

# THE BRODIE CLUB



*Established 1921*

Website: <http://thebrodieclub.eeb.utoronto.ca>

## **THE 1,091st MEETING OF THE BRODIE CLUB**

The 1,091st meeting of the Brodie Club was held on Tuesday, 15 March, 2016 in Room 432 of the Ramsay Wright Laboratories of the University of Toronto.

Chair: Glenn Coady

Secretary: Kevin Seymour

The meeting was called to order at 7:30 pm and was attended by 42: 28 members and 14 guests.

### **Roll Call:**

Present: E. Addison, R. Addison, Aird, Bertin, Bryant, Coady, Crins, Currie, Daniels, Dengler, Dunn, Eadie, A. Falls, B. Falls, Hussell, Iron, Machin, McAndrews, Obbard, Pittaway, Reading, Riley, J. Rising, T. Rising, Seymour, Speakman, Sutherland, Zoladeski

Guests: Linda Pim (guest of Aird), Neil Macdonald and Heather Speakman (Speakman), Warren Dunlop (Crins), Kathy Lindsay (Riley), Ron Dengler (Dengler), Sharon Hick (McAndrews), Jerry De Marco and Anne Bell (T. Rising), Peter Molnar, Juan Sebastian Vargas Soto and Alexander Nascou (Obbard), Pamela Wong and Kimberly Flock (guests of the Club)

Regrets: Abraham, Carley, Curry, H. Juhola, A. Juhola, Peter, Rapley, Slessor

**Minutes:** No corrections suggested to the minutes of the February meeting. Moved to accept the minutes by J. Rising and seconded by Currie. Unanimously approved.

### **Committee Reports:**

Program Committee (E. Addison): The April meeting will feature John Casselman, speaking on Ontario Sturgeons. In May, Andrew Peregrine will give a presentation on Lyme disease.

Field Trip Committee (Pittaway): The June field trip will be held on Saturday June 25<sup>th</sup>, featuring a trip to the zoo and a behind-the-scenes tour.

Membership Committee: Nancy Dengler and Carolyn King were welcomed as new members (Carolyn *in absentia* due to a conflicting engagement).

### **New Business:**

Forty-six organizations have signed a letter to OMNR urging them to enforce the law on climate change.

Coady announced that Open Air Books closes at the end of March, so there will be book bargains in the near future as they sell off stock.

## **SPEAKER:**



Ed Addison introduced the speaker, Marty Obbard, whom he has known for 40 years. Marty is a researcher at OMNR who works on a wide variety of animals, from snapping turtles to furbearers.

### **Polar Bears: Is there a tipping point?**

“Tipping point” generally refers the point beyond which there is no return to an earlier state. Given the climate warming that is presently occurring, the question Marty addressed is whether there is a tipping point for continuation of sea ice in the Arctic, and whether disappearance of sea ice will prove to be a tipping point for the long-term survival of Polar Bears.

There are 13 subpopulations of Polar Bear in North America, based on movement, tag returns and management units. Two are stable, four are likely stable, two are in decline, two are increasing, and there are insufficient data to classify the remaining three.

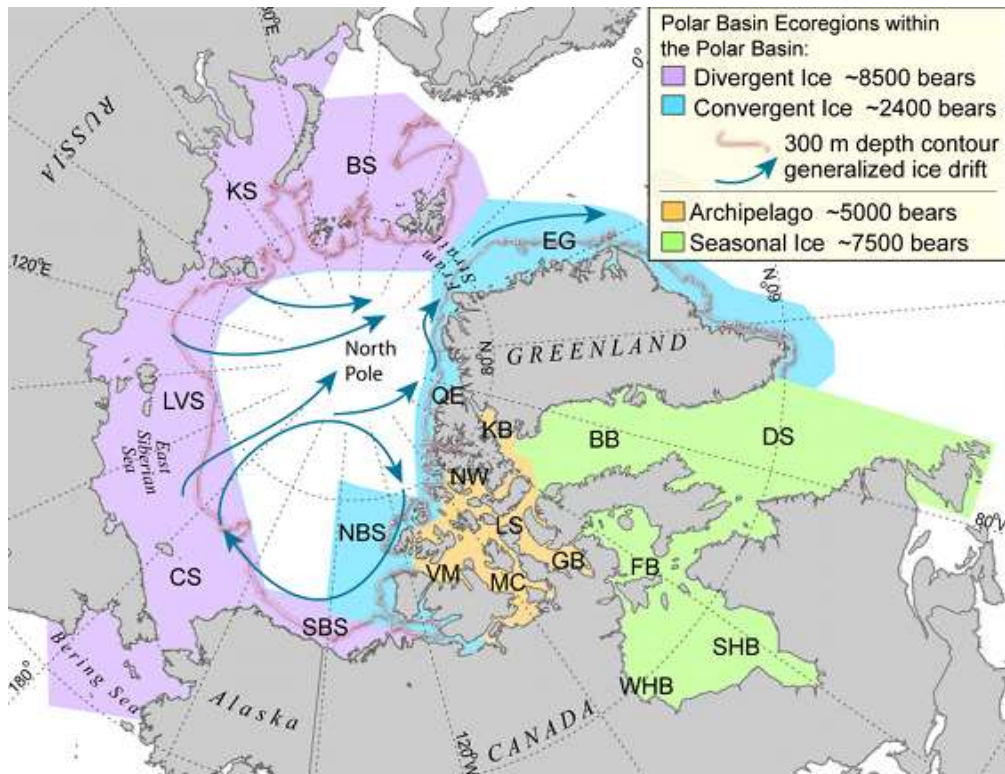
Within the Polar Bear’s range, there are four ecoregions based on sea ice conditions:

1. Seasonal ice: which melts completely every year (~4,500 bears live in this zone)
2. Divergent ice: melting causes retreat of ice from shorelines, such that bears must swim long distances to shore for breeding, and remaining ice recedes from parts of the ocean suitable for seals – the bear’s main prey (~8,500)
3. Convergent ice: collects along the shore so seal hunting remains good year-round (~2,400)
4. Archipelago ice: Multi-year ice that also allows hunting year-round (~5,000)

Bears along Ontario coasts are part of the Hudson Bay population, in the zone of seasonal ice. These bears have to come off the ice by July and then must survive on land using stored fat for up to 6 months before returning to seal hunting. The problem is that the atmospheric CO<sub>2</sub> has risen from the pre-industrial level of 280 ppm to 398 ppm in the last 100 years, most of that in the last 60 years. This has raised the global average temperature, and therefore the extent of the annual sea ice. As of November 2013, the average per decade loss of sea ice on Hudson Bay has been 7%. Last year (2015) was the hottest year on record, followed by the previous year, 2014. Globally the average annual temperature has risen 1.35 degrees. The recent El Niño, the biggest since 1998, has exacerbated this issue, leading to prediction that 2016 will be the warmest year yet.

In 2008, the USFWS declared the Polar Bear to be threatened. The USGS predicted that Arctic sea ice could disappear completely by mid-century, and a 2010 study suggested that the Polar Bear population might be sustainable only until the turn of the next century. Bears in the seasonal ice ecoregion are the most immediately threatened by climate warming, while those living in the divergent ice zone come next on the list. In the convergent ice zone Polar Bears are doing well, but continued warming could lead to loss of that shoreline ice within 75 years. Archipelago ice will persist the longest in the Canadian Arctic islands, and that will likely be the ultimate refugium of Polar Bears – though even that ice could disappear in 100 years if greenhouse gas emissions are not greatly reduced.

In Hudson Bay, Polar Bears have a huge home range on the ice, ranging from 250,000 to 400,000 sq km. Radio collared individuals have been shown to walk 4,000 to 5,000 km per year on as they hunt for seals. Both males and females feed mainly on Ringed Seal pups, supplemented with Bearded Seal pups and a few walrus and beluga. If the bears' time on the ice is reduced due to ice retreat or melting, there is less time to feed and store the fat required to survive on shore during the summer. If their body condition is affected there will be fewer successful female breeders and the population will decline.



<http://www.polarbearsinternational.org>

The last 30 years of ice data tells us that there are fewer days of ice cover, such that Hudson Bay bears now spend up to 30 more days on land. Body condition of Polar Bears (based on mass and length measurements), decreased between the 1980's and 2000's in all social classes. Condition of cubs has changed the least over these decades, suggesting that lactating females now transfer proportionally more energy to cubs even if at their own expense. On average, adult polar bears lose 0.85 kilo/day while on land.

Recent aerial surveys of the Hudson Bay Polar Bear population show that numbers have not changed much so far, though declines are expected eventually. Longer summer fasts may be the main cause of the change in body condition, but possibly numbers of seals, which are obligate on-ice reproducers, have declined sufficiently to affect success of winter hunting. Unfortunately, there is little information on the seal populations of eastern Hudson Bay and James Bay.

As geographic and temporal extent of ice declines, might Polar Bears become more terrestrial? They are known to catch a few flightless geese, feed on eggs and goslings in Snow Goose colonies and occasionally scavenge dead beluga, but it is unknown how adaptable they might be, and whether they could survive solely on land. It seems unlikely, as the bears need 43 adult Ringed Seal equivalents to store enough fat to survive to the next season, and two to three months on the

ice is not sufficient time to accumulate the required energy. You can't grow a bear the size of a Polar Bear on a diet of berries.

As well as affecting ice conditions, climate warming may affect survival of the bears when on land. Females make dens by digging into a gravel bar or an ice push-up (called a palsa), but the latter start to collapse and become less common as warming continues. Possibly bears can den in other features, and it was recently discovered that they sometimes 'den' in areas with scrubby trees, making only a shallow bowl among the roots that lacks an earthen roof.

Physics tells us there is no tipping point for sea ice, in the sense of reaching a point of no return. If CO<sub>2</sub> concentration can be reversed and the climate cools, the ice will form again. The same is not true of Polar Bears, however, which cannot return from extinction if they disappear in the meantime.

### **Questions following the presentation:**

Zoladeski: Is it not true that during past interglacials there were times when the Arctic was ice free? If so, how did Polar Bears survive this? A: In the last interglacial, they apparently survived in an archipelago, but genetic work shows their population suffered a severe population bottleneck.

E. Addison: Black bear males are known to sometimes kill a cub for food. Does this happen with Polar Bears? A: Yes, but there is only anecdotal evidence.

Machin: Is there not also an increase in methane and does this also play a role? A: Yes, as the climate warms there is more methane released from peat, which just compounds the global warming issue.

Eadie: Could bears eat seals from land? A: Maybe. If there is no ice then the seals may have to breed on land and then the bears could access these, but it is unknown at this point what the seals would do, and where they may or may not breed in an ice-free environment.

Riley: Was the estimate of only 300 Polar Bears in Hudson Bay in the 1950's realistic? Since the Hudson Bay Company has pelt data in their archives going back 300 years for York Factory and Fort Severn, could these data be useful in estimating past populations? A: The 300 estimate was based on shoreline surveys only and did not include inland individuals, so it was a guess only and surely an underestimate. And yes that is a good idea using HBC data, I don't think this has been examined!

Sutherland: Polar Bears in West Hudson Bay repeatedly use the same den sites, but that isn't true for the Southern Hudson Bay bears. What's the case for Ontario? A: Although dens are used repeatedly (over 100 years or more) in other areas, the Ontario habitat is different and so far there is not much evidence to suggest they use the same den year after year.

Reading: I have heard the Polar and Grizzly Bears will interbreed. A: Yes there are 3 or 4 documented cases of this. It is always a male Grizzly wandering out onto the ice to mate with a female Polar Bear. The offspring are fertile.

B. Falls: Can Polar Bears catch seals in places other than on sea ice? A: Yes, they can catch them in open water, but this must be a rare event, as a seal can swim much faster than a Polar Bear. They can also apparently catch sea ducks (ambushing them from below), and maybe some fish.

E. Addison: Black Bears can “den” on the surface in just a scrape. Could Polar Bears do this? A: Yes, They could probably survive in a scrape alone, but this would not afford any protection for a newborn cub.

The speaker was thanked by George Bryant for a fascinating talk.

## **OBSERVATIONS**

Daniels: On 7 March, he observed about 400 honey bees attending a patch of early blooming winter aconite (*Eranthis hyemalis*, a buttercup relative). The hive must have been within 2 miles or so. They were not at the same spot a few days later. Daniels also reported that his local chipmunk entered hibernation later than ever last year and recently emerged earlier than ever --for a total of only about 76 days in hibernation.



E. Addison annually records the date that Turkey Vultures start roosting behind his house. March 9 was the earliest return date over the last 6 years, and this year they returned on March 9 again.

Dunn observed 14 cardinals at her feeder at one time in early March, rather than the normal 2 or 3. Feeders in the southern U.S. can attract up to 60 at once, but winter flocks are unusual in Ontario.



Photo by Paul Umfleet, in southern Illinois. He also posted a video: (<https://www.youtube.com/watch?v=7WfSATkSel8&feature=youtu.be>)

The meeting was adjourned at 9:02 pm.