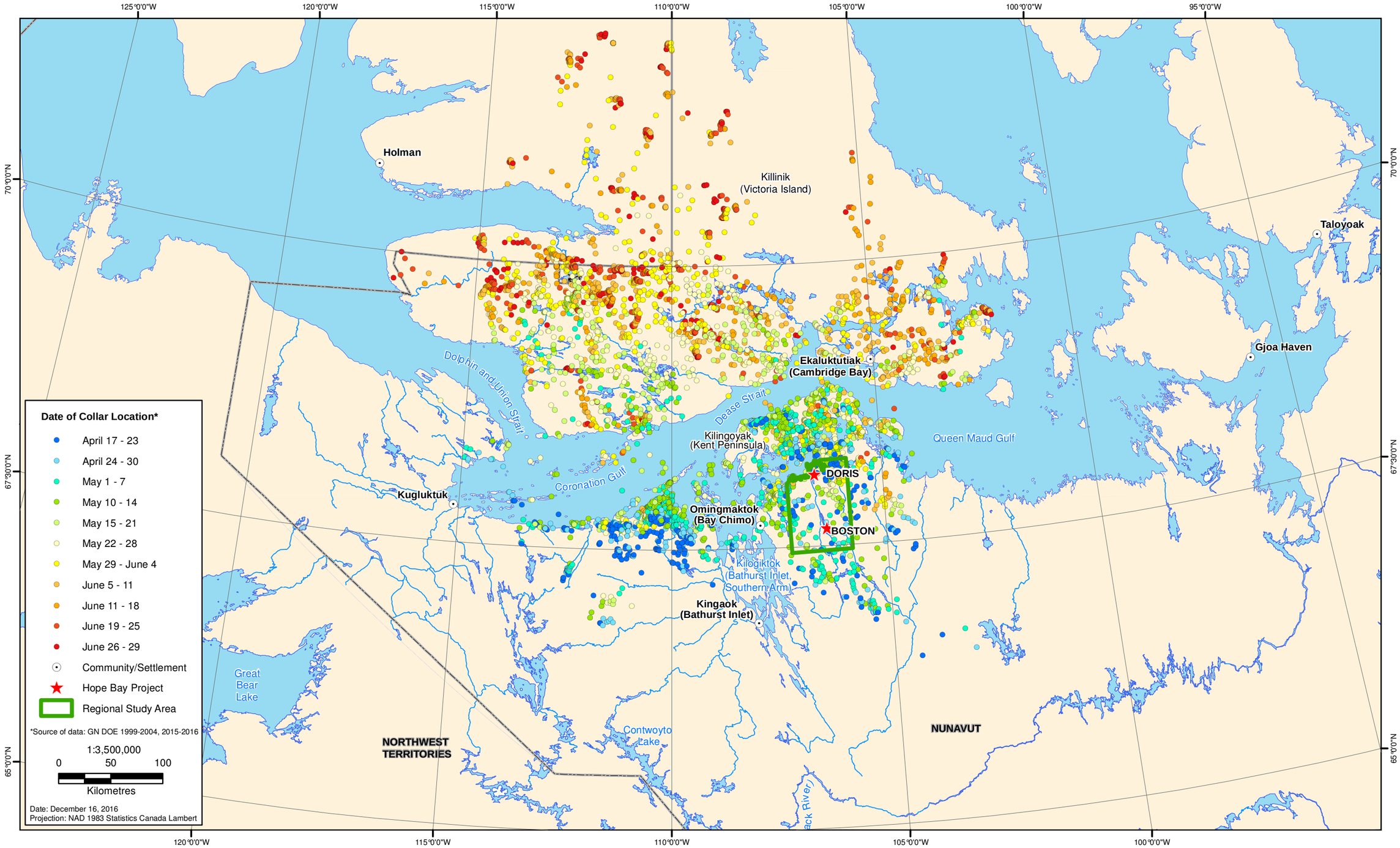
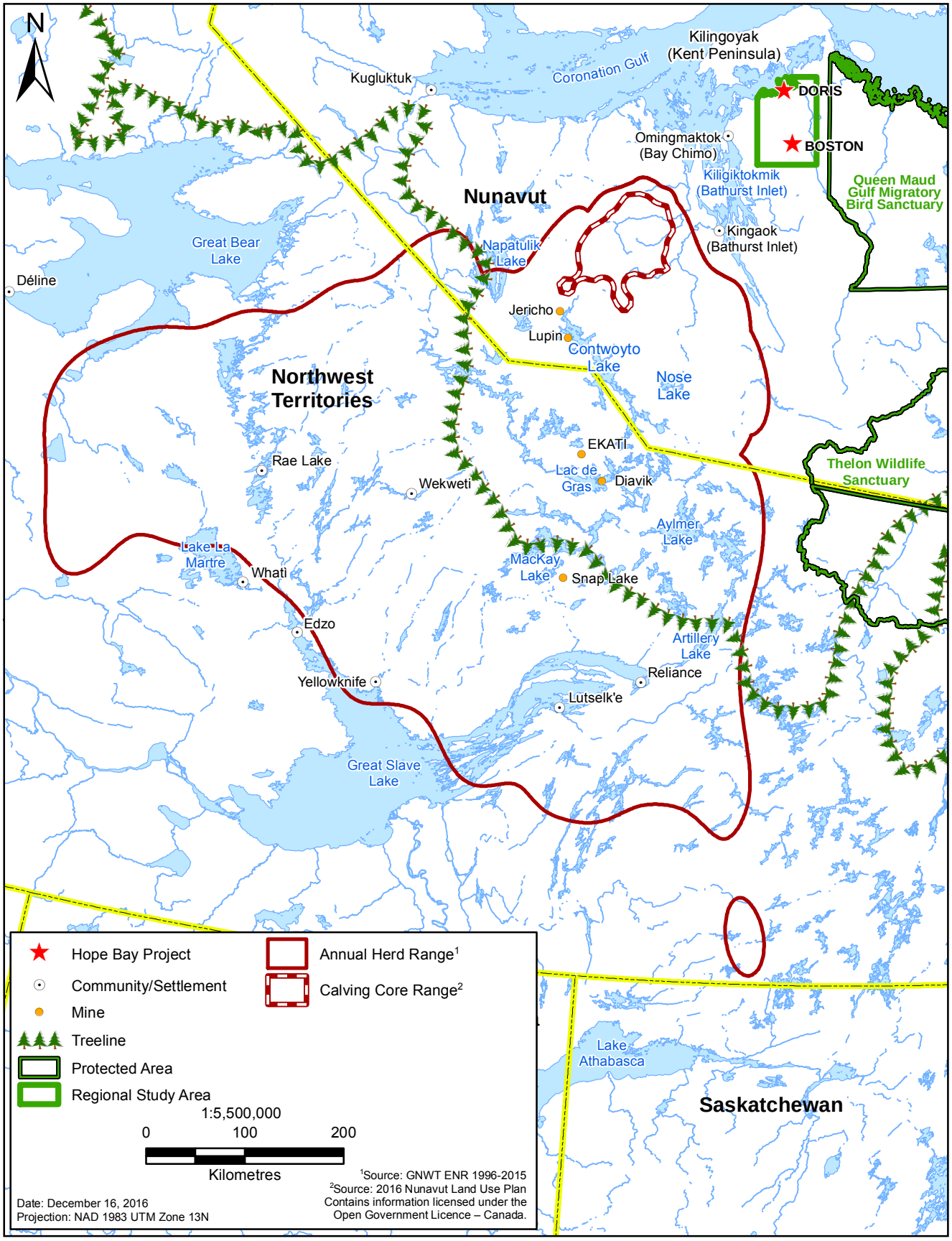


Figure 9.2-11
Annual and Calving Range of Satellite-collared Bathurst Caribou Herd



During the 1970s and early 1980s calving appears to have occurred primarily on the eastern side of Bathurst Inlet adjacent to the QMGMBS (Gunn, Poole, and Wierzchowski 2008). Starting in the early 1980s, aerial surveys indicated that the calving area began moving west each year. Surveys in 1986 and 1990 indicated that the calving area had moved west to the eastern coastline of Bathurst Inlet. Sometime between the aerial survey conducted in 1990 and the next survey in 1996 (the year in which caribou collaring began), the Bathurst caribou shifted their calving range from the east side of Bathurst Inlet to the west side of the Inlet. Since 1996, the calving area has been located west of Bathurst Inlet, between the Hood and Burnside Rivers (Gunn, Poole, and Wierzchowski 2008).

Aerial Surveys

An aerial survey program was conducted within the Hope Bay Belt from 1996 to 2011 for baseline and monitoring purposes. Aerial surveys were discontinued after that time due to low numbers of observations and following discussions with the GN DOE. The Program was altered several times in response to regulator comments, most notably following 2005, when the survey transects were doubled in length and reduced in number. The following sections discuss the methods and results of these surveys.

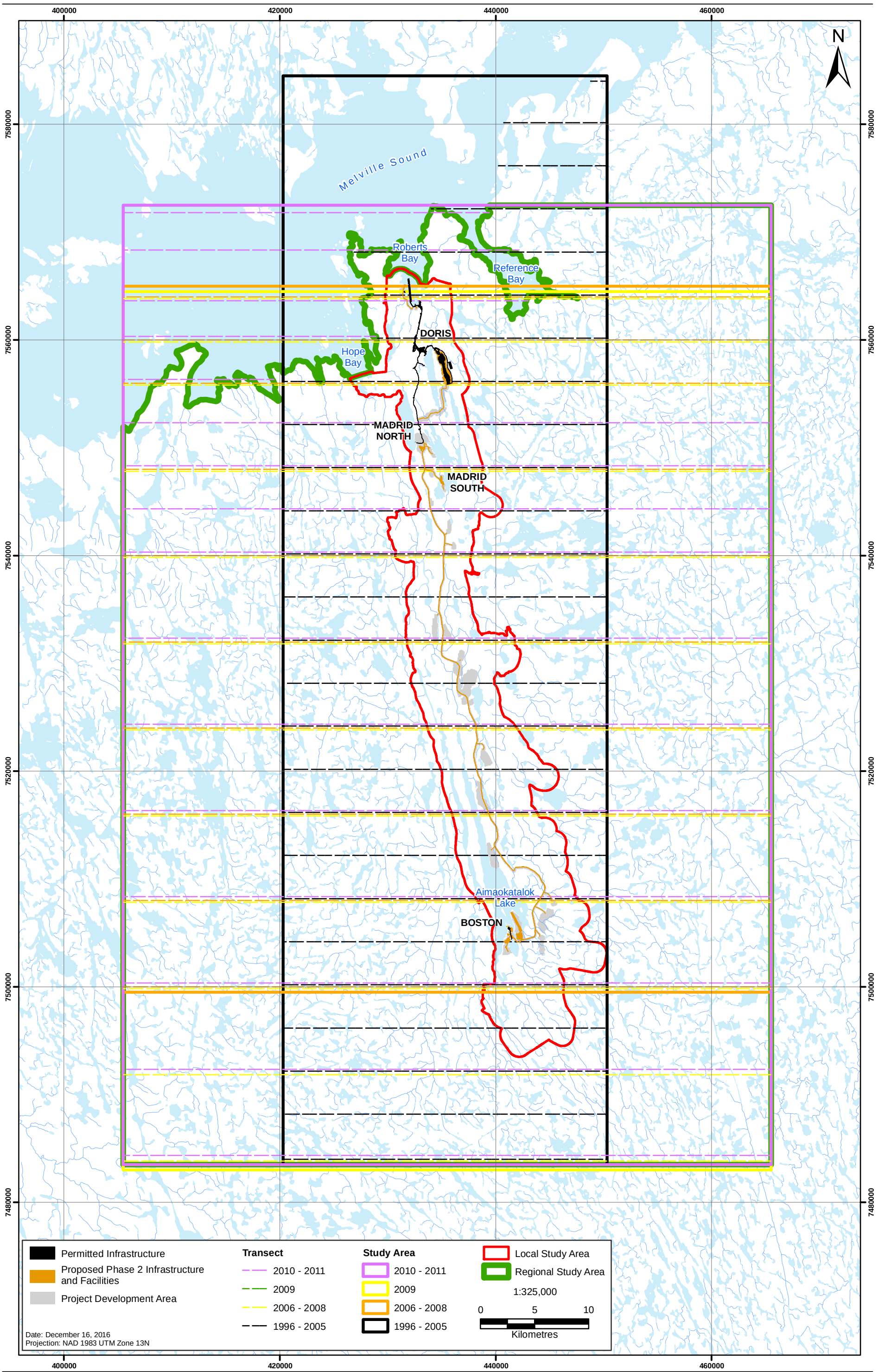
Methods

From 1996 to 2005, aerial surveys were conducted in an area encompassing the Hope Bay Belt and generally centred on a line connecting Doris and the Boston camp. Surveys followed 26 east-west transect lines, each 30 km in length, and spaced 4 km apart. In 2006 the study design was changed to 10 east-west transect lines, 60 km in length, with the northern three transects spaced 4 km apart and the other seven transects spaced 8 km apart. This was done to provide greater coverage of the areas east and west of the Hope Bay Project. In 2009, two additional transects were added to the south, also spaced 8 km between transects. The expanded set of transects provided additional coverage to the south of the Boston area.

In 2010, the study area was extended northward by an additional two transects each spaced 4 km from each other and the previous transect. Two additional transects were also added between those in the northern portion of the 2009 study area (between the third and fourth and fourth and fifth transects of the 2009 study area) to increase the density of transects in the northern area. This new transect design (9 northern transects spaced 4 km apart and the following 7 southern transects spaced 8 km apart) was surveyed in 2010 and 2011.

The study areas, which are bounded 0.5 km to the north and south of the northern and southernmost transects, respectively, and transect layouts are presented in Figure 9.2-12. The study area refers to the area of interest over which extrapolation of the survey data is applicable. The sampled area is the total transect length flown within the study area, multiplied by 1 km (surveys consisted of 1 km strip transects, with observers recording observations within 500 m to either side of the helicopter). The percent coverage refers to the ratio of the sampled area to the total study area. The number of caribou observed in the sampled area can be used to estimate density in the study area across seasons and years. In an effort to increase the extent of the survey area and maintain a relatively consistent survey grid spacing and survey length, some changes were accepted in the percent direct survey coverage. The survey area, and the percent direct survey coverage were: 3,030 km^2 and 26% coverage in 1996 to 2005; 3,900 km^2 and 15% coverage in 2006 to 2008; 4,860 km^2 and 15% coverage in 2009; and 5,340 km^2 and 18% coverage in 2010 and 2011. The percent direct survey coverage is within values from other regional caribou surveys, e.g. western Victoria Island 10 km transect spacing for 10% direct survey coverage (Nishi and Buckland 1994) and within values typically applied to transect aerial surveys (Buckland et al. 2004).

Figure 9.2-12
Ungulate Aerial Survey Areas, 1996 to 2011



Surveys were conducted during five periods that align with seasonal periods for Beverly/Ahiak caribou (Tables 9.2-2 and 9.2-4):

1. Spring Migration: April 15 to June 4;
2. Calving: June 5 to June 20;
3. Post-calving: June 20 to July 25;
4. Summer/Fall: July 25 to October 31; and
5. Winter: November 1 to April 14.

The exact timing of aerial surveys (seasonality) and number of surveys varied by year (Table 9.2-6). During some years, multiple surveys were conducted within any one seasonal period. After 1999, winter aerial surveys were discontinued except for one survey in late-winter 2010. Overall, seven years of survey were conducted during the spring migration period (eight surveys total), nine years of survey (10 surveys total) during the calving period, 10 years of survey during the post-calving period (19 surveys total), eight years of survey (10 surveys total) during the summer/fall period and five years of survey during the winter period (seven surveys total) for a total of 54 surveys conducted between 1996 and 2011. Detailed survey methodology can be found in The Doris Project Wildlife Mitigation and Monitoring Program, 2011 (Rescan 2011f). Note that the above aerial survey seasonal periods may differ relative to those reported in Rescan (2011f) as the above dates have been grouped to align with seasonal periods for Beverly/Ahiak caribou based on the current, improved knowledge of seasonal timing in these herds. Note that the spring migration and winter periods above roughly align with the time when Dolphin and Union caribou are expected to be on the arctic mainland (see above).

Table 9.2-6. Aerial Survey Dates for Caribou and Muskox, 1996 to 2011

Year	Spring Migration	Calving	Post-calving	Summer/Fall	Winter
1996	May 31	ns	June 20-21; July 3, 19, 23	October 18	November 27
1997	May 30–31	ns	June 21; July 13, 23	August 18; September 11	February 12–13; November 28
1998	ns	June 2*	June 25; July 11	August 19–20; October 15	February 28; December 2–3
1999	ns	ns	June 20; July 11	ns	February 28–March 1
2000	May 18–19	June 1-2*, 11	ns	ns	ns
2001	May 23	June 9	ns	ns	ns
2002	ns	June 8-9	ns	ns	ns
2003	ns	June 8-10	ns	ns	ns
2004	ns	June 11	ns	ns	ns
2005	ns	ns	June 26-27, 29	August 10	ns
2006	ns	June 14	July 6	ns	ns
2007	ns	June 17	June 29	August 3	ns
2008	May 15–16	ns	June 29; July 6;	September 15–16	ns
2009	ns	June 8,9	ns	ns	ns
2010	May 11	ns	July 24–25	Sept 13–14	April 5–6
2011	April 18-19; May 21-22	ns	July 9-10	August 15-16	ns

ns = not surveyed
** just prior to the calving period*

The mean densities of caribou in the study areas were calculated during each seasonal period for each year of study and plotted, along with standard errors when more than one survey was conducted in a given period, to assess seasonal and annual differences in caribou density in the study areas.

Results

Data collected between 1996 and 2011 was used to calculate caribou density estimates for the study area for each survey flight (Figure 9.2-13, Table 9.2-7). In general, very few caribou were observed within the study areas during aerial surveys conducted between 1996 and 2011. After correcting for survey effort, the greatest estimated density of caribou during a single survey was 5.73 individuals/km^2 (on the June 20, 1999 survey). However, the majority (48 of 54 surveys) of densities calculated during the surveys was under 1.0 individual/km^2 and 38 of these surveys had densities of less than 0.5 individuals/km^2.

Overall, density was very low during all seasons surveyed within the survey areas. Caribou densities were lowest during the summer/fall period, and during the spring migration period, consistently below0.5 individuals/km^2 (Table 9.2-7). Winter densities ranged from 0.22 to 1.3 individuals/km^2. Density during the calving season was initially high, between 1 and 5 individuals/km^2, between 1996 and 2002, but fell to low densities of 0.00 to 0.13 after 2002.

This was consistent with the period in the late 1990s and early 2000s when the Beverly caribou were shifting their calving range north from the area near Beverly Lake to the Queen Maud Gulf area. Collar data show Beverly caribou calving in a more diffuse area during this period. After approximately 2002, the Beverly caribou appear to have settled on their new calving ground in the Queen Maud Gulf area, where it has remained to this day.

During the late 1990s, larger groups of Beverly were also observed during the post-calving period, presumably as caribou were moving from the calving ground to the summer range. Again, after 2002, observations of large groups in the post calving period ceased (Table 9.2-7).

Caribou observed during aerial surveys are likely Dolphin and Union caribou and Beverly/Ahiak caribou. Dolphin and Union caribou winter on the Nunavut mainland and have been recorded in the RSA between November 7 and June 9. Beverly/Ahiak caribou may also occur in the study area during some years in winter and spring migration periods as indicated by collaring data collected for Beverly caribou between 2001 and 2011.

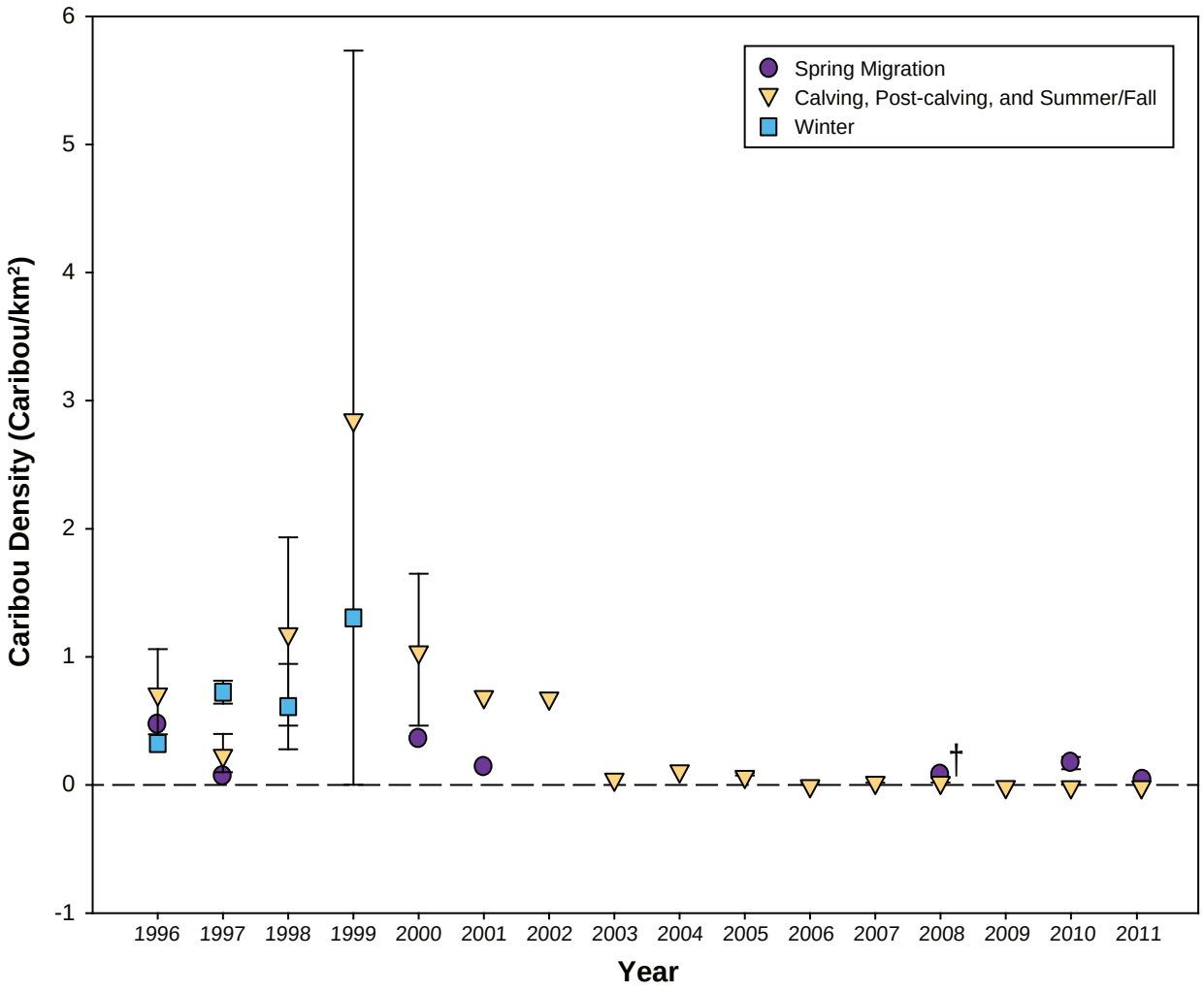
Sea Ice Crossing Surveys

Methods

Aerial surveys were conducted June 3 to 5, 2010 in Melville Sound and northern Bathurst Inlet to document sea ice crossing locations used by Dolphin and Union caribou in the marine RSA (Figure 9.2-14). Transect lines were spaced 8 km apart and oriented east to west in Melville Sound. Three transect lines were oriented north to south in northern Bathurst Inlet and Coronation Gulf (Figure 9.2-14). Surveys were timed to capture the latter part of the spring (northern) migration for Dolphin and Union caribou. Incidental observations of caribou trails were also recorded during caribou surveys conducted on May 22, 2011 as part of the annual WMMP monitoring program (2011 WMMP).

Figure 9.2-13

Caribou Densities in the Aerial Survey Area between 1996 and 2011



Note: Error bars represent standard error of the mean.

† Caribou counted in only 7 of the 15 groups observed in May; group size of uncounted groups assumed to be one for graphical and analysis purposes.

Table 9.2-7. Aerial Caribou Survey Details and Results, 1996 to 2011

Year	Month	Date	Survey Category	Number of Transects Surveyed	Transect Length (km)	Transect Width (km)	Total Transect Area (km^2)	Total Number of Caribou Observed (on transect)	Estimated Caribou Density ($ind./km^2$)
1996	May	31	Spring Migration	22	30	1	584.5	273	0.47
	June	20, 21	Post-calving	26	30	1	674.5	1,198	1.78
	July	3	Post-calving	26	30	1	674.5	4	0.01
	July	19	Post-calving	26	30	1	674.5	653	0.97
	July	23	Post-calving	26	30	1	480	420	0.88
	Oct	18, 19	Summer/Fall	26	30	1	300	4	0.01
	Nov	27, 28	Winter	26	30	1	674.5	218	0.32
1997	Feb	12, 13	Winter	26	30	1	674.5	428	0.63
	May	30	Spring Migration	26	30	1	674.5	44	0.07
	June	21	Post-calving	26	30	1	674.5	545	0.81
	July	14	Post-calving	26	30	1	674.5	3	0
	July	23	Post-calving	26	30	1	674.5	0	0
	Aug	18	Summer/Fall	26	30	1	674.5	93	0.14
	Sept	11	Summer/Fall	26	30	1	674.5	199	0.3
	Nov	28, 29	Winter	26	30	1	674.5	549	0.81
1998	Feb	28	Winter	26	30	1	674.5	188	0.28
	June	2	Calving	26	30	1	674.5	893	1.32
	June	25	Post-calving	26	30	1	674.5	451	0.67
	July	11	Post-calving	26	30	1	674.5	2,680	3.97
	Aug	19, 20	Summer/Fall	26	30	1	674.5	17	0.03
	Oct	15	Summer/Fall	26	30	1	674.5	0	0
	Dec	2, 3	Winter	26	30	1	674.5	637	0.94
1999	Feb, Mar	28, 1	Winter	26	30	1	674.5	880	1.3
	June	20	Post-calving	26	30	1	674.5	3,867	5.73
	July	11	Post-calving	26	30	1	674.5	1	0
2000	May	18, 19	Spring Migration	26	30	2	1349	481	0.36
	June	1, 2	Calving	26	30	1	674.5	752	1.11
	June	11	Calving	26	30	1	674.5	1,384	2.05

Year	Month	Date	Survey Category	Number of Transects Surveyed	Transect Length (km)	Transect Width (km)	Total Transect Area (km^2)	Total Number of Caribou Observed (on transect)	Estimated Caribou Density ($ind./km^2$)
	July	20	Post-calving	26	30	1	674.5	1	0
2001	May	23	Spring Migration	23[1]	30	1	584.5	80	0.14
	June	9	Calving	23[2]	30	1	652.5	461	0.71
2002	June	8, 9	Calving	26	30	1	674.5	469	0.7
2003	June	8, 9, 10	Calving	26	30	1	674.5	42	0.06
2004	June	11	Calving	26	30	1	674.5	86	0.13
2005	June	26, 27, 29	Post-calving	26	30	1	674.5	63	0.09
	Aug	10	Summer/Fall	26	30	1	674.5	50	0.07
2006	June	14	Calving	10	60	1	600	14	0.02
	July	6	Post-calving	10	60	1	600	1	0
2007	June	17	Calving	10	60	1	600	40	0.07
	June	29	Post-calving	10	60	1	600	27	0.05
	Aug	3	Summer/Fall	10	60	1	600	0	0
2008	May	15, 16	Spring Migration	10	60	1	600	46[3]	0.08
	June	29	Post-calving	10	60	1	600	12	0.02
	July	6	Post-calving	10	60	1	600	11	0.02
	Sept	15, 16	Summer/Fall	10	60	1	600	44	0.07
2009	June	8, 9	Calving	12	60	1	720	3	0
2010	April	5, 6	Winter	16	60	1	960	209	0.22
	May	11	Spring Migration	16	60	1	960	118	0.12
	July	24, 25	Post-calving	16	60	1	845[4]	2	0
	Sept	13, 14	Summer/Fall	16	60	1	845[4]	4	0
2011	April	18, 19	Spring Migration	16	60	1	960	124	0.13
	May	21, 22	Spring Migration	16	60	1	960	6	0.01
	July	9, 10	Post-calving	16	60	1	845[4]	1	0
	Aug	15, 16	Summer/Fall	16	60	1	845[4]	4	0

[1] *The three southern transects were omitted*

[2] *The three northern transects were omitted*

[3] *Caribou were only counted for 7 of the 15 groups observed. For analytical purposes, uncounted groups were assumed to have 1 caribou each.*

[4] *Northern transects were not flown over open water.*

Results

A total of 18 caribou and 114 caribou tracks were observed on the sea ice during aerial surveys during spring migration (June 3 to 5, 2010) of Dolphin and Union caribou (Rescan 2011g)). One group of 13 bull caribou were observed off-transect and five bull caribou were incidentally observed during travel to and from Doris Site (Figure 9.2-14). Of the 114 caribou tracks observed, the majority were documented along the shoreline of northern Melville Sound (Figure 9.2-14). In several areas, caribou tracks were grouped together, suggesting that larger groups of caribou (~5-10 individuals) were travelling together. Generally, caribou tracks were oriented in a northerly direction and followed shorelines of the Kent Peninsula (Figure 9.2-14).

A total of 10 caribou and 17 groups of trails were observed during the May 22, 2011 caribou survey (Figure 9.2-14) (Rescan 2011g). The majority of observations were recorded west of Roberts Bay and toward the western extent of the survey area. Caribou were observed using a group of small islands to cross to the Kent Peninsula. The annual movement patterns of Dolphin and Union caribou vary between sexes. Cows generally start their northward migration in May; the median migration initiation date of female caribou based on a decade of satellite collar data was May 24 (Poole et al. 2010). Females generally take less than five days to complete the northward trip (Poole et al. 2010). Males and juveniles tend to be the last members of the herd to travel to Victoria Island, crossing well into June (Gunn et al. 1997). This pattern agrees with the results of the ice crossing survey, since only male caribou were observed crossing in late May. It is likely by the time of the survey that most female caribou had crossed and were on their calving grounds on Victoria Island.

The results of the ice crossing surveys agree with historical and current movement patterns of Dolphin and Union caribou. The majority of caribou tracks documented during the ice crossing surveys were oriented in a north or north-westerly direction, suggestive of caribou that pass from the northern edge of the Kent Peninsula towards Byron Bay on Victoria Island.

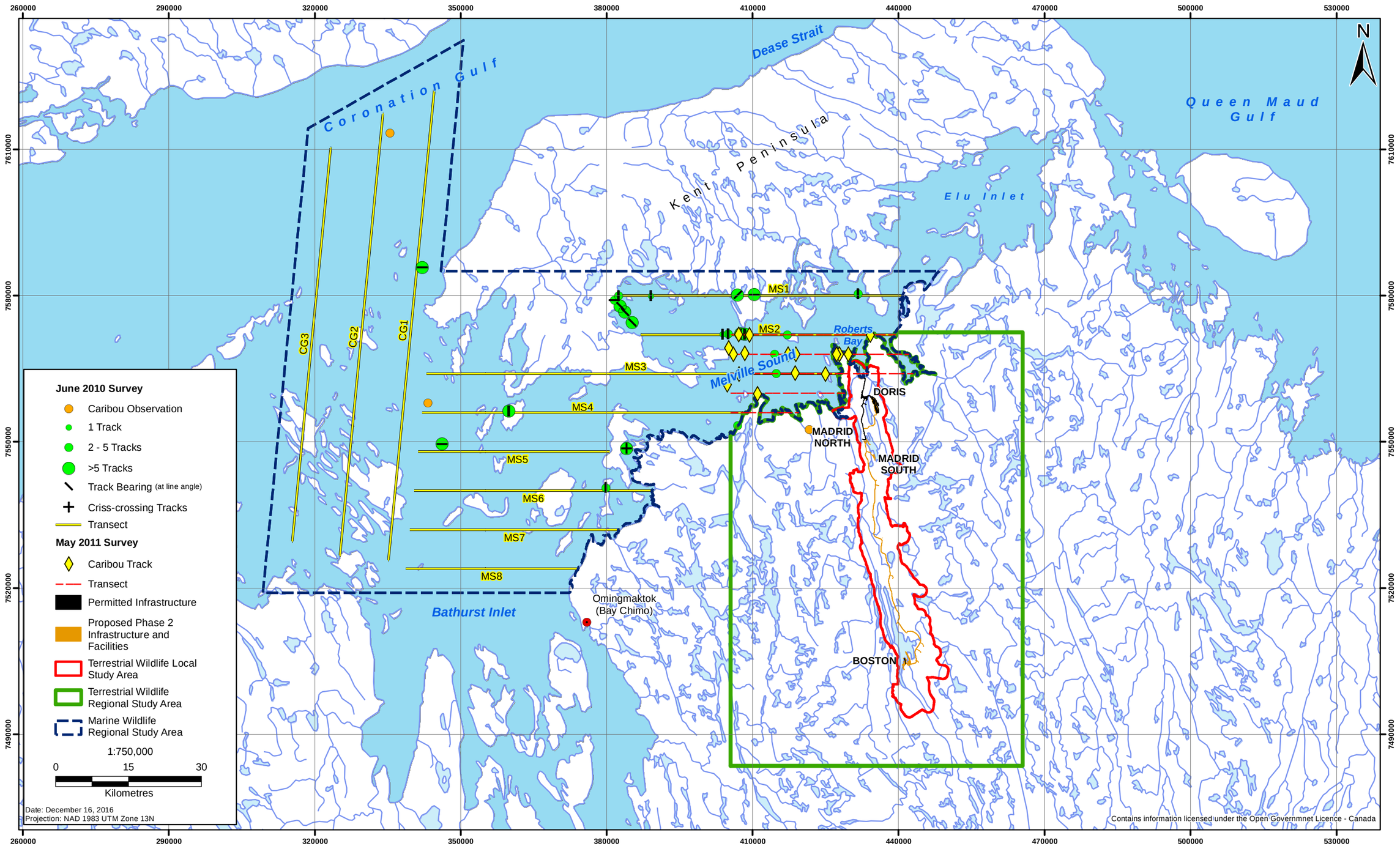
Dolphin and Union caribou exhibit fidelity to crossing areas to move across Dease Strait from the Kent Peninsula and for movement across Coronation Gulf and Queen Maud Gulf. Based on 20 years of satellite collar data, groups of female caribou begin ice crossing from the same general area on the Arctic mainland for 5 or 6 years, consecutively (Poole et al. 2010). Several areas east and west of Bathurst Inlet appear to be used consistently across years. West of Bathurst Inlet, many female caribou started their northward migration near Grays Bay and proceed northwards towards the Richardson Islands (Poole et al. 2010). East of Bathurst Inlet, several females consistently started their northward migration from the edge of the Kent Peninsula and crossed eastward towards Cape Colborne just south of Cambridge Bay and roughly northward towards Byron Bay (Poole et al. 2010). This crossing location is consistent with Inuit TK on crossing locations (Banci and Spicker 2016). The annual fidelity may be an artefact of the shortest possible “over ice” crossing distance, for example, island chains shorten the ice crossing distance west of Bathurst Inlet (e.g., Richardson Islands)..

Camera Monitoring

Methods

In 2012, a passive wildlife monitoring program was initiated using motion-triggered cameras and has continued to collect data to present. The camera program focused primarily on the northern portion of the Hope Bay Belt, as a part of monitoring for the Doris Project. Cameras were placed near to the Doris Project site (“on-site” cameras), and > 1 km from the Doris Project (“off-site” cameras). Data from September 2012 to August 2015 were used in this report to characterize existing caribou use of the northern portion of the Belt, including seasonal and spatial use patterns, and usage differences associated with the existing Doris Project.

Figure 9.2-14
Observations of Caribou and Tracks Recorded during Aerial Surveys, June 2010 and May 2011



Remote digital cameras are a reliable method for examining ungulate migratory timing and habitat associations given the landscape's short vegetation and features such as eskers and river crossings that direct caribou movement through the landscape (Cutler and Swann 1999; Noel et al. 2006). Motion triggered cameras can also be used to monitor activities at important wildlife habitat features such as road crossing areas for caribou and at camps and infrastructure.

For the purposes of the EIS, off-site camera data were used to characterize caribou activity in the RSA, with the objective of 1) evaluating caribou use of high value areas identified by TK, and 2) characterize activity of Dolphin and Union caribou in the marine RSA (Volume 5, Section 11) during winter. A comparison to on-site camera data was also made between off-site and on-site cameras to evaluate the existing influence of the Doris Project.

Off-site cameras were placed in areas of likely caribou movement (lake shores and existing caribou trails), areas of high value to caribou (such as eskers and probable crossing locations on rivers), and adjacent to the sea ice at potential crossing points in Roberts Bay, Ida Bay, and Hope Bay.

On-site cameras were deployed in key areas within 1 km of current infrastructure and on infrastructure around the Doris site. On-site cameras were placed sites with similar features to off-site cameras and/or specific locations such as camps, waste management facilities and road crossings to examine caribou use of these areas. The number of cameras deployed varied by year and season due to logistical reasons (Table 9.2-8; Figure 9.2-3).

Observations of caribou (and other wildlife) on motion-triggered photographs were recorded and termed "an event" where the triggers were separated by 30 minutes. Results were summarized for each species for summer (May – August) and winter (September – April) (Table 9.2-8). Further details on the rational for camera placement, image retrieval, and data analysis are described in the annual WMMP reports from 2012 to 2015 for the Doris Project (ERM Rescan 2014a; ERM 2015b, 2016a).

Table 9.2-8. Number of Remote Cameras On-site/Off-site during Each Survey Period and for Each On-site/Off-site for 2012 to 2015

Survey Period	Dates	No. Days	Camera Location	No. Cameras
Winter 2012/2013	September 12, 2012 to June 21, 2013	269	On-site - Within 1 km of Existing Infrastructure	30
			Off-site - Greater than 1 km from Existing Infrastructure	14
			All Cameras	**44**
Summer 2013	June 22, 2013 to September 28, 2013	98	On-site - Within 1 km of Existing Infrastructure	25
			Off-site - Greater than 1 km from Existing Infrastructure	33
			All Cameras	**58**
Winter 2013/2014	September 29, 2013 to May 31, 2014	244	On-site - Within 1 km of Existing Infrastructure	25
			Off-site - Greater than 1 km from Existing Infrastructure	34
			All Cameras	**59**
Summer 2014	June 1, 2014 to August 22, 2014	82	On-site - Within 1 km of Existing Infrastructure	25
			Off-site - Greater than 1 km from Existing Infrastructure	31
			All Cameras	**56**
Winter 2014/2015	August 23, 2014 to May 22, 2015	272	On-site - Within 1 km of Existing Infrastructure	25
			Off-site - Greater than 1 km from Existing Infrastructure	32
			All Cameras	**57**

Survey Period	Dates	No. Days	Camera Location	No. Cameras
Summer 2015:	May 23, 2015 to August 7, 2015	76	On-site - Within 1 km of Existing Infrastructure	27
			Off-site - Greater than 1 km from Existing Infrastructure	30
			All Cameras	**57**

Results

A total of 44 to 59 cameras were deployed in the RSA between 2012 and 2015 and recorded caribou over a total period of 1,041 days. In general, caribou events on photos from motion-triggered cameras were rare, with a total of 135 events recorded during those 1,041 days (Table 9.2-9). Most events were of a single individual (124 events, 92%), with a few pairs (9 events, 7%) and groups of 5 to 6 individuals (2 events, 1%). This equates to an average of 0.0026 caribou events per camera per day.

Table 9.2-9. Caribou Detection Summary across All Cameras, September 2012 to August 2015

Survey Period	Camera Location	No. Events	No. Events/camera/day	Total No. Ind. Recorded On Events1
Winter 2012/2013	On-site	0	0	0
	Off-site	5	0.0013	6
	All Cameras	**5**	**0.0004**	**6**
Summer 2013	On-site	27	0.0110	29
	Off-site	39	0.0121	40
	All Cameras	**66**	**0.0116**	**69**
Winter 2013/2014	On-site	0	0	0
	Off-site	0	0	0
	All Cameras	**0**	**0**	**0**
Summer 2014	On-site	17	0.0083	20
	Off-site	21	0.0083	21
	All Cameras	**38**	**0.0083**	**41**
Winter 2014/2015	On-site	0	0	0
	Off-site	4	0.0005	15
	All Cameras	**4**	**0.0003**	**15**
Summer 2015	On-site	12	0.0058	12
	Off-site	10	0.0044	10
	All Cameras	**22**	**0.0051**	**22**

[1] Does not represent total number of individuals recorded across all events, as multiple events can be of the same individual utilizing the area surrounding the remote camera.

These results indicate that the Hope Bay Project RSA is not heavily used by caribou. In comparison, cameras placed in the post-calving range of the Bathurst caribou in 2013, north of Contwoyto Lake recorded 5,300 caribou on 30 cameras in 34 days, for an average of 5.19 caribou events per camera per day; approximately 2,000 times the capture rate in the Hope Bay Project RSA (Sabina 2015a).

Seasonal Differences

Camera data collected were partitioned into "summer" and "winter" time periods to evaluate seasonal differences (Table 9.2-8). From 2012 to 2015, the number of caribou events detected by motion-triggered camera was greater during the summer period (0.0083 ± 0.0019 events/camera/day) relative to the winter period (0.0002 ± 0.0001 events/camera/day). The greatest number of caribou events were recorded during the summer of 2013 (Table 9.2-9). During the summer periods of 2013, 2014, and 2015 a total of 0.0116 events/camera/day (66 events), 0.0083 events/camera/day (38 events), 0.0051 events/camera/day (21 events) were recorded, respectively (Figures 9.2-15 and 9.2-16; Table 9.2-9). In contrast, the number of caribou events/camera/day during the "winter" period was 0.0004 (5 events) "winter" period of 2012/2013 and 0.0003 (4 events) during the "winter" period of 2014/2015; no events were recorded during the 2013/2014 "winter" period (Figures 9.2-15 and 9.2-16, Table 9.2-9).

Caribou events recorded during the summer periods, which were the majority of events (125 of 161 events), are likely Beverly/Ahiak caribou. Caribou were recorded in summer between June 20 and September 4, which corresponds to the post-calving, summer, and fall periods for Beverly caribou. Beverly caribou are expected to be south of the Hope Bay Project from November through early May, and pass to the east of the Hope Bay Project on their spring migration to the calving grounds in the Queen Maud Gulf.

Dolphin and Union caribou are expected to be on Victoria Island from June through September, based on the satellite collaring data from 1999 and 2004, and knowledge of the distribution and movements of this herd. Events recorded during the winter periods from 2012 to 2015 (9 events) were recorded from November 19 to May 27, which corresponds with fall migration, winter, and spring migration time periods for Dolphin and Union caribou.

Coastal Monitoring

Ten cameras were located on the land/sea-ice boundary, and were evaluated for evidence Dolphin and Union caribou crossing onto the ice at these locations. These cameras were located along the Hope Bay, Roberts Bay, and Reference (Ida) Bay shorelines (Cameras 6b, 9a, 10a, 17a, 23b, 55a, 56a, 57a, 59a, and 60a). Two of the cameras (9a and 10a) captured events in fall and spring, during migration periods (Figure 9.2-15). At Camera 9a, one event was recorded on April 11 and 13, 2013; each event consisted of a detection of a single individual. At Camera 10a, one event consisting of a detection of six individuals was on May 12, 2015. These events confirm that Dolphin and Union caribou do make on-off ice crossings near the Hope Bay Project.

Incidental Observations

Methods

Incidental observations of wildlife were recorded by Hope Bay Belt personnel during normal activities and by environmental personnel and contractors while conducting environmental monitoring work. Incidental data are useful for documenting which species are present in the area, timing of migrations (caribou, various bird species), information on group sizes, emergence from hibernation (grizzly bears), and calving (muskox, caribou). However, minimal information on density or abundance can be gleaned from this type of data, as it is highly influenced by observer reporting biases such as work activity and locations, preferential and multiple reporting of large mammals/novel occurrences, and visibility.

Incidental observations can include actual observations of wildlife, wildlife sign, including tracks, excrement, body parts (antlers, fur), bones, residences (e.g., dens, nests), or signs of activity (e.g., grizzly bear digging). However, for the purposed of the EIS, only observations of animals were

considered. Incidental observations were reviewed to ensure that only observations collected within the RSA were included.

Incidental observations of caribou were recorded between 2006 and 2015, when:

1. observed by personnel near the Doris Project site and recorded in the wildlife sighting log; and
2. observed incidentally by wildlife biologists and environmental personnel when conducting baseline and monitoring programs.

Incidental observations at the Doris Project were summarized monthly as observations per person on site. Although this provides some level of standardization, densities and abundance inferences remain heavily influenced by other observer biases such as those mentioned above and any inferences made must be viewed with caution. Incidental observations by environmental personnel were summarized annually because of the high variability in the number of environmental personnel on site and their much higher per-capita reporting rate; which is largely a product of specific work activities and experience (e.g. many incidental sightings are recorded during a single caribou aerial survey or point count survey).

Results

Incidental Observations of Caribou by Site Personnel

Personnel recorded incidental observations of caribou in all months except January and October from 2009 to 2015 (Table 9.2-10). The number of caribou recorded varied both annually and seasonally (Table 9.2-10) and ranged from 1 animal (March & June of 2010 and August of 2012) up to approximately 148 animals (May, 2010). Caribou were generally recorded as being in small groups of 1 – 10 individuals (102 of 125 records where group size specified; 81%), with only 23 observations of groups over 10 individuals, and the largest observed group size of 100 individuals.

After correcting for the number of personnel on site, there are peaks in the observations/person of caribou in spring (April and May) in all years and recent peaks (2014 and 2015) during the fall (November and December) which likely correspond to movement migrations of Dolphin and Union caribou past the Doris site. Summer observations of caribou are likely Beverly/Ahiak caribou.

Incidental Observations of Caribou by Field Personnel

Incidental observations of wildlife recorded by field personnel including wildlife biologists and other environmental personnel conducting studies within the RSA indicate that caribou have been observed incidentally in the RSA at low densities during all years and all months from 2006 to 2015 (Golder 2007, 2008a, 2009; Rescan 2010, 2011c, 2011f, 2013e; ERM Rescan 2014a; ERM 2015b, 2016a) .

Habitat Suitability Modeling

Methods

Habitat suitability models provide a means of identifying the spatial extent and distribution of habitats across the landscape. Habitat suitability mapping was conducted for the RSA using West Kitikmeot / Slave Study (WKSS) ecosystem mapping to identify vegetation groups. Additional detailed mapping was conducted in the Local Study Area (LSA) surrounding the Hope Bay Project footprint using ecosystem mapping conducted for the Hope Bay Project using aerial photographs.

Figure 9.2-15
Caribou Detected on Cameras Located in the Northern Portion of the Regional Study Area, 2012 to 2015