THE BRODIE CLUB

ROYAL ONTARIO MUSEUM OF ZOOLOGY

THE 1,034th MEETING OF THE BRODIE CLUB

The 1,034th meeting of the Brodie Club was held at 7:30 pm on December 09, 2009 in Room 432 of the Ramsay Wright Laboratories of the University of Toronto.

Chairman: George Bryant
Secretary: Kevin Seymour

The meeting was attended by 28 members and 8 guests:

Roll Call, Present: Abraham, E. Addison, R. Addison, Aird, Bertin, Bodsworth, Boswell, Bousfield, Bryant, Currie, Dunn, Eadie, A. Falls, B. Falls, J. Hussell, Iron, A. Juhola, H. Juhola, Larsen, Lumsden, Machin, McAndrews, Pittaway, J. Rising, T. Rising, Seymour, Speakman, Tasker

Regrets: L. Bendell, Y. Bendell, Crins, Curry, D. Hussell, Slessor, Tomlinson

Guests: Ron Thorpe and Emily Addison, guests of E. and R. Addison; Robert Falls, guest of Ann and Bruce Falls; Kendra Sakaguchi and John Saunders guests of Bertin; Nigel Best and Deidre Tomlinson, guests of Harry Lumsden; Dan Barzak guest of Tomlinson.

The minutes were approved as written.

Bruce Falls reported on the upcoming speaker for January. Robert Willson, Senior Terrestrial Ecologist, Species at Risk Specialist will speak on "*Movement and Spatial Dispersion of the Massasauga (rattlesnake) and Eastern Hog-nosed Snake: Implications for Interactions with Roads".*

Rose Addison reported on FON information including a writing and art contest for grade 8 students.

Sandra Eadie handed out sets of published minutes from Archives. More are available.

Bruce Falls made another request (one was made last month as well) looking a photocopied copy of "*A Pocket Full of Galls".* This is a short biography of William Brodie which was lent to someone and has not been returned.

SPEAKER:

The speaker was Dan Strickland, retired Chief Park Naturalist of Algonquin Provincial Park. The title of Dan's talk was "***What originally prevented, and later what permitted, the great northern expansion of White-tailed Deer?"*** He was introduced by Ron Pittaway.

In his book Mammals of North America, Ernest Thompson Seton first documented 100 years ago the expansion of the White-tailed Deer in the NE. In Canada, the deer followed settlement and has gained much new territory, now over one million sq. km. including the Maritimes. Aldo Leopold's influential thinking (among others) was that the carrying capacity was not sufficient for them originally, in that the old growth forest was too dense and there was not enough undergrowth for them. However, in the 1960s and 1970s the deer population crashed in Northern Minnesota and in Algonquin Park, and has never recovered. Why?

We don't know what the original restriction was that kept deer out of this northern area. In theory there could have been three possible reasons for its range expansion:
1. Improvement of the inherent carrying capacity
2. Removal of a competitor
3. Removal of a predator

Unfortunately all three things happened about simultaneously: we logged, cleared and burned much habitat allowing new undergrowth ("habitat improvement"), both moose and caribou were removed from the southern regions of their original range, as were wolves. Since we can't prove which one of these hypotheses is correct, maybe we can eliminate some of the competing hypotheses.

1. Inadequate Carrying Capacity theory

In the pre-settlement era, deer were excluded due to an inadequate carrying capacity in the NE, and are today excluded from N. Minnesota and Algonquin Park for the same reason. Although this might be true, the corollary is that if we put deer in an area with worse carrying capacity, they will not persist. To test this we can look at Anticosti Island, an island a little larger than Algonquin Park. Two hundred deer were introduced to the island in 1886-1900 and today there are about 150,000, with the only possible native predator being the Black Bear. The deer have removed virtually all the browse, including the preferred Balsam fir, leaving the island with a virtual monoculture of White Spruce with nothing to eat below it. For 15 weeks of the winter, the snow depth is even greater than it is in Algonquin Park. Yet in these conditions, much harsher than those in Algonquin Park, the deer persist, even though 20,000 of them starve annually. This shows the inadequate carrying capacity hypothesis to be false.

2. Competitor theory

Moose were later introduced onto Anticosti Island but have never become more numerous that about 1,000 individuals. So if anything, deer are keeping the moose population down, not vice versa.

3. Predator theory

If the predator was excluding the prey, how could deer and wolf have co-existed in the N US in pre-settlement times, along with bears, cougars and later humans? In other words, how could a predator exclude a prey species from one area but not from another area? The hypothesis is: a predator can exclude a prey species from part of its range if it has a less-preferred prey species in the same area. Here the less-preferred prey species is the moose. We know wolf today will go out of their way to take deer, so deer are highly preferred over moose. And we know there were no moose in the NE US historically, where wolf and deer co-existed.

So the removal of the wolf allowed the northern expansion of the deer. In this case it was probably assisted by an increased carrying capacity (logging by humans etc). When the wolf was protected in N. Minnesota and Algonquin Park, the wolf population grew, and since they preferred the deer, they ate all the deer (and the population crashed) but still had moose as a backup, so the wolf population did not crash, as it would have if there were only deer to eat.

Computer modeling shows that if you introduced wolves on Anticosti Island, after 22 years the deer would go extinct and the wolf and moose populations would stabilize at 230 and 7,000 respectively. If there were only deer and no moose, and you controlled the wolf population to 122, the deer would not go extinct but stabilize at 10,200. Add moose to the scenario, AND wolf control to 307, then the deer population would stabilize at 30,000 and the moose at 10,000. However if you do not control the wolf population then the wolves will eat all the deer and the first scenario (above) occurs.

A parallel situation is the removal of deer from the central US at the turn of the century. Humans preferred them and hunted them to extinction in this area, because they had no alternate food. The deer have now recovered only because of hunting laws, i.e. a control on the excluding predator.

This presentation has been published under the same title:
Strickland, D. 2009. What originally prevented, and later what permitted, the great northern expansion of White-tailed Deer? Occasional Papers from Oxtongue Lake 1: 1-40.

The abstract of this work is reproduced here:

In the late 1800s-early 1900s white-tailed deer (*Odocoileus virginianus*) spread north to occupy almost 1 million sq. km of new deer expansion range in the northern U.S. and southern Canada. The prior exclusion of deer from the new range is usually attributed to its allegedly inadequate carrying capacity (*K*), and the subsequent expansion to habitat improvements. These hypotheses are challenged by Anticosti Island, Quebec, where introduced deer have maintained high densities for 70 years in spite of snow depths and food resources that are much less favourable than in the new range. Difficulties with an alternative hypothesis, that deer were excluded from the new range by wolf (*Canis* spp.) predation are accommodated by a simple model indicating that a predator can exclude

prey from otherwise suitable habitat in the rare circumstance that a less-preferred and / or much more numerous alternative prey is also available. For pre-settlement wolves, moose (*Alces alces*) satisfy the distributional and ecological requirements for a less-preferred alternative to deer and I accordingly propose the pre-expansion northern limit of deer was indirectly set by the southern limit of moose, south of that which deer carrying capacity would have otherwise permitted. This "suitable alternative prey" hypothesis suggests that suppression of either moose or wolves in the deer expansion range would have permitted deer to expand north and, given the new range's known history, control or eradication of wolves was probably responsible. Concurrent improvements to *K* would have contributed to the expansion only in the uncertain circumstance that they and wolf suppression both extended further north than the northern deer limit that would have been imposed by pre-settlement *K*. The hypothesis further attributes the failure of deer to recover after winter-caused collapses in Ontario's Algonquin Park and part of northern Minnesota in the 1960s-70s, not to deteriorating *K*, but to the prior local cessation of wolf control.

Copies of this work may be ordered from The Friends of Algonquin Park at Box 248, Whitney, ON K0J 2M0; pr via www.algonquinpark.ca

QUESTIONS:

1. Could elk have been the suitable alternative?
A: Elk were probably rare, as they need open meadows, and so may not have been numerous enough to allow the wolves to drive the deer to local extinction

2. But E.T. Seton said that there were 7 million elk in the east at the time.
A: For the exclusion to work, the disparity in preference has to be great. Maybe elk were preferred but not as greatly preferred as deer.

3. What about caribou and beaver as possible alternatives?
A: Pre-settlement, caribou and deer seemed to be mutually exclusive (i.e. ranges did not overlap), since caribou is very susceptible to brainworm (that deer carry), so deer limited the caribou.

4. Does the brainworm story compilcate this story?
A: Yes, when deer were abundant, there was a drop in the number of moose. When wolves were protected, the number of deer dropped and moose increased again.

5. What effect did the introduction of coyotes have to this scenario?
A: There may have been some hybridization of coyote and Algonquin wolf, called "Brush Wolf".

6. Did logging in wintertime affect this scenario?
A: Deer followed the loggers. Now with Algonquin reserves, the deer may have declined, but still Anticosti's environment is SO much worse.

Ed Addison thanked the speaker.

NOTES & OBSERVATIONS
Field Observations were duly cancelled so the Christmas goodies could be enjoyed.

The meeting was adjourned at 9:30 pm.

NEXT MEETING
The next meeting will be held on Tuesday, January 19th, 2010 at 7:30 pm in Room 432 as usual.
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CORRESPONDENCE
Merry Christmas to you all and Happy New Year - new computer and old brains account for tardiness, Yorke (Edwards)

Gulls in Britsh Columbia.

Glaucous Gulls: We sometimes see a small group flying by our house. They nest in the Arctic, but in winter stand by on our western shores. .

Glaucous-winged Gulls: These gulls are passing by our home all year. They nest on many small islands that I have walked upon to see their nests on the ground.

Western Gulls: These gulls are rarely seen here, but in early fall a few come up from the USA. Their wings are the colour of the same bluish sea.

California Gulls: I saw one once from my window beside the sea, and it stayed there most of the afternoon. A few come north to us from the USA every year.

Bonaparte's Gulls: These are black-headed gulls living in summer with their nests not far north from our city. They all live from B.C. to northern Ontario.

Thayer's Gulls: They nest in the Arctic, and in winter hundreds come to stay by our western shores, living from southern B.C. to down to Mexico.

Herring Gulls: These big gulls nest in summer, in Alaska to Quebec, living in many water places in half of Canada. We see those numerous gulls all year.

Mew Gulls: In fall we see them flying by in groups going south to stay in winter all along the western sea shore of the USA.

Bonaparte's Gulls: They are small, black headed, and have dark red legs and feet. In summer they nest from Alaska to Ontario's Great Lakes.

Black- legged Kittiwakes: One year I saw a few of those northern gulls in winter, standing on a long beach on the northwest edge of Vancouver Island.

Red-legged Kittiwakes: Once on a beach I saw two gulls with red legs beside by a group of black legged gulls. They nest on a few tiny islands beside Alaska.

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Sabine's Gulls: Once walking by the sea I saw below me a gull that had on the each wing three coloured triangles - white, gray and black.