

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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RABIES IN ONTARIO REVIEW OF THE YEAR 2000

There were 178 rabid animals in Ontario during 2000, as confirmed by the CFIA-ADRI laboratory in Nepean. The comparable number for 1999 was 101, so it will take a very optimistic outlook to make a silk purse of this sow's ear!! Despite the increase, there came from the 2000 experience two sources of optimism, and a couple of useful lessons as well. First, we must realize that there were four foci of terrestrial rabies in Ontario during 2000, compared to only two in 1999. Raccoon rabies entered the province in 1999, but to

the end of that year there had been only 8 cases, while 2000 produced another 40. Fox rabies was only in Grey-Bruce-Huron-Waterloo-Wellington-Dufferin counties in 1999. In 2000 it reappeared in Peterborough, and spread west about 25 km. There was a worrisome outbreak in northeastern Ontario. The graph in Figure 1 adds bats, for a fifth concern. Rabies in bats fluctuates completely independently of the rabies in terrestrial species, except that a few terrestrials are occasionally seen infected with a bat strain. There are no control pro-

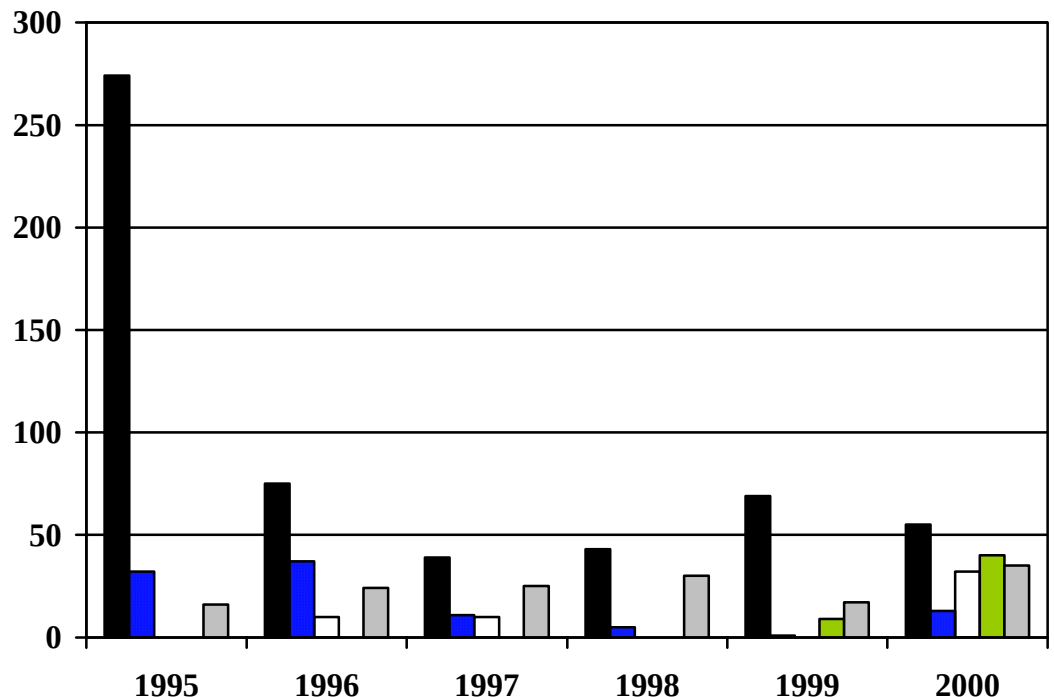


Figure 1. Summary of rabies cases in Ontario, 1995-2000. The left bars (black) show arctic fox strain rabies in western Ontario, the western and southern regions of the tables. The next bars (blue) show the central region, which has Peterborough in its center. The white bars show northern Ontario, the green bars give a summary of raccoon rabies, and the rightmost (gray) bars show rabid bats. This graph underlines the fact that the situation in 2000 was more complex than in previous years.

grams directed toward rabies in bats.

This review starts with the remnants of arctic fox strain rabies in southern Ontario. During 1998 and 1999, that strain was seen in skunks and foxes throughout much of western Ontario; notably in Grey, Bruce, Huron, Perth, Waterloo, Wellington, and Dufferin counties. In the first half of 2000, that area saw more cases than in the comparable times of the two previous years. However, the increased activity was in Grey and Bruce, and Waterloo-Wellington-Dufferin rabies

cases subsided. In the second half, new cases appeared more slowly. By the end of the year, county totals had evened up, so there was little change from the previous year. Cases in the region were: foxes, 7 in 2000, 12 in 1999, 3 in 1998; skunks, 43 in 2000, 41 in 1999, 29 in 1998; dogs, 3 in 2000, 1 in 1999 and 1998, and livestock, 8 in 2000, 14 in 1999, 8 in 1998. This was the major remnant of arctic fox strain rabies, and the change was minimal, but downward.

Skunks are the critical species keeping the fox strain alive in southern Ontario.

The second arctic fox rabies event in southern Ontario was unexpected, and potentially serious. The last cases of this strain around Peterborough were mostly in 1998, with only one raccoon in April 1999, and one skunk in Victoria County during the same quarter. When the first two quarters of 2000 passed without a single case in the whole central region, the picture

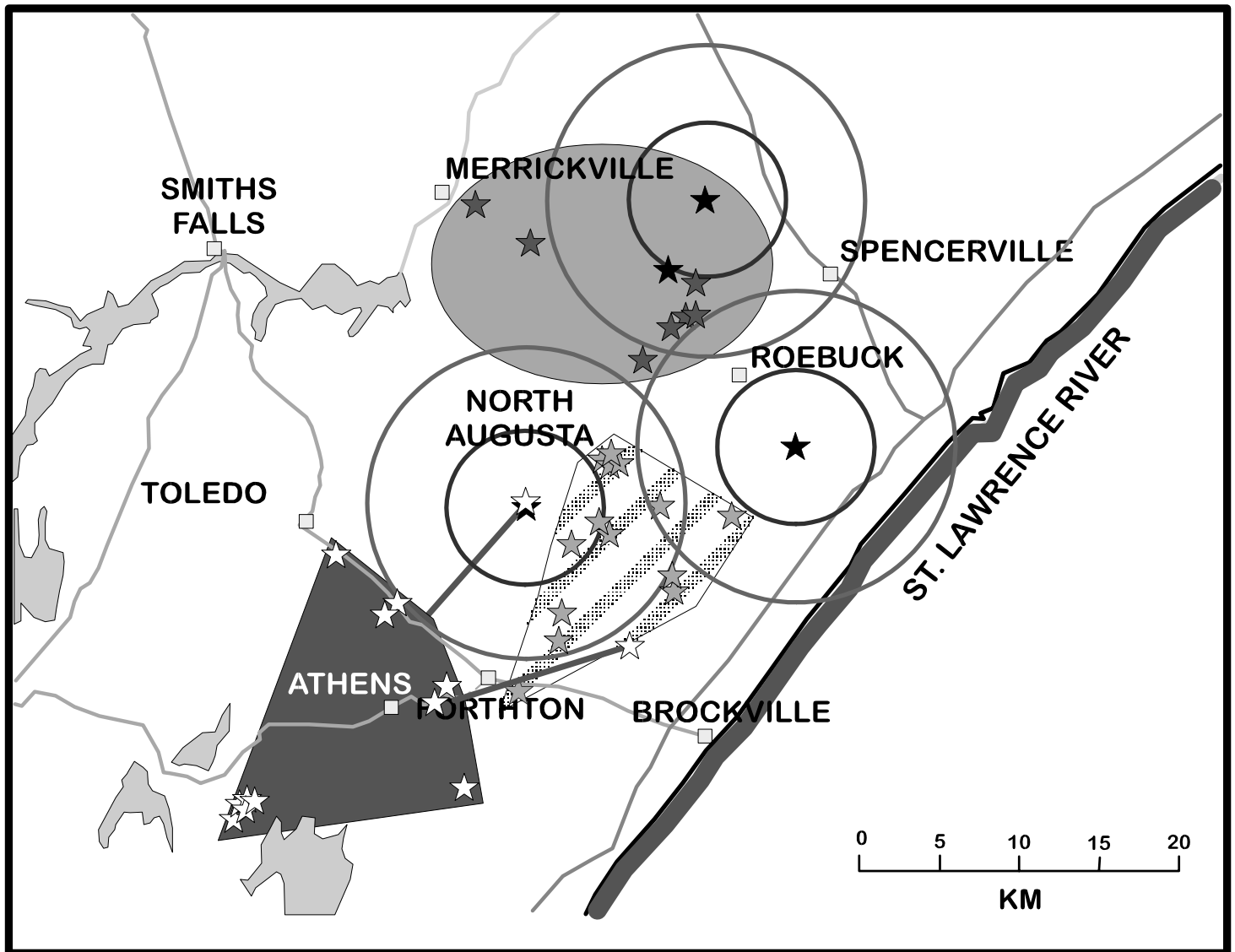


Figure 2. Map of the locations of the 44 raccoons which were found in the Brockville-Prescott area between 14 July 1999 and 31 January 2001. The shaded areas are possible clusters of cases, based on proximity in space and time. The cluster on the left experienced its first case 55 days after the last case in the adjacent cluster. The two cases joined to the left cluster by lines belong in time, but not space. Detailed analysis is in progress. The concentric circles outline the Point Infection Control operations of 1999, surrounding the first three cases.

was optimistic. Then a rabid skunk was taken right in the city of Peterborough in September, followed by three more in the same 3-block neighbourhood. By year's end, there were 12, and January saw 2 more. This is an important lesson, underlining the necessity to continue vaccination of foxes for at least two years after the last known rabies case.

The third arctic fox rabies event in 2000 was the sizeable outbreak in the Cochrane-Iroquois Falls area. That started in summer, but the case load really exploded in October and November. By southern Ontario standards, the numbers are not that large, but against the northern background of being completely rabies-free in most years, they are of concern. Consider the recent update from LEEANNE BEAUDIN, who is tracking northern rabies cases for the Cochrane office of MNR: "It was confirmed today that the bison (Picards) that was submitted last week from Hannah township was positive for rabies. A fox was sent in earlier this week - we have not got the results yet. Also, the Porcupine Health Unit informed me today that a wolf in Ramore was dispatched by OPP the other day. Apparently, it attacked and killed a German shepherd, attacked a horse, and when the OPP cruiser arrived to dispatch it - it attacked the cruiser, flattening one tire and puncturing the bumper. Results on the testing have not been confirmed yet." No wonder people are concerned!

In deciding whether to bait or not, we also have to consider that past outbreaks in that area have been of short duration. When baits were dropped in 1992 and 1993, the outbreaks were probably already over, and it has not taken two drops in the same area. Maybe this outbreak will change that idea, and we will wait until summer to decide. Northerners would like a bait drop in the spring. In the south, early bait drops have been much less successful than fall drops. For one thing, young born in the spring are not

old enough to eat baits, nor are they mature enough to react to the vaccine. Thus, a spring drop demands also that there be a follow-up in the fall.

The fourth area of concern during 2000 was a big one: raccoon rabies. Ontario had its first cases of raccoon rabies in July 1999. These were immediately hit with Point Infection Control (PIC) tactics, and towards the end of the year, it looked as though the initial attack had succeeded. Then, in December 1999, a trickle of new cases began, and the fight was on in full force.

Wolfe Island, near Kingston, experienced 6 rabid raccoons between 9 December 1999 and 16 January 2000. Since then, there have been no further cases. Wolfe Island has been part of the St. Lawrence TVR program since 1995, but the percent vaccinated in 1999 was low (50%), because the trapper was pulled off the job to help with the PIC operations near Prescott, and the TVR was only finished in October. Nonetheless, it seems to have been enough, as the outbreak died out promptly. Of course, we did reduce raccoon numbers, starting in April, and we dropped baits in late June. In retrospect, that may have been unnecessary, but we could not know that at the time.

The situation inland of Brockville and Prescott was much more complex, and remains active. Figure 2 shows the locations of the 44 cases that have occurred since the index cases. These occurred in 3 time groups, 16 July - 3 October 1999, 14 December 1999 - 12 June 2000, and 8 August 2000 - 26 January 2001. There are three clusters of cases, determined arbitrarily as functions of location and time. Within these clusters, there is evidence of very long incubation periods. For example, in the village of North Augusta, where there have been 5 cases, the spread was from 25 January to 13 April (80 days) within the cluster, including a gap between succeeding cases as

large as 53 days. This cluster of cases occurred 183 days after the nearest of the first cases, which occurred less than 10 km away on 26 July 1999. This situation is under analysis.

Before we can understand the spread in time and space, we have to examine the intensity of surveillance. If we are only seeing 1% of the raccoons which actually die of rabies in the wild, then what appears as prolonged incubation may just indicate that we did not see several cases which were part of the chain of infection. That is, if transmission went from $A \Rightarrow B \Rightarrow C \Rightarrow D \Rightarrow E$, but surveillance only recovered individuals A and E, then what looks like very long incubation may actually be made of four transmissions being mistakenly called one.

There were three tactical approaches to fighting raccoon rabies. The first, live trapping and removal covered 1127 km², and resulted in the capture of 3339 raccoons and 653 skunks. The 1999 control areas are illustrated in Figure 2; the 2000 PIC area covered all of the area to 5 km beyond the outermost cases, so the team went over the whole removal and TVR zones treated in 1999. The three 1999 PIC areas resulted in removal of 1202 raccoons and 337 skunks, and hand vaccination of a further 1759 raccoons and 301 skunks. It is going to be very interesting to review in detail what raccoons and skunks were caught during 2000 operations within the 1999 depopulation and TVR areas. How much movement, and who did the moving, are of vital interest to those trying to understand the movement of rabies in wild populations.

The second tactic is TVR. The St. Lawrence TVR zone was extended in 2000; the eastern end is now at Iroquois. TVR in Niagara continued as it has since 1994. Success rates are not yet available - the last of the field data are being entered into the computer file as you read this. It was a busy year in both zones, with almost 10,000 individual raccoons being vaccinated, ear-tagged and released.

The third tactic was dropping vaccine-baits which was described in the last issue. One part of the 2000 experi-

ment has been analyzed. The follow-up to the test of 0.75 km and 1.5 km between flight lines showed no difference between the two treatments, based on tetracycline marks in the teeth.

Did all of these efforts pay off?? Consider the following: there has been no spread to either the east or the north since the first cases in 1999. In fact, there has been no spread to the northwest either. Secondly, the total extent of spread is less than 40 km. In fact, if we measure the westward spread from the westernmost of the 1999 cases, movement has been only 25 km in 18 months. When raccoon rabies swept across New York, it moved at 40 – 80 km per year. Further, as Rick Rosatte has pointed out, the year after arrival of raccoon rabies in New York, Connecticut, Massachusetts and other states was over 100 confirmed cases. Ontario's efforts have much slowed the movement and reduced the number of cases. On the other hand, raccoon rabies was not snuffed out by the first three Point Infection Control operations, and the fight has dragged on for another year.

There were 35 rabid bats during the year, and one skunk infected with bat rabies. While that is double the level in 1999, it is well within the normal range of variation in southern Ontario.

In summary, there were two bright spots to the year, and two worrisome occurrences. The fact that the skunk-maintained old fox strain situation in western Ontario has not increased is encouraging, as is the reasonable success of the fight against raccoon rabies. The fox strain outbreak in northern Ontario, and the resurgence around Peterborough, are definitely concerning us.

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TEXAS 2001: Seven Years and Counting

On 6 January, given some time to rest after New Year's, three Rabies Unit staff and driver Beverly Stevenson made the first leg of their trip north overnighting in Sudbury. The next morning, it was off to Sault Ste. Marie with a quick stop in Blind River to visit former colleague Kathy McDonald-Delorme and her new daughter. Compared to last year, the weather was more favorable. Once at the hangar, the aircraft were loaded with equipment, and the food for the trip south the following day was picked up.

All of the aircraft (OGA, OGB and OGC) were equipped with bubble windows, which are more photographer friendly. The team for this year included pilots Neil Ayers, Garry Stewart, Ray Fread, Gord Leamy and newcomers Dean Gill and Jeff McClain. Engineers Joe Spence, George Levasseur, Derek Gilmour and Norm Hamel would do the first half the program and switch with Marc Benoit, Randy Godda, Bob Everett and Pierre Verhelst. The Rabies Unit team remained the same as last year with Andrew Silver (in charge of bait machines), Kim Bennett and Mark Gibson.

Before the crack of dawn on the morning of the 8th, the Twin Otters were pulled from the hangar and fueled for the first leg of the trip south to Texas. After clearing Customs, it was clear flying to our first stop for fuel in Springfield, Illinois. At our next fuel stop in Paris, Texas, we began to shed some of our winter garb in the warmer climate. One by one, the planes landed in Cotulla with a beautiful sunset and a warm reception from old friends. After unloading the crews, essential bags, and gear, the Canadians were off to our hotel, the Village Inn. Cotulla is a small town so a group of our size had to be divided up amongst the 3 hotels in town.

At the airport the following morning, the new ORVP Program Coordina-

tor, Ernest (Skip) Oertli, welcomed everyone in one of the 2 Army tents provided by the National Guard. Release forms for Internet pictures were signed, Polaroids of flight crews were taken and ballcaps were issued before the planes were offloaded and the bomber and navigator panels were installed. Other essentials, such as gloves and airsick bags, were added before the safety briefings and the navigator, bomber, and loader training commenced. As in previous years, the Texas Department of Health, Texas Wildlife Damage Management Service and the Texas National Guard made up the lion's share of the work force. On the coyote (south Texas) portion of the program, the flights were about 3 hours in duration and commenced when everyone returned from lunch. The maiden flights went off without a hitch and only a few minor adjustments were needed to ready things for an early start the next morning.

Unlike last year in Texas, the weather was not cooperative and flights were frequently delayed due to morning frost and fog, low cloud ceilings, high winds or rain. The periods of down time were made more bearable thanks in part to the great B.B.Q. cookouts for lunch that Steve Wilson and Gary Kratz and later Alvin Combs and Frank Whitley prepared. In turn, the Texans were treated to spaghetti prepared by the Canadians with Garry Stewart at the helm. Both Nuevo Laredo, Mexico and San Antonio were about an hours drive away and were a great way to kill time between shifts and down time to buy some trinkets and do some sight seeing. Apart from the Country Store, fast food and taco places, the weekend opening of Peppers was a highlight for it's great steaks.

The flights near the surveillance balloon kept getting delayed

RABIES BAITS SERVED BY OMNR AIRCRAFT

YEAR	ONTARIO	QUEBEC	NEW YORK	TEXAS	VERMONT	OHIO	TOTAL
1989	285,010						285,010
1990	744,088						744,088
1991	674,126						674,126
1992	687,001						687,001
1993	699,385						699,385
1994	1,485,000						1,485,000
1995	1,629,092	148,000	159,379	830,000			2,766,471
1996	1,280,289		343,507	2,565,253			4,189,049
1997	1,230,840	67,075	347,032	2,549,040	71,640		4,265,627
1998	965,796	118,404	396,312	2,663,000	114,800	576,720	4,835,032
1999	1,009,096	211,392	615,383	2,755,000	186,239	1,215,768	5,992,878
2000	1,600,460	90,720	866,670	1,970,000	195,258	863,280	5,586,388
TOTAL	12,290,183	635,591	2,728,283	13,332,293	567,937	2,655,768	
GRAND TOTAL = 32,940,000							

due to the weather but eventually got off as did the popular Padre Island flight which the senior pilots were nice enough to let Jeff (The Kid) McClain fly. While in Cotulla, 770,000 doses of vaccine were delivered at a density of 70 baits per square mile and covered a drop zone of 11,000 square miles which included 14 counties. Since the initial airdrop in 1995, the program has been responsible for the distribution of over 14,000,000 individual doses of rabies vaccine. The surveillance program conducted in March of 2000 showed results of over 76% of tested coyotes consumed bait(s) and of that, 74% developed an immune response to the vaccine. Canine rabies cases in South Texas have dropped from 166 cases in 1994, to 75 in 1995, 15 in 1996, 3 in 1997, 7 in 1998, 8 in 1999 and no cases reported as of November of 2000.

On 22 January, the remaining flights were completed and things were packed up for the move to Fredricksburg. While some people were left to fly, others drove the rental cars using an alternate route to avoid the traffic of San Antonio. The back roads allowed us to see some wildlife including javelinas, deer and a roadrunner. In Fredricksburg, the hotel was larger and could accommodate the whole group so the evenings were more sociable. Some of the crazy Canucks took this opportunity to wind down using the hot tub and pool while a couple of the pilots took the Texans up on learning how to do the 2 step. In the morning meeting the following day, the new people were introduced to the gray fox portion of the program and then the safety briefings and training commenced.

Things were running smoothly,

with the exception of a minor hydraulic leak in OGC, when on the morning of the 24th, OGB was forced to return to the airport with engine problems. As usual, things have a way of happening on media day and after closer examination it was determined that another engine would have to be sent down from Ontario. That evening at dinner, the crew presented Dean Gill with a t-shirt that read "My Hero" as they were impressed with his smooth landing and were thankful for the two engines of a Twin Otter. The replacement engine arrived on the 27th and had to be picked up bright and early as the remaining planes continued to pick away at the rest of the flights. A big thank you should go out to Bob Sims for the use of his trailer, the airport manager for finding the engineers a hangar to work in and to a local man for offering the services of his truck hoist to

help install the engine. The second shift of engineers had their work cut out for them as the weather continued to be temperamental. This gave them time to install the engine before resuming flights on the 30th.

{Editor's note: I met with Skip Oertli and Guy Moore recently. They expressed great admiration and praise for the way this engine failure was handled from start to finish. At the first sign of trouble, Dean looked across his navigator and commented, calmly "Funny, I thought that propeller should be turning"! The navigator was Hoppy Turman, and, knowing Hoppy, I suspect he was ready to get out and walk at that moment. When Dean glanced back into the cabin, the crew were already in their seats fastening their seat belts. Those safety briefings were taken seriously! When the plane touched down, pilots talked to all the crew, and everyone was ready to fly again. The new engine and propeller had to be shipped by American Airlines, and of course, all this happened on a weekend. Congratulations are due to the whole MNR Air Service team for dealing with an emergency so professionally and promptly.}

With weather and mechanical delays, the project was running behind schedule by almost a week. With a day and a half of flying left, the National Guards orders were not extended and they returned to the valley. This left some holes in the flight crews which gave the rabies staff a chance to get into the rotation of daily flying. With all 3 planes flying now, the last flight of the project landed at 3 on the afternoon of 1 February, with a big sigh of relief from both Skip Oertli and Guy Moore. That gave us the rest of the afternoon to vacuum up the excess sugar from the baits out of the back of the plane and do some packing for the flight back. The

next day, the remaining equipment and personal gear was packed up and the rental vehicles were returned to San Antonio.

While in Fredricksburg, on the West Central Texas portion of the gray fox program, 901,000 doses of vaccine were dropped at a density of 100 baits per square mile and covered a drop zone of 9,100 square miles which included 24 counties. As with the coyote program, the gray fox program has shown similar success with 188 cases reported in 1995, 57 in 1996, 30 in 1997, 43 in 1998, 74 cases in 1999 and 31 cases reported as of the end of November 2000. Of the tested foxes in the surveillance program in 1999, 52% consumed baits and, of those, 75% developed an immune response to the vaccine.

On the morning of the 3rd, we said "Via Con Dios Amigos" to the Texans that remained to help get the Canadians to the airport. All planes headed northward with OGA and OGB heading to the Sault and OGC dropping the Rabies Unit staff off in Peterborough. Our first fuel stop was Little Rock, Arkansas and the second in Dayton, Ohio as it started to get gradually colder. On the last leg home, we found that we had to head to Pearson Airport in Toronto to clear customs as arrangements had to be made in advance to clear customs in Peterborough on the weekends. We finally landed and offloaded our gear into a truck left behind for us. After a month away, it was nice to be back home but boy, oh boy, was it cold.

Apart from the mechanical and weather gremlins, the operation was a success thanks to all the Texas agencies and volunteers involved. As in previous years, everyone worked very hard under some adverse conditions to make the program work. Once again, thanks to all of our friends in Texas from the whole Ontario team. With talk of a

return to Fort Stockton, some of us can hardly wait to see what next year has in store.

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BAIT DROPS ARE EXPANDING

The Table on page 5 shows the total number of baits dropped by MNR aircraft. Demands on the time for these planes has expanded rapidly in recent years, and are coming close to the full capacity of our fleet. Part of the problem is the time window. There are six Twin Otters. OPG services the Hudson and James Bay coasts, and is especially busy during June, July, and August, supplying biologists' research camps. During the period from mid-April to Labor Day, the other five are on water-bombing floats. They may or may not be busy, but experience has shown that a big fire may start tomorrow, so they can't be "borrowed" from fire duty. Add to that, it requires more than a day at each end to convert from floats to wheels, and it really means that they are busy fighting fires all summer.

We have thought of using a fourth machine to allow two drops to take place at the same time. However, due to the long days flown during the bait drops, that would put pressure on the pilot corps.

The Air Service has pledged to do their best to supply planes when needed for ORV.

The Rabies Research & Development Unit has two projects on the go to improve bait drops. We are requesting proposals to design a computer-based controller for the bait throwing machine in the aircraft. This will be a self-contained system, which should work in different types

of aircraft, and drive different bait machines. It will include its own GPS system, so that all the aircraft would have to supply will be an approved GPS antenna and electric power. It will, of course, work from the Queens-MNR flight planning and management system. There are two main reasons for this project. First, we want to capture a lot more data about where baits were really dropped, how the off-time was distributed, what the bait count was on each line segment, and so on. Second, we want to take as much of the control of the bait machine as possible out of manual mode, and have the computer change bait rate in response to changing ground speed. This will allow the navigator to concentrate on the most important job which cannot be automated, turning the machine off and on in order to get as much countryside as possible covered with baits, while keeping the baits out of sight of humans.

The second project is smaller, but just as important. The current bait throwing machine is not well suited for dispensing the Coated Sachet (CS) bait. As described a couple of issues back, the CS bait is much lighter than either the Ontario Slim bait or the Fishmeal Polymer bait. The new machine will be a lot smaller and lighter, so that it can easily be used in smaller aircraft, such as the MNR Turbo Beaver.

So MNR will, hopefully, be much involved in bait drops for many years to come, but there is a limit, and there is room for others to enter the field. Indeed, rules in most state and provincial governments require that competitive bids be requested. The next few years are going to be interesting.

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A FATAL INCIDENT

Ontario experienced a rabies related human death in January. A farmer went to the barn to feed his horse and two llamas. When he did not come back within an hour, his wife went to check on him. He was dead in the barn, apparently killed by the horse. The horse tested positive for the arctic fox variant of rabies. Horse people that I have asked say that horses with rabies may become very agitated.

The family reported that a sick skunk had been shot and buried a few weeks earlier. This happened in northern Dufferin County, where there were four rabid skunks confirmed during 2000. The last human death in Ontario due to infection with rabies occurred in 1967. It is sad that our technology was not sufficient to have eliminated the last traces of fox strain rabies before this accident.

Information received from:

Dr. Elliot Salsberg,

Canadian Food Inspection Agency

POST-EXPOSURE TREATMENT IN ONTARIO IN 2000

There were 1073 people given Post-Exposure Treatment (PET) in Ontario during 2000. This is a bit disappointing. Dr. Charles LeBer in the Ministry of Health compiled data in the 1980s about the sources of exposure. He indicated that 23% of all PETs were administered when an animal, usually a dog or a cat, bit or scratched someone, but ran away, so that it could not be tested for rabies. Based on the average for 1981-90 of 2,400 PETs per year, we had hoped to see PET's drop to between 500 and 600 per year once rabies was controlled. Although the bait program has reduced rabies by 96%, PETs are remaining at about 1000.

During 2000, the vaccine and rabies immune globulin for one person averaged \$700.00, to which must be added approximately \$140.00 for the doctor's fees to administer the vac-

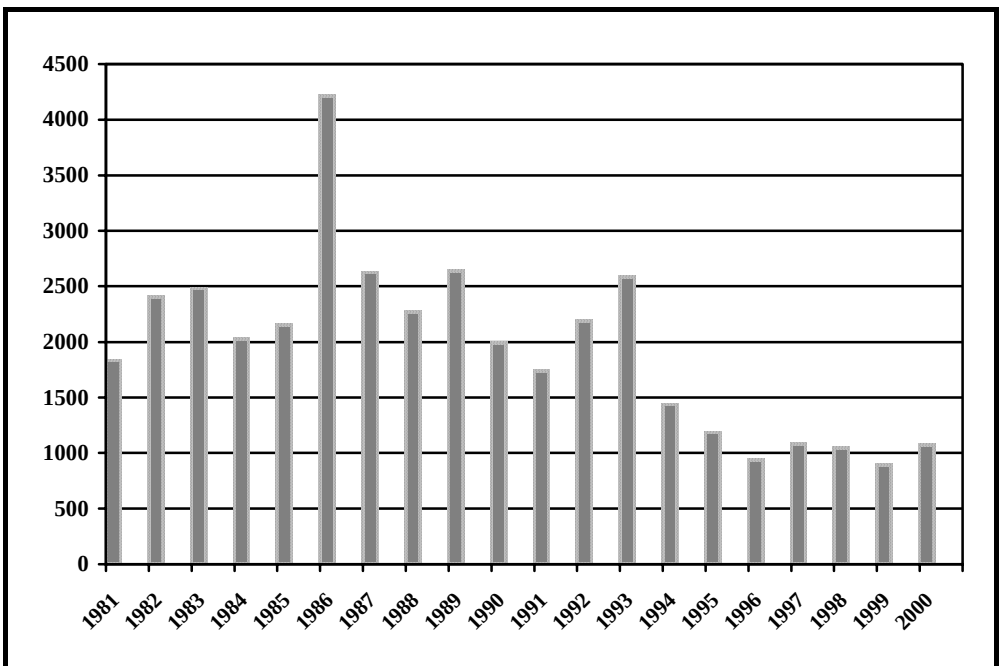


Figure 3. The number of humans treated in Ontario as a result of possible exposure to rabies, for the years 1981-2000.

cine (paid by OHIP). For those not familiar with PET, two products are administered. Rabies immune globulin is injected around the site of the exposure. This provides an immediate source of antibodies. Meanwhile, 5 doses of vaccine, carefully timed, are administered to stimulate the individual's immune system to develop antibodies to rabies. The latter protection takes 1 to 2 weeks to develop, but provides an immunity which will last for years. The globulin is a stop gap to reduce rabies virus during those critical first two weeks.

The year 2000 was similar to the last 6 or 7 years as far as human exposures were concerned.

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RABIES IN NEW YORK STATE IN 2000

Introduction

It was another remarkable year for rabies-related activities in New York State during 2000. New York again led the nation in animal rabies cases, despite recording the smallest number of cases here since 1991. Also noteworthy are the human death due to rabies of an international traveler in an up-state New York hospital, record annual numbers of rabid bats and bats examined during the year, three consecutive weeks of record numbers of samples received at the laboratory during July and August, and the first rabid dog in this state since November, 1997.

Human Rabies

A visiting professor was hospitalized in Warren County, just one week after arriving here from Ghana on September 22. His condition rapidly progressed to signs of encephalitis and classical symptoms of rabies including altered mental status, combativeness,

hyper-excitability, dysphagia and excessive salivation. The patient died on October 9. A skin biopsy taken on October 3 was positive for evidence of rabies virus by immunofluorescence examination at the Wadsworth Center. Investigation disclosed that the patient had been bitten on the thumb and leg by his own unvaccinated puppy in Ghana in May, 2000. Genetic analysis at the Wadsworth Center of the virus isolated from the patient's saliva confirmed infection with a variant of rabies virus associated with dogs in equatorial west Africa. This was one of five human rabies deaths in the US during the year. The other four, and another in Quebec, Canada, were the result of infection with bat rabies variants.

Specimens Tested

There were 840 confirmed rabid animals in the state in 2000. This was 89 (9.6%) fewer than the 929 in 1999 and 24% less than the average for the previous five-year period (1,107). As was the case last year, the smaller number of rabid animals can be attributed to fewer confirmed rabid raccoons; the 419 cases in raccoons was 101 (19.4%) less than the 1999 total of 520. Nonetheless, rabies in terrestrial mammals as a result of the raccoon rabies outbreak was present in 54 of the state's counties. Rabies was identified in bats from 44 of the state's 62 counties. There were 13 counties with rabies only in terrestrial animals and three with rabies confirmed in bats only. Hamilton County of the Adirondacks, Manhattan and Queens of metropolitan New York and Long Island's Suffolk and Nassau Counties had no reported rabid animals.

The 10,038 animals received at the Wadsworth Center for rabies examination was the second greatest annual total in the laboratory's history (11,893 in 1993), 6.5% (615) greater than the 1999 total, and 9.7%

(889) more than the average for the previous five-year period. The New York City Health Department rabies laboratory received 755 animals for examination, down from 942 in 1999, for a statewide total of 10,793, which was the greatest state total for 2000 in the US. Animal specimens for examination for rabies were received from each of the state's 62 counties and 903 of the state's 990 towns and cities. Fifty-eight species of animals were represented in samples received. Wild species accounted for 68.5% (7,396) of all specimens examined, and domestic species 3,397 (31.5%). The rate of rabies specimen submissions is always greatest during summer months, with 42.1% of all specimens received in July-September during the five year period 1995-1999. This pattern was particularly dramatic at the Wadsworth Center in 2000, with 51.2% (5,144) of the year's specimens received during the three summer months, including an unprecedented three-week period in late-July and early-August in which 2,219 specimens were received and examined! The Wadsworth Center examined samples from 10 human patients for the purpose of antemortem diagnosis of rabies and performed two postmortem examinations for human rabies. The NYC laboratory performed one postmortem examination for human rabies.

For the third consecutive year, bats were the largest group of animals examined (4,616), a sharp increase of 29.8% (1,061) from the 1999 total (3,555). Bats accounted for 42.7% of all specimens received for testing. There were 4,564 bats examined at the Wadsworth Center, comprised of 3,126 big brown bats (68.5% of all bats tested), 1,180 little brown bats (25.9%), 161 of the state's 5 indigenous non-house bat

species, and 97 bats not identifiable to species. There were 1,321 raccoons examined, down 22.8% from 1999 (1,710), and comprising only 12.2 % of all examinations. The laboratories also examined 2,115 cats (19.6% of all animals tested), 924 dogs (8.6%), 555 skunks (5.1%), 462 rodents and lagomorphs (4.3%), 189 foxes (1.8%), 103 cattle (1.0 %), 368 other wild animals (3.4%), and 80 other domestic animals (0.7%). Among the animals received at the Wadsworth Center, 20.8% had reportedly bitten one or more persons, 18.9% had some other non-bite human contact, 32.3% had contact with one or more domestic animals, and 37.1% were non-contact surveillance specimens. Most of the non-contact specimens were bats found inside human occupied areas of homes in encounters for which it was difficult to determine the potential for human contact.

Rabies in Wildlife

Rabies in wild animals accounted for 95.5% (802) of all animal rabies cases in 2000. The rabies-positivity rate among all wildlife examined was 10.8%. Rabid wildlife included 419 raccoons (52.2% of all rabid wildlife), 210 skunks (26.2%), 123 bats (15.3%), 45 foxes (5.6%), 4 woodchucks (0.5%), and an opossum. For the first time since raccoon rabies spread into New York in 1990, there were no newly affected areas and therefore no epizootic front in the state, but the outbreak remained entrenched in previously affected areas. The incidence of rabies in raccoons fluctuated in independent cycles across affected areas, with an increased number of terrestrial rabies cases in 21 counties, a decreased number in 30 counties, and an unchanged number in 11. The rabies-positivity rate was 41.2% among all raccoons tested, 35.9 among raccoons in contact with humans, 41.2% among raccoons in contact with a cat,

and 56.2% in raccoons in contact with a dog. The 37 rabid gray foxes were widespread throughout the area affected by raccoon rabies, occurring in 37 different towns in 22 counties. The gray foxes were associated with unusually effective aggressive behavior, even for rabid animals: while only 2.9% of rabid raccoons and 5.9% of rabid bats actually bit a human, 56.8% of the rabid gray foxes bit a person.

Rabies in Bats

The 123 rabid bats was the greatest annual total in the state's history, 4.2% greater than the 1999 total (118), and 43% greater than the average for the previous five years (86). The rabid bats included 109 big brown bats (88.6% of all rabid bats), 8 little brown bats (6.5%), 3 eastern pipistrelles, 1 hoary bat, 1 red bat and 1 bat unidentifiable to species. The rabid bats were geographically widespread, occurring in 97 localities in 43 counties. Overall in 2000, the rabies positivity rate among all bats tested was 2.7%, notably lower than the 3.4% average for the previous five-year period. Among housebats, 3.5% of big brown and 0.7% of little brown bats tested were rabid. Seventy-one (57.7%) of the rabid bats were female, 49 (39.8%) male, and 3 were unidentifiable to gender. Six of the rabid bats were juveniles. Among the rabid bats, 24 (19.5%) had reported human contact, 25 (20.3%) contact with a cat, 17 (13.8%) contact with a dog, and 62 (50.4%) had no reported contact.

Rabies in Domestic Animals

There were 38 laboratory-confirmed rabid domestic animals in 2000, including 29 cats (76.3% of all domestic animal cases), 6 cattle (15.8%), 1 horse, 1 camel and 1 dog. Although there had been an average of 4.5 dog rabies cases annually in the state from 1993-1997, there had been no confirmed rabid

dogs in 1998 or 1999. The rabid camel occurred in Rhinebeck, Dutchess County in September and was a pet that was infected with the raccoon rabies virus variant. Appearing in the Wadsworth Center's data tables are 13 rabid goats which were among 46 tested in a collaboration to verify laboratory findings in a goat vaccine trial and 2 rabid bats from Texas identified in a collaboration with a bat conservation and rehabilitation center.

*Dr. Charles Trimarchi
Wadsworth Centre
New York
(New York City Health Department Laboratory data provided by
Dr. Iqbal Poshni.)*

New Name for the Rabies Unit

To keep up with changing times and to reflect our current role, the Rabies Research Unit of the Ministry of Natural Resources is now being referred to as the Rabies Research and Development Unit.

The staff, office locations, and field programs are unchanged. We're still the same unit with a new title.

Due to space restrictions in the bylines, it will appear only as Rabies Research and Development.

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Animal Rabies Report: October to December 2000

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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		00	99
Northern																											
Muskoka																								0	0	0	
Parry Sound																								0	0	0	
Nipissing																								0	0	0	
Cochrane	11	25						1		2	2					2	5					5	5		20	38	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				5	40	8			3				4	17	8									9	57	19	
Central						1	12	13	1					6	4									12	19	6	
Western		7	12				11	43	41					3	4	1	3	1				3	8	14	15	64	72
Southern									1					8	2									0	8	3	
Northern	11	25						1		2	2					2	5					5	5		20	38	0
TOTALS	11	32	12	5	40	9	23	57	46	2	2	0	4	34	18	3	8	1	0	0	0	8	13	14	56	186	100

Notes for this quarter:

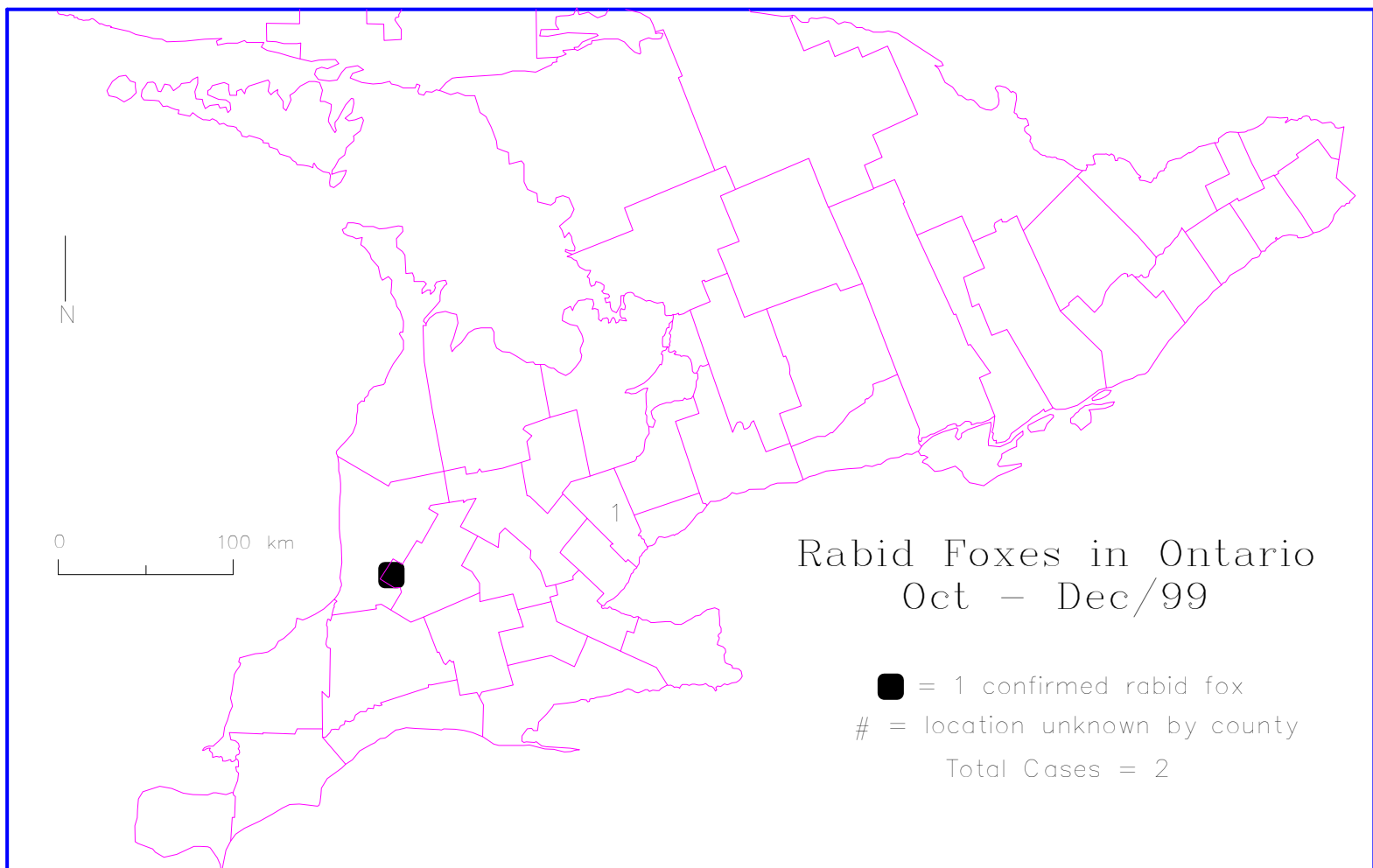
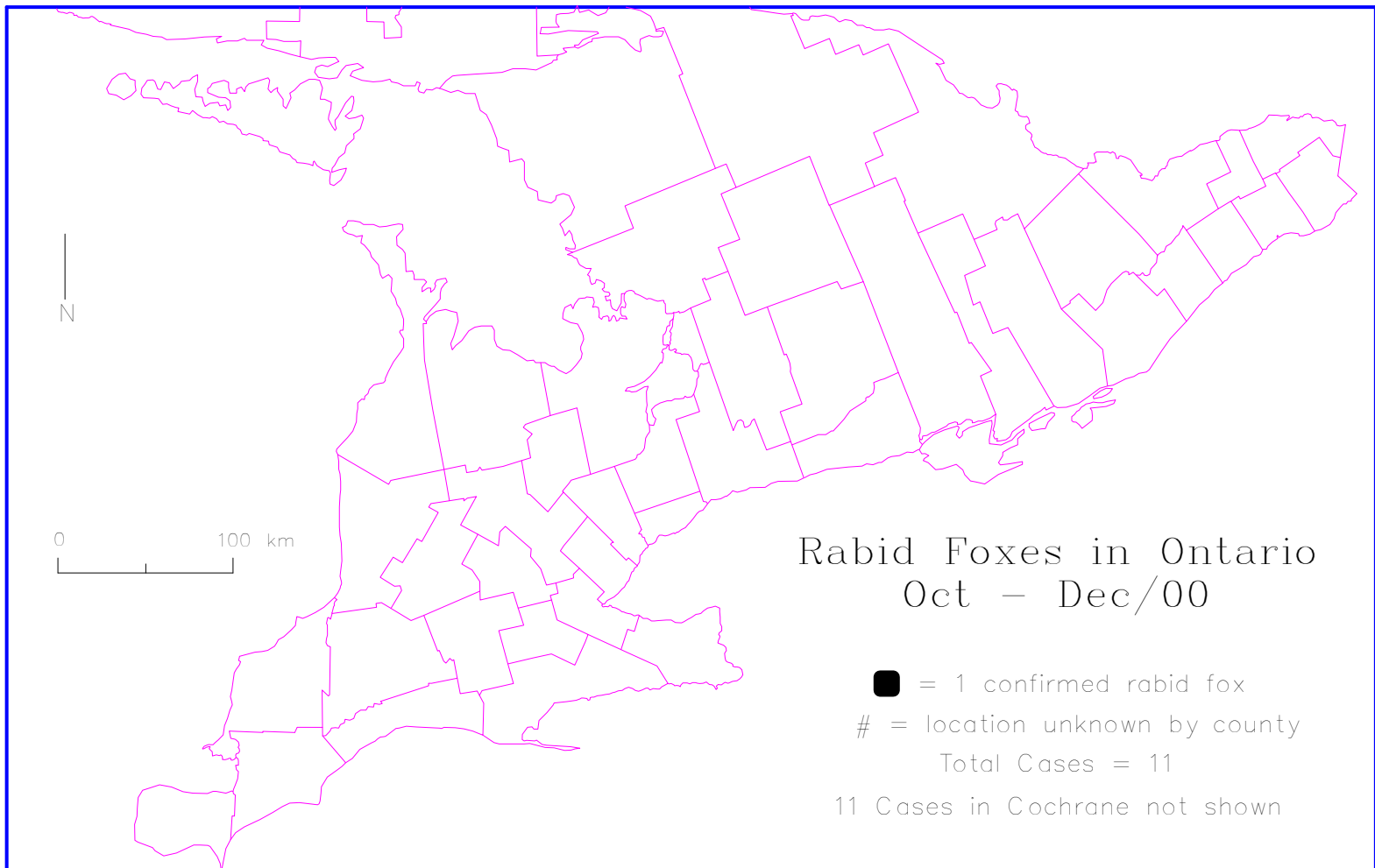
All bats this quarter were big brown bats.

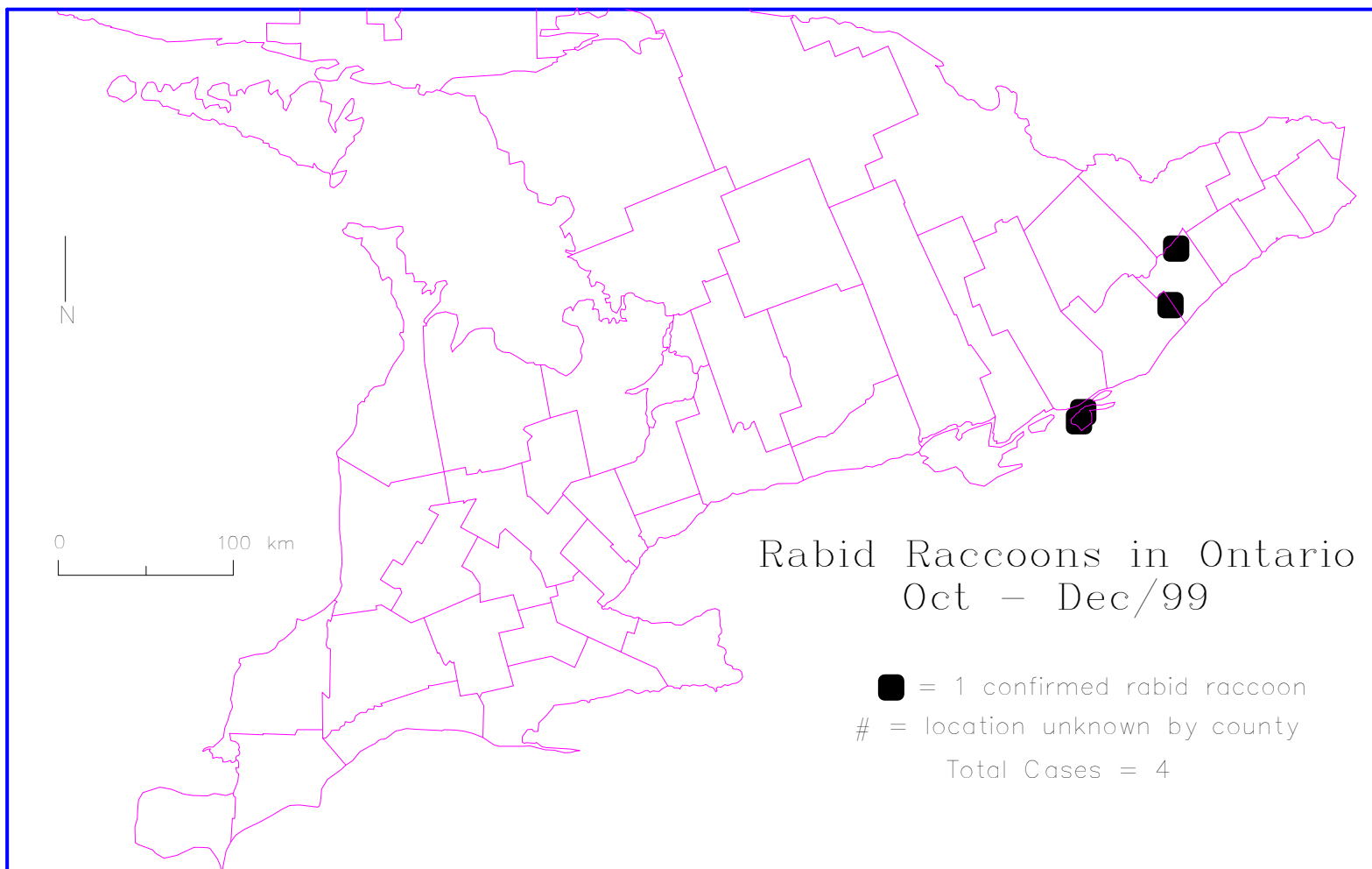
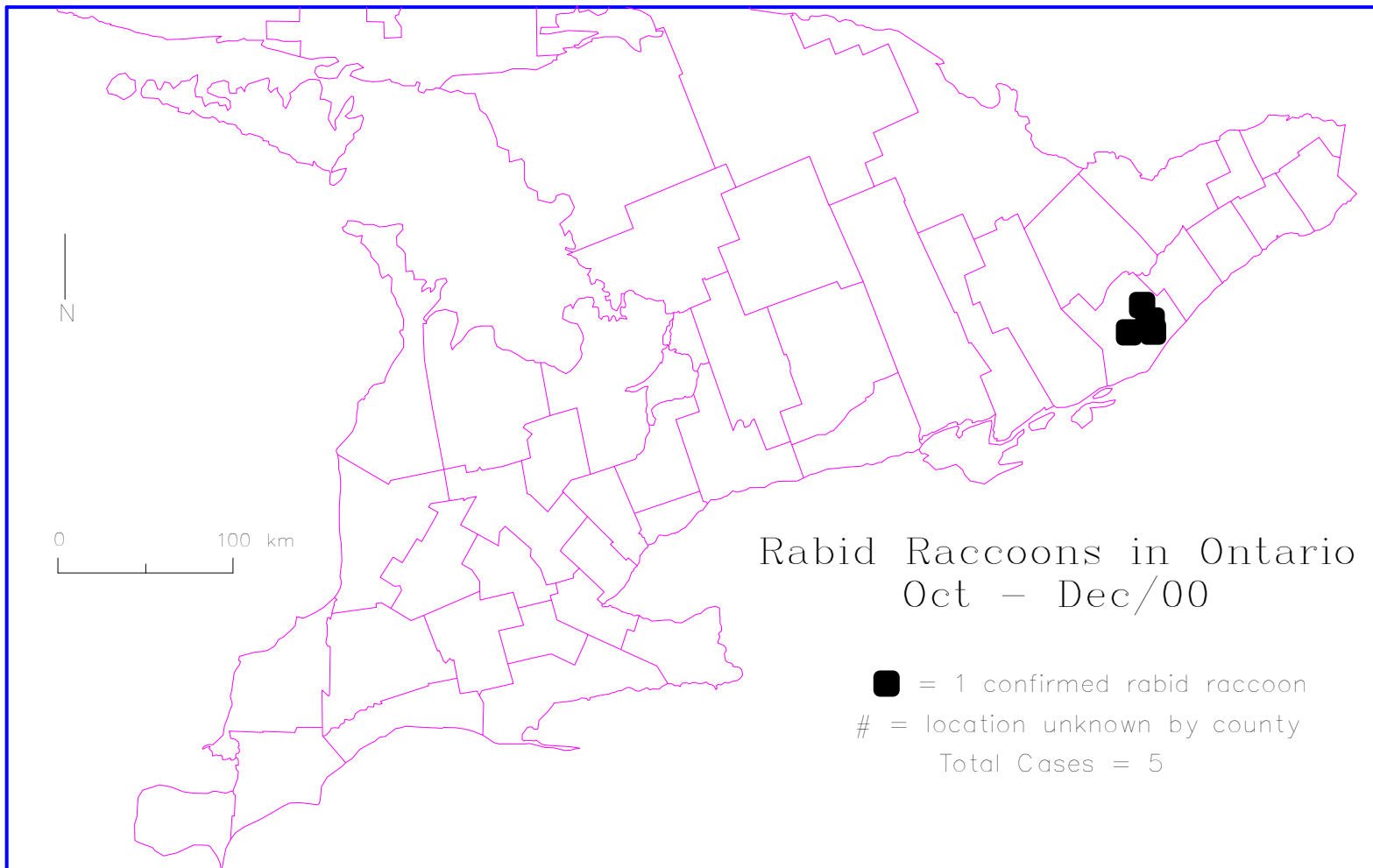
The skunk in Simcoe County was infected with a bat strain.

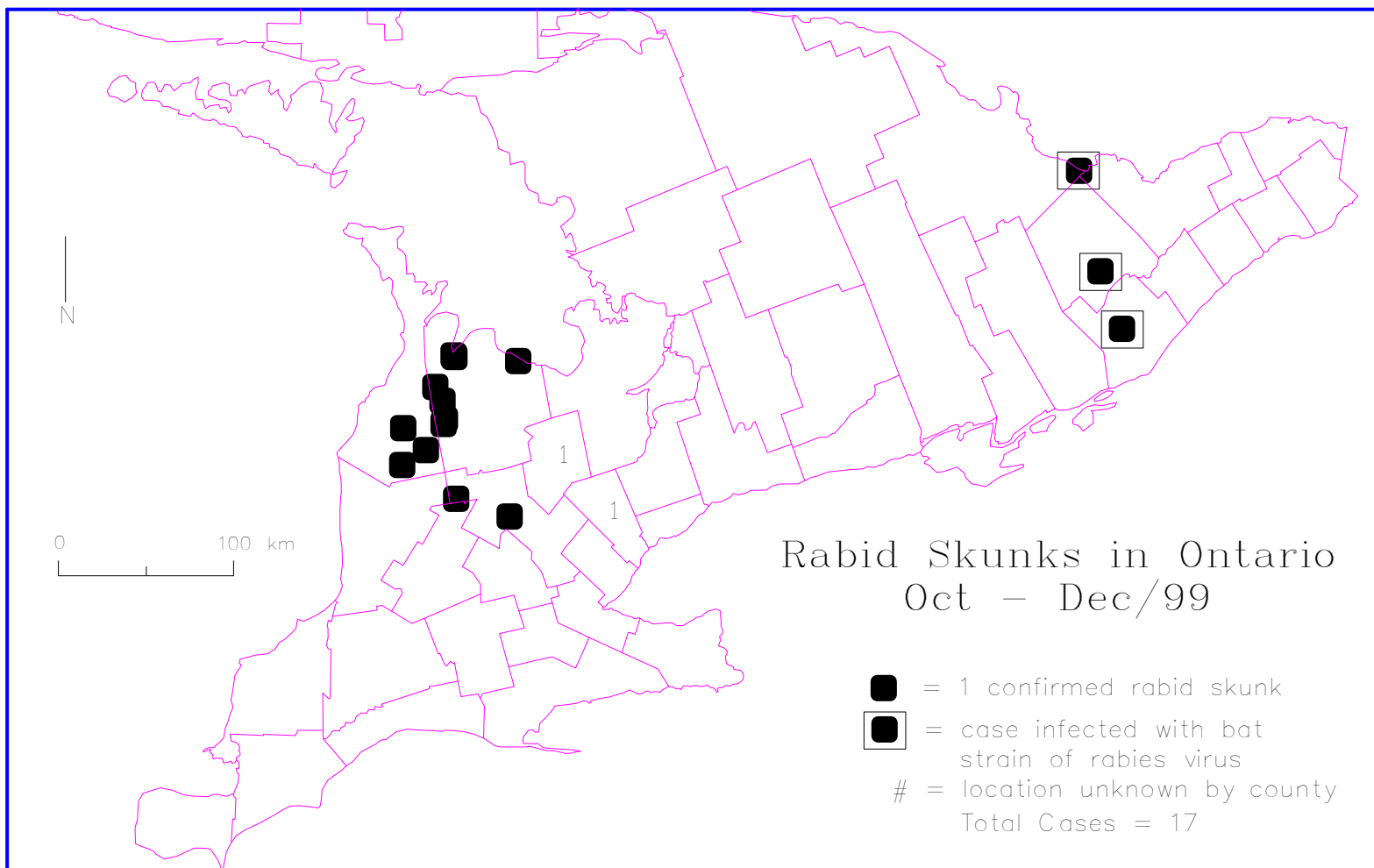
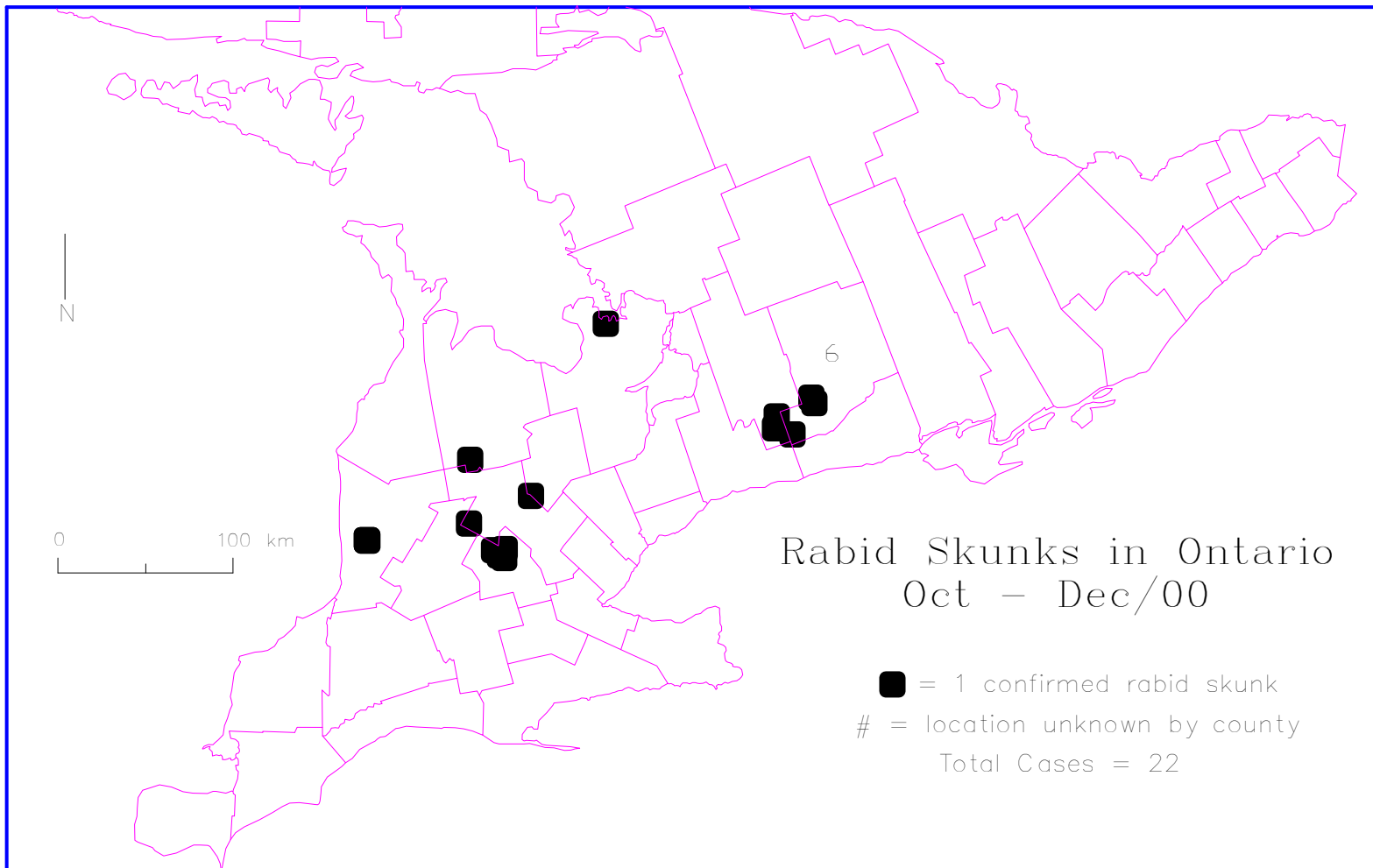
The livestock cases this quarter in Bruce and Huron were horses, and in Waterloo and Cochrane were bovine.

The “other wildlife” in Cochrane were a groundhog near Iroquois Falls and a wolf near Timmins.

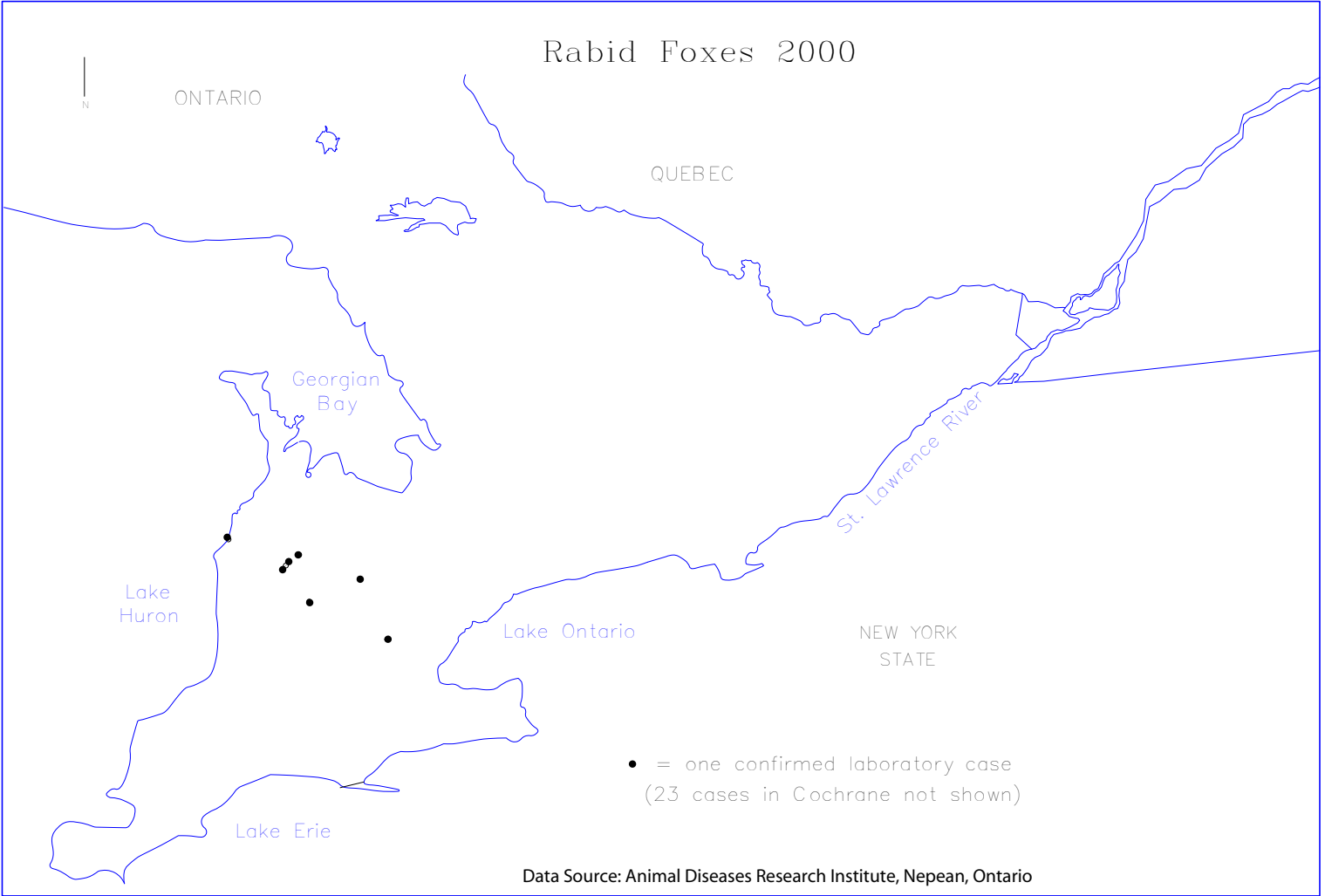
The raccoon in Central region in 1999 was infected with arctic fox strain rabies.



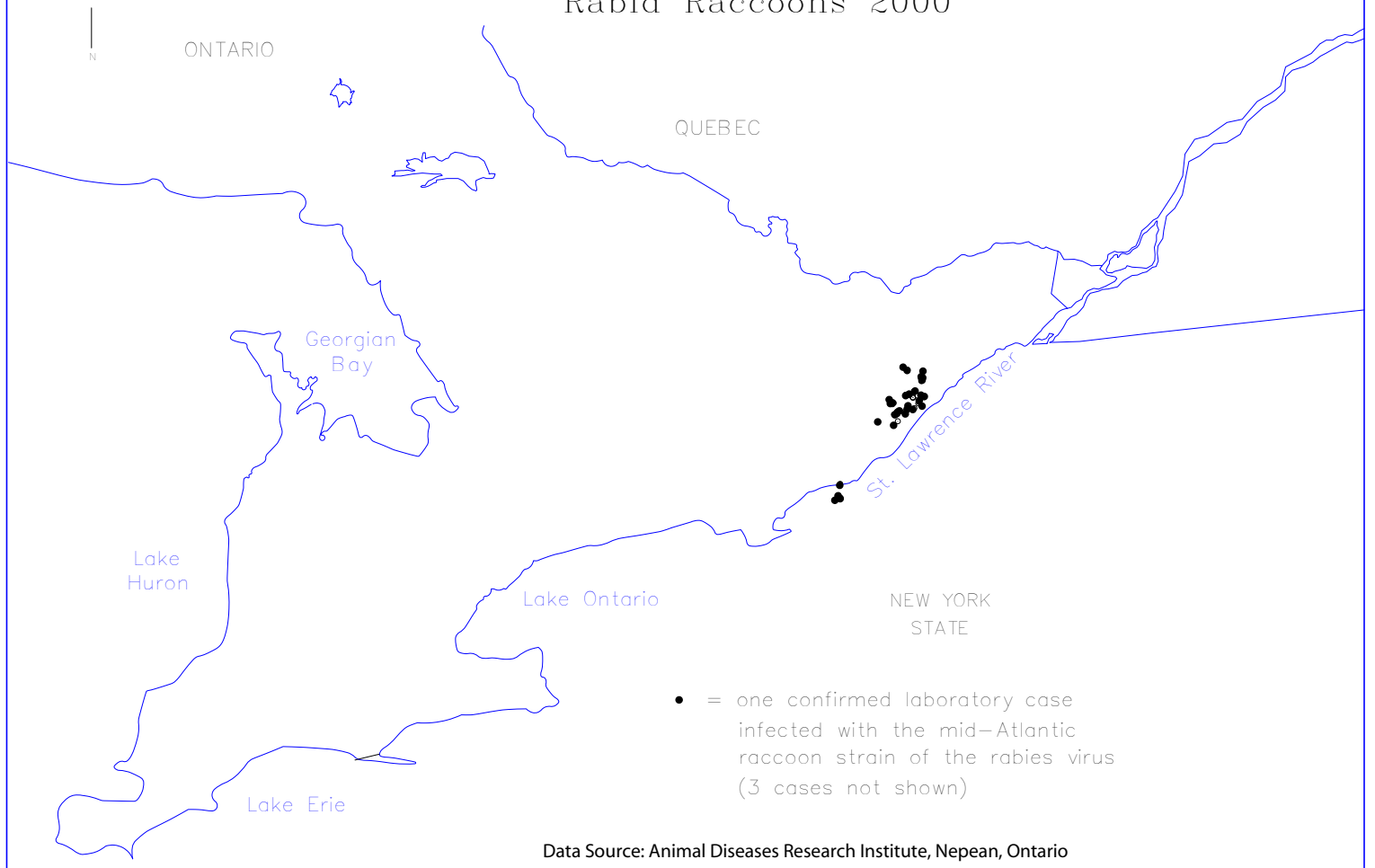




Rabid Foxes 2000



Rabid Raccoons 2000



Rabid Skunks 2000

