THE BRODIE CLUB

ROYAL ONTARIO MUSEUM OF ZOOLOGY

THE 989TH MEETING OF THE BRODIE CLUB

The 989th meeting of The Brodie Club was held on Dec. 14 2004 at 7:30 p.m. in Rm. 432 of the Ramsay Wright Zoological Laboratories of the University of Toronto.

Chair: Jock McAndrews
Secretary: Ed Addison

There were 22 members and six guests:
Sharon Hick, guest of Jock McAndrews
Richard Aaron, guest of Bruce Falls
Karine Beriault, guest of the speaker, Ron Brooks
Rosemary and Emily Addison, guests of Ed Addison
Ian Sturdee, guest of Mary Boswell

The minutes of the previous meeting were approved as written (Falls/Abraham).

NEW BUSINESS

The date of the May 2005 meeting will be 3 May rather than the third Tuesday of the month. This change is in anticipation of many club members being away birding later in May.

Some of the Brodie Club archives were thought to have been missing at the ROM but they have been relocated.

COMMITTEE REPORTS

Bruce Falls reported on our speakers for the coming months:
Jan 18 – Eugene Morton – Why tropical birds are different.
Feb 15 – John Casselman – Effects of weather and invasions on fish populations
Mar 15 – Bruce Falls – trip to India
Apr 19 – Sarah Shettleworth – Do animals think?
May 3 – Pete Ewins – What does climate change mean to Arctic ecosystems?

SPEAKER

Bruce Falls introduced Dr. Ron Brooks, the evening's speaker. Ron completed an MSc degree working with Bruce Falls on individual recognition by song in White-throated Sparrows

and completed a PhD at the University of Illinois on lemmings. Beginning in 1970, Ron has been on faculty in zoology at the University of Guelph where since 1977, he has, amongst other research, focused on life history traits and population dynamics of common snapping turtles, Chelydra serpentina serpentina centred at the Wildlife Research Station in Algonquin Park. Ron is a member of the Committee on Species of Endangered Wildlife in Canada (COSEWIC). Ron's talk was on:

Biology of Turtles in Canada:
Implications for their Study and Conservation

Seventy percent of reptiles (and headed for 82%) have been listed by COSEWIC. This is in marked contrast to Canadian species of the other classes of vertebrates where only 7-38% are listed. Threats to turtles are many and include pollution, habitat loss, diseases, being run over by vehicles on roads, and being shot and netted.

Ron reviewed the nine species of turtles in Ontario (painted, snapping, wood, Blanding's, musk (stink pot), soft-shelled, map, spotted and eastern box) and spoke briefly of snakes and lizards.

Painted turtles are the most common, have a broad range, are up to 15cm long with males smaller than females. Females have claws 0.75 cm long and males have longer claws that are used in wooing a mate. Young turtles have an egg tooth to assist in breaking out of their shells. Painted turtles bask a great deal. They have 7-15 eggs/clutch.

Snapping turtles bask much less than do painted turtles. They range from Canada to Ecuador and are declining throughout their range. Large males may be up to 35 lbs. in weight and are about twice as big as females. Fighting among males is common but the causes unknown. Mating in snapping turtles is very violent. Snapping turtles have approximately 40 eggs/clutch. Placobdellid leeches are very common on snapping turtles in Algonquin Park. Placobdellids are found only on turtles and there is no evidence of them having a detrimental effect on snapping turtles. There are few published records of reptiles nurse feeding on reptiles, but Ron and his students have noted snapping turtles in 'floating position' with outstretched legs in the water column and painted turtles foraging on the placobdellid leeches on the snapping turtle with the painted turtles even removing leeches from within the mouth of a snapping turtle.

Wood turtles make no attempt to escape from threats. Their distribution has been so drastically reduced by collectors that they are now endangered. The wood turtle is much more terrestrial in its habits than are most other species. They have 7-15 eggs/clutch.

Spotted turtles are small, being up to 12 cm in length and they have very small clutches of 2-7 eggs. In an 18-year-long study on Georgian Bay, only one hatchling has been found!

Blanding's turtles have a bright yellow throat. They are vulnerable and have been known to live for up to 90 years. They bask a lot and lay 9-10 eggs/clutch.

Map turtles have been seldom studied. They bask a lot, are very good swimmers and they live in large lakes. Female map turtles are three times larger than males.

The musk or 'stink pot' turtle doesn't produce a lot of musk. Some other species smell more than do musk turtles. Few people know when they are around. Like snapping turtles, stink pots have a relatively under-developed plasteron. They are listed as vulnerable.

Soft-shelled turtles are much more exposed than many turtles because of their soft shell. They are more aggressive than many turtles and can run so quickly that they can out-run many people. Females are much larger than males.

The eastern box turtle is considered by some people to be an exotic species to Ontario. It is extirpated and Ron thinks that it was native to Ontario but was extirpated by natives before the whites came to the area. Eastern box turtles live up to 120 years.

Ron briefly reviewed some of Ontario's snakes. Timber rattlers are extirpated and blue racers are endangered with fewer than 200 individuals all found on Pelee Island. The eastern hog-nosed snake is long-lived not maturing until 7-10 years of age. They hiss, bloat up and strike but do not bite. If that doesn't ward off threats they will defecate on themselves, roll over and bleed from the mouth! Ron spoke of the eastern fox snake that is being studied on Georgian Bay. They are only found very close to water and are known to swim up to 35 km/yr. Single swims of up to 12 km have been noted. The eastern fox snake eats birds. The black snake is now found only in a small area north of Kingston. The milk snake is listed as a species of special concern. Little is known about milk snakes. The Lake Erie water snake is endangered with only about 1200 individuals remaining.

The five-lined skink is the only lizard in Ontario. It is not killed on the roads very much but is not so long lived as some reptiles. Sixteen former areas of concentration in southwestern Ontario have now been reduced to two, at Rondeau and Pelee.

Life Histories: Traits of Turtles Influencing Population Parameters

Based largely on their long-term research on snapping turtles in Algonquin and elsewhere in Ontario, Ron proceeded to discuss the life history traits that are appearing to make turtle populations particularly vulnerable in Canada. These traits included number of offspring, size of offspring, growth rate, size at maturity, age at maturity, age specific reproductive investment, age specific mortality and longevity.

The Algonquin study started in 1977 at which time there were 70 nests on the dam at Lake Sasajewun. In 2004, there were only 18 nests!

The female snapping turtles drill lots of test holes before excavating the real nest. The presence of drill holes does not distract predators. Once the females start laying it is difficult to distract them even by approaching closely for photographs. They lay between 25 and a maximum of 70 eggs. As the eggs are laid the female catches each one with a hind foot and gently packs them tightly in the hole. While very gentle with their own eggs, they will smash eggs of other turtles. Once the eggs are laid the turtle carefully refills the hole, packing the dirt tightly.

Predators, the main species of which are red fox, raccoon and striped skunks, can be there very quickly, occasionally even waiting in view for the female to finish laying. Raccoons have become much more abundant in southern Ontario in the past number of decades. Predation is very high. The type of predator can, to some extent, be identified from the distribution of the eggs. Foxes scatter the eggs widely whereas the raccoons make neat piles of the eggs. Thus predation is a serious problem for turtle populations.

Cumulative summer heat unit (CHUs) are sufficiently limited in Ontario, particularly in the northern parts of snapping turtle range, that there is insufficient warmth for incubation and emergence of young turtles in only half the years.

In some experiments with effects of temperature, all eggs hatched at 2403-2637 CHUs and at 1940-2358 CHUs. However, no eggs hatched at 1306-1562 CHUs. With the snapping turtles in Algonquin, there was 50% hatching success at 1900-2100 CHUs.

The thermal environment during incubation can have other significant effects on turtle populations. For example, with painted turtles and with snapping turtles, the amount of heat to which the embryos are exposed during certain specific phases of their development (stages 14 and 19) will determine the sex of the hatchling. In marked contrast, with wood turtles, the sex of the embryo, as with humans, is determined at fertilization.

In addition to influencing the success of snapping turtle hatchlings, increased temperature during incubation also results in increased hatchling survival, post-hatchling success and size of hatchling. Interestingly enough, hatchlings are quite similar size between species despite there being considerable interspecific differences in the size of adult turtles.

If embryos are exposed to temperatures of 21^{o}C or less for more than a week, they will be abnormal. Eighty-eight to 96% of variation in development is explained by temperature.

Because of the effects of temperature on sex of hatchlings, some people have postulated that with global warming there will be skewed sex ratios of hatchlings to the resulting detriment of snapping turtle populations. However, as Ron points out, turtles go back about 250 million years and have certainly survived numerous warm periods during that time. It is not cumulative heat units during the summer that appears critical in determining sex but rather the temperatures during stages 14 and 19. If temperatures increase turtles might choose to nest in shaded rather than sun exposed sites. Ron predicts that global warming will not adversely affect the sex ratio of hatchlings.

Experiments have been conducted on raising turtles from Alabama and Algonquin Park. Turtles of the same age have been raised in the same tanks at the same temperatures and with the same food, yet the Alabama turtles have matured much more quickly, thus demonstrating an obvious genetic effect on age of maturity.

It is very difficult to determine age at maturity because people know of no technique for ageing snapping turtles. There are numerous lines on the scuta of many turtles but lines are sometimes absent from a mature turtle and later present on the same turtle. Despite these problems, work with known-age turtles (tagged since hatchlings), supports the results of the above experiments that turtles from the south mature more quickly than turtles from the north (see table below).

Age of Maturity of Turtles

Species of Turtle	United States	Ontario
Snapping	6-7	13-18
Painted	2-7	12-15
Wood	7-10	16-18
Spotted	7-9	12-20
Stink pot	3-4	9

In Algonquin, only two female snapping turtles have matured in 17 years and one of these had been run over as a hatchling!

Why are reptiles endangered In Canada?

Because of the restrictive effects of temperature, almost all of our reptiles are in deep southern Canada (garter snakes are an exception) where 90-95% of Canadians also live and where, at least in southern Ontario, most natural habitat has been converted to agriculture. This includes the drainage of many swamps and marshes, a preferred habitat of most species of turtles. In southern Ontario, there are very few areas that are more than one kilometre from a road. While turtles have recovered to mature following serious damage from vehicle accidents, many are killed. Turtles often choose to lay their eggs on shoulders of roads thus increasing their likelihood of death from contact with vehicles.

Low nest survivorship has a minimal effect on turtle populations because of the longevity of mature members of the population. For example, some painted turtles live more than 50 years and some snapping turtles more than 70 years. However, juvenile survivorship must be 80% or higher to get increased populations and, as importantly, most adults must survive for a population to remain stable or to grow. Any drop in juvenile or adult survivorship will result in marked population declines.

During one winter in the 1980s in the Algonquin study, otters killed about 60% of the adult population while the turtles were lodged underwater in the mud. The population has not recovered from that one winter mortality and is still declining 15-20 years later.

The clutch size has not changed from the late 1970s to the early 1990s so it would appear that the reduced density from the winter otter kills has not led to a density dependent response production of eggs.

Many people have collected painted, wood and other species of turtles for pets and the pet trade and snapping turtles can still be harvested for food under permits with harvest limits. In a few hours, the pet or food industry demands can stimulate removal in more turtles than a population can replace naturally in 100 years!

Even with moving lots of female turtles off of roads, we still have decreasing populations if 1-3% of adults are killed.

QUESTIONS/COMMENTS:

- Richard Aaron recounted pulling off a highway near Bancroft to move a snapping turtle to safety and being immediately approached by a conservation officer. The turtle was a 'dummy' and was being used to catch people who would take turtles away with them.
- Some people like to swerve and run over turtles and others like to shoot them.
- Can pet stores legally keep turtles? It is now illegal to have and to sell any native species of turtle. The exception is the snapping turtle that can be held by those issued valid permits specifying numbers in possession for the food trade.
- Are red-eared sliders having an effect on other species? None that we know of but nobody is looking into that question.
- Is there a central registry for reports of occurrence of reptiles? Yes. The Natural Heritage Information Centre in Peterborough does this. Mike Oldham coordinates the database.
- Do painted turtles lay more eggs as they get older? Yes, based on data from a 50-year-long study in Michigan, older turtles have both more frequent and larger clutches with better survival of young than do young turtles.

OBSERVATIONS:

- Kevin Seymour reported an opossum in his back yard in north Toronto in late September-early October. Other members have seen them in a variety of places including Aurora.
- Bruce Falls reported observation of a Black-throated Gray Warbler in High Park. This species is regularly present in British Columbia. Also having been seen were a White-eyed Vireo (banded), Rufous Hummingbird, Glaucous-winged Gulls, Iceland Gulls and Scoters and Eiders.
- Ken Abraham noted that three Fork-tailed and one Scissor-tailed Flycatcher have been seen in Ontario this year.
- Jean Iron noted that a 'mystery' Flycatcher has been seen in Prince Edward County and it might be a Western.
- Jock McAndrews and Sharon Hick recently drove to Florida. They noted many dead deer or evidence of them on the roads in Pennsylvania and West Virginia but not so many in Georgia and the Carolinas where many roads have been lined with fences to exclude the deer. Native palms seemed to have survived the autumn hurricanes well whereas lots of pine stands have been obliterated.

DISPLAYS:

There was a very interesting display of grit from the gizzard of Passenger Pigeons that had been placed in an urn and also a display of evidence of Canada geese in the sediments of an area lake.

The meeting was adjourned (Young/Bodsworth) and members and guests enjoyed an abundance of food while visiting.

Corresponding members Yorke and Joan Edwards sent the following note from Victoria, B.C.

Pine Cone Climbing.

In 1945's late September, with Jim Bendell, we drove 2,200 miles in a small government truck through 18 days zigzagging across southern Ontario, then into Quebec. When not driving we collected pine cones, climbing up to collect them if there were not enough on the ground. On the tree, most cones are on the upper half.

Our leader was Dr. C. C. Heimburger of Danish, Finnish and Russian decent, well known at selecting seeds for only superior plants. He was considered one of the best in Canada¹s science of forestry, and the Lands and Forests wanted him to gather seeds from superior white pines that were free of rust, weevil, and were well timbered. This time, he was after the best pines with the best seeds. One such study, for example, was whether our white pines are regionally different. Are there four different kinds that re-entered Ontario in four different places after the Ice Age? Were the four different? Do some keep free from bark rust while others do not? In our travels, he wanted to find good trees with good cones, the trees away from others, properly shaped, straight up, and well limbed. He also wanted them to be in good health. Jim and I climbed up such trees to collect their cones.

The Ontario government¹s truck that we used was a small, British army truck, a Chevrolet with its steering wheel and driver at the English right seat. Behind the small cabin was its open box of short length, and in it we had a long solid, ladder leaning on our cabin and towering high and forward above us into the sky. People stared at us. Gas pumps of the day were often under low roofs. Low roof, no gas. Too, when we were about to sail across the St. Lawrence River sailors came out wild and waving. We forgot. Our ladder waved well above the ship¹s entrance.

First, we were driving back and forth zigzagging across southern Ontario, crossing through some towns three or four times. Later, we were hunting in places close to Montreal, then went south of the St Lawrence River. In Ontario, we drove most of our zigs and zags for 2,200 miles in the area from Lake Ontario to North Bay and London to Ottawa. After several days around Montreal, we went into a wonderful experience. At Trois-Rivières, we crossed to Sous les Ormes (Under the Elms) and its hotel. Next morning, we drove a short distance east along the river to an old land grant given to the family in 1672. That family is still there, the owner, Joli de Litbiniere, and his English wife, living in a very large and wonderful house with a fascinating inside. In it were old swords, animal heads, a gun room, and food for us to remember. Everything seemed outstanding. And near the river his father had bought 500 USA white pines in 1908. Through the years about 400 of the pines became diseased, the yellow rust, so they were destroyed. Those still alive were still preventing the rust. We collected their cones. Then we left and went driving through Montreal, Ottawa, North Bay and home, collecting, along the way.

White pines are tall, straight and good looking. When I was small, I decided they were the nicest trees in Ontario. They can be 175 feet high with trunks five feet across. Pine cones usually grow on outward branches, so Jim and I went high and outward to steal them. Before climbing, we explored the ground beneath. Under one tree, we came on our best find, a heap of cones, squirrel food for winter. (There were still lots of seeds above for it). Most times, we climbed the ladder to the limbs, then went upward and outward doing monkey work, going along the limbs. The main problem was that we had to go far outward from the trunk because cones hung near the ends of branches. But we survived. It was also a sticky business increasing daily. Pine sap stuck onto and into our clothes, and it gathered small bits of everything. Near the end, at little Kaladar¹s hotel they decided to throw us out until the Doctor explained the situation. We stuck with our jobs.

Wondering what animals are killed on our many roads, we listed them along the way. The total was: snakes 17, skunks 7, house sparrows 2, European hares 2, snowshoe hares 2, chipmunks 2, flicker 1, woodchuck 1, Norway (gray) rat 1, porcupine 1. Driving can be interesting – sometimes.

Merry Christmas and the very Best to all in the 2005: Yorke

NEXT MEETING:

The next meeting will be held at 7:30 pm on Tuesday Jan. 18, 2005. Eugene Morton will explain why tropical birds are different.

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