

The Rabies Reporter

November 1998

Volume 9, Number 3

ISSN 1186-8961

In this issue:

- Third Quarter Rabies Cases
- Fine Tuning Flight Lines
- Bait Drops in 1998
- Is It Distemper?
- It Happened During TVR
- Sectioning Teeth

THIRD QUARTER RABIES CASES IN REVIEW

Rabies cases during the third quarter were up in some categories and down in others. The big disappointment was that the year was no longer free of rabid foxes, as it had been for almost 7 months. There were 4 rabid foxes during this quarter, 1 in late July and 3 in August. These were well scattered, 1 each in Victoria, Wellington, Grey and Bruce Counties. Once again, all were in areas which have had some rabid skunks recently, but there is no special evidence to indicate that these rabid foxes were infected by skunks. The story behind the fox in Victoria is interesting. This fox attacked a bitch with several puppies on a rural property. It killed four puppies, and injured others, as well as fighting with the mother. The landowner shot the fox, and put it in his incinerator. He wanted to sell the rest of the puppies. Four days later his conscience got the better of him, and he submitted the fox for diagnosis. Despite four days in the hot July weather, the ADRI team was able to confirm rabies!

Rabies in skunks was down sharply this quarter, from 11 cases last year to 6 this year. However, the total

skunks for the year were only 1 less than last year, as a result of relatively higher numbers early in the year.

A rabid dog in Wellington, a cat in Grey, and single cows in Grey, Perth and Huron all indicated that rabid skunks and foxes are still out there. Indeed, every one of these counties had rabid wildlife in this quarter as well as in one of the last two. The fact that there are still dogs and cats becoming rabid indicates that we all should keep up the pressure on pet owners to make sure dogs and cats are vaccinated.

Rabies in bats was conspicuous, as it usually is, during the third quarter. However, the major source of the larger number of cases is worthy of attention. In July, two small boys in Durham region found a bat that could not fly, and played with it. Not only did the bat test positive for rabies, the incident became front page news. Suddenly an alerted public started to submit sick bats, and the ten cases reported in the region indicated the biggest bat rabies outbreak the region has experienced. Over 40 people received post-exposure treatment, and more were being evaluated. It is, unfortu-

thousand bats living in the region, so rabies does not seem to affect the overall bat populations. I live in Durham Region, and every night there are 10 or more bats hunting insects around my house. I can't tell how many are over my back field, as the animals are harder to see without the lights from the house and yard. Epidemiology of rabies in bats remains an enigma.

*Charlie MacInnes
Rabies Research Unit
Trent University
Peterborough*

HIGH TECH TUNING FOR OUR HIGH TECH FLIGHT LINES

During the summer, Bob Steiss and Jennifer Neish, under the supervision of Bruce Pond, conducted a very important project to improve efficiency of aerial baiting in urban-suburban complexes. The problem was that the base maps on which we draw flight lines are usually two or more decades old. Anyone living east of Kitchener and west of Oshawa, and south on to the Niagara Peninsula can assure you that new subdivisions are springing up every summer. Gloucester Township, east of Ottawa, appears on maps as farmland, but was raw new subdivision when I flew over it in 1989-95. The result, navigators will tell you, is flight lines that result in long stretches with the bait machine turned off, because of housing that wasn't on the map, but is under the flight path this year. In some cases, however, the lines stop before the green space gives way to houses, and the lines should be

HELP !

Please do your best to ensure that any fox or skunk which might be rabid gets to the CFIA-ADRI lab in Nepean. The rabies control team urgently needs to know where the last pockets of rabies are. CFIA district staff have been asked to submit all rabies-suspect specimens. We need all the help you can offer!

nately, impossible to tell whether there really were more rabid bats than usual, or whether the publicity brought in more reports than usual. It is also important to note that there are probably thousands, if not over ten

extended. That usually occurs along municipal boundaries. An additional problem is that there were fewer people available for hand-baiting the urban areas. We therefore wanted to make sure that coordination between the air and ground operations was as close as possible, because former farmland, awaiting development along the edges of cities and towns, is excellent fox and skunk habitat, and can be hard to reach on the ground.

Bob and Jennifer's project was to use Geographic Information Systems (GIS) technology to match the flight lines to the most recent information on where green space and housing actually are this year. For 1998, the best source of digital information was a set of aerial photographs taken in 1995. Towards the end of the summer we were able to look at some current satellite images, but they will not be available for the whole area until next year. Bob and Jennifer brought the air photographs into their computer, and overlaid the maps of our flight lines on them. From these it was easy to see where extra little pieces of flight line would "capture" unbaited habitat. Lucy Brown, the Rabies Unit's flight line expert, made adjustments to the fall's lines. There is a lot of technology involved in making air photographs match actual maps exactly and precisely.

The job of importing photographs is not as simple as it might sound. These files contain a lot of information, and take up a huge quantities of storage in the computer. There was much experimenting to do to find an appropriate level of detail, one which would show the housing we wanted to avoid, but not overload the computer programs.

As it turned out, there were fewer changes than expected needed to our flight maps. Most of the changes were small extensions, sometimes at angles to, the normal flight lines. The most conspicuous of these were in the Hamilton-Burlington area, on the Niagara peninsula, and in north-eastern Scarborough. However, the best of the maps became available only late in summer, so Lucy opted not to make major changes in the orientation of flights to avoid downtown flying. That will be examined for next year.

The positive side is that we have more confidence in our coverage of the highly populated fox habitat which is characteristic of recently abandoned farm fields in areas planned for development in the next decade. And we have a clearer idea of

where hand-baiting can be replaced by extended flight lines.

*Charlie MacInnes
Rabies Research Unit
Trent University
Peterborough*

BAIT DROPS 1998 FAST, EFFICIENT, SUCCESSFUL

The bait drops lasted for nearly a month this fall, and represented the most ambitious operation we have undertaken in our own region. In addition to our own

major bait drop in southern Ontario, and our cooperative ventures in New York, in partnership with the Diagnostic Laboratory of the College of Veterinary Medicine at Cornell University, we dropped baits in Quebec, Vermont and Ohio. The locations of all these drops are shown on Figure 1. The Quebec operation represents a strategic change in an operation we began last year. Whereas in 1997, the purpose of the drop was to prevent movement of fox rabies from Quebec into eastern Ontario, this year we decided to go after the Quebec outbreak itself. The drive behind that was time: fox rabies was hanging on in the Richelieu Valley, east of Montreal. If we could stifle that, we might be able to stop protecting eastern Ontario sooner.

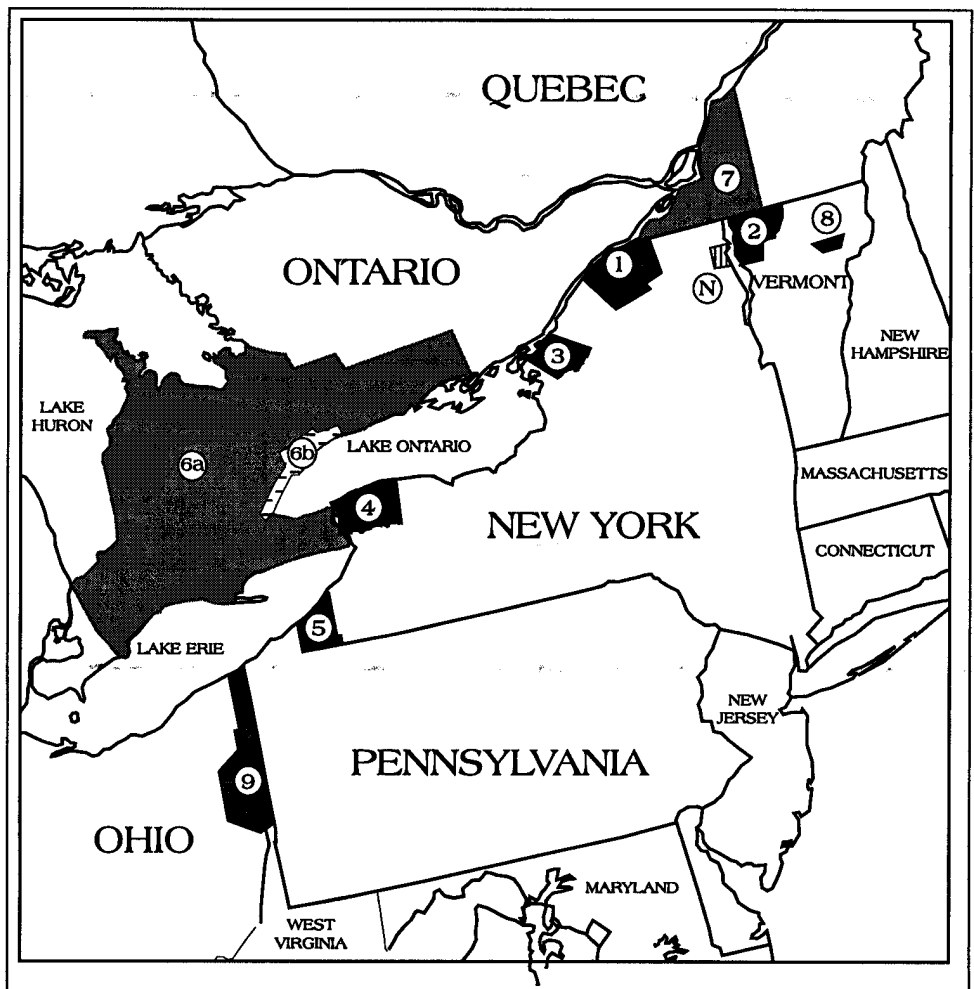


Figure 1. Map showing all the baited areas treated in the fall of 1998. Areas are shown in order of treatment. 1 - Massena NY; 2 - Burlington, VT; 3 - Watertown NY; 4 - Niagara NY; 5 - Chatauqua NY; 6a - Ontario Fox Baiting Area; 6b - Urban Hand-Baiting Area (for fox rabies); 7 - Quebec; 8 - Lyndonville VT; 9 - Ohio (based at Youngstown). The area labelled N is the New York Department of Health project designed to stop raccoon rabies from moving north up the corridor between Lake Champlain and the Adirondack Mountains.

Wednesday, September 9 1998. 0915

I arrived at Peterborough Airport just as OPJ turned final to land, followed in two minutes by OPG. Neil Ayers went to Canada Customs to fill in the paperwork to speed our return, then we were off for New York. We headed straight overland from Peterborough to Belleville, and then followed the Lake Ontario shore to the St. Lawrence. The tour down the length of the Thousand Islands at low level was spectacular. We landed in Massena, NY at 1100. Peter Bachmann was there when we arrived with our support truck. Laura Bigler, head of the New York project, arrived within the hour with a lot of support equipment. Ahh, one small detail, the baits were still in Georgia last evening, but they should arrive tonight. We set up the radios, adjusted the bait machines for the first baits, and went to check in at the motel.

OPJ was manned by two contract pilots, Steve Stackhouse and Jason Karas, neither of whom had flown with the Rabies Unit before. It took both a bit of time to get used to using the ARNAV system with our specialized flight lines system.

Thursday September

10. The Massena drops had two purposes. The first was to provide a block to keep the Morristown outbreak in St. Lawrence County from moving northeastwards along the St. Lawrence. (Morristown is just across the river from Brockville, Massena is across from Cornwall.) The second purpose was to test three baits made by Merial, the familiar oblong fishmeal polymer (FP) bait, a smaller, square FP bait, similar to the Texas gray fox bait, and the Linhart bait, a plastic sachet with a thin coating of attractant (Fig. 2). As we were completing the final details for first flights, such as safety briefing and bait machine training for the volunteers, up drove a transport full of baits, and we were in business. Most volunteers came from the St. Lawrence County Health Department, but there were also some students from a veterinary technician course at a local

college. The first two flights took off, then promptly turned back. Navigation problems cropped up, the same that we encountered in Cornwall a year ago. A hurried (or was it harried?) computer mapper had forgotten to change the UTM zone in the computer program which interprets the maps, and produces the navigation files which we upload to the computer. Twenty minutes of hard work by Janet Morden from Queen's, and we were on our way again. That was the last glitch of the day, and we completed 6 flights before

and the baits were in bags of about 267 each. The loading crew piled a bag of baits, in a sort of windrow, between each pair of marks on the belt. The navigator turned the machine off and on in the usual way, although the rate settings had to be modified, and the only count of baits gone was made by tallying the empty bags at the end of each flight line. Everything went so smoothly that by the time I landed in OPJ, OPG was already on the way to Burlington. We landed, cleaned up, packed up, and headed to Burlington ourselves. We had a fine tour over the northern Adirondacks, and were in the motel in Burlington by 1430. The afternoon off was more than welcome. When you are dropping baits, weekends happen only when it rains.

Saturday, September

12. The day started OK, except that all the pre-printed flight sheets had an error, because they had been done with the line spacing of the last time we baited in Vermont. Then the software would not print the revised sheets, but eventually we got off the ground, into a light rain. Eldon and I drew a flight which followed the contours along the western side of the Green Mountains. The lines were made up of several short (less than 3

1730.

There was an unusual, and normally pleasant, hazard at Massena Airport. Several hundred Canada geese were feeding on the grass along the runways. On one flight, as we were taxiing toward the take-off end of the runway, we had to warn an incoming KingAir of geese actually walking across the runway he was about to land on. He made a very short landing, but still scared a group of geese onto the runway we were about to use. Eldon took OPG up steeply, so we went over the geese as they scrambled to get out of the way.

Friday September 11. This was a perfect day for baiting, sunny, cool, almost no wind. This was the day that we dropped the Linhart sachet bait. Those baits will not fit the regular bait machine, so we took off everything except the conveyor. There were four lines drawn on the conveyor,

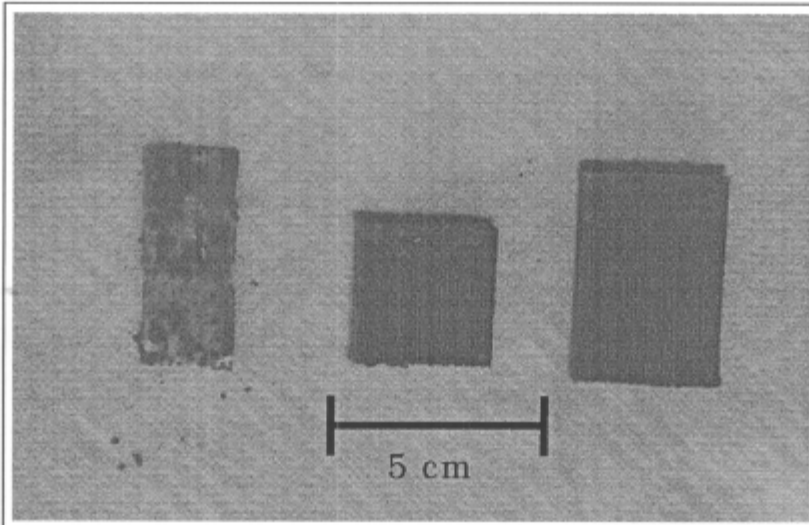


Figure 2. The three U.S. baits dropped on the Massena NY baiting area. On the left is the Linhart bait, a plastic sachet containing V-RG, and thinly coated with an attractant mixture. On the right is the oblong Fishmeal Polymer (FP) bait which has been used widely in the U.S.A. In the center is the new square FP bait, the same shape as the dog-food bait used for gray foxes in Texas, and now favored as potentially a better raccoon bait.

mile) segments, which caused navigation problems because the ARNAV system takes 30-60 seconds to advise the pilot of upcoming turns, and the normal flight data are unavailable during that time. Since we were also going up and down to avoid hills up to 600' above the valley floor, our speed was changing in a range of 120-170 knots, which meant changing the bait drop rate between 4.1 and 6.2 baits a second. We kept flying in and out of rain showers, so the visibility was going from good to bad and back every few minutes.

After that, everything went well, until the base in Burlington got a relayed call from OPJ. Bev Stevenson, trying to clear a jam on the bait machine, had got a squirt of vaccine right in the eye. Steve Stackhouse landed promptly at the nearest airport (Franklin County, Vermont, between Highgate and Swanton) and called

for advice. OPG relayed this to us by climbing high enough to make an effective FM connection to Burlington, so by the time the OPJ crew called, Laura Bigler had already telephoned Miguel Escobar of Merial, at home (Saturday) to ask for advice. When OPJ called, we had the advice to wash the eye thoroughly, which was done. On the ground in Burlington, we imagined scenarios of what happened. The most likely seemed to be a jam which resulted in one or more of the steel fingers on the drum had pushed into the vaccine sachet, building up pressure so the liquid was forced out the other end, upwards.

The weather deteriorated in the afternoon, with rain and fog, but we got all the flights done. We had one flight left, and Janet split it between the two planes while we were holding in the rain. OPG made one short try to get up, but half an hour later we were both in the air, and everything went well. At the end of the day we ferried over to Watertown, above the clouds, and landed just before a beautiful red sunset.

Sunday 13 September. What a beautiful morning this was, sunny, still and warm! Jean Bilow and her Jefferson

Honestly, the weather was so cooperative, and the local Health Departments did such a good job of ground organization that all we had to do was load planes, fly, and drop baits. We left Watertown at 0720, landed Niagara Falls at 0830. I did my first TV interview within 5 minutes of landing. The first flights were in the air by 0925, with newly trained crews. There were a lot of old friends to greet us here, just as there were in Watertown, as these are the two New York areas where we first started bait drops in 1995. There was one potentially serious event, for which the weather must shoulder much of the blame.

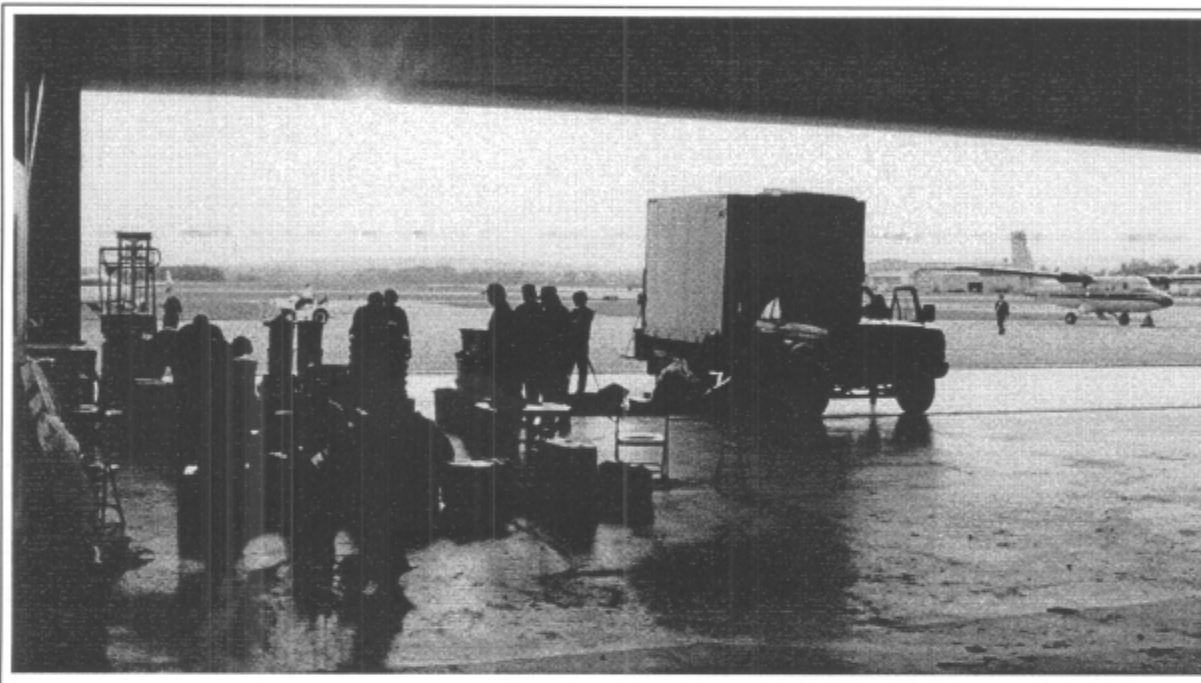


Figure 3. Sunrise in Vermont. This picture shows the command center at Burlington airport. On the left of center, personnel are loading trays of baits into tubs. To the left of that are the radios. One aircraft (OPG) is visible on the tarmac. The Green Mountains were visible through the morning mist in the background, but did not show in the photograph.

When the crew were back in Burlington, I asked Bev exactly what happened, but she had little to offer. All she saw was that suddenly there was red liquid running down the side of her face.

Across all the various bait drops, Ontario aircraft have dropped more than 17 million baits, over a period of ten years. This was the second vaccine exposure, the first to V-RG. Advice was instantly available, and everything was done promptly. One of the airport people at Franklin County volunteered to take Bev to emergency at the nearest hospital. Had she needed that, having a local vehicle, and a driver who knew where the hospital was, would have saved time.

County Health Department crew were there to support us, as were a contingent from the local National Guard. First flights were off at 0825, after safety and bait machine training. The day went very well, with all six flights done by 1730. That meant an early night, which was welcome for all of us. Fort Drum gave us a window of time which fitted the schedule well. We waved to tank crews, when we saw them through their camouflage, as we dropped baits over the ranges. Who knows how many we didn't see! Also conspicuous, on and off the military reservation, were lots of wild turkeys.

Monday 14 September. It's Monday morning, so this must be Niagara Falls.

One flight where I was part of the loading crew, a gray-haired lady volunteer was air-sick. She was still smiling five minutes before we landed, but when encouraged to get out of the aircraft (after we landed!), she was not sure that she could make it. Within minutes she had developed symptoms of fairly severe heat stroke. Fortunately, Kathryn MacDonald, a former police officer and fireman, had a lot of first aid training, recognized the cause of the problem, and started care promptly. We were

able to contact the lady's daughter, who came over, with her husband and their children, to pick up mother and her car. The incident ended well, but it was scary to watch.

OPG flew a series of bait lines right over the airport, which was a photographers' delight. Lunch, donated by several local businesses, arrived early, and the whole operation was done by mid-afternoon. As soon as we were done in Niagara, we headed for Dunkirk, got the radios set up, picked up rental vehicles, and headed for supper and the motel.

Tuesday 15 September. There were six flights to do from Dunkirk, and they

went off quickly. The weather forecast was not encouraging, but we got all the work done before the rain arrived. At the end of the day we decided to stay over, and head for Stratford in the morning. That turned out to be a very shrewd decision, as we would have arrived in Stratford about dark, in time to find a real shortage of rooms, as we were not booked in until Sunday.

Wednesday 16 September. A quick flight to Stratford, followed by quick dispersal. Most went home, although some of the northerners stayed in London and saw some of the Stratford festival.

STRATFORD

Sunday 20 September. This was the day to assemble and train. OGC arrived from Sudbury during early afternoon, and by evening all was ready for serious baiting in the morning. Most of the baiting crew have been with us before, so they needed a refresher, plus briefing on new ideas and procedures.

The day was unusually hot and humid, which did not bode well for an early morning start.

Monday 21 September. We were out to the airport by 0700, but heavy haze kept the visibility down so that the first flights were not able to leave until 1000, after the worst of the mist had burned off. There were some navigation problems, and two machine malfunctions, but overall the day went well. The bait total at the end of the day was 161,148.

One of the navigation problems was interesting. Lucy Brown loaded the three flights for the day into OPJ first thing in the morning. The flight headed out, the pilot told the navigator they were on line, and they did the first leg. As they passed the end of the line, and turned over Lake Huron, they realized they had picked the wrong flight. So they flew the second leg of the "wrong" flight to bait their way back to Stratford, then went off on the "right" flight, which went over Barrie. This was a pilot new to bait flights, and no one had told him that we could load more than one flight into the ARNAV. He picked the first flight that came up when he switched on the power. Oops!

Tuesday, Wednesday, Thursday 22-24 September. Stratford was done in a

blur. I was away on Tuesday, giving a paper on the results of the program to the annual conference of The Wildlife Society, in Buffalo. When I got back on Wednesday morning, there was some groggy talk about the long day yesterday. Each plane did four flights, and the daily total was 216,060. Not bad for a day when it was supposed to rain. Wednesday was an even bigger day, 224,016 baits put out. Again, rain was forecast for the next day, so there was a big push to get extra work done before the weather closed us down. On Thursday there were only 88,920 baits to put out, and the last plane was down by 1330. That meant that we put out 670,000 baits in 3 1/2 days, which must be some sort of record.

The only real problem was baits sticking together on the conveyor. We are going to have that, and some new problems to solve for next year, when, we hope, we will be using the newest "Ontario Slim" bait. Second problem came up from some bait contact calls. People were worried that the Vanilla-Sugar bait we are now using looks and smells like white chocolate. That is a legitimate concern, and we will try to add an unattractive colour to the baits next year. The last time we debated this, the only colour that does not appear in some kind of candy was "old army fatigues khaki". Amazingly enough, a food colour maker mixed us some of that to order!!

Friday and Saturday 25-26 September. We moved from Stratford to Peterborough in leisurely fashion. Although crew and aircraft were positioned by early afternoon, the weather was questionable, so no flights were sent up. On Saturday there was very poor visibility at ground level, and serious thunderstorms were strewn all across southern Ontario, so an old baiters' maxim was verified in novel fashion: "Weekends only occur when it rains".

Sunday, Monday, Tuesday 27-28-29 September. Peterborough flights were completed in very leisurely fashion. The date for the Quebec and extra Vermont flights was set for 30 September, so that the public could be correctly notified. That being the case, there was no need to hurry in Peterborough, and, in fact, we ended up taking Tuesday off, as we were finished all the scheduled flights on Mon-

day. Six flights were done on both Sunday and Monday.

Wednesday, 30 September. This was a lo . o . o . ong day. The plan for the day was complex, but possible. We got the jobs done, but two minor glitches made for late home. Three aircraft took off from Peterborough at 0715 for St. Jean, Quebec, each with a full load of baits aboard. The plan was that OGC would go to St. Jean, drop one load of baits, then go and do two short flights in eastern Vermont. The other two aircraft would do three flights each from St. Jean. And that was the way it worked out.

OGC's day went exactly as planned. The whole operation only started to develop during the Vermont operations on 12 September. There was a rabid raccoon taken just west of St. Johnsbury VT. Although the country north of St. Johnsbury is mountainous, there are three river valleys which flow northwards, eventually into Quebec, and which have dairy farms (potential raccoon habitat, at least compared to unbroken maple forest) nestled along their paths. If rabid raccoons made it over the high country into these valleys, Quebec would be threatened along Lake Memphremagog. Laura Bigler thought she could provide 7,000 baits to put a small bandaid across this area. By 30 September, with the help of Dennis Slate of USDA-Wildlife Services, there were 23,000 baits ready. That was two short flights, drawn up on Tuesday by Lucy Brown of the Rabies Unit. Thanks to Neil Ayers' traditional organization, everything went as planned. The plane left St. Jean for Burlington to clear customs, hopped over to Lyndonville, did the baiting, went back to Burlington for fuel, and flew straight home to Peterborough, arriving at 2050.

For the other planes, there were complications. When we arrived in St. Jean, Michel Pigeon of the Quebec Ministère de l'Environnement et de la Faune had 13 volunteers to man the back of the aircraft, and Dr. Denise Bélanger from the Faculté Vétérinaire at Ste. Hyacinthe was also ready for a flight. The first flights went smoothly, but when they got back just before noon, the trucks of baits for the next flights had not yet arrived. They struggled in at 1400, so the afternoon flights were delayed, with the result that the last baits were dropped uncomfortably close to dark. Furthermore, as the last flights were ready

to take off, it developed that there was not enough fuel available to get us home. So both flights finished baiting and landed at Bromont (just east of the bait lines) for fuel, then came back to St. Jean to drop off the Quebec volunteers and pick up pilots and Rabies Unit crew who were on the ground rotation. In OPG we were off from St. Jean at 2030, and down in Peterborough at 2215. OPJ was about half an hour behind us. Next year St. Jean will have more fuel available, or else we will fly from Bromont. Baiting will have to leave Peterborough before 0400, and the trucks will be recalled by cellular phone if the flights cannot go because of weather.

Thursday and Friday, 1-2 October. These were clean up days, but the weather did not sufficiently cooperate. We had 17 tubs of baits left after the Quebec flying, and we wanted to put them in the northeast corner of our baiting area, from whence we had taken the baits needed for Quebec. However, winds were up to 40 knots, so the last flight was postponed until Friday. We had done all the baiting so far in summer weather, but this was autumn with a vengeance!

OPG was cleaned up and went home to Timmins for a 100 hour check. That meant saying farewell to Jason Karas and Steve Stackhouse, who were only on contract for the summer. Last winter they met flying in the Maldive Islands, off the west coast of India! I hope they prosper this winter too, they were good men to fly with!

By the end of Friday, all was ready for Ohio

Sunday, 4 October. We arrived at Peterborough Airport at 0830 sharp, for an early departure, but made it off the ground at 0915. The reason became clear at the first stop, customs in Niagara Falls NY, where we arrived at 1000, but had to wait 45 minutes for the customs agent to arrive. It turned out she was trying to be helpful. Hearing that we were an Ontario government aircraft, she went to the military side of the airfield, only to find that we were on the other side, more than 5 miles away by road.

All this was done on a clear, frosty fall morning. As we left the Lake Erie shore and headed for Youngstown, the haze and cloud got thicker and thicker. On approach to Youngstown-Elser Airport at 1200, we were down under 500 feet, and scraping the bottoms of thick clouds.

The afternoon started with training, and getting baits into tubs, then the first two flights went out. Normal practice is to send one plane north and one south, but OGC, going south, found the clouds too thick, so they came back, took on a new flight, and went off to the north. The day ended with OGC landing at 1848.

Monday, 5 October. First flights were airborne at 0730, under a cloudy sky. The day went very smoothly, except for fuel. The local airport discovered suspicious material in their fuel tank, so the planes had to go fuel elsewhere. Their first try was at the Youngstown Regional Airport. The dealer at 4G4, the rabies base, is BP, so they were sent to the BP dealer at YNG. The pilots' description of the service they got was unprintable, but the key feature was that both aircraft were delayed for an hour. On the next flights they landed at Beaver Falls in Pennsylvania for fuel, and got better service, but still, there was delay. The result was that the final scheduled flights had to be postponed until next morning. That meant that we would not be going home Tuesday.

In addition to the 290,000 baits to be put out by the Twin Otters, there were baits put out by helicopter in urban green spaces, and by hand by county Health Department staff. It was a busy time.

Tuesday 6 October. Planes were rolling at 0735. The visibility was hazy, but the sky was blue. By dint of hard work, we had the last bait flights done before dark, but too late in the day to head for home. We had a leisurely supper with the Ohio crew, some of whom complained that we had finished so quickly, compared to the four days in the spring (one aircraft instead of two), that there had been almost no time to socialize. They are good friends!!

Wednesday 7 October. We were off at 0900, with OPJ heading for Sudbury to drop off its bait machine, then on home to Timmins, while OGC took the Rabies Unit to Peterborough, then home to Sudbury. It was raining hard when we got to Peterborough.

So, the month of hard work was over. Despite threats to the contrary, the weather was the best we have had for a long bout of bait drops. We finished on schedule, with more time off between sections than we had anticipated. I want personally to thank everyone: Aviation Services and

Rabies Unit personnel, volunteers, staff of county Health Departments in St. Lawrence, Jefferson, Niagara and Chautauqua Counties, New York, USDA-APHIS-Wildlife Services personnel, staff of the Vermont Department of Health and others who helped in Vermont, and staff of the Ohio Department of Health, and their County colleagues.

Personnel for the 1998 bait operations were:

Air Service: Neil Ayers, Eldon Germain, Berj Sillian, Jason Karas, Steve Stackhouse, Randy Godda, Wanda Sawyer, Red Seguin, Dan Baron, Dan Berndt and Al Quinn

Rabies Unit: Charlie MacInnes, Peter Bachmann, Terry Medd, Kathryn MacDonald, Lucy Brown, Andrew Silver, Kim Bennett, Bev Stevenson, Nancy Eaton, Mike Pedde, Mark Taylor, Mark Gibson, Brian Stapleton, Rodney Meeks, Todd Free, Paul Copland, Tara Warren, Dan Wright, Matt Brooks, Tony Jawarski, Jim McAuslan, Kevin Wallace, Glen Keddie, and Grant Hudolin

Charlie MacInnes
Rabies Research Unit
Trent University
Peterborough

IS IT RABIES, DISTEMPER OR BAYLISASCARIS?

Raccoons are susceptible to a number of parasites, plus bacterial and viral infections. However, only a few have any significant impact on raccoon populations and not all of those are of any health significance to humans, domestic animals and other species of wildlife. We have all heard of raccoon rabies, but raccoons also harbour other pathogens which are not so familiar to many people. Of particular concern for domestic animals are canine distemper and feline panleucopenia (feline parvovirus). Distemper can cause significant mortality in raccoon populations and can be transmitted to dogs. Transmission of this virus usually occurs through nose-nose or close contact and resultant inhalation of the virus. The message here is to keep your dogs vaccinated against distemper and confined or on leash during the evenings when raccoons are active. Raccoons are also susceptible to parvovirus (canine or raccoon) and feline

panleukopenia (feline parvovirus). During some years panleukopenia has been the most common cause of mortality in tested raccoons. Infection by these two pathogens is usually by direct contact with an infected animal or by ingestion of virus shed in the feces of an infected animal. Again the message is keep your pets, both cats and dogs, vaccinated and confined or on leash during the evenings when potential for contact with raccoons will be high (there are an estimated 1 million raccoons living in southern Ontario with densities averaging from 4-20/km²).

One parasite (a roundworm) that is common in raccoons in Ontario, called *Baylisascaris procyonis*, can, on rare occasions, be damaging or fatal to humans as well as domestic and wild animals. In some areas as much as 27%-80% of local raccoon populations can be infected. The eggs of this parasite are shed in the feces of infected raccoons where the larval stage takes about 30 days to mature. Infection of other animals and humans occurs through ingestion of the eggs or larvae. The scary thing about the eggs of this roundworm is that they are so resistant that they can withstand the most corrosive of disinfectants. Apparently the only effective method of killing the egg stage is through torching. (i.e. extremely high heat). Anyone working with raccoons should be particularly cautious of contact with the eggs of this parasite.

A bacterial infection of raccoons that is not so well known is leptospirosis. Recently in a survey for this pathogen, revealed that 24% of a sample of raccoons in SW Ontario were positive for antibody against *Leptospira*. Leptosporosis was confirmed in 3 dogs and more importantly in 3 trappers in Ontario during 1997. The trappers had all captured and handled raccoons prior to their infections. This bacteria is spread through the urine of infected animals. Therefore the recommendation of the Middlesex-London Health Unit is that **trappers and other individuals who frequently collect raccoons should wear rubber or latex gloves when handling or skinning these animals to minimize direct skin contact with urine and other bodily fluids.** (reference-Wildlife Health Centre Newsletter, Volume 5, summer 1998).

The above text describes a few of the diseases that raccoons are capable of being infected with, the most notable being rabies. Most people are aware of MNR's well publicized efforts to keep raccoon

rabies out of the province. Two of the more proactive tactics being utilized are the creation of buffer zones of vaccinated raccoons and increased monitoring of raccoons for the early detection of raccoon rabies. Early detection of the disease is not without problems, the most noteworthy being how to tell whether a raccoon has distemper or raccoon rabies. The problem is that many of the clinical symptoms of these two diseases are the same. Raccoons with canine distemper may have neurological problems including convulsions, tremors and loss of fear of humans. These same symptoms may be found in rabid raccoons. As distemper in raccoons is exceptionally prevalent in Ontario, the similarity in symptoms of these two diseases presents a serious problem to those who are trying to ensure that the first case of raccoon rabies is detected in Ontario so it can be quickly contained. This problem was a reality just last month along the St. Lawrence River. Some of our MNR trappers noted that many raccoons that they were live-trapping for vaccination against rabies were acting sick and one even died as it was released from the live-trap. Some of the sick animals were submitted for rabies testing and were negative. Suspecting there may have been a distemper outbreak, a sample of sick raccoons were submitted to the Ontario Veterinary College in Guelph for diagnostics. Testing is still ongoing but one of the specimens had fairly good evidence of canine distemper infection in the brain (thanks to Doug Campbell and Ian Barker, Canadian Cooperative Wildlife Health Centre, Guelph).

So far this week (and its only Monday August 17/98), I have received three calls regarding sick raccoons in the Toronto area - one was in a fight with a fox. All had symptoms similar to rabies but also indicative of distemper. The question is "Is it distemper or our first case of raccoon rabies"? Obviously, due to the high expense of diagnostic tests and the labor involved we cannot collect every sick raccoon in Ontario and submit them for rabies and distemper testing. But what we can and are doing is sampling areas from which we receive reports of abnormally acting raccoons, especially along the St. Lawrence and Niagara Rivers (rabid raccoons have been reported in New York directly adjacent to those two rivers). However, it is a game of "Russian Roulette" that we are playing. Will the telephone call I receive tomorrow be our first case of raccoon rabies or just another

raccoon with distemper - or will we miss the first case of raccoon rabies. Only time and vigilant sampling will tell.

*Rick Rosatte
Research Scientist
Rabies Research Unit*

IT HAPPENED DURING TVR

Even in the course of serious business, strange events occur. Here are a couple from TVR trappers:

From Cindy Hesp (Summer 1998) While working in a residential trapping cell, Cindy was joined by one of the local residents during her normal daily duties.

This middle aged, British-born lady had a few questions to ask the OMNR trapper. Cindy was in the process of ear-tagging and vaccinating an adult male skunk through the protective plastic sheet.

"What are you doing to that black and white kitten?" asked this "new" resident to North America. At that moment, the skunk began to spray his defensive secretions. The British lady did not stick around to listen to Cindy's answer. She fled to her house coughing and choking as she went. Welcome to Ontario.

From Rob Warren, Scarborough TVR project, in the "early 1990's". "I was trapping in an elderly couple's yard which backed onto a ravine. The two of them liked to sit on their back porch and watch me vaccinate the animals. They were always very kind to me, asking me to sit for a while and have some lemonade or a cookie. I was sitting having a drink with them one morning, and I remember it was a very peaceful setting, with the wife's garden blooming, the sun shining, and their little poodle sniffing around the yard and the traps I had set. "What do you know about coyotes"? the husband asked me. I told him there were several in the area, but that they mostly stayed in the ravines and were not often seen. He was concerned because a couple of them had been in his yard while he was working in the garden and didn't seem afraid of him. I said that a healthy coyote would never attack a human and that he need not worry about an attack from these mostly timid animals. No sooner had I said that than a coyote

lunged out of the bushes at the side of the house, grabbed the poodle, and streaked away into the ravine. The attack took about 2 seconds and was absolutely silent. The silence that followed was *much* longer. I looked at the couple, they looked at each other, and then they looked at me. I was speechless. In the end the couple was very understanding and took the loss well, but I don't think they believed another word I told them".

TOOTH SECTIONING AND INTERPRETATION AT THE RABIES RESEARCH UNIT

A single section of a tooth root can provide valuable information for the Rabies Research Unit. The tooth is a continually growing structure where tissue is deposited daily (and annually), for the duration of an animal's life. At the Rabies Unit, we use teeth to determine an accurate age of a wild animal and to estimate how

many of our rabies vaccine-baits (which contain tetracycline), have been eaten, and when eating occurred. The dentin and cementum, located on the root of the tooth, are the tissue that provide us with this information.

Dentin is the tissue that forms the wall of the pulp cavity. As the animal ages and dentin grows 'inwards', the pulp cavity gets smaller. Daily layers of dentinal growth are called the incremental lines of von Ebner. Daily lines are distinguished to an accuracy of ± 1 day in juvenile animals *only*, when dentin deposition is rapid. These lines become too close together to read when the animal is about 6-8 months old. After this age the deposition rate of dentin decreases appreciably.

Cementum is deposited on the outer surface of the root, around the dentin. Yearly growth zones are created here as the cementum grows 'outwards'. Zones of slow growth (winter) are much less extensive than zones of rapid (summer) growth due to variation in diets and stress conditions. These differences will appear as alternate bands of high and low density areas, creating annual lines or "annuli" in the cementum. This is how we determine the age of the animal in years.

Tooth Extraction and Sectioning

Specimens (mainly fox and raccoon) are collected from licensed fur harvesters for surveillance purposes. From these specimens, upper canines are

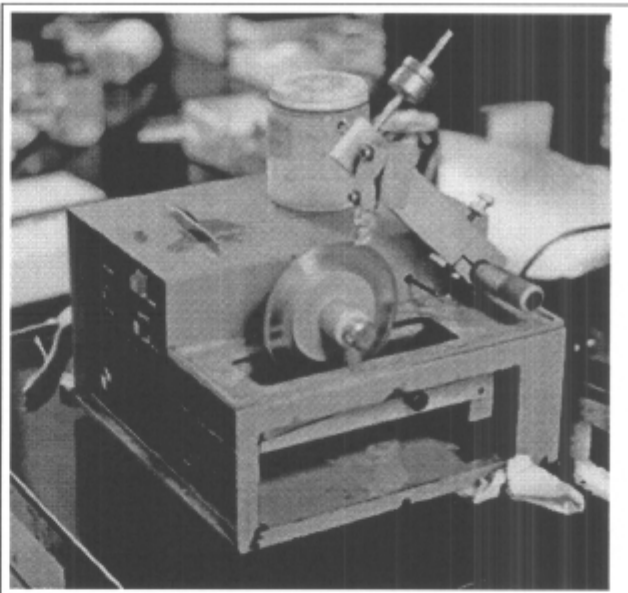


Figure 1. The Isomet saw in action. The tooth, clamped in the chuck, is resting on top of the twin blades.

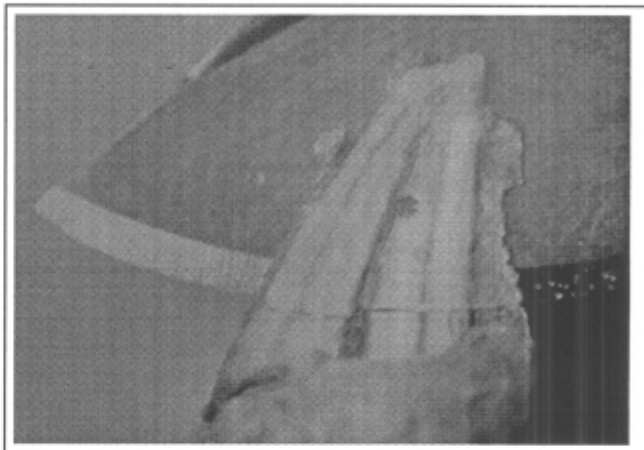


Figure 2. A thin section of a tooth is being lifted from the tooth.

extracted with bone cutters, placed in a paper envelope and assigned a specimen number. The samples are then kept frozen until tooth sectioning begins.

Before a tooth is sectioned, it is disinfected in 70% ethanol. Bone cutters are used to remove excess bone around the root tip (being careful not to damage the cementum). A double diamond blade Isomet saw is used to section the tooth. A shim is placed between the two blades. The thickness of the shim depends on the desired thickness of the section you want to cut. Once the root tip is exposed, the crown is placed in the saw chuck with the root tip down towards the blade. The chuck is adjusted so the tooth will be cut longitudinally through the pulp cavity.

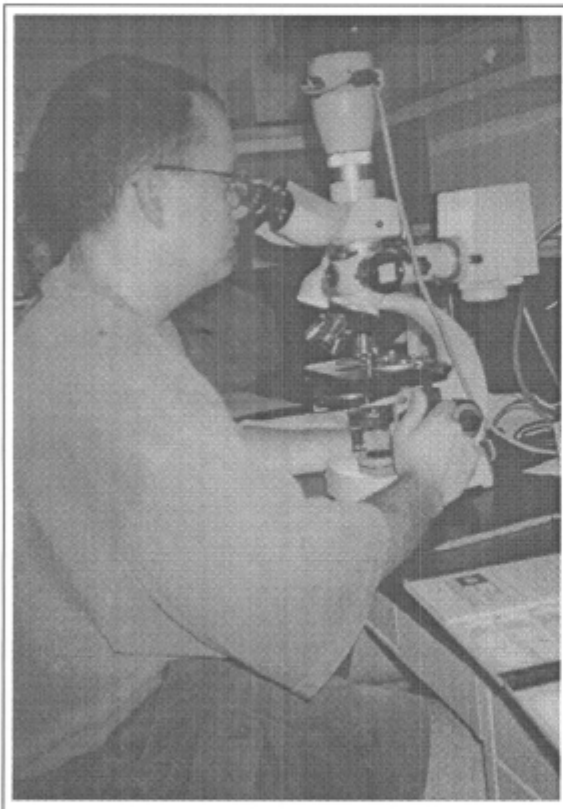


Figure 3. Andrew Silver is checking teeth for tetracycline marks, using the ultraviolet microscope.

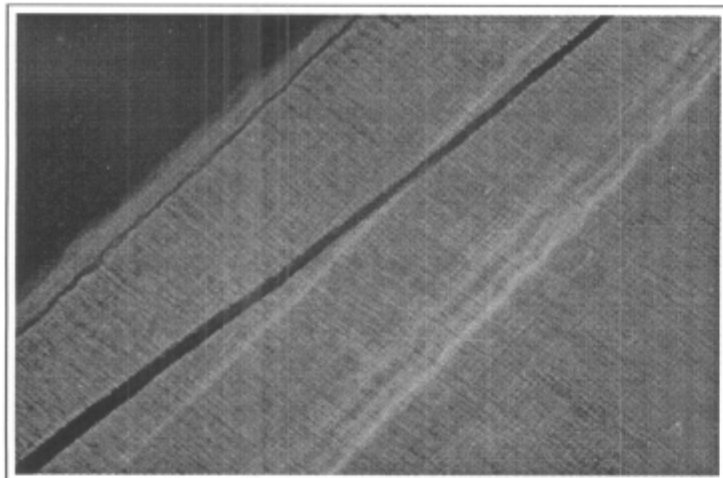


Figure 4. Section through the dentin of a young fox. The paler lines are tetracycline deposits. The very fine dark lines, if visible in this reproduction, are daily deposits, the lines of von Ebner

Cross-sections can also be used, but longitudinal sections provide more uniform deposits of cementum and dentin. Once the tooth is perfectly aligned in the chuck, cutting begins. When the section is complete, the tooth is removed from the chuck and the section is carefully pried out of the tooth using a scalpel. If the section measures between 70 and 90 microns, it is then cleaned, placed on a microscope slide with glycerine and covered with a glass cover slip. This is a non-permanent method of mounting the sample so if staining is desired at a later date, it can still be done. If the section is too thick, it is hand sanded down using 600 grit emery paper.

Upper canines are the most desirable teeth to work with. They are large and have a relatively straight root tip. The root of a lower canine is much more curved and therefore harder to section properly. Premolars can also be used, but must be sectioned using a grinding wheel because they are too small to place in the saw chuck. The advantage of using premolars is that they can be taken from a live animal that will be released. Canines will only be taken from dead specimens.

Tooth Interpretation

A microscope equipped for polarized and ultraviolet illumination is used by a skilled technician to examine the unstained, undecalcified sections. Polarized light is used for age determination and ultraviolet light is used for presence of biomarker.

A system of polarizing filters is adjusted to create colour changes in the sample so the annual growth zones in the cementum can be separated. These areas can be distinguished because they vary in density and mineralization, and consequently, optical properties.

The reader will see a range of colours from red to blue to yellow in relation to these variations. As a result, "annuli" become evident.

Ultraviolet light from a specialized mercury bulb is projected onto the sample to reveal the presence of tetracycline. If tetracycline has been deposited in the tooth, it will appear as a yellow fluorescent band. In young-of-the-year, a line is deposited for each day on which the subject ate a bait. This technique can only be used with undecalcified sections since tetracycline binds with the calcium in teeth and bones.

By using polarized and ultraviolet light simultaneously, the exact year that a bait(s) was eaten can be established. This is how we can tell how well our baits are being accepted in the field and when the baits are being picked up. After sampling many animals ($n=800$ to 1500) we can determine what proportion of the baited population has eaten our baits in the present year and in past years.

Due to the fast growth and daily incremental lines of von Ebner of dentin in juveniles, we can determine on how many different days an animal ate a bait(s) by tetracycline deposition in these lines. Since we generally know the date of death of the animal, we can also count back and determine when the bait(s) was eaten. This information is valuable since the vaccine in the bait has a "field life" after which it begins to lose potency. Determining time of bait ingestion relative to bait distribution is valuable in evaluating immunity rates of baited populations. Past studies have demonstrated that over 85% of baits are taken by foxes within 10 days after bait distribution. This falls within a reasonable potency level of the vaccine.

Facts taken from:

Johnston, D.H., D.G. Joachim, P. Bachmann, K.V. Kardnag, R.E. Stewart, L.M. Dix, M.A. Strickland, and I.D. Watt. 1987. Aging furbearers using tooth structure and biomarkers. In *Wild furbearer management and conservation in North America*, M. Novak, J.A. Baker, M.E. Obbard and B. Malloch (eds.). Ontario Trappers Association, North Bay, Ontario, Canada, pp. 228-243.

Johnston, D.H., and I.D. Watt. 1981. A rapid method for sectioning undecalcified carnivore teeth for aging. Pages 407-422. In J.A. Chapman and D. Pursley, eds. *Proc. Worldwide Furbearer Conf.*, Frostburg, Md.

Bachmann, P., R. Bramwell, S. Fraser, D. Gilmore, D. Johnston, D. Lawson, C. MacInnes, F. Matejka, H. Miles, M. Pedde and D. Voigt. 1990. Wild carnivore acceptance of baits for delivery of liquid rabies vaccine. *Journal of Wildlife Diseases*, 26(4): 486-501.

Kim Bennett
Rabies Unit
Trent University
Peterborough

The Rabies Reporter, a scientific newsletter about current issues in rabies research and control, is a joint effort of the Rabies Research Unit, Ontario Ministry of Natural Resources; the Food Production and Inspection Branch of Agriculture Canada; The Ontario Ministry of Health and the Department of Geography, Queens University, Kingston.. Articles for future issues will be welcomed by the editor. Comments, letters, submissions and enquiries should be sent to:

The Rabies Reporter
Rabies Research Unit,
Ministry of Natural Resources
P.O. Box 4840,

Peterborough, Ontario K9J 8N8

Telephone: (705) 755-2270

Fax: (705) 755-2288

e-mail: macinnnc@gov.on.ca or

macinnch@netrover.com

Also, visit our home page on the internet, at <http://www.gis.queensu.ca/RRreporter/mm.html>

Animal Rabies Report: July to September 1998

[illegible]

Animal Rabies Report: July to September 1998

[illegible]

Animal Rabies Report: July to September 1998

Animal Type	Fox			Skunk			Bat			Dog			Cat			Livestock			Total		
County or Area	#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative	
		98	97		98	97		98	97		98	97		98	97		98	97		98	97
Thunder Bay																			0	0	0
Rainy River																			0	0	0
Kenora																			0	0	0
Subtotals																					
Eastern							6	9	8										6	9	8
Central	1	1	1		2	10	11	11	1										12	14	12
Western	3	3	2	6	20	13	1	1	1	1	1	1	1	1	1	3	8	4	15	34	21
Southern							5	6	9										5	6	9
Northern			10																0	0	10
Totals	4	4	13	6	22	23	23	27	19	1	1	1	1	1	1	0	3	8	4	38	63

Livestock this quarter: 3 cattle

Bats this quarter: 22 big brown, 1 hoary

