

**1. Project Number: NWRT # xxxxxxxx**

**2. Project Title: Foxe Basin Polar Bear Study - Polar Bear Movements, Habitat Selection, Population Delineation & Inuit Qaujimajatuqangnit**

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### **PROJECT PERSONNEL**

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### **3. SUMMARY (available in Inuktitut translation)**

This report summarizes progress on the Foxe Basin (FB) Polar Bear Project from November 2009 – November 2010. The 2010 field work consisted of searching for active and failed satellite collars using airborne (helicopter) VHF telemetry during the fall aerial population survey. Two female polar bears were captured and collars removed. Two other female polar bears with collars were observed but not captured, their collars continue to transmit.

A summary of the 2009-2010 polar bear movement data is presented, including, rate of movement, distance travelled, home range size and maps of movement paths. As in previous years, the satellite collared polar bears moved throughout Foxe Basin, Hudson Strait and central and northern Hudson Bay. Early breakup forced Hudson Bay and Hudson Strait bears ashore earlier than in previous years. A consolidation and analysis of all movement data from 2007-2010 will be completed in 2011.

The trends in available habitat analysis is complete and publication undergoing final revisions. Significant losses of preferred polar bear habitat were found in Foxe Basin, Hudson Strait and Hudson, particularly during freezeup, spring and breakup. The habitat selection analyses and modelling (coarse and fine scale) are in progress and will be completed in 2011.

Foxe Basin population delineation analysis is schedule for 2011-12.

Further Inuit Qaujimajituqangnit (IQ) research in FB communities will occur early in 2011.

#### 4. PROJECT OBJECTIVES & STATUS

- I. **Polar Bear Movements.** To collect information on the annual movements of Foxe Basin polar bears (2007-2011).
  - a. Deploy GPS satellite collars on female polar bears with cubs and satellite ear tags on male polar bears in 2007, 2008 and 2009 to collect movement information.

*STATUS:* all satellite collars and satellite ear tags deployed as per schedule. Location data cleaned and archived to November 2010. Map reports provided in spring, summer and winter to GN-DOE and FB HTOs. Annual data summaries provided to GN-DOE. Movement data will be consolidated and a summary report completed in 2011.
- II. **Foxe Basin Population Delineation.** To geographically delineate the Foxe Basin polar bear population (2007 - 2013).
  - a. Use movement information collected using GPS satellite telemetry to delineate the Foxe Basin polar bear population.

*STATUS:* six satellite collars continue to transmit and provide movement data. Data archive to be updated. Analysis scheduled for 2011-12. Final report 2013.
- III. **Habitat Ecology.** To investigate sea ice habitat selection of Foxe Basin polar bears (2007 – 2012).
  - a. Use movement information and sea ice imagery/maps to study polar bear sea ice habitat selection.

*STATUS:* Historic sea ice habitat availability analysis complete and publication complete. Habitat selection analyses and modelling in progress with anticipated completion in 2011.
- IV. **Inuit Qaujimajatuqangit.** To collect IQ of polar bear distribution, behaviour and habitat use (2007 – 2012).
  - a. Use IQ to develop habitat selection models
  - b. Use IQ to interpret polar bear behaviour and movements.

*STATUS:* First set of interviews complete. Verification and 2<sup>nd</sup> set of interviews scheduled for February-March 2011. Data analysis, model building and reports to be completed in 2011 and 2012.

#### 5. MATERIALS AND METHODS

No changes to report, as per previous NWMB reports.

#### 6. PROJECT SCHEDULE

No changes to report. See status in Objectives.

## 7. PRELIMINARY RESULTS

### 1. Polar Bear Movements

We report on polar bear movements for the time period August 2009 to September 2010. Throughout, we defined the seasons as follows: open-water (August – October), freeze-up (November – December), winter (January – March), spring (April-May) and break-up (June-July). All seasons but spring reflect sea ice phenology; spring is the main ringed seal pupping season. The 2009 satellite collar and ear tag deployment effort was reported on in the 2009 Foxe Basin Polar Bear Study Report (Peacock et al. 2009). Further analyses of all movement data collected from 2007-2010 will be completed in 2011. These analyses will be included in V. Sahanatien's Ph.D. dissertation and a publication prepared.

#### *Satellite Collars*

As of November 2010 seven satellite collars continued to transmit. The status of the balance of deployed collars: two collars were removed (September 2010), three collars slipped off (one was retrieved in March 2010 by GN DOE Igloodik field staff), and thirteen collars failed (Table 1). The two removed collars were collected using standard helicopter field capture protocols in September 2010 during the FB aerial population survey. One Gen IV satellite collar (CTN 618542A) that was deployed in 2008 continued to transmit into its 2<sup>nd</sup> year as programmed and failed in March 2010. Despite the collar failures, almost a full year of data was obtained for twelve bears.

It is not known if there technical problems with the automatic release (CR2-A) mechanism in 2010. It is possible that the collar failures were caused by the collars prematurely releasing into the ocean. It is also possible that the failures resulted from damaged antennae or GPS failure. The one collar (CTN 618540B) retrieved by snowmobile had been removed by the bear (slipped over her head), as the attachment was intact. Two collared polar bears with collars were observed during the aerial survey and their collars continue to transmit. The failed collars were searched for using VHF telemetry from a helicopter during the 2010 fall aerial population survey but no failed collars were found.

#### *Adult female Polar Bear Home Range*

Annual and seasonal home ranges were calculated using the Hawth's Tool minimum convex polygon method in ArcMap 9.3.1©.

Annual home ranges (2009 – 2010) for collared FB adult female polar bears with at least four seasons (open-water, freeze-up, winter, spring) of data ( $n = 16$ ) ranged from 22,529 – 255,684 km<sup>2</sup> (Figure 1, Table 2). The mean annual home range size was 101,660 km<sup>2</sup> (Table 3) and similar to 2008\_09 but less than 2007\_08 (Figure 2). The open-water home range size was smallest (6,781 km<sup>2</sup>) and freeze-up largest (28,363 km<sup>2</sup>). The seasonal home range size patterns were similar to those observed in 2007-08 and 2008-09

(Peacock et al 2008, 2009). Differences and similarities between years will be explored in the final FB polar bear movements report.

#### *Female Polar Bear Movements*

We calculated movement distances using the Hawth's Tool movement parameters method in ArcMap 9.3.1©. Movement rates were calculated by dividing the distance (km) moved by the intervening time (hr) between locations.

The monthly rates of travel were highest in December, June and July and lowest in August, September and October (Table 4). Generally rate of travel and distance travelled are positively correlated, the contrary values are likely a reflection of the large variation of individual movement rates and distances. The mean seasonal movement rates were highest during breakup and lowest during the open water season (Table 5).

The monthly distances travelled were individual and variable (Table 6). The greatest mean monthly distances travelled were in April, May and June, and least in August, September and October (Table 7). Long distance overland movements occurred during the open water seasons of 2009-2010 as the previous year. Bears 631694A and 631716A crossed the Melville Peninsula to Committee Bay, Bear 618540B moved up to the head of Steensby Inlet from Grant Suttie Bay, and Bears 631687A and 634586A moved from the Airforce Island area of central Baffin Island to Hudson Strait (Figures 4, 5 and 6). Long distance swimming events occurred in the open water and break-up seasons. Five bears swam between islands during the open water season. In early July, Bears 600661B and 631681A swam from the retreating ice edge of Hudson Bay to Southampton Island (~ 68 km) and to Coates Island (~125 km) respectively. We observed fidelity to summer home range in 8 bears. These bears returned to the island or mainland coast where they were captured then spent the remainder of the season nearby. Another 6 bears returned to the general region of capture.

As in 2007 – 2009, we observed movements from the Foxe Basin study area into adjacent polar bear subpopulations (management zones): 5 bears moved into Western Hudson Bay (WB) and returned to FB (Figures 3 and 6); 2 bears moved into Gulf of Boothia (GB) for a period of time and then returned to FB (Figures 3, 4 and 5); and 2 bears moved into Davis Strait (DS) and returned to FB (Figures 3 and 6).

#### 2. Foxe Basin Population Delineation

No results to report at this time. Analysis and reporting scheduled for 2011-13.

#### 3. Habitat Ecology

##### *Polar bear sea ice habitat trends (1979-2008) in Foxe Basin, Hudson Strait and Hudson Bay*

We completed the imagery update (1979 – 2008) and re-analyzed trends in available sea ice habitat. Three polar bear habitat trends were found in Foxe Basin, Hudson Strait and

Hudson Bay: 1) shorter duration of sea ice cover, 2) loss of preferred sea ice habitat during spring, break-up and freeze-up, and 3) increasing habitat fragmentation. These habitat trends will likely alter habitat use patterns and energetics for the polar bear subpopulations. We are currently completing revisions to the publication manuscript (Sahanatien and Derocher 2010, in prep.). The accepted manuscript will be provided to GN-DOE and included in V. Sahanatien's Ph.D. thesis.

#### *Sea ice habitat selection models*

We are currently working on the coarse and fine scale habitat analyses and modelling. Reports and manuscripts will be completed in 2011. All results will be included in V. Sahanatien's Ph.D. thesis.

#### 4. Inuit Qaujimajatuqangit

A Nunavut Wildlife Management Board NWSF Grant was awarded for this research component in May 2010. Follow-up meetings and interviews are scheduled for February-March 2011. Reports and publications will follow closely in 2011 and 2012.

### **8. REPORTING RESULTS: Conferences**

#### *Poster Presentations*

Sahanatien, V., Derocher, A.E., and Peacock, E. 2008. Polar bear movements in relation to sea ice structure, Foxe Basin, NU. ArcticNet – Arctic Change Conference, Quebec City.

Sahanatien, V. 2006. Incorporating Inuit knowledge in polar bear research. ArcticNet Annual Science Meeting. Victoria.

#### *Oral Presentations*

Sahanatien, V. 2007. Sea icescapes and polar bear habitat, Foxe Basin, Nunavut (1979-2004). October 2007: Association of Colleges and Universities Northern Studies (ACUNS), Saskatoon, SK.

Sahanatien, V., Derocher A.E. 2007. Sea icescapes and polar bear habitat, Foxe Basin Nunavut (1979-2004). Sixteenth International Bear Research and Management Conference, Monterrey, Mexico.

Sahanatien, V. 2008. Polar bear habitat fragmentation, sea icescapes and climate change. ACUNS – Annual General Meeting, Ottawa.

Sahanatien, V., Derocher, A.E., Peacock, E and Haas, C. 2009. SAR and Polar Bear Sea Ice Habitat. Marine Mammal Society 18<sup>th</sup> Biennial Conference, Quebec City.

Sahanatien, V., Peacock, E., and Derocher, A.E. 2009. Polar bear habitat in a seasonal sea ice ecozone. ACUNS – Communities of Change Conference, Whitehorse.

Sahanatien, V., Derocher, A.E. and Peacock, E. 2009. Beyond Maps and Stories: Wildlife habitat modeling using traditional ecological knowledge. 9<sup>th</sup> World Wilderness Congress, Merida, Mexico.

## **9. REPORTING TO COMMUNITIES/RESOURCE USERS**

Community consultation efforts were shared between the University of Alberta and the GN in 2007. In 2008 and 2009, the GN conducted consultations. In 2010, the field crew met with some HTOs during the aerial survey. Maps of polar bear movements (2007, 2008, 2009, 2010) and current interim reports and posters (FB Aerial survey, FB polar bear project, FB Inuit Knowledge Study) have been sent to all FB HTOs and Wildlife Secretariats. The most recent map report was completed in July 2010.

### *Planned Consultations (2011)*

February-March 2011 – FB HTOs – in person presentation of results

### *Completed Consultations*

- Repulse Bay
  - Hunters and Trappers Organization (February 2007, February 2008, February 2009, April 2009)
  - Grades 9-12
- Chesterfield Inlet
  - Hunters and Trappers Organization (February 2007, February 2008, April 2009)
- Coral Harbour
  - Hunters and Trappers Organization (April 2007, July 2007, February 2007, February 2008, April 2009)
  - Radio call-in show (February 2008)
  - Public Meeting (April 2009)
- Rankin Inlet
  - Hunter and Trappers Organization (February 2007, February 2008)
- Igloodik
  - Hunters and Trappers Organizations (May 2007, May 2008, November 2008, January 2009)
- Hall Beach
  - Hunters and Trappers Organizations (May 2007, May 2009)
- Cape Dorset
  - Hunters and Trappers Organizations (May 2007, March 2009, April 2009, August 2010)
- Kimmirut
  - Hunters and Trappers Organizations (May 2007, January 2009, May 2009, August 2009, August 2010)
  - Public meeting (January 2009)
- Baker Lake
  - Hunters and Trappers Organization (emailed and mailed information only in 2006, 2007 and 2008)
- Sila Lodge Co-Owners (July 2007)

- Ukkusiksalik Park Management Committee (December 2006, February 2007, January 2008); emailed reports 2009, 2010
- Qikiqtalluq Wildlife Board (November 2007, November 2008, November 2009)
- Kivalliq Inuit Association – Lands (February 2007, February 2008, February 2009)
- Nunavut Tunngavik Incorporated, Wildlife (February 2007, February 2008)
- Nunavut Wildlife Symposium (all HTOs, RWOs, NWMB and NTI attended), March 2009

Table 1. Status of Foxe Basin satellite collars deployed in 2009, November 2010.

| <i>CTN</i>           | <i>Status</i>                    | <i>Date Deployed</i> | <i>Date Last Transmission</i> |
|----------------------|----------------------------------|----------------------|-------------------------------|
| 618532B              | OK                               | 08 September 2009    |                               |
| 618535B              | OK                               | 27 September 2009    |                               |
| 618537B              | OK                               | 02 October 2009      |                               |
| 631681A              | OK                               | 24 September 2009    |                               |
| 631684A              | OK                               | 13 September 2009    |                               |
| 631692A              | OK                               | 14 September 2009    |                               |
| 631694A              | OK                               | 13 September 2009    |                               |
| 600661B <sup>1</sup> | Removed - helicopter             | 27 August 2009       | 14 September 2010             |
| 631682A              | Removed - helicopter             | 18 September 2009    | 21 September 2010             |
| 618540B              | Dropped & Retrieved - snowmobile | 07 September 2009    | 21 February 2010              |
| 618539B              | Dropped                          | 03 September 2009    | 03 April 2010                 |
| 634586A              | Dropped                          | 28 August 2009       | 11 January 2010               |
| 618529B              | Fail                             | 03 September 2009    | 21 June 2010                  |
| 618531B              | Fail                             | 02 September 2009    | 03 August 2010                |
| 618542A <sup>2</sup> | Fail                             | 15 August 2008       | 31 March 2010                 |
| 631643A              | Fail                             | 08 September 2009    | 05 September 2010             |
| 631687A              | Fail                             | 27 August 2009       | 25 August 2010                |
| 631688A              | Fail                             | 23 September 2009    | 26 September 2010             |
| 631691A              | Fail                             | 23 September 2009    | 20 March 2010                 |
| 631693A              | Fail                             | 07 September 2009    | 05 November 2009              |
| 631695A              | Fail                             | 23 August 2009       | 01 July 2010                  |
| 631696A              | Fail                             | 24 September 2009    | 09 November 2009              |
| 631716A              | Fail                             | 18 September 2009    | 15 March 2010                 |
| 631718A              | Fail                             | 26 September 2009    | 16 June 2010                  |
| 631720A              | Fail                             | 19 September 2009    | 06 October 2010               |

<sup>1</sup> Gen III satellite collar. <sup>2</sup> Gen IV satellite collar deployed in September 2008.



Table 2. Area (km<sup>2</sup>) of individual seasonal home ranges (MCP) of satellite collared female polar bears, Foxe Basin (2009-2010).

| CTN     | Open-water | Freeze-up | Winter | Spring | Break-up | Annual |
|---------|------------|-----------|--------|--------|----------|--------|
| 600661B | 647        | 55834     | 46224  | 16333  | 20995    | 91600  |
| 618532B | 144        | 26794     | 16062  | 7290   | 11685    | 56014  |
| 618535B | 227        | 25241     | 24866  | 56101  | 30717    | 127229 |
| 618537B | 1685       | 7228      | 3052   | 20855  | 15254    | 50030  |
| 631643A | 1443       | 8035      | 4124   | 10881  | 4470     | 22529  |
| 631682A | 383        | 67284     | 45660  | 30632  | 42545    | 255684 |
| 631684A | 1563       | 27895     | 16001  | 35178  | 24012    | 91571  |
| 631687A | 40317      | 3697      | 19157  | 3947   | 15668    | 107505 |
| 631692A | 464        | 13639     | 12741  | 12602  | 12929    | 42163  |
| 631694A | 11674      | 38802     | 5341   | 20219  | 14827    | 86341  |
| 631688A | 267        | 1615      | 5771   | 7992   | 46405    | 160894 |
| 618529B | 1101       | 24762     | 18107  | 17940  |          | 49694  |
| 631681A | 2548       | 26138     | 11488  | 25159  |          | 105501 |
| 631695A | 1141       | 39773     | 75599  | 24202  |          | 135081 |
| 631718A | 8284       | 66260     | 71161  | 37099  |          | 196446 |
| 631720A | 3995       | 20253     | 7138   | 12672  |          | 48279  |
| 618539B | 3221       | 1353      | 811    |        |          |        |
| 618540B | 3494       | 5872      | 441    |        |          |        |
| 618542A | 4699       | 12183     | 6370   |        |          |        |
| 618531B | 3473       | 124150    | 4942   |        |          |        |
| 631691A | 809        | 5552      | 22527  |        |          |        |
| 631716A | 35045      | 48140     | 7186   |        |          |        |
| 631693A | 4158       | 1853      |        |        |          |        |
| 631696A | 1238       |           |        |        |          |        |
| 634586A | 37514      |           |        |        |          |        |

Table 3. Mean area (km<sup>2</sup>) of seasonal home range (MPC) of satellite collared female polar bears, Foxe Basin 2009-2010.

|         | Open-water | Freeze-up | Winter | Spring | Break-up | Annual |
|---------|------------|-----------|--------|--------|----------|--------|
| Mean    | 6781       | 28363     | 19308  | 21194  | 21773    | 101660 |
| SE      | 2389       | 6084      | 4579   | 3375   | 3967     | 15622  |
| N       | 25         | 23        | 22     | 16     | 11       | 16     |
| Minimum | 144        | 1353      | 441    | 3947   | 4470     | 22529  |
| Maximum | 40317      | 124150    | 75599  | 56101  | 46405    | 255684 |

Table 4. Mean monthly movement rate (km/hr) of satellite collared female polar bears, Foxe Basin 2009-2010.

|         | September | October | November | December | January | February | March | April | May  | June | July | August | September |
|---------|-----------|---------|----------|----------|---------|----------|-------|-------|------|------|------|--------|-----------|
| Mean    | 0.27      | 0.45    | 1.05     | 1.21     | 1.12    | 1.10     | 1.13  | 1.19  | 1.43 | 1.51 | 1.91 | 0.69   | 0.12      |
| SE      | 0.04      | 0.06    | 0.12     | 0.12     | 0.11    | 0.10     | 0.09  | 0.10  | 0.13 | 0.20 | 0.21 | 0.19   | 0.04      |
| N       | 14        | 24      | 23       | 21       | 20      | 18       | 17    | 15    | 12   | 10   | 7    | 6      | 5         |
| Minimum | 0.02      | 0.16    | 0.13     | 0.31     | 0.09    | 0.37     | 0.57  | 0.69  | 0.83 | 0.84 | 1.49 | 0.09   | 0.03      |
| Maximum | 0.61      | 1.34    | 2.57     | 2.47     | 2.05    | 2.21     | 1.87  | 2.10  | 2.18 | 3.08 | 3.01 | 1.16   | 0.22      |

Table 5. Mean seasonal movement rate (km/hr) of satellite collared female polar bears, Foxe Basin 2009-2010.

|         | Open-water | Freeze-up | Winter | Spring | Break-up |
|---------|------------|-----------|--------|--------|----------|
| Mean    | 0.38       | 1.13      | 1.11   | 1.30   | 1.67     |
| SE      | 0.04       | 0.09      | 0.06   | 0.08   | 0.15     |
| N       | 38         | 44        | 56     | 27     | 17       |
| Minimum | 0.02       | 0.13      | 0.09   | 0.69   | 0.84     |
| Maximum | 1.34       | 2.57      | 2.21   | 2.18   | 3.08     |

Table 6. Monthly distances (km) moved by satellite collared female polar bears, Foxe Basin 2009-2010.

| CTN     | September | October | November | December | January | February | March | April | May  | June | July | August |
|---------|-----------|---------|----------|----------|---------|----------|-------|-------|------|------|------|--------|
| 618532B | 302       | 947     | 748      | 901      | 805     | 993      | 1180  | 1223  | 955  | 1005 | 375  | 17     |
| 631643A | 103       | 588     | 669      | 540      | 550     | 709      | 554   | 628   | 803  | 507  | 224  | 344    |
| 631687A | 249       | 418     | 409      | 573      | 779     | 612      | 548   | 407   | 419  | 550  | 134  | 117    |
| 618529B | 28        | 369     | 1171     | 1072     | 1369    | 1069     | 825   | 970   | 1189 | 902  |      |        |
| 631681A |           | 152     | 760      | 442      |         |          | 517   | 259   | 454  | 310  | 198  | 66     |
| 631682A |           | 172     | 566      | 927      | 701     | 529      | 572   | 635   | 604  | 576  | 623  | 448    |
| 631684A |           | 208     | 781      | 561      | 629     | 565      | 564   | 663   | 1247 | 1051 | 991  | 568    |
| 600661B |           | 173     | 751      | 773      | 828     | 391      | 710   | 587   | 389  | 415  | 144  | 22     |
| 618535B |           | 112     | 452      | 542      | 808     | 494      | 715   | 1107  | 1175 | 957  | 736  | 42     |
| 618537B |           | 280     | 495      | 395      | 207     | 442      | 789   | 920   | 1143 | 1641 | 1106 | 64     |
| 631692A |           | 70      | 446      | 599      | 683     | 534      | 502   | 536   | 558  | 558  | 442  | 138    |
| 631694A |           | 471     | 856      | 635      | 538     | 503      | 389   | 699   | 780  | 793  | 859  | 528    |
| 618542A |           | 88      | 248      | 821      | 1167    | 982      | 802   | 1283  |      |      |      |        |
| 631695A | 67        | 122     | 109      | 965      | 920     | 709      | 780   | 832   | 509  |      |      |        |
| 631718A |           | 174     | 867      | 926      | 855     | 678      | 590   | 738   | 640  |      |      |        |
| 631720A |           | 344     | 563      | 314      | 633     | 365      | 451   | 595   | 334  |      |      |        |
| 631688A |           | 131     | 158      | 345      | 144     | 126      | 354   | 703   |      |      |      |        |
| 618540B | 183       | 401     | 384      | 218      | 324     | 144      |       |       |      |      |      |        |
| 631691A |           | 279     | 255      | 528      | 661     | 482      | 649   |       |      |      |      |        |
| 631716A |           | 241     | 885      | 1178     | 888     | 504      |       |       |      |      |      |        |
| 618539B | 157       | 242     | 186      | 212      | 64      |          |       |       |      |      |      |        |
| 618531B | 88        | 519     | 1388     | 1150     |         |          |       |       |      |      |      |        |
| 634586A |           | 274     | 468      |          |         |          |       |       |      |      |      |        |
| 631693A | 195       | 515     |          |          |         |          |       |       |      |      |      |        |
| 631696A |           | 222     |          |          |         |          |       |       |      |      |      |        |

Table 7. Mean monthly distances (km) moved by satellite collared female polar bears, Foxe Basin 2009-2010.

|         | September | October | November | December | January | February | March | April | May  | June | July | August |
|---------|-----------|---------|----------|----------|---------|----------|-------|-------|------|------|------|--------|
| Mean    | 153       | 301     | 592      | 664      | 678     | 570      | 638   | 752   | 747  | 772  | 530  | 214    |
| SE      | 30        | 40      | 67       | 63       | 72      | 58       | 46    | 67    | 83   | 106  | 106  | 65     |
| N       | 9         | 25      | 23       | 22       | 20      | 19       | 18    | 17    | 15   | 12   | 11   | 11     |
| Minimum | 28        | 70      | 109      | 212      | 64      | 126      | 354   | 259   | 334  | 310  | 134  | 17     |
| Maximum | 302       | 947     | 1388     | 1178     | 1369    | 1069     | 1180  | 1283  | 1247 | 1641 | 1106 | 568    |

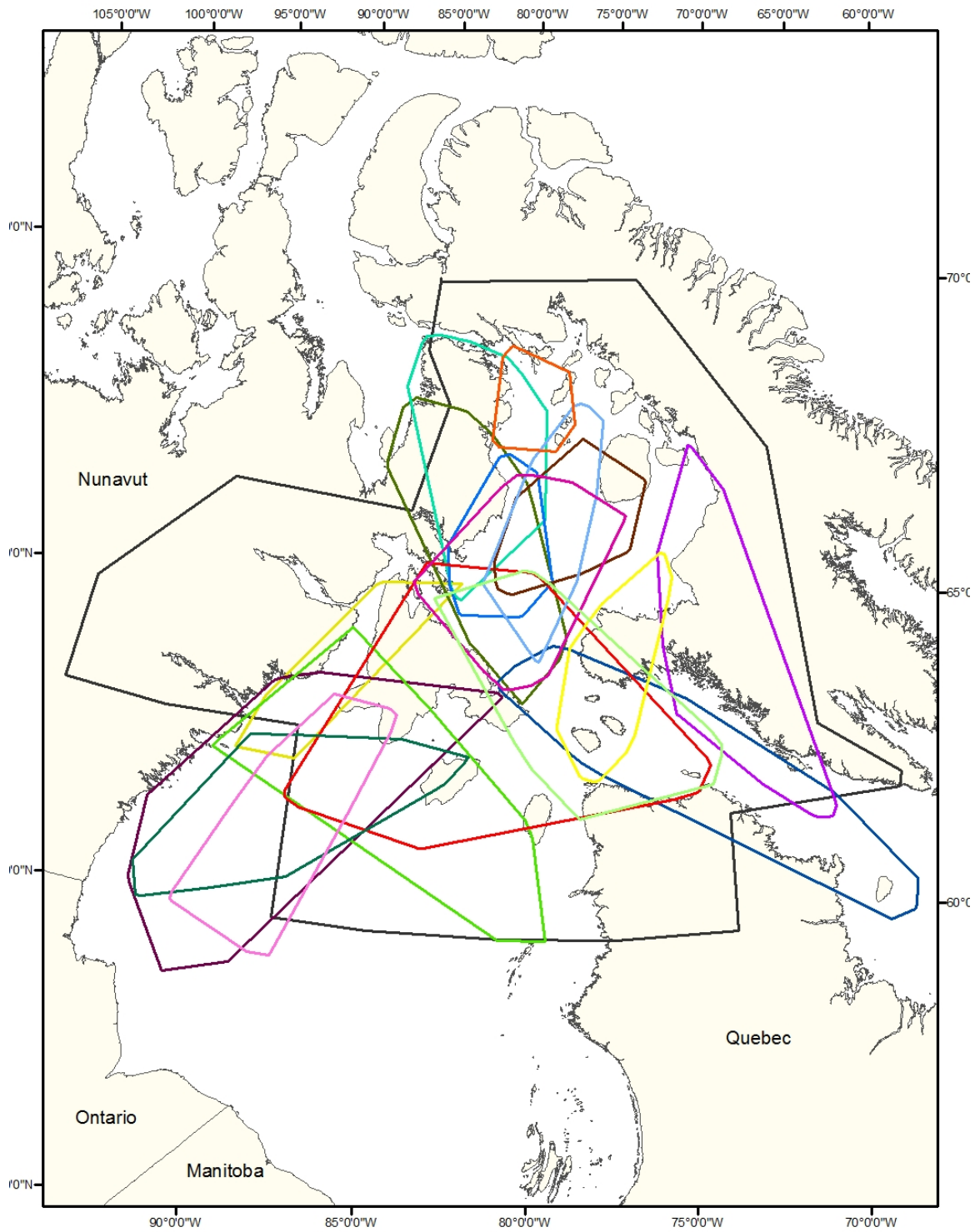


Figure 1. Annual home ranges (minimum convex polygon) of satellite collared female polar bears, Foxe Basin 2009-2010. Heavy black line shows the Foxe Basin management zone (subpopulation).

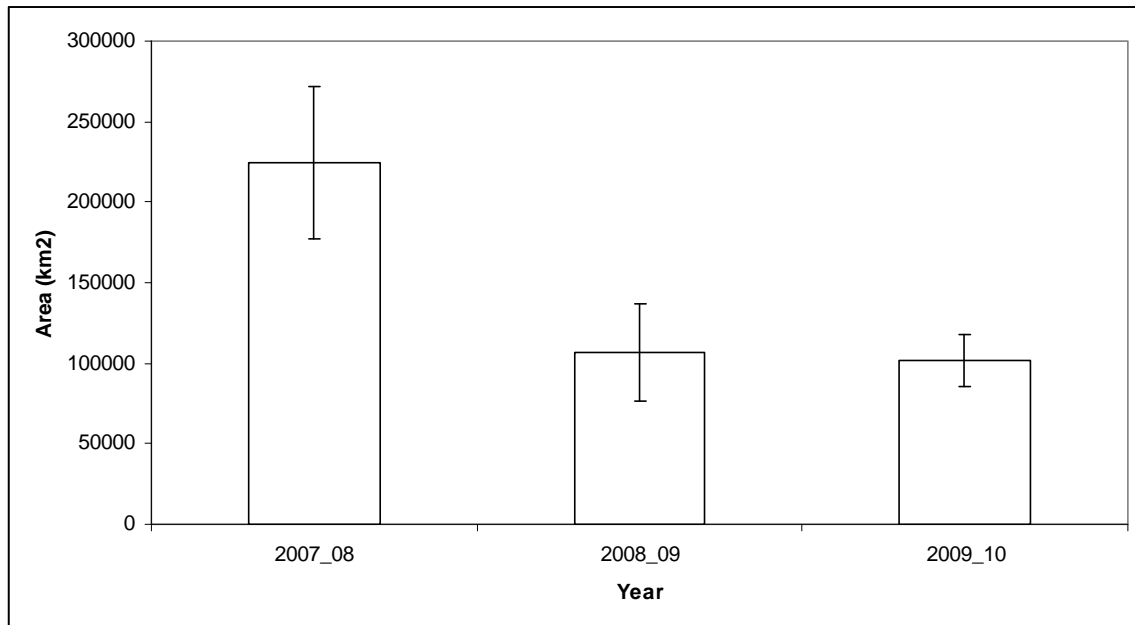


Figure 2. Minimum convex polygon annual home range size (km<sup>2</sup>) of satellite collared female polar bears, Foxe Basin (2007-2010).

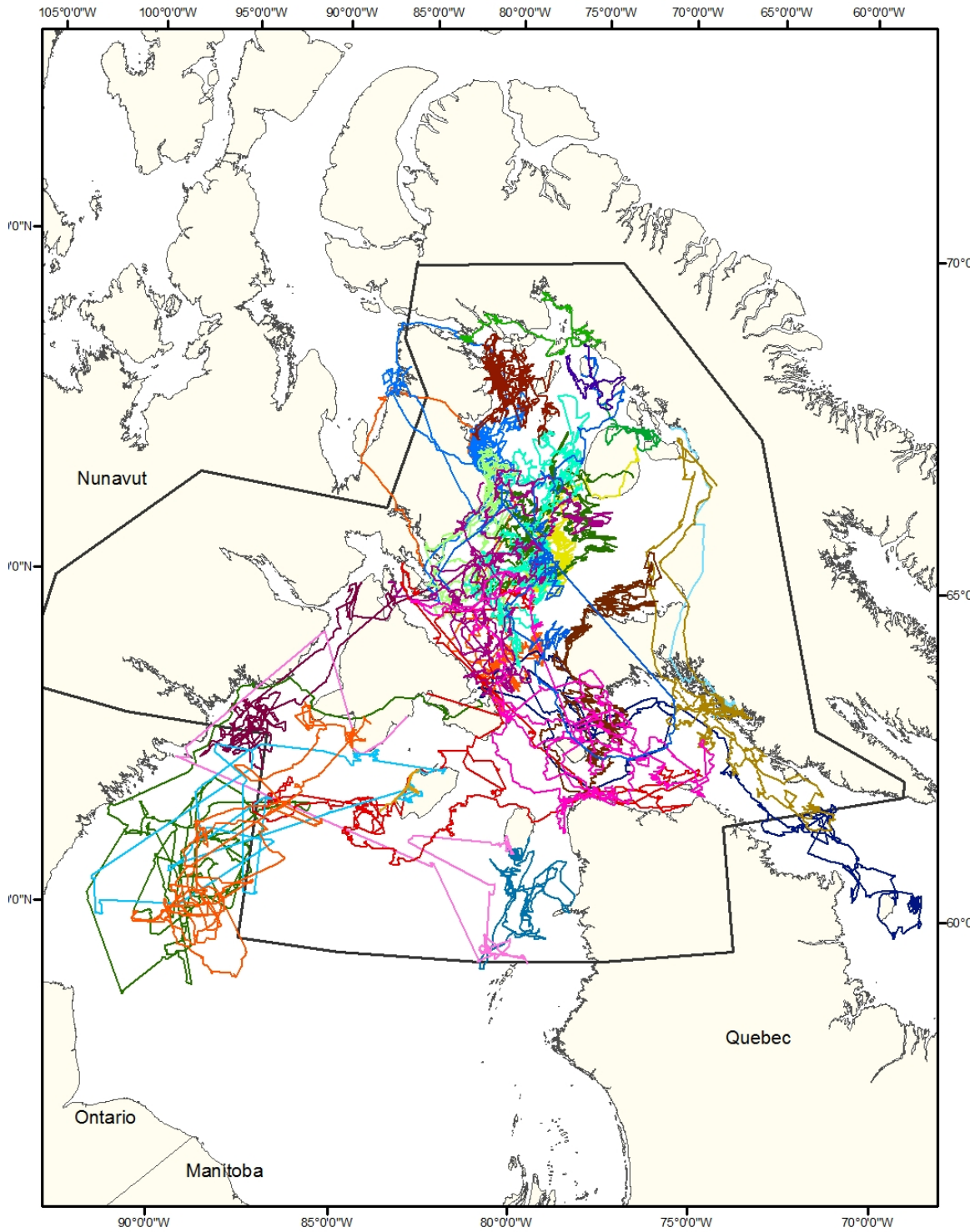


Figure 3. Annual movements of satellite collared female polar bears, Foxe Basin 2009-2010. Heavy black line shows the Foxe Basin management zone (subpopulation).

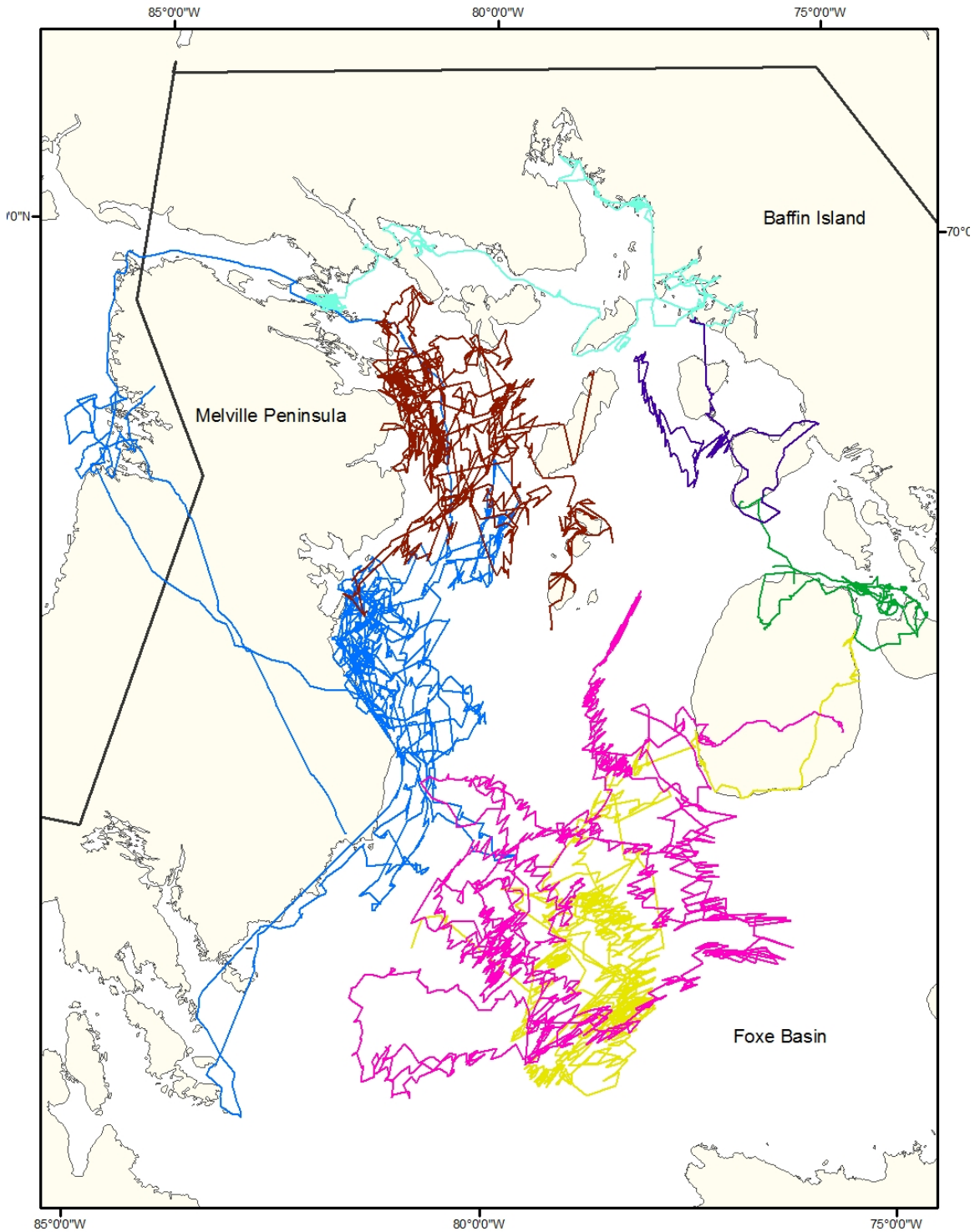


Figure 4. Annual movements of seven satellite collared female polar bears in northern Foxe Basin 2009-2010. Heavy black line shows the Foxe Basin management zone (subpopulation).



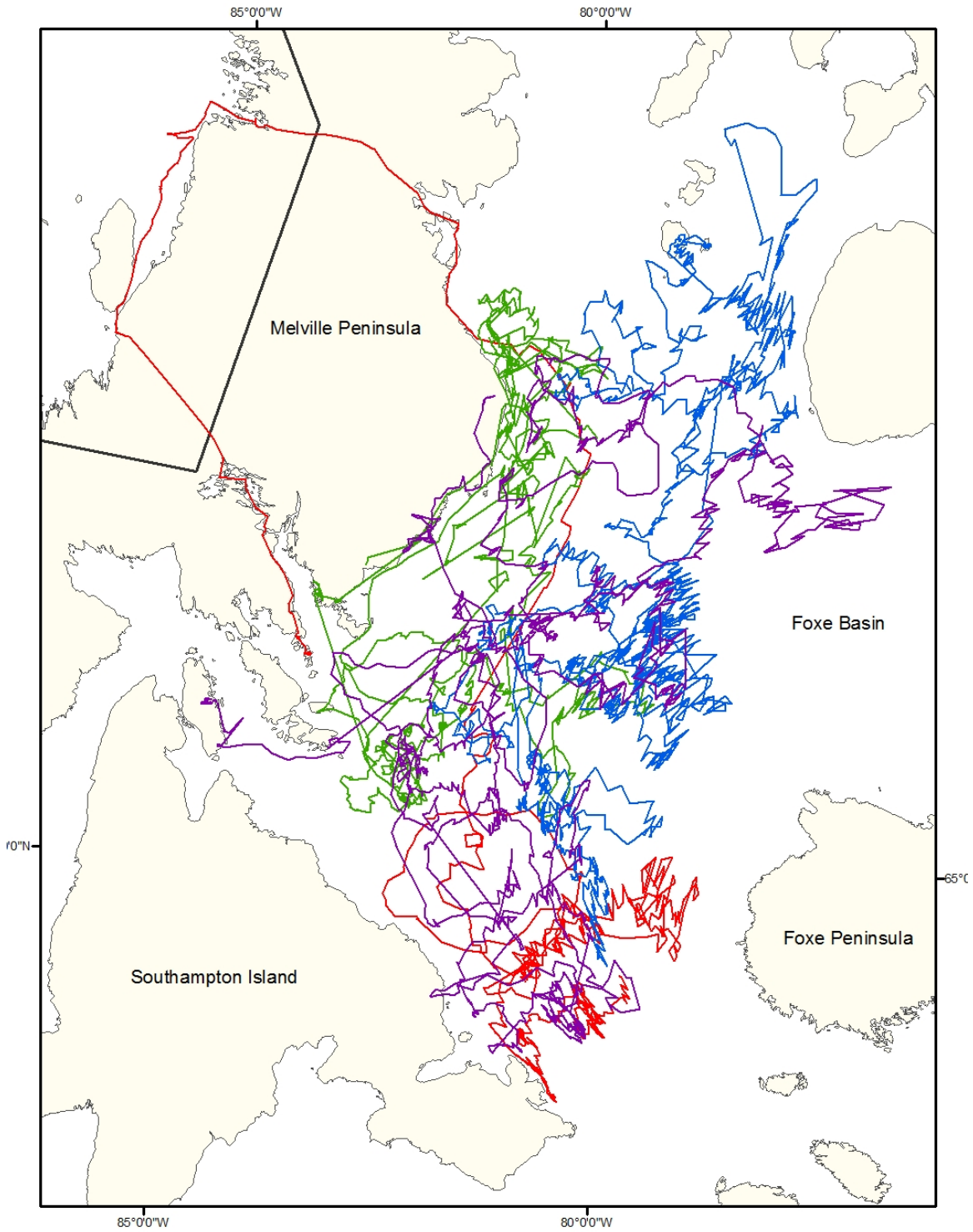


Figure 5. Annual movements of four satellite collared female polar bears in Foxe Basin 2009-2010. Heavy black line shows the Foxe Basin management zone (subpopulation).

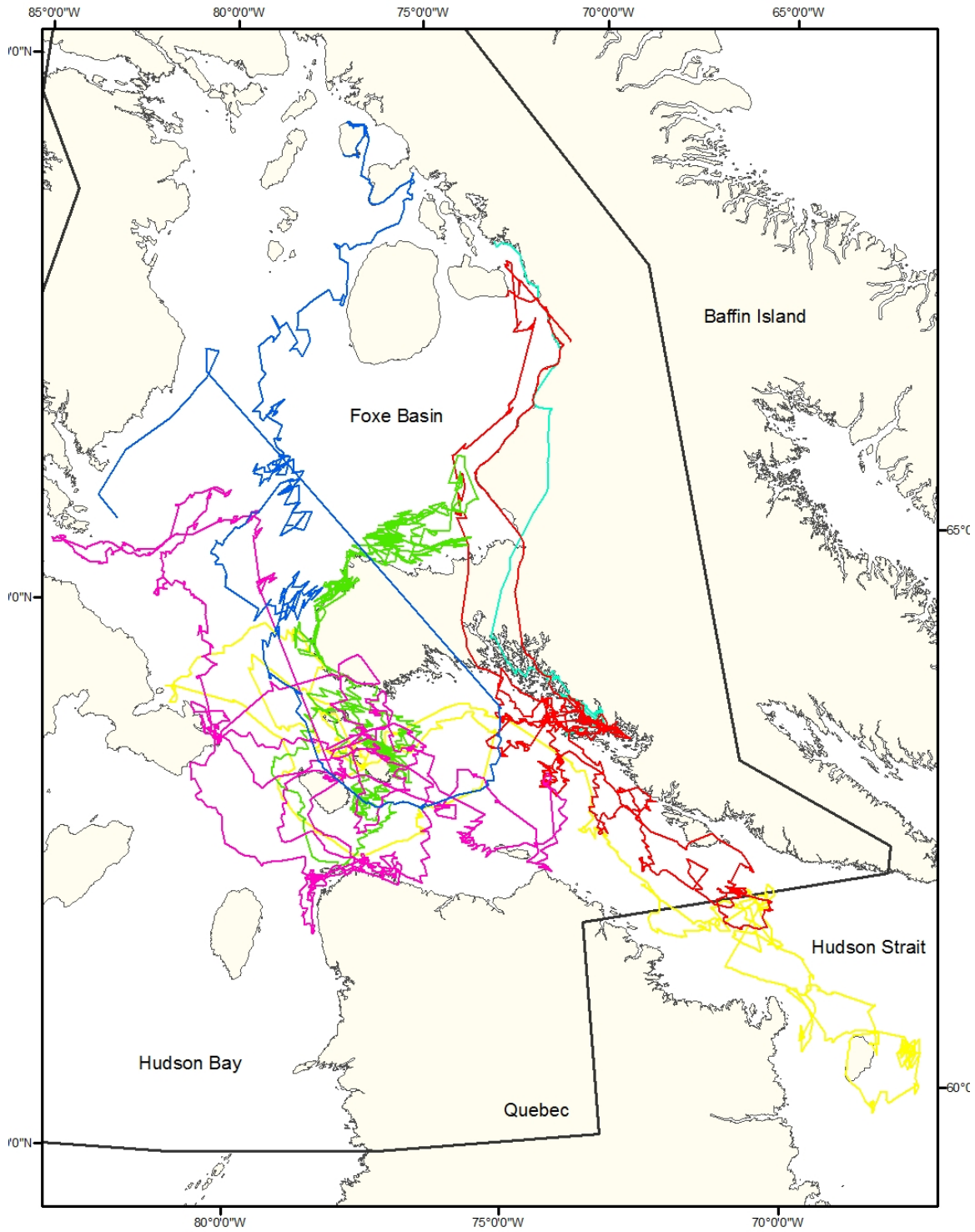


Figure 6. Annual movements of six satellite collared female polar bears in Foxe Basin and Hudson Strait, 2009-2010. Heavy black line shows the Foxe Basin management zone (subpopulation).

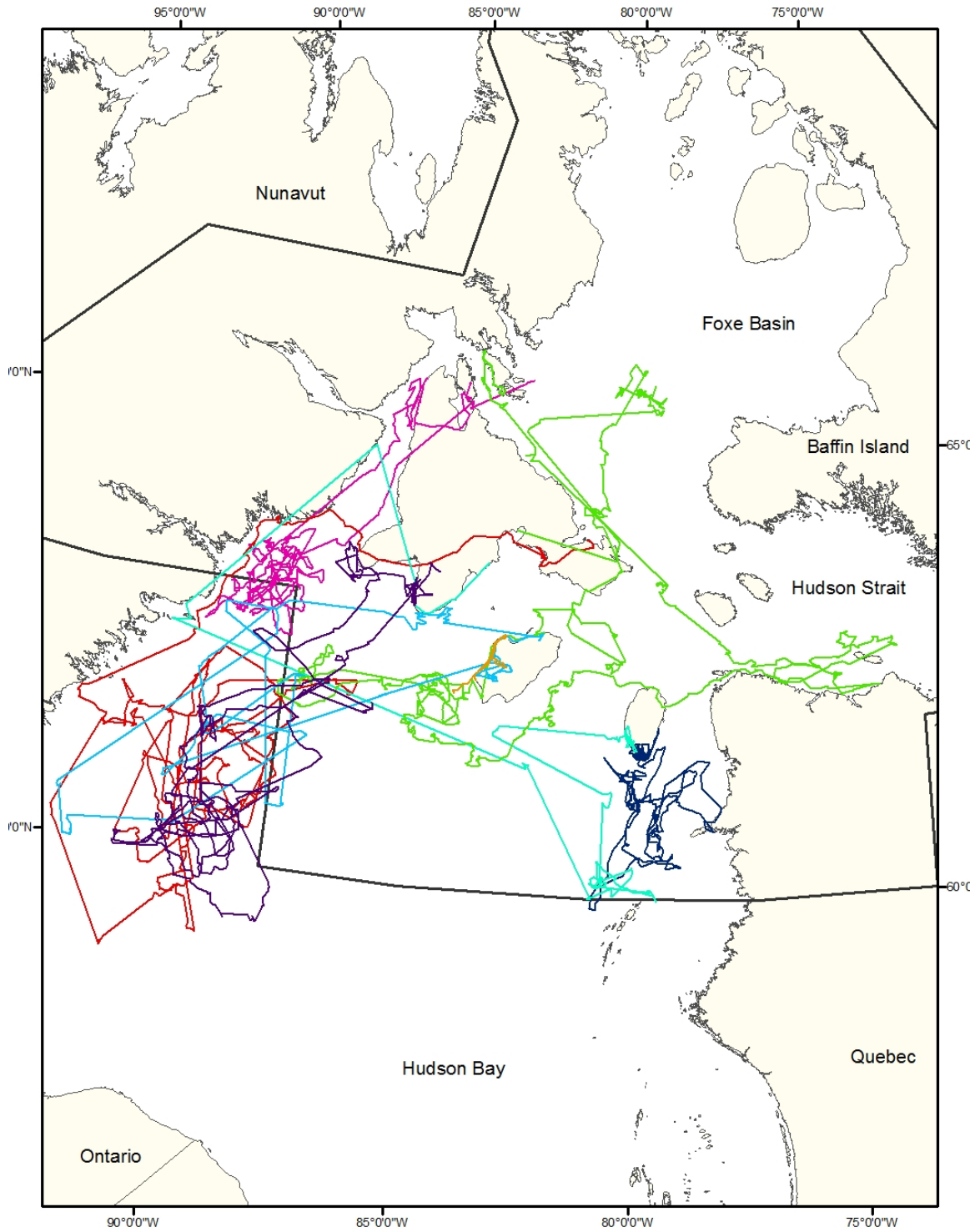


Figure 7. Annual movements of four satellite collared female polar bears in Foxe Basin, Hudson Strait and Hudson Bay, 2009-2010. Heavy black line shows the Foxe Basin management zone (subpopulation).