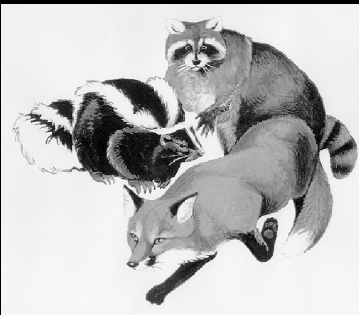


The Rabies Reporter

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The Rabies Reporter, a scientific newsletter about current issues in rabies research and control, is a joint effort of the Rabies Research Unit of the Ontario Ministry of Natural Resources; the Rabies Laboratory at the Animal Diseases Research Institute of the Canadian Food Inspection Agency; the Ontario Ministry of Health; and the Geographic Information Systems Laboratory of the Department of Geography at Queens University, Kingston. Articles for future issues will be welcomed by the editor. The Rabies Reporter is not refereed, and should not be cited in papers intended for refereed journals. Send contributions, letters and inquiries to:

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Visit: www.gis.queensu.ca/RReporter/mnr.html or
www.mnr.gov.on.ca/mnr/rabies/rabmenu.html

CFIA LEADS THE WAY

Ever wonder who does the rabies testing? The Rabies Reporter depends for its basic information on data from the testing laboratory. The data set of rabies cases in Canada is one of the best in the world. It has been and will be used in a variety of analyses to help understand how rabies persists in the wild. In Canada, we have a national standard for data, and the quality of the data has been maintained to very high standards for many years.

Testing for rabies is a mandate of the federal government's Canadian Food Inspection Agency. CFIA's response is a two-part system. There are field offices scattered across Canada, one of whose functions is to collect specimens suspected of having rabies, and make sure that those are delivered quickly and safely to one of the two CFIA diagnostic laboratories. The second part is first class diagnostic laboratories. In Ontario, most specimens go to the laboratory at the Animal Diseases Research Institute (ADRI) in Nepean, near Ottawa, which has a world (WHO) recognized Center of Expertise for Rabies (CER). However, specimens from Thunder Bay and further west go to the laboratory in Lethbridge, Alberta.

Since the incursion of raccoon rabies into eastern Ontario in July, 1999, most of the Rabies Unit's dealings have been with the CFIA district office in Brockville and the (CER). One key liaison with this agency has been Dr. Doug Hayes, district veterinarian of the Brockville CFIA office, who has been an incredible help to our operations. On many occasions, Dr. Hayes went beyond the call of duty by providing his services to us at the MNR Rabies Research Unit. Also, Frances Muldoon, diagnostics supervisor of the CER, and the entire diagnostic staff, should be awarded medals for their efforts during our point infection control operations. The number of samples they handled was nearly doubled by

MNR control efforts. "Since the first rabid raccoon was identified in July 1999 and for those months that the rabies unit was testing survey samples along with regular diagnostic submissions, 81 survey samples were tested for every 100 diagnostic submissions." The results of their exceptional efforts are an object lesson to those who seek means of enhanced surveillance for rabies in wildlife. From over 4200 raccoons trapped in the outbreak area in 1999 and 2000, only 9 were rabies positive. Without the diagnostic services of the CER, the raccoon rabies control program would have muddled along in the dark. Their quick and 100% reliable testing for the variant of rabies virus has been especially important.

The organization and efficiency of Frances and her staff provided us with the quick answers we needed to maintain our control programs and communication updates with the media. Additionally, Dr. Lindsay Elmgren and his staff have been helping us with an antibody survey in raccoons from areas baited with the V-RG vaccine. Of course, none of this extra survey work done in the laboratory would have been possible without the support and approval of Dr. Alex Wandeler, head of the CER. Dr. Wandeler has long been a collaborator with the MNR Rabies Research Unit and we are grateful for his continued support. We at the Rabies Research Unit wish to extend our sincere gratitude to all these people for their continued dedication and hard work. We couldn't keep going without you!

Mike Allan
Rabies Unit
Trent University
and

Lindsay Elmgren
Center of Expertise for Rabies
Animal Diseases Research Institute
Canadian Food Inspection Agency
Nepean, Ontario

HUMAN DEATH FROM RABIES IN QUEBEC: FIRST IN CANADA

A nine-year-old boy died of rabies in a Montreal hospital on 9 October 2000. The boy was in contact with a bat in August, while at a cottage near Montebello on the Ottawa River. The virus was identified as that most usually seen in the silver-haired bat (*Lasionycteris noctivagans*). This is the first human case of rabies in Canada since 1985 when a man infected in Alberta died in hospital in British Columbia. That infection was also due to a virus of bat origin. It has also been a bad year in the USA, where five people have died of rabies, and four of those succumbed to infections that originated in bats.

It is hard to see just how rabies in bats should be explained to the public. On one hand, a majority of human rabies cases in the USA and Canada are virus of bat origin, and in over half of those cases there is no known contact with a bat. On the other side of the equation, bats are common; humans are in contact with them every year, but only very few humans become infected with rabies from bats.

If you know anything about population dynamics, it is actually surprising that rabies manages to survive at all in bats, yet North America has more distinctive forms of rabies in bats than in terrestrial species. Bats reproduce very slowly: Little brown bats (*Myotis lucifugus*) in Ontario do not become mature until about five years old, then they have one young a year. They live up to 30 years in the wild. Thus bats, which have about 1/4 the body mass of mice, have reproductive biology more typical of large species such as black bears. The reason it is important to know this in the context of rabies, and survival of rabies in the wild, is that if rabies killed

a large proportion of bats every year, the bats, and rabies, would become extinct. The replacement rate of bats in the wild is so slow that bat populations cannot sustain mass epidemics so rabies must spread rather slowly in bats. How this slow spread occurs among bats, some of which live in dense colonies, is not understood at all.

There might be, very roughly, three to six million bats in southern Ontario. If you measure southern Ontario at 100,000 km², this means 30-60 bats/km². When I consider that I can see five to ten bats around my yard light on a summer evening, these guessed estimates seem, if anything, low. In all of southern Ontario, we normally have 15-45 rabid bats confirmed each year. Although I am convinced that most rabid bats are never submitted for diagnosis, these low numbers still indicate that rabies is very rare among bats. Even when a rabid bat is found close to an established colony of bats, most of the colony live on. Big brown bat colonies in summer most commonly comprise 50-150 individuals, so you might expect that there would be more than one dead or dying bat found if rabies gets into a colony. That does not often happen.

So how should we "sell" bats to the public? On one hand, they are very useful insect eaters. They are pretty unobtrusive, although larger colonies in old buildings can cause a mess and smell. Some bat species are becoming rare, and need active conservation measures. On the other side of the coin, rabies from bats kills humans. However, look at the comparative risk: There have been fewer than ten human deaths to rabies in all of Canada in the past 50 years (0.2 per year). Maybe 50 times more humans (10 per year) have died from being struck by lightning during that time frame! Rabies, however frightening, is a very uncommon cause of death.

I am on the side of conserving

bats. I have two bat houses on my property, but neither has been occupied yet. But, however friendly I may be to bats, I draw the line at handling them without gloves, and I have tried to make my house bat-proof, so they do not live in my own living space.

The Centers for Disease Control (CDC) and Prevention in Atlanta, Georgia, have issued instructions that, if you are in the same room as a bat, and cannot have that bat tested for rabies, you should seek post-exposure vaccination (PET). This recommendation is the best that can be made given the observed facts. More than 80% of human deaths due to rabies in the USA (excluding cases where the person was infected outside the US) are due to bat variants of rabies. Usually, the person had no knowledge of contact with a bat. Thus, a bat close to you may be dangerous, but only very rarely. Implementation of the CDC recommendation resulted in an increase from less than 100 PETs per year in New York state in the 1980s, to over 1500 per year in recent years. There have been two human deaths to rabies in the state in the past 40+ years, and one of those two people was actually infected in Connecticut. That means that almost all the recent treatments may have been unnecessary, but it is impossible to say which encounters with bats are dangerous, so there is no easy solution in deciding what constitutes an exposure. The sobering feature of this is that a single course of post-exposure treatment in the USA costs \$1600-2800 US.

Start on the other side of the question: which bats are obviously risks? In a previous Rabies Reporter we published an account of a silver-haired bat dropping from the ceiling of a cottage onto a person, and "attacking". Obviously that was a subject of concern, and it was no surprise that the bat tested rabies positive. I have submitted two big brown bats (*Eptesicus fuscus*) for testing. The first could not, or would not fly, but gave a peculiar

scream, which I rated as somewhere between the buzz of a rattlesnake and the higher pitch of an insect. The second was hanging on the wooden siding inches from the handle of my front door when I came home from work one day, uttering the same strange buzzing scream. They were both rabies positive. A couple of years later I helped my local bookshop by removing a little brown bat that was flopping around on the floor. It was negative when tested for rabies. I use gloves or a plastic bag if I have to handle a bat. I prefer to use a screw-top bottle to catch bats that can't or won't fly.

There must be literally hundreds of instances where a bat flies around inside a cottage or old farmhouse. If you know there are bats in the attic, it is surprising how infrequently the bats get into human living space. They prefer their own confined space, and, perhaps fortunately, prefer temperatures in their roosts that humans find terribly hot. So the bats do try, from their side, to avoid humans. Perhaps, bats which break that rule are more likely to have something wrong with them? They certainly are to be avoided.

Bats out of doors, behaving normally, are not likely to be dangerous. When they are unable to fly, avoid them, or capture them without handling, and send for rabies testing. Live and let live, but don't get friendly!

Rabies is so rare among bats that wholesale killing is not a useful option. There are too many bats, too thinly scattered, for killing to eliminate rabies, and an overwhelming majority of bats we encounter do not have rabies.

Charlie MacInnes
Rabies Unit,
Trent University

BAIT DROPS: SUMMER AND FALL 2000

New York 2000

Wednesday August 16

It was a perfect day for baiting. The sky was clear and the weatherman was predicting a warm, calm, sunny summer day. OGC landed at Peterborough airport to pick up Kim Bennett and Andrew Silver while OPG flew directly from Sudbury to Ogdensburg. All other Rabies Unit staff drove in a convoy from Peterborough to Ogdensburg, New York and arrived just in time for lunch.

By supplying our own vehicles, we would not need to rent vehicles to transport crews from the motel to the airport. The afternoon was spent setting up radios for flight watch, training crews, loading baits, and initiating a pilot new to the baiting program on the uses and abuses of GPS. With nice weather and efficient crews, we managed to complete 1 flight in each aircraft distributing 42,800 fishmeal polymer (FP) baits.

Thursday August 17

Baiting crews awoke to find the sun peeking through the fog. After numerous phone calls by Laura Bigler in the previous months, it had been arranged in the previous couple of days that the first flights of the day would bait Fort Drum. Fort Drum is a military training base with live firing ranges which must cease fire while we are baiting the area. Both aircraft were loaded with FP baits and sent on their first mission of the day. Fort Drum is a large military base consisting mostly of uninhabited terrain with a small congregation of buildings and people at one end. Both aircraft completed their flights and returned to Ogdensburg as the fog was starting to burn off.

OGC had to have the bait machine converted so that it could drop Linhart sachet (LS) baits. OPG carried on with more FP flights and managed to complete an additional 3 flights. After slight modifications, OGC was ready for action and left for its first LS flight only to have to abort it for fog in the

hills. OGC returned and was sent in another direction and completed 3 flights. A total of 78,666 LS and 118,932 FP baits were distributed.

It appears that not all animals are patient though. As a small group of us were supervising the burning of the garbage at the airport, we noticed a coyote wandering around by the airstrip. Presumably it had heard about the free lunch and wanted to be first in line.

As the baiting staff returned to the motels and headed out for supper, the engineers remained at the airport to do some adjustments to the front landing gear on OGC so it would be ready for flying again the next morning.

Friday August 18

It was another sunny day. Three days of clear weather in a row had to be a record for this summer. OPG completed 3 flights and distributed 72,937 FP baits while OGC completed 4 flights and distributed 94,777 LS baits.

NY State Troopers showed up at the airport during the morning. Although there were concerns about how many baiting staff were going to be arrested, the State Troopers were only interested in having us look for marijuana fields while we were baiting. I was suspicious of two of our younger pilots who denied knowing what marijuana looked like.

The only glitch to the day was that Ogdensburg airport ran out of fuel and the planes were forced to refuel at another airport. A new supply of fuel arrived at the airport that evening.

Saturday August 19

The first flight for OPG required us to either fly directly through Fort Drum airspace to get to the first waypoint or to fly around the base before we could begin baiting. Pilot Bob Beaulac contacted Fort Drum for permission to go through the center of the base. Permission was granted. Fort Drum was on a training holiday! This was much to Laura Bigler's consternation when I informed her on our return. She had been making 2-3 calls each day for the last month trying to arrange a date when training could be shut

down for a couple of hours (not the whole day) and had been repeatedly told to call back; they would try to arrange something.

OGC and OPG each completed 4 flights and dropped 94, 249 LS and 106,252 FP baits with the assistance of 2 Mohawk Conservation Officers and another individual from the Akwesasne Indian Reserve in Ontario. Crews not busy flying attended a local auction sale at one of the airport hangars.

Sunday August 20

The final day of baiting in Ogdensburg had arrived. OPG completed 3 flights with FP baits and OGC did 1 LS flight and 1 FP flight dropping a total of 26,327 LS and 97,158 FP baits. The State Trooper returned to the airport today and decided to fly one flight with us on his day off. The flight was only an hour and a half long but covered as many of the American islands in the St. Lawrence River as we could. Unfortunately for him, the islands are not lined up in a nice row so the pilot had to constantly turn the aircraft so we could bait the island lengthwise. Larger islands were circled so that more than one pass could be made. The goal was to put as many baits as possible on the islands as they were the final barrier between New York and Ontario. OPG succeeded in distributing 12,480 baits on the various islands and returned to Ogdensburg with a very sick State Trooper and a pilot tired of flying.

OGC had finished flying first, so the crews were busy packing up equipment in preparation for the trip to Dunkirk. OGC and the staff who were driving departed for Dunkirk. OPG was delayed a few minutes as they waited for their crew to finish eating lunch. Neil Ayers had rented a car in Dunkirk so he became responsible for shuttling crews to the motel for check-in as the other Rabies Unit staff were still in transit. Evidently, Neil had left his GPS in the aircraft as he had to confirm directions to the motel before he left with his first carload of passengers who had never been to Dunkirk before.

Meanwhile, engineers and Rabies Unit staff were busy converting the bait



Figure 1. Map of the Bait drops along the St. Lawrence River in August and September 2000. This shows all the baiting done to eliminate raccoon rabies from Ontario, and to prevent reinvasion across the St. Lawrence. The unbaited zone from Kingston to Iroquois, which shows up as a white band, is the 2000 TVR zone. There is no need to drop baits on top of successful TVR!

machines to drop LS baits, setting up the radio antennas and unloading the equipment from the airplanes while we waited to be driven to the motel.

Monday August 21

A new day, a new airport, and new volunteers to train. Fortunately several of the volunteers had participated in previous years, so training was quick and all 8 flights were completed in the first day dropping 166,072 LS baits.

Everyone was in the spirit to get the job done. Chad Millen, an engineer with the Air Services even volunteered to go baiting. He completed the 2 hour flight admirably and returned with no little white bags.

Tuesday August 22

It was time to move to the final airport in New York - Niagara Falls. There were only 5 flights to be completed so everyone was getting anxious to go home. OGC got a headstart on the job and baited Grande Island on the way to Niagara Falls. Unfortunately, co-pilot Jeff McClain assumed that he could not navigate the flight and no one told him otherwise. He hopped in the back of the

aircraft and started complaining about the hard seats before we even took off.

Several of the Rabies Unit staff had him convinced at the start of the flight that he had to count the number of revolutions of the drum. We told him we were going to be nice and weren't going to make him handle any of the baits. He quickly caught on though that we were just trying to make him sick.

The remaining 4 flights, over many of the local vineyards, were completed without incident and 100,515 LS baits were distributed on the final day. Pilot Dean Gill seemed rather concerned though that he had lost his touch. His very last flight in New York was his only flight where one of his passengers did not get airsick.

Between flights, enough lunch to feed a small army arrived at the airport. It seemed that every fast food restaurant in the area had provided food, dessert, and beverages.

By late afternoon, Rabies Unit staff were driving back to their offices in Peterborough and the pilots and en-

gineers were returning to their home bases as well.

The entire mission was a remarkable success in that we had no down time from bad weather. Some flights were flown in fog and light rain but nothing too serious. It was a job well done by everyone.

The next bait drops on the schedule were the eastern Ontario drops to help contain the raccoon rabies incursion. These resulted in just under 500,000 baits being dropped, as shown in Figure 1. You will note that the flight line spacing experiment was continued during this operation. The lines in the center on the Ontario side, as well as all lines on the New York side, were spaced 0.75 km apart. The wider line spacing was 1.5 km apart. Preliminary data suggest that acceptance by raccoon was almost identical on the two regimes. We replicated this experiment in western Ontario.

There are other experiments built into these operations. We are comparing the success of Fishmeal Polymer (FP) baits dropped on the New York side of the St. Lawrence with that of Ontario Slim baits dropped on the Ontario side. Laura Bigler is comparing raccoon vaccination rates by FP baits with those by Coated Sachets.

VRG Baiting in Eastern Ontario and Quebec

Tuesday September 5

Rabies Unit staff departed Peterborough en route to Smiths Falls for the second round of VRG baiting in eastern Ontario. After stopping in Perth for lunch, everyone arrived ready for a busy afternoon. Neither the fuel truck or the reefer containing the baits had arrived yet so the Rabies Unit staff got serious and hauled out the frisbee and a deck of cards to play euchre with. After what seemed like several hours of waiting around, we decided to return to the motel to check in, stroll through downtown Smiths Falls, have supper, and then some staff would return to the airport around 7:00 to position the reefer and fuel truck.

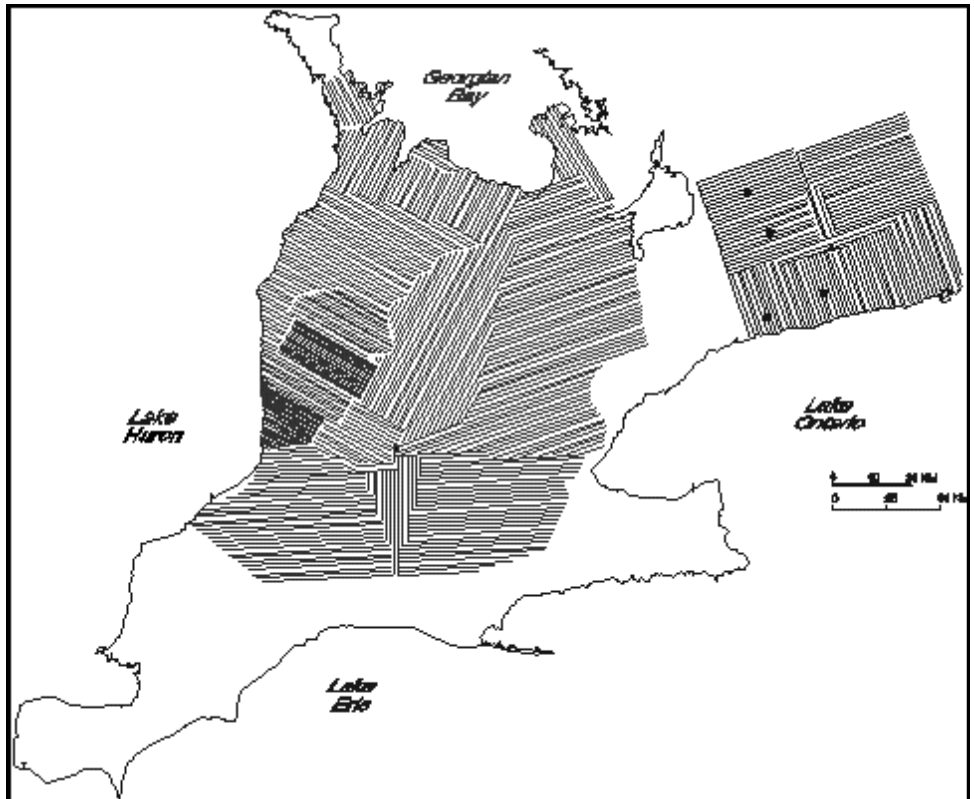


Figure 2. Map of the fox baiting operations in September 2000. All flight lines were spaced 2 km apart, except in the experimental areas in Huron and Perth Counties, where the lines were 0.75 and 1.5 km apart, to measure acceptance by raccoons.

Dinner was a semi-elaborate affair starting off with salad served with a generous helping of aphids. After explaining to our waitress why several of us did not wish to eat the salad, both the chef and the waitress came to apologize and offer us soup instead. The chef had explained that the aphids were probably from the broccoli which was difficult to clean thoroughly. Everyone managed to keep a straight face while they declined the soup of the day - cream of broccoli!

Wednesday September 6

A leisurely 8:00 breakfast for arrival at the airport at 9:00 seemed like a vacation to our experienced baiting staff. We began the day by loading tubs with the assistance of the TVR staff as they arrived. After the bait tubs were loaded and all staff were present, safety briefings and baiter training commenced.

Lunch was served as the first flights departed. The motel had provided lunch for us consisting of salad and

stew. Surprisingly, no one who had dined on aphids the night before touched the salad.

OGC, OGB, and OPI departed on the first flights. Two of the aircraft completed the flights without incident but OGB was having problems with the bait machine. The baits were sticking to the drum and causing the machine to jam. OGB returned to Smiths Falls where the bait machine was cleaned and then went back out to complete the flight. Shortly after departure, it was apparent that the problem had not been solved. The bait machine was still jamming and the crew in the back were manually pulling the baits off the drum and dropping them out the chute. OGB was ordered to return to Smiths Falls where the baits were replaced with fresh ones and again departed to complete the flight. Although the baits had been sitting outside in the sun for the past 2 or 3 hours, they weren't creating problems

in the other aircraft so this wasn't considered the cause of the problem. The previous day, several tubs of baits had been driven up from Peterborough and it was possible that they weren't yet cooled enough. No one was sure whether these baits had been put on the aircraft or not. Andrew Silver decided to go up on the flight and discover exactly what was going wrong. Despite the new baits, OGB continued to have problems. Andrew was perplexed by these problems in one aircraft only. He thoroughly checked the bait machine and discovered that one of the heater bars was not in the proper position. This was allowing the first baits to get caught between the drum and the heater bar which coated the drum with wax and prevented subsequent baits from dropping out of the aircraft. With some minor adjustments in flight, the problem was solved and the flight was finally finished.

Thursday September 7

Breakfast at six before staff headed to the airport for the first flights. One of the first flights headed to Ottawa and surrounding area. Due to the early morning airport traffic at Ottawa, the baiting crew had an excellent opportunity to tour the nation's capital by air. OPI was repeatedly ask to alter its course or wait before starting its next flight line because of incoming and outgoing air traffic.

The Rabies Unit was conducting an experiment on flight line spacing so some of the plots were being flown at 0.75 km flight line spacings and the remainder were being flown at 1.5 km flight line spacings to determine if there was a difference in bait acceptance by raccoons. All areas were being baited at 75 baits/km². For the flights with 1.5 km flight line spacings, an extra crew member was required in the back of the aircraft to keep up with the higher bait rates. This resulted in some staff doing back-to-back

flights.

In early afternoon, we received a call from the OPP. They wanted our assistance in searching for a vehicle which was involved in a hit and run accident and had disappeared in the Winchester Bog. Using the approximate location that the police had given us, the UTM co-ordinates for the location were determined and they were entered into OGC and OPI which were heading in that direction for the next flight anyway. After several minutes of searching, our airplanes were unable to locate the vehicle and the normal flight was resumed.

When baiting was completed for the day, the bait machines in OPI and OGC were converted for dropping FP baits. Both aircraft were being sent to Bromont, Quebec the next day to complete baiting operations there.

Friday September 8

OPI and OGC headed to Quebec while OGB remained in Smiths Falls to finish baiting in eastern Ontario. After landing in Bromont and being welcomed by staff, a quick training and safety session was held so the first flights could be finished before the media session scheduled for 10:30. Michel Pigeon wanted one aircraft at the airport when the media arrived but the planes would either have to sit for an hour waiting on the media or do the first flight and wait before starting the second flight. OPI was designated to be there for the media since it had the shorter flight.

Murphy had other plans. With 3 Quebec volunteers and 1 Ontario staff in the back of the aircraft, OPI was forced to abort mid-flight and exchange 2 passengers who had become airsick. OGC was now designated for media coverage. The final 2 flights were dispatched as the weather started to deteriorate. OGC had done its first flight in the mountains while the weather was fine.

OPI had decided to do its flight in the mountains second so that there would not be any conflict between the aircraft. This meant that the second crews had a much rougher flight.

After the flights were finished, crews were fed and the planes were loaded to return to Ontario. OPI and OGC arrived shortly after OGB had finished its last flight in Smiths Falls.

The bait machine in OGB had to be converted for FP baits before it could head to Ohio the following week. While some staff worked on that, others were busy packing up the supplies and equipment for the trip back to Peterborough.

Our mission was completed and we returned to the motel for supper. Pilot Al Quinn acted as host for the evening and kept the staff entertained with games of euchre and yahtzee with music supplied by Country Music Television.

Saturday September 9

Rabies Unit staff drove to Peterborough after a 7:00 a.m. breakfast. The pilots and engineers were also going to Peterborough but waited until later in the morning to depart. The pilots and engineers would be spending 3 days in Peterborough before they departed for the Ohio baiting program.

Their free time was spent visiting, sight-seeing and catching up on some sleep. One engineer even went as far as getting a tattoo during his visit to Peterborough.

As soon as this work was done, the aircraft flew to Ohio to do the fall drop there. The operation went smoothly, and the planes were back in southern Ontario in lots of time to do the fox bait drops. The Rabies Unit gathered in force in Stratford on 17 September, and the bait drop began next day.

Monday September 18

The Ontario fox bait drop went incredibly well. By Wednesday, September 20, baiting from the Stratford airport was complete and 633,096 baits had been dropped in southwestern Ontario. It was a busy time, but every-

thing went so smoothly we all slept soundly at night!!

Thursday September 21

We were on the ground most of the day, due to bad weather. However, the baits were already out, so we could put our feet up!

Friday September 22

This was the day of the Peterborough drop. There were only 8 short flights. The planes left Stratford ready to bait, and completed their first drop on the way to Peterborough. The rest of the baits arrived by truck, and by mid-afternoon 140,832 baits had been distributed. The planes went home, although OGB went to Timmins full of baits, as explained in the next story.

Thanks to all team members for making this season pass so smoothly. See y'all next year!

*Beverly Stevenson
Rabies Unit,
Trent University.*

OUTBREAK NORTH 2000

The Arctic fox strain of rabies which made southern Ontario the North American record holder for 40 years came from the Arctic. The original invasion moved down the Quebec side of Hudson and James Bays in the 1950's. There was one peak (69 cases) in the Cochrane area in 1955, and three in the Little Clay Belt farming country between New Liskeard and Kirkland Lake, 1955-56 (10 and 12 cases), 1959-60 (29 and 35 cases), and finally 1964-65 (11 and 22 cases). After 1965 there were 0, 1, or 2 cases until 1972, then no more rabies until 1991! What is especially significant about this history is that rabies died out on its own. There were no bait drops for rabies control before 1989. The first drop in the north occurred in 1992.

Rabies came back to the north in the '90s. The first outbreak actually came north from eastern Ontario, according to Dr. Susan Nadin-Davis of ADRI, who studied molecular sequences of rabies virus from different places. That outbreak was largely in the Timiskaming district. There were 2 cases in 1991, at the end of the year, then 113 (108 in Timiskaming, 5 in Cochrane district) in 1992, but down to 14 (all in Cochrane) in 1993! We dropped baits in 1992 and 1993. The 1992 drop was certainly needed, although number of cases

dropped sharply after May, and baits were dropped in September. In 1993, in retrospect, all of the cases had occurred before the bait drop happened. Those two events taught us to monitor case numbers carefully in the north. Northern outbreaks tend to last less than two years, and stand a very good chance of dying out naturally.

Rabies appeared on the Hudson and James Bay lowlands in the early 90s, after a handful of cases were seen around Churchill, Manitoba. It is next to impossible to figure out

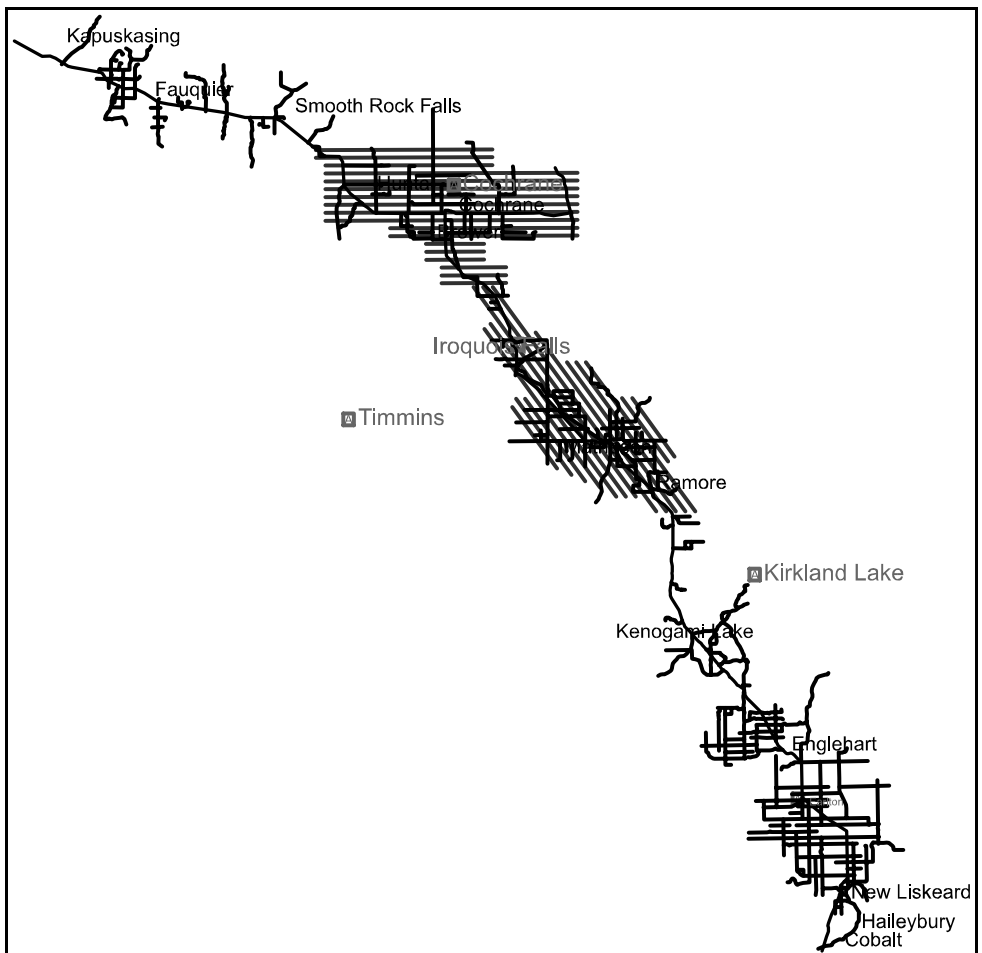


Figure 3. Map of the bait drops in northern Ontario, done on Saturday, 23 September, 2000. I apologize for the lack of a map of the cases in the area, but technology failed to produce a base map which would print in the Rabies Reporter format. In addition, case locations are not, for a variety of reasons, recorded as precisely in northern Ontario as further south, so all case maps are tentative. In addition to the outbreaks around Cochrane and Iroquois Falls, there was a cluster of cases north of Authier, in Quebec due east of Cochrane, as well as scattered cases further north.

what the situation is on the lowlands, because there are very few human residents, and those are concentrated in two settlements for much of the year. There have been one or two cases each year during the 1990s at Peawanuk, and occasional cases in some of the James Bay settlements as well. In 1996 and 1997, some of this activity made it to highway 11 around Kapuskasing, and spread eastward as far as Cochrane. Baits were dropped in 1997, from west of Kapuskasing to the farmland around Cochrane.

In 2000, there were cases in the Hudson and James Bay areas early in the year, including a cluster at Fort Severn on the Hudson Bay coast, mentioned in the last Rabies Reporter. Cases started to appear in the farming country further south. The first was near Tunis, along highway 11 between Iroquois Falls and Cochrane. Then cases appeared in and around both Iroquois Falls and Cochrane. There was also a flurry of cases in July near Authier Nord in Quebec, due east of Cochrane.

In July, when we were making decisions on planning the fall bait drops, there had been very few cases in the north, and we opted not to have a northern bait drop. However, at 1300 on Friday 22 September, Peter Bachmann informed me that there would be 45,000 baits left from the southern Ontario drop. Where, he asked, should we put them. Northern Ontario was the obvious place, but it was not that simple. Chris Davies had already told northern managers that there would not be baits put in the north, and there were several permissions that had to be obtained. The cell phones were busy that Friday afternoon, but by 2230 we had permis-

sion from the north, from cabinet office and from MOEE; we had draft press releases on their way, and all that was needed was a bait drop. OGB headed home to Timmins on Friday carrying all the baits, flown by Dean Gill and Frank Aquino, accompanied by Andrew Silver, Kim Bennett and Holly Simpson of the Rabies Unit. Despite mediocre weather, two bait flights were completed on Saturday 23, as shown in Figure 3. Bev Stevenson drove north on Saturday to pick up the RRU staff, and everyone was home by Sunday evening.

Now, it is a matter, as it was three times in the past decade, of waiting to see if the outbreak will die down, or whether it will increase, or spread to new areas, and require that more baits be dropped.

There was no rabies after the bait drops in 1992, except in the Cochrane area, and again, none after the 1993 outbreak. A similar pattern happened in 1997. This makes it very tempting to claim that the bait drops were very successful. However, careful scrutiny of the case records gives a different picture. In 1992, in the Little Clay Belt, there were 108 rabies cases, but the very last of these occurred in June. We dropped baits in September. So, did those baits snuff out the last of the rabies, which is quite possible, or was it already gone before the drops? We will never know the answer to that. The cases in 1993 showed a similar pattern: there was only one case from July-September, compared to 14 earlier in the year. The baits were dropped in September, then there were no more cases. It is possible that rabies would have increased again in 1994, but that is only a guess. The picture was again simi-

lar in 1997, with a small flurry of cases in early summer, but nothing after the bait drop. Remember, too, that when we drop baits two months after the most recent case, we do not know whether there will be additional cases after the drop. It is only possible to identify the last case when looking back, a year or more later.

Events in 2000 were rather different. There had been only 5 rabies cases in the Cochrane-Iroquois Falls area up to the end of August. We made our bait drop plans in late July, and decided that the outbreak was so small that it would likely die out. So no baits were allocated. Then during September, things really heated up! Hence, when the 45,000 baits became available, there was no question about where to put them.

Since the northern bait drop there have been a lot more rabies cases. These will be discussed in more detail in the next issue of the Rabies Reporter. There is, of course, intense interest among residents and elected councilors in the Cochrane area, as this is the largest number of rabies cases they have seen since 1955! They would like a firm promise of another bait drop in 2001. The Rabies Unit, based on the history related above, has said let's wait and see. If there is still rabies in the area, we certainly will drop baits.

It takes some explanation to justify our desire not to drop baits before July. The reason is quite simple. We want to make sure that the foxes born that season are also protected against rabies. It is not until July or later that a majority of young-of-the-year are mature enough to react to vaccine.

Study of events in the Quebec district of Abitibi is very illuminat-

ing. In 1997, there were more cases in Quebec, due east of Cochrane, than there were in Ontario. That outbreak died out with no treatment at all. The pattern was repeated in 2000. There were 8 cases in May-August, mostly around the village of Authier Nord. There has not been a subsequent cases in the whole area there, since 11 August. Meanwhile things were really heating up around Cochrane in September and October.

The conclusion is that all past outbreaks in the farming country of northeastern Ontario have been of short duration. Although there are skunks in the region, and there are always a few rabid skunks, Arctic fox strain rabies does not hang on in skunks in the north as it is currently doing in southern Ontario. So our approach to rabies control in the north is different in the fine details than further south. The key to the northern situation is to keep a very sharp watch on cases. I wish we could increase the probability that rabid foxes are submitted to the laboratory. That would make planning control measures much easier and more reliable.

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RABIES IN ONTARIO DURING THE THIRD QUARTER

The summer of 2000 was pretty boring in terms of rabies in Ontario. As the tables and maps show, raccoon rabies in the Brockville area produced new cases at a very low rate. The skunk problems in western

Ontario seemed to diminish, but there was renewed activity in Peterborough. In northern Ontario, a new outbreak began. It is important to remember that this issue of the Rabies Reporter, which is very late, covers the quarter which included the months of July, August and September. Overall, the number of cases right across the province was so low that no dramatic conclusions can be drawn.

The raccoon rabies situation in the Brockville area became much clearer during the summer. There were no new cases on Wolfe Island since 16 January, so it appeared that that incident was over. The beginning of the third quarter was very promising on the mainland, too. After 12 June, there were no new cases until 7 August. In the rest of the third quarter, there were only five more cases, all on the southwestern part of the infected

area (Figure 4). The Point Infection Control tactic seems, therefore, to have had major influences towards slowing and, hopefully, eliminating the outbreak. There has been no spread eastward from the easternmost first case of 1999 which occurred on 14 July. The spread northward from the third 1999 case has been very slight, less than 5 kilometers. The major spread has been westward and southwestward from the second case of 1999, and even that has not progressed any distance. In New York state, the raccoon rabies front advanced 40-80 km per year. The distance from the 26 July 1999 case at Jellyby, to the western edge of the infected zone 14 months later was 22 kilometers. There will be more about this situation in the next issue.

In western Ontario, the area covered by rabid skunks shrank a bit, and the number of cases was down compared to the same quarter last year. Unfortunately, the "hot" start to the

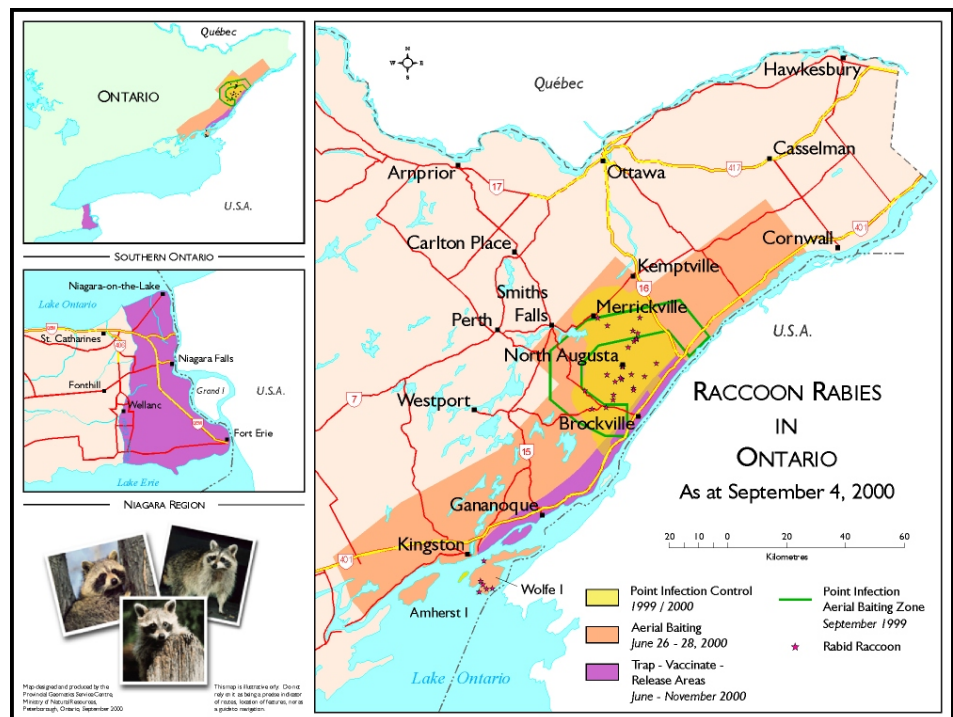


Figure 4. Raccoon rabies in eastern Ontario to September 2000. Note that there has been no spread eastward from the 1999 cases, and very little spread northward. The westward spread by the end of the third quarter was about 20 km from the westernmost case in 1999.

year 2000 resulted in the total number of rabid skunks for 1 January-30 September 2000 being slightly larger than a year ago. However, most of those cases were in the first quarter, which saw more cases reported than the second and third quarters combined. The total number of rabid foxes was down slightly, but all except two of those occurred in the third quarter. I am really looking forward to seeing the data for the fourth quarter, to see if the skunk situation may finally be shrinking. You can't be sure from the third quarter results, the numbers are so small that only complete absence will signal a significant change.

An old outbreak reappeared, when two skunks with Arctic fox strain rabies were taken in Peterborough during the third quarter. Cases trickled in later in the fall as well. Most of these were within the city limits of Peterborough. In fact, the first four cases came from an area of roughly three city blocks. There had been a single raccoon with fox strain taken in April 1999, and we hoped that there would be no more fox strain east of Toronto. There will have to be more baits dropped in that region in 2001. Once again, I certainly wish we had a bait that would immunize skunks reliably.

The fourth rabies event in the third quarter was described in the article on the northern Ontario outbreak. Again, by the end of the third quarter, this was still a very small event, but it expanded in the fourth quarter, as will be described in the next issue.

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RACCOON RABIES IN NEW BRUNSWICK

On 9 September 2000 a skunk submitted from Heathland, Charlotte County, New Brunswick was confirmed rabies positive. The virus was identified as raccoon variant. Heathland is close to the St. Croix River, which contains the border between Maine and New Brunswick. There were two rabid raccoons reported from Calais, Maine, one on 15 May, and another on 24 August.

Through the rest of the fall, several more cases of raccoon rabies virus have been confirmed on the New Brunswick side, but there have been no additional cases in adjacent parts of Maine. Roughly half of these cases were skunks.

When raccoon rabies swept across New York, skunks infected with raccoon virus mostly did not appear until about a year after the first rabid raccoons. Might that observation indicate that this outbreak in New Brunswick has been there for some months without being detected? Is it significant that we have not yet had a single rabid skunk in the Ontario outbreak of raccoon rabies?

Another line of thinking stems from comments in the last Rabies Reporter about the role of enhanced surveillance in the Ontario outbreak. Roughly half of our cases would not have been reported without the MNR program in the area. Since there has been no comparable effort in either New Brunswick or Maine, is it possible that this eastern outbreak is almost as large as what we have in Ontario?

Currently there is no active control program in New Brunswick or Maine. However, New Brunswick has appointed a wildlife biologist as front line contact, and is

exploring options for control of this outbreak. We hope to be able to report on their program in future issues. There are meetings scheduled for this winter on planning for coordinated attacks on raccoon rabies in the northeast, and I certainly look forward to participation by Canada's maritime provinces.

On 10 August, I met with representatives of the Nova Scotia Departments of Health, Natural Resources and Agriculture, as well as CFIA staff stationed in Nova Scotia. Also present were representatives from Prince Edward Island and New Brunswick. One part of that meeting was a meeting of a Nova Scotia task force to look at risks associated with raccoon rabies, and possible countermeasures.

We have worried in Ontario about hitch hiking raccoons. The Nova Scotians told me that they have a lot of trucks used to transport fish and shellfish to the U.S.A., which come back empty. The outbreak in New Brunswick is roughly 80 kilometers in advance of the main front of raccoon rabies. As mentioned in a previous issue, Calais, Maine is the site of a large lumber mill, and a significant land-fill operation, so hitch hikers are a strong possibility.

We do live in interesting times!

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Animal Rabies Report: July to September 2000

[illegible]

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[illegible]

Animal Rabies Report: July to September 2000

Animal Type	Fox			Raccoon			Skunk			Other Wildlife			Bat			Dog			Cat			Livestock			Totals		
County or Region	#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative	
		00	99		00	99		00	99		00	99		00	99		00	99		00	99		00	99			
Northern																											
Muskoka																									0	0	0
Parry Sound																									0	0	0
Nipissing																									0	0	0
Cochrane	8	14					1	1							2	3									11	18	0
Timiskaming																									0	0	0
Algoma																									0	0	0
Thunder Bay																									0	0	0
Rainy River																									0	0	0
Kenora																									0	0	0
Regional Totals																											
Eastern				6	35	4							8	13	8										14	48	12
Central						1	1	1	1				6	6	4										7	7	6
Western	6	7	10				7	32	27				2	3	3	2	2	1					5	11	17	49	52
Southern									1				7	8	1										7	8	2
Northern	8	14					1	1								2	3								11	18	0
TOTALS	14	21	10	6	35	5	9	34	29	0	0	0	23	30	16	4	5	1	0	0	0	0	5	11	56	130	72

Notes for this quarter:
Bats were 2 little brown (Wellington and Durham), 1 silver-haired (Niagara), and the remainder big brown bats.
The raccoon in Central region in 1999 was infected with arctic fox strain rabies.

