

# The Rabies Reporter

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## Rabies in the Fourth Quarter and a Review of Rabies in 2004

The final quarter of 2004 had 22 diagnosed rabies cases in wild and domestic animals compiling a total of 107 diagnosed (and seven clinical) cases for 2004, the fourth lowest since 1957. The predominant feature of the fourth quarter was the continuing focus of nine rabid striped skunks (*Mephitis mephitis*) in the southwestern and southcentral counties of Wellington, Grey, Perth, and Simcoe. There was also one rabid fox (*Vulpes vulpes*) in Simcoe County. In addition, there were nine rabid bats in this quarter mainly restricted to urban and semi-urban areas throughout southern Ontario. With the exception of one little brown (*Myotis lucifugus*) in Wellington County, all were big brown (*Eptesicus fuscus*) bats. Associated with the focus of rabid skunks were two rabid cows - one in Grey County and one in Waterloo RM. In northern Ontario, there was one rabid bat in Thunder Bay and one rabid fox in Fort Severn.

Although there were fewer rabid bats in 2004 (56) than in 2003 (74), bats still predominated, comprising 52% of the diagnosed cases. The numbers of rabid bats by quarter were: 2, 8, 37, and 9, respectively. During the third quarter summer months, bats and people are most active and contact probabilities between the two increases, consequently the most rabid bats are diagnosed in the third quarter. Rabid bats were evident throughout southern Ontario, however, many are associated with urban and semi-urban areas. Most (95%) of the rabid bats are big browns due to their association with human habitation. There were three rabid little brown bats from Muskoka, Renfrew and Wellington Counties. The rabid cat from York Region was diagnosed with bat strain rabies in the third quarter.

The rabid skunk situation is similar to previous years, although there was a resurgence in Simcoe County, which began in the fourth quarter of 2003. The focus of rabid skunks transmitting arctic fox strain

rabies has been maintained in the southwestern counties of Bruce, Grey, Huron, Wellington, Waterloo and Perth; even after rabies in foxes, for the most part, had been eliminated and rabid skunks had disappeared in all other areas of southern Ontario. On average, the annual number of rabid skunks in this area was 38 from 1997 to 2002. In 2003, there were only 21 rabid skunks. This increased in 2004 to 25 (probably due to the spread into Simcoe County). The quarterly distribution of rabid skunks in 2004 was: 4, 5, 7, and 9, respectively. The main impacts of the rabid skunks were an association with increases in rabid livestock, especially in Grey and Simcoe Counties. There was also a rabid dog in Waterloo RM associated with a rabid skunk. Two rabid foxes, one from Perth (submitted in late 2003) and Simcoe, were most probably re-infected by rabid skunks in those areas.

In 2004, there were five rabid raccoons (*Procyon lotor*) - one with Arctic fox strain rabies in Grey County, and four with mid-Atlantic raccoon strain rabies in Leeds and Grenville County. Since 1999, when raccoon strain rabies first appeared in Ontario, there have been 131 cases with raccoon strain - 123 raccoons and 2 skunks in Leeds and Grenville County; and six from Wolfe Island in Frontenac County. The annual distribution (1999 to 2004) of rabid raccoons with raccoon strain rabies was: 7, 40, 45, 19, 16 and 4 respectively. The decrease is most likely due to careful vigilance and intensive rabies control programs. From 1999 to 2004 there were five raccoons diagnosed with Arctic fox strain rabies: one in Peterborough County (1999), one in Wellington County (2002), two in Sudbury District (2002), and one in Grey county (2004). One raccoon in Renfrew county (1999) was also infected with bat strain rabies during this period.

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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 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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# New York State - Summary of Rabies in 2004

## Introduction

In 2004 rabies continued to be recognized as a well entrenched endemic disease in New York State. Terrestrial wildlife rabies, a result of the raccoon rabies enzootic, was identified in animals from 51 of the 62 counties in the state. In upstate New York terrestrial rabies was not identified in Chautauqua, Lewis, Hamilton, Franklin, Clinton and Essex counties. Suffolk County on Long Island and Richmond (Staten Island), Kings, Queens and New York (Manhattan) were also without reports of terrestrial rabies cases in 2004. The Wadsworth Center rabies diagnostic laboratory tested 8,459 animals during 2004. This number is 223 specimens greater than the 2003 total. The 546 confirmed rabid animals represent an increase of 117 over the total in the

previous year. An increase in wildlife rabies cases was observed in 23 counties that had experienced endemic wildlife rabies for at least five years, compared to 8 counties that had an increase in 2003. These increases are attributable to natural fluctuations seen in wildlife rabies cases as animal rabies vector populations rebound from the previous reductions due to rabies mortality.

## Raccoon Rabies in Nassau County

Raccoon rabies emerged in northern Nassau County in mid-summer 2004. When raccoon rabies was identified in Queens County on the western end of Long Island in 1993 it was anticipated that eastward spread into a contiguous Nassau County may quickly

follow. However, this was not observed. As rabies in raccoons has not been regularly or recently reported in Queens during the intervening eleven years, it is likely that its appearance in Nassau County now was the result of an introduction rather than spread. Between August 9 and December 2, 2004, a total of ten rabid raccoons were amongst the 652 animals tested from Nassau County. These animals were part of an enhanced surveillance program that was promptly initiated after the first rabid raccoon was seen in early August. Extensive efforts at raccoon vaccination are underway in an attempt to prevent the further spread of the disease throughout Long Island with a coordinated effort of county, state and federal officials.

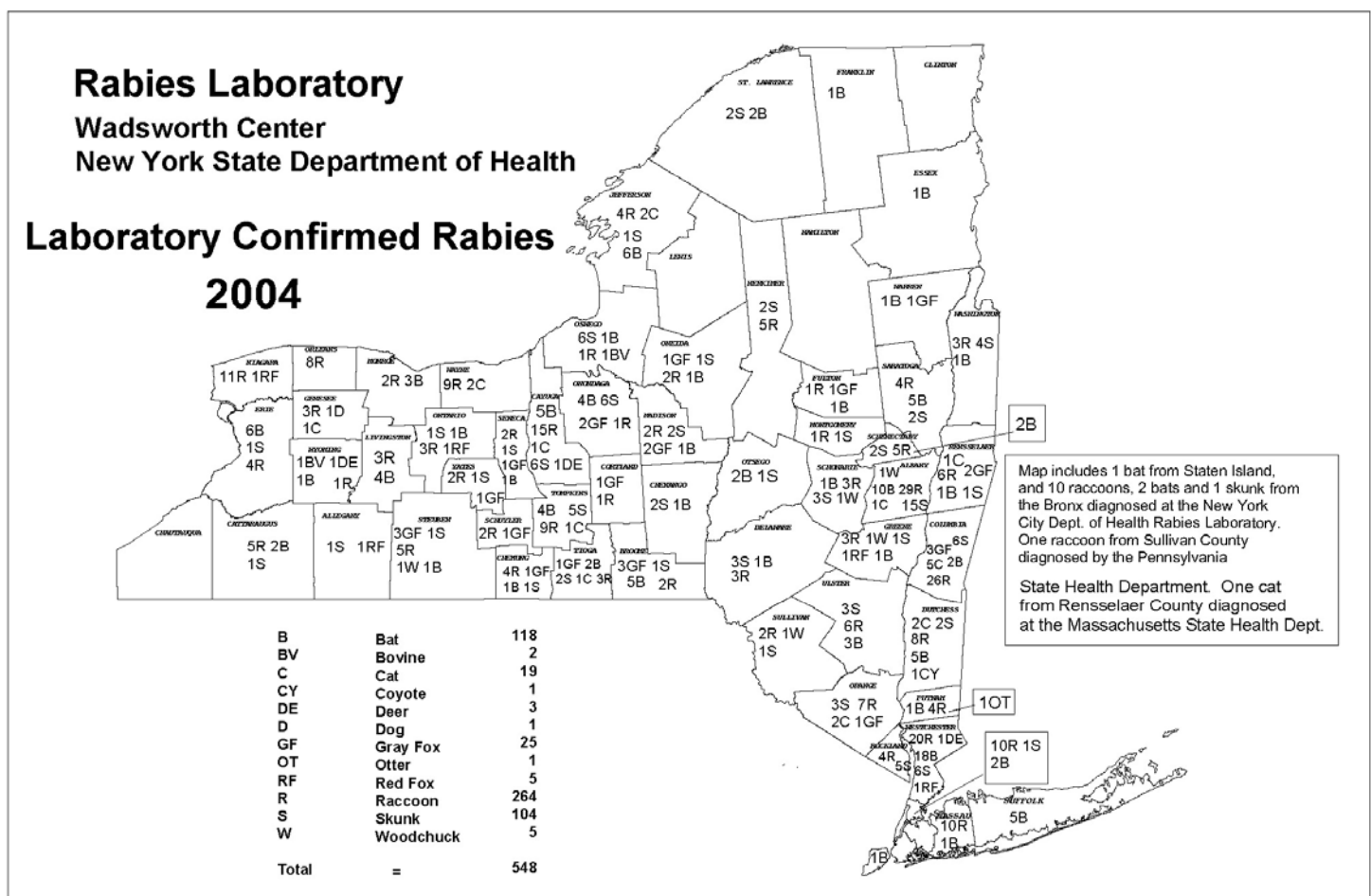


Figure 1. Distribution of rabies cases in New York state in 2004.

### Rabies in Wildlife

Greater than 50 species of animals were submitted to the Wadsworth laboratory for rabies diagnosis in 2004. Specimens were received from all 57 counties in New York, and from Bronx County in New York City. The New York City rabies diagnostic laboratory examined 406 animals for rabies, finding 14 (3.4%) positive for rabies.

The 118 laboratory confirmed rabid bats in 2004 is the second largest number in the history of the laboratory and just six below the 124 reported in 2000. However, the number of positive rabid bats comprised 3.2% of the 3,592 bats received for diagnosis, a positivity rate equal to the average for the previous 10 year period. Bats received comprised 42.4% of all animals tested during the year. The laboratory also examined 1,560 cats (18.4% of all animals tested), 1,321 raccoons (15.6%), 759 dogs (8.9%), 337 skunks (4.0%), 136 foxes (1.6%), 99 woodchucks (1.1%), 87 deer (1.0%) 86 cattle (1.0%) 58 squirrels, 39 horses and 33 goats.

Rabid wildlife accounted for 96% of all rabid animals in New York State during 2004. The 526 rabid wild animals included 264 raccoons (48.2% of all rabid wild animals), 118 bats (21.5%), 104 skunks (19.0%), 25 grey fox (4.6%), 5 red fox (0.91%) 5 woodchucks (0.91%), 3 white tail deer, one coyote and one otter. There were 68 grey fox submitted for rabies diagnosis during the year. With a positivity rate of 36.8% grey foxes were the animals most likely to be rabid of all tested animals. They were followed by skunks (30.5% positivity rate), rac-

coons (19.1%), pipistrelle bats (16.6%), red bats (15%), red fox (7.6%) and big brown bats (4.2%).

Of the rabid bats diagnosed at the Wadsworth laboratory 19% had contact with humans, 13% had contact with a cat and 14.7% had contact with a dog. Of the rabid raccoons tested, 24% had contact with a human, 7.5% had contact with a cat and more than half (53.3%) had contact with a dog.

### Rabid Otter

The rabid otter story took on the sensationalism usually reserved for the stories accompanying the aggressiveness of rabid grey foxes. The otter swam up to and attacked a six year old child who was swimming at a public beach in Putnam County. The child emerged from the water with the otter clinging by its teeth, embedded in the boys arm. It required the actions of several people to dislodge the animal from the child, who received rabies post exposure prophylaxis. Monoclonal antibody typing identified the virus in the otter as the raccoon rabies variant.

### Rabies in Domestic Animals

The 22 laboratory confirmed rabies-infected domestic animals in the state during the year were the smallest number since raccoon rabies entered the state in 1990. The cases included 19 cats, two bovines and one dog. As in previous years, the number of rabid cats eclipsed the number of rabid dogs. It is likely that this is largely the result of difficulties encountered with licensure, control and vaccination of cat populations and the success of vaccination clinics at reducing rabies in dogs. The 19 cases of rabies in cats were identified from ten counties in the state and represent 1.2% of all cats tested for rabies during the year.

(New York City data provided by Dr. Igbal Poshni, Director, Virus Laboratory, New York City Department of Health)

*Wadsworth Center  
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### Rabies Laboratory Wadsworth Center New York State Department of Health

### Raccoon Rabies Outbreak Newly Affected Areas

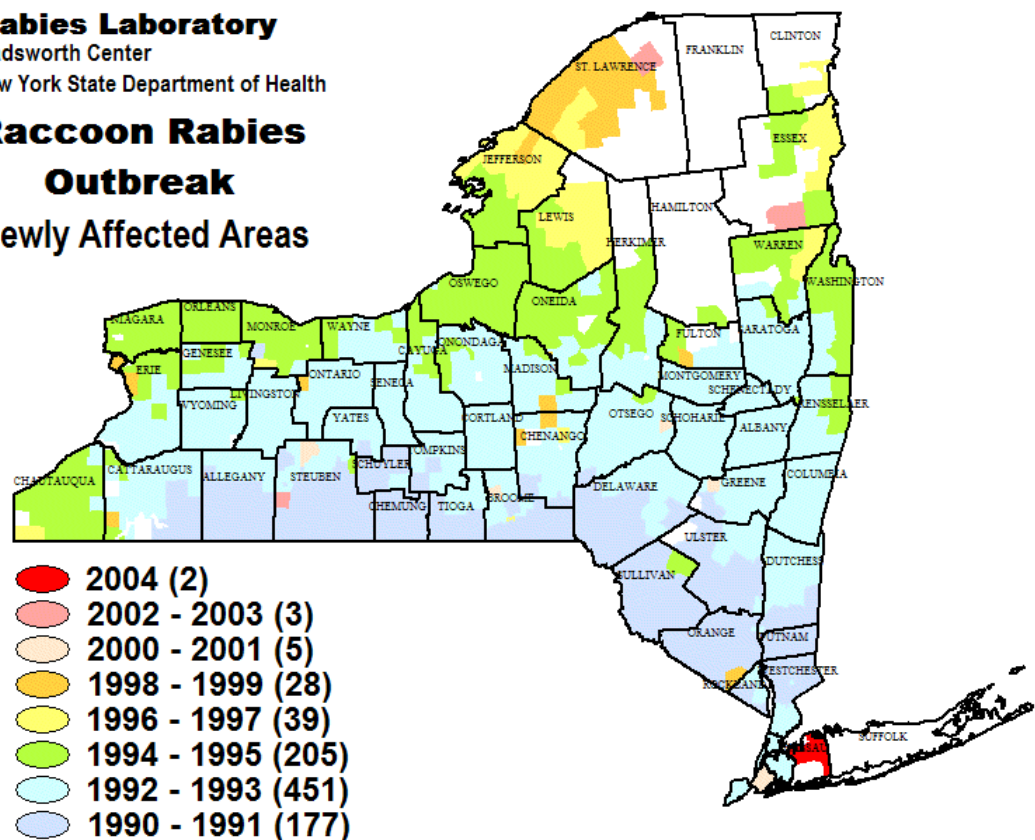


Figure 2. Advancement of mid-Atlantic raccoon strain rabies in New York State.

## Girl Recovers from Clinical Rabies

Rabies is a viral infection of the central nervous system, usually contracted from the bite of an infected animal, and is nearly always fatal without proper postexposure prophylaxis (PEP) (1). In October 2004, a previously healthy female aged 15 years in Fond du Lac County, Wisconsin, received a diagnosis of rabies after being bitten by a bat approximately 1 month before symptom onset. This report summarizes the investigation conducted by the Wisconsin Division of Public Health (WDPH), the public health response in Fond du Lac County, and the patient's clinical course through December 17. This is the first documented recovery from clinical rabies by a patient who had not received either pre- or postexposure prophylaxis for rabies.

While attending a church service in September, the girl picked up a bat after she saw it fall to the floor. She released the bat outside the building; it was not captured for rabies testing, and no one else touched the bat. While handling the bat, she was bitten on her left index finger. The wound was approximately 5 mm in length with some blood present at the margins; it was cleaned with hydrogen peroxide. Medical attention was not sought, and rabies PEP was not administered.

Approximately 1 month after the bat bite, the girl complained of fatigue and tingling and numbness of the left hand. These symptoms persisted, and 2 days later she felt unsteady and developed diplopia (i.e., double vision). On the third day of illness, with continued diplopia and onset of nausea and vomiting, she was examined by her pediatrician and referred to a neurologist. At that time, the patient continued to have blurred vision and also had partial bilateral sixth-nerve palsy. Magnetic resonance imaging (MRI) with and without contrast and magnetic resonance angiography (MRA) studies of her brain were normal, and the patient was sent home.

On the fourth day of illness, the patient's symptoms continued, and she was admitted to a local hospital for

lumbar puncture and supportive care. On admission, she was afebrile, alert, and able to follow commands. She had partial sixth-nerve palsy, blurred vision, and unsteady gait. Standard precautions for infection control were observed. Lumbar puncture revealed a white blood cell count of 23 cells/ $\mu$ L (normal: 0 cells/ $\mu$ L) with 93% lymphocytes, a red blood cell count of 3 cells/ $\mu$ L (normal: 0 cells/ $\mu$ L), a protein concentration of 50 mg/dL (normal: 15--45 mg/dL), and a glucose concentration of 58 mg/dL (normal: 40--70 mg/dL). During the next 36 hours, she had slurred speech, nystagmus, tremors of the left arm, increased lethargy, and a temperature of 102°F (38.9°C).

On the sixth day of illness, the bat-bite history was reported, and rabies was considered in the differential diagnosis. The patient was transferred to a tertiary care hospital. Because rabies was recognized as a possibility, expanded infection-control measures, including droplet precautions and one-to-one nursing, were instituted at time of transport. On arrival, the patient had a temperature of 100.9°F (38.3°C), impaired muscular coordination, difficulty speaking, double vision, muscular twitching, and tremors in the left arm. She was somewhat obtunded but answered questions appropriately and complied with commands.

Blood serum, cerebrospinal fluid (CSF), nuchal skin samples, and saliva were submitted to CDC for rabies testing. MRI with and without contrast and angiogram/venogram sequences were normal. She had hypersalivation and was intubated. Rabies-virus-specific antibodies were detected in the patient's serum and CSF. Direct fluorescent antibody staining of nuchal skin biopsies was negative for viral antigen, and rabies virus was not isolated from saliva by cell culture. Rabies-virus RNA was not detectable by reverse transcriptase polymerase chain reaction assay of either sample. Therefore, identification of the virus variant responsible for this infection was not possible.

Clinical management of the patient

consisted of supportive care and neuroprotective measures, including a drug-induced coma and ventilator support. Intravenous ribavirin was used under an investigational protocol. The patient was kept comatose for 7 days; during that period, results from lumbar puncture indicated an increase in antirabies IgG by immunofluorescent assay from 1:32 to 1:2,048. Her coma medications were tapered, and the patient became increasingly alert. On the 33rd day of illness, she was extubated; 3 days later she was transferred to a rehabilitation unit. At the time of transfer, she was unable to speak after prolonged intubation. As of December 17, the patient remained hospitalized with steady improvement. She was able to walk with assistance, ride a stationary cycle for 8 minutes, and feed herself a soft, solid diet. She solved math puzzles, used sign language, and was regaining the ability to speak. The prognosis for her full recovery is unknown.

To provide community members accurate information about rabies and its transmission, local and state health officials held a press conference on October 21. Public health officials and community pediatricians visited the patient's school to assess the need for rabies prophylaxis among students. WDPH distributed assessment tools to the local health department to screen health-care workers and community contacts of the patient for exposure to potentially infectious secretions. The patient's five family members, five of 35 health-care workers, and 27 of 55 community contacts received rabies PEP, either because of exposure to the patient's saliva during sharing of beverages or food items or after contact with vomitus. No health-care workers at the tertiary care hospital required PEP. Site inspection of the church revealed no ongoing risk for exposure to bats.

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#### Editorial Note:

This case represents the sixth known occurrence of human recovery after rabies infection; however, the case is unique because the patient received no rabies prophylaxis either before or after illness onset. Historically, the mortality rate among previously unvaccinated rabies patients has been 100% (2). The five previous patients who survived were either previously vaccinated (3) or received some form of PEP before the onset of illness (4--7). As in this case, viral antigen was not detected nor was virus isolated from those patients; increased antibody titers detected in serum and CSF (inconsistent with vaccination alone) confirmed the diagnosis of clinical rabies. Only one of the five patients recovered without neurologic sequelae (4). No specific course of treatment for rabies in humans has been demonstrated to be effective, but a combination of treatments, which might include rabies vaccine, rabies immune globulin, monoclonal antibodies, ribavirin, interferon-alpha, or ketamine, has been proposed (2). Given the lack of therapeutic utility observed to date, and because the patient had rabies-virus--neutralizing antibodies on diagnosis, a decision was made to avoid use of immunomodulators (e.g., rabies vaccine, rabies immune globulin, or interferon). However, the particular benefits of the regimen received by this patient remain to be determined.

The history of a bat bite 1 month before this patient's illness suggests an etiology of bat-associated rabies-virus variant. This is consistent with the epidemiologic pattern of rabies in humans in the United States during the preceding 2 decades. During 1980--2000, a total of 26 (74%) of rabies-virus vari-

ants obtained from patients in the United States were associated with insectivorous bats, most commonly silver-haired and eastern pipistrelle bats (8,9), including a variant from a fatal case of rabies reported in Wisconsin in 2000 (10).

In this case, only five health-care workers received PEP. Previous reports of rabies cases have noted large numbers of contacts being treated (8); however, delivery of health care to a patient with rabies is not an indication for PEP unless the mucous membranes or open wound of a health-care worker are contaminated by infectious material (e.g., saliva, tears, CSF, or neurologic tissue). Adherence to standard precautions for infection control will minimize the risk for exposure (1).

Rabies in humans is preventable with proper wound care and timely and appropriate administration of PEP before onset of clinical disease (1). PEP is recommended for all persons with a bite, scratch, or mucous-membrane exposure to a bat, unless the bat tests negative for rabies. When direct contact between a human and a bat has occurred and the animal is not available for testing, PEP should be administered when a strong probability of exposure exists. However, if a bat bite is unrecognized or if the significance of exposure is underestimated, medical intervention might not be sought and appropriate treatment not administered. Once clinical signs of rabies are evident, a progressive and usually fatal encephalitis ensues.

This report underscores the need for increasing public awareness to minimize the risk for rabies following contact with bats and other wildlife. Persons bitten by a potentially rabid animal should immediately 1) wash the wound thoroughly with soap and water, 2) capture the animal (if this can be done safely by avoiding direct contact) and submit it for testing or quarantine, 3) contact local or state public health officials, and 4) visit a physician for treatment and evaluation regarding the need for PEP. Persons should not handle or keep bats as pets and should keep bats away from living quarters

and public places. Despite the recovery of this patient, no proven therapy for clinical rabies has been established, and the reasons for recovery in this case are unknown. Clinicians and the public should recognize the risk for contracting rabies from any direct contact with bats and not regard it as a curable disease on the basis of the outcome of this case.

#### References

1. CDC. Human rabies prevention---United States, 1999: recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR* 1999;48(No. RR-1).
2. Jackson AC, Warrell MJ, Rupprecht CE, et al. Management of rabies in humans. *Clin Infect Dis* 2003;36:60--3.
3. CDC. Rabies in a laboratory worker---New York. *MMWR* 1977;26:183--4.
4. Hattwick MA, Weis TT, Stechschulte CJ, Baer GM, Gregg MB. Recovery from rabies. A case report. *Ann Intern Med* 1972;76: 931--42.
5. Porras C, Barboza JJ, Fuenzalida E, Adaros HL, Oviedo AM, Furst J. Recovery from rabies in man. *Ann Intern Med* 1976;85:44--8.
6. Alvarez L, Fajardo R, Lopez E, et al. Partial recovery from rabies in a nine-year-old boy. *Pediatr Infect Dis J* 1994;13:1154--5.
7. Madhusudana SN, Nagaraj D, Uday M, Ratnavalli E, Kumar MV. Partial recovery from rabies in a six-year-old girl. *Int J Infect Dis* 2002;6:85--6.
8. Noah DL, Drenzek CL, Smith JS, et al. Epidemiology of human rabies in the United States, 1980 to 1996. *Ann Intern Med* 1998;128:922--30.
9. CDC. Human death associated with bat rabies---California, 2003. *MMWR* 2004;53:33--5.
10. CDC. Human rabies---California, Georgia, Minnesota, New York, and Wisconsin, 2000. *MMWR* 2000;49:1111--5.

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## Flight of the Navajo

Since 1989, the workhorses for the aerial oral rabies vaccination programs (ORV) have been MNR's Twin-Otter aircraft. These marvelous planes have certainly provided excellent service in delivering over 56,000,000 rabies vaccine baits and accumulating over 6,500 hours, in our efforts to control and eliminate rabies in wild animal populations in Ontario, other parts of Canada and up to 13 states in USA. A baiting machine was adapted to the interior of the Twin-Otters and baits were ejected from the aircraft through an opening which was originally devised for a camera port for aerial photography. Up until 1998, the baits being used for rabies control weighed 16 to 24 grams and, with 25,000 baits per flight, accumulated a substantial load, but certainly one that a Twin-Otter could handle. In addition, the Twin-Otter had suitable interior space to accommodate upward of 25 containers holding those baits.

After 1998, there was a shift to developing smaller, lighter baits, possibly to lower manufacturing and shipping costs, in addition to better reaching wild animals. A 'coated-sachet' bait, weighing about 4 grams, was developed in USA to target raccoons. Also, Ontario is in the process of developing more effective baits to reach wild skunks, baits with names such as ultra-lite, coated-blister, and A-sachet. These baits weigh approximately 4 grams per bait. From 1999 to the present, Twin-Otters were still used in USA to distribute 'coated-sachets', but at 4 grams per bait and 20,000 to 25,000 of these baits requiring only 5 or 6 bait-holding containers, the size of the Twin-Otter seemed a little over-kill. This became particularly apparent from a very practical stand-point: is there a more economical plane that could deliver the baits, at least lighter baits, as effectively as the Twin-Otter? Original plans considered the Turbo-Beaver, but this proved not suitable due to the twin-engine requisite for aerial baiting.

After we (*MNR Rabies Research & Development Unit*) responded to a



Figure 3. The Piper Navajo—an alternate aircraft for distributing smaller, lighter aerial vaccine baits.

questionnaire circulated by MNR Aviation Services in early 2003, suggestions were made that MNR's Piper Navajo might be applicable for aerial baiting. We were made to understand that predominant use for the Navajo was for Remote Sensing research and development, and that there was a search on for additional applications for that plane. The Navajo has twin-engines, so it meets a prime requisite. In addition, it is able to transport enough of the bait containers carrying the lighter baits for a standard baiting flight. For the remainder of 2003 we asked questions about the plane and did a preliminary fit of the baiting machine, but otherwise did nothing further to apply it. That changed in 2004!

We decided to seriously pursue the Navajo "...until we determined it wasn't worth pursuing anymore". Well, as it turns out, we never determined that. In early spring 2004, Andrew Silver and Kim Bennett of RRDU, and Chad Millen and Joel Kuni of Aviation Services proceeded to re-fit the existing baiting machinery to the Remote Sensing Navajo at its base at the Muskoka airport (affectionately known as the Muskoka Skunkworks). Although the basic conveyor had to be shortened, it did fit and could do the job in the aircraft. Since the Navajo is used mostly for aerial Remote Sensing, and has two

openings (ports) through the floor it would provide the necessary egress port for the baits. All agreed that the combined weight of an average bait load, the baiting machine and 2 or 3 passengers would not be limiting.

One of the main concerns was the proximity of antennae on the exterior of the plane immediately behind the openings. The delicate antennae might be damaged by baits hitting it when they ejected. Chad, Larry D'Andrea and Andrew scoured the Bracebridge Hardware establishments for a variety of conduits which were adapted to the opening to provide a funnel which would direct the ejected baits below and away from the antennae. Ted Senese of Remote Sensing rigged up a video camera to the exterior of the plane to record, in-flight, the impact of a prototype funnel on the direction of the baits leaving the opening. Larry Hill, (MNR's Remote Sensing Pilot), did the test flights for the modifications. Success! The video showed that the baits ejecting did not hit the antennae. Armed with the video and engineering, Transport Canada authorities approved the funnel conduit sticking through the opening and the installation of the baiting machine in the aircraft. A major hurdle had been crossed. Some further test runs were flown to assess a com-



Figure 4. Coated sachet baits being distributed from the Navajo.

puterized baiting recorder – GPS system in the aircraft. That also worked!

After further discussions between Aviation, Rabies, and Remote Sensing, who relinquished some of their planned flights in late August (thanks Ted), a decision was made to apply the Navajo to aerial baiting, mainly as a test of the capabilities in itself and, perhaps, in comparison to the Twin-Otters. The application was planned for northeastern USA (New York and Vermont) where the predominant type of bait being used is the light coated-sachet. The projected baiting period was 24 August to 4 September 2004.

Initial baiting with the larger, heavier baits began in Ontario on 15 August. The Twin-Otters were positioned for those projects. On 23 and 24 August, 3 Twin-Otters and 1 Piper Navajo from the MNR fleet positioned in Dunkirk, in extreme western New York State. The baiting in New York started in earnest on 24 August in the Niagara region. In northeastern USA, the 3 Twin-Otters were supported by 6 pilots (Frank Aquino, Shawn Bell, Ray Fread, Dean Gill, Al Quinn, and Brent Wood – Carl Hansson and Jeff McLain arrived when Frank and Dean had to return home) and 3 engineers (Marc Benoit, Chad Millen and Jean-Marie Kelley). Bob Everett and Randy Godda took over when Marc and Chad had to

return to home-base). The Navajo had one pilot, Larry Hill and one engineer, Denis Banville, throughout. Generally speaking the Twin-Otters flew 4 flights each per day and the Navajo flew 3 flights. Flight-times ranged from 1.5 to 3.0 hours; 3.0 hours was an extreme. Flight-times were predetermined from the flight-planning software, and we tried to assure that the Navajo was given the shorter flights, but it didn't always happen that way. The coated-sachet baits were distributed from 24 August to 2 September 2004, from various bases: Dunkirk, Niagara Falls, and Ogdensburg in New York, and Newport, Vermont. Although the Navajo was smaller, we managed to fit 2 or 3 baiting staff into the aircraft during a flight, 1 navigator and 1 or 2 baiters to load and monitor the baiting machine. The total time accumulated for distributing coated-sachet baits by all aircraft was 157.1 hours; the Navajo accumulated 42.4 hours. The total number of coated-sachet baits distributed was 1,518,750; the Navajo distributed 411,480. So, of the four aircraft involved in the baiting project the Navajo was able to provide slightly over 25% of the input. Perhaps we have another workhorse!

Thank you to all involved in the 2004 ORV aerial baiting projects and the preliminary Navajo testing.

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## Gone but not Forgotten— Neil Ayers Retires

Neil Ayer's first encounter with the Wildlife Rabies Control Program was when Mike Pedde came knocking on his door in late winter 1988 searching for bigger and better aircraft to drop rabies vaccine baits.

Early in 1988, we, at the Rabies Research Unit in Maple, realized that dropping baits from Cessna 172 aircraft was fine for the fairly small areas that we were used to while dropping 5000 to 10000 baits, but would not do for large tracts of the Ontario rabies enzootic area and the 1,000,000 plus baits that would have to be dropped. We needed a larger aircraft. With our limited knowledge of aircraft, and a bounty of knowledge right at our doorstep in the Government Air Service, Ted Bekkers, along with Berj Sailian, took Rabies Unit staff for a ride in a Turbo Beaver, as did Roy Vinall in a Twin-Otter. We were impressed! These original test flights had been arranged by Neil Ayers.

During this time, Neil was still stationed at MacFarlane Lake Airbase, a virtual paradise just south of Sudbury. Further discussions proved fruitful. During these encounters, we found Neil to be a real gentleman: considerate, intelligent, very knowledgeable, open to new concepts, extremely helpful and keen to learn more. And, he loved his profession – airplane pilot. He immediately grasped the potential in adapting government aircraft to new ventures. Right from the get-go, Neil provided an unlimited amount of support to our project.

Neil organized test flights with Twin-Otters to evaluate bait dispersal on frozen MacFarlane Lake in January 1989. We were baffled how the baits ended up falling far behind where they

were being released from the airplane, when they should have been driven forward. Believe us we spent most of an evening, past midnight, in a local establishment drawing and re-drawing trajectory lines and reciting principals of ballistics on paper napkins to solve this puzzle. Of course the answer was simple, as Neil revealed the next morning: 'prop-wash'! So, we further our knowledge of falling objects.

It was decided that government Twin-Otters would be very applicable to our needs. They could carry an appreciable load and fly for extended periods, but most importantly, these planes had a built-in hole through which the baits could be released. In fall of 1989, Neil and crew from Aviation Services, along with Rabies Unit and Queen's University staff started distributing rabies vaccine baits in southeastern Ontario, the first large scale distribution in North America. The original Aviation crew along with Neil was Ted Bekkers, Roy Vinall, Larry Zinn, 'Red' Seguin, John Harding, Ken Wong and Berj Sailian. Neil provided excellent leadership support and maintained high standards to the project – and he brought with him quite

a sense of humour. We dropped about 283,000 baits targeted to fox rabies from 2 to 13 October - the initiation of fox rabies control and elimination in Ontario. The Twin-Otter with the Aviation crew along with the bait machine and Rabies Unit staff looked like a winner!

After the very successful first year, aerial baiting programs expanded and for a few years we settled into the sign of the 'Good Eats' at McChesney and Irvine Lake in eastern Ontario. Throughout those early years, we were introduced to many new names and faces, such as Bill Turcotte, Ken Stirrett, Garry Stewart, Eldon Germaine, Mark Benoit, Charlie Brown, and many others. One thing remained constant: Neil Ayers. Neil was present at all of the aerial baiting campaigns. Neil became the regular overseer of the Aviation organizational details and took a very personal interest in the Wildlife Rabies Control Program. It was not long into a new year and Neil would be on the phone to us to form the year's itinerary around aerial baiting projects.

In 1995 the Wildlife Rabies Control Program went international. Rabid coyotes in southern Texas required



Figure 6. Neil Ayers.

some drastic action there. MNR were hired by the State of Texas to drop baits. Neil became a central organizer for the Texan campaigns over the next few years. In addition, aerial baiting began in New York State. Many of these programs expanded into other states in efforts to halt the spread of rabies. We dropped baits in Vermont, New Hampshire, Maine, Ohio, Pennsylvania, Virginia, West Virginia, Tennessee, Georgia, and Florida. Neil was there. Neil became a familiar face with many of our associates involved in rabies control. He represented MNR at a number of international conferences on rabies and rabies control. His easy going nature and finesse made him an exemplary ambassador for Ontario in other parts of Canada and United States.

In 1998, along with members of the Rabies Unit (MacInnes, Rosatte, Bachmann), Neil, as representative of Aviation Services, was presented with the Amethyst Award by Premier Mike Harris, on behalf of the Wildlife Rabies Control Program.

So, we reflect on Neil's retirement in April 2004. We thank you not only as a proficient pilot (yes! those flights, turns and landings were always very very smooth), but also as a leader, a colleague, and a friend. We wish you all the best in your retirement, and have come to know from others that in retirement, you'll still be busy 'making hay while the sun shines'.

*The Entire Staff  
RRDU  
Peterborough, ON*



Figure 5. Neil Ayers is presented with a retirement gift which was painted by former RRDU member Laurie Calder.

## Baiting 2004 - Rabid Raccoons Disrupt Plans

Due to scheduling problems, our baiting route was west (Stratford, ON) to east (Brockville, ON) to west (Niagara and Dunkirk, NY) and then back east again to Ogdensburg, NY; Newport, VT; and Houlton, ME.

We started with two Twin Otters - OGA and OGB. OPJ and an alternate aircraft (Navajo CJX) would join us in New York.

Staff assembled in Stratford on August 15th. After lunch, staff received refresher training on safety and operation of the bait machine. Due to more scheduling problems, Sunday was our only opportunity to bait the Meaford tank range so OGA completed that flight when all systems were operational. The following morning we had an early start and decided to try and complete the flights furthest from the airport first. OGB had a computer display problem which required a road trip to London for repairs. With some switching of spare parts, we were able to complete seven flights by day's end. Kim Bennett and Bev Stevenson stuck around at the end of the day to troubleshoot the bait machine problems. Peter Bachmann confirmed the rumour that there were two rabies positive raccoons near Mallorytown and the trappers

which were part of the flying team may get reassigned to deal with that.

On August 17<sup>th</sup>, OGB was still having computer problems. After the connections were checked, it was decided to switch the cable running from the bait machine in the back to the navigator up front. Some of the newer fliers were still trying to find their flying legs. Staff from our Niagara TVR arrived and volunteered for a few flights. With an early start to the morning, we managed to get another seven flights done.

The 18<sup>th</sup> started off with fog which kept us grounded until 09:30. Some passed the time throwing a football around while others played euchre. Our TVR trappers, which comprised half of our flying crew, were being recalled to Brockville for Enhanced Surveillance around the two new cases. Several volunteers also showed up for flights. With the departure of the trapping staff who were just getting used to flying, we were left with the

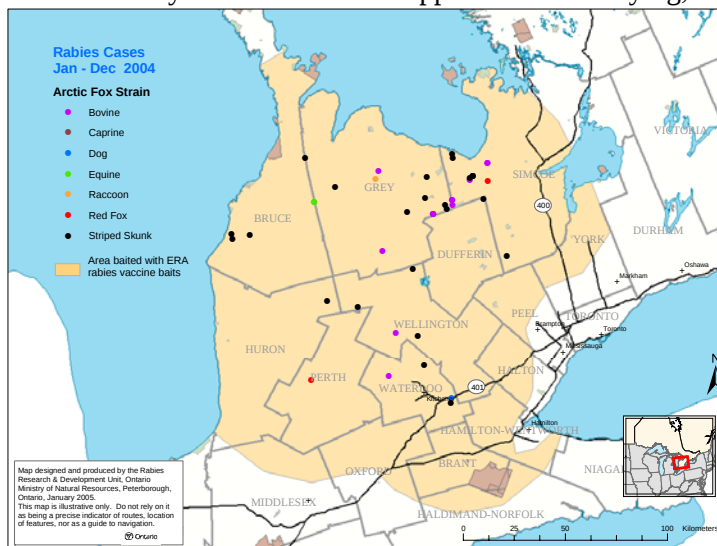


Figure 7. Baited area in southwestern Ontario. Rabies cases during 2004 are also illustrated.

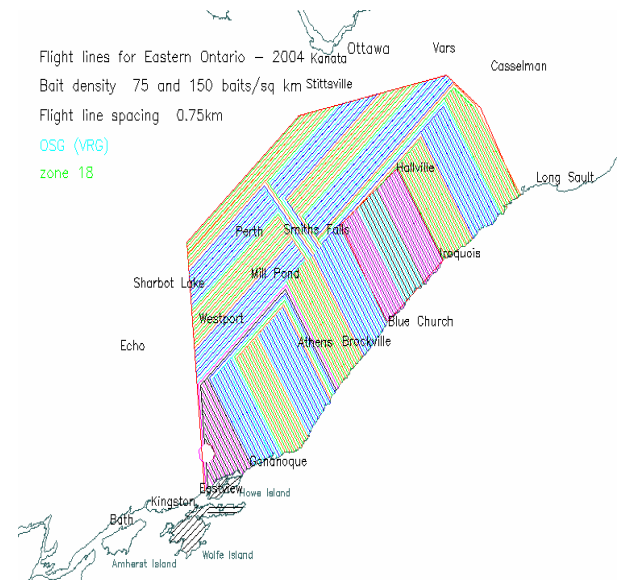


Figure 8. Area baited for raccoon rabies in eastern Ontario.

task of looking for replacement fliers. Fortunately, one of our previous volunteers was available to work. Bev Stevenson also contacted some of her acquaintances at the local MNR office and they were able to direct several individuals our way to help out.

On August 19<sup>th</sup>, we said fare well to our trappers. The day

started off very windy for our new flying staff. Our Minister of Natural Resources, the Hon. David Ramsay arrived today to observe the aerial baiting program. The Minister and his contingent arrived and were briefed on the ground operations before doing a few interviews with the local media and participating in a short flight to see first-hand how the baiting machinery worked. Even with new staff, media and the Minister's visit, we managed to complete six flights leaving only two more flights from Stratford.

On the 20<sup>th</sup>, we readied the vehicles for our next destination - Brockville. Each plane departed with a crew while the remainder of the staff headed for highway 401. The planes completed their flights, landed, dismantled the radio equipment and loaded the planes for the flight to Brockville. With good weather, we completed two flights from Brockville.

On August 21<sup>st</sup> and 22<sup>nd</sup>, we worked from sunup to sundown completing nine flights each day. On our final evening in Brockville, we held a BBQ at the airport for the baiters and the reassigned TVR trappers.

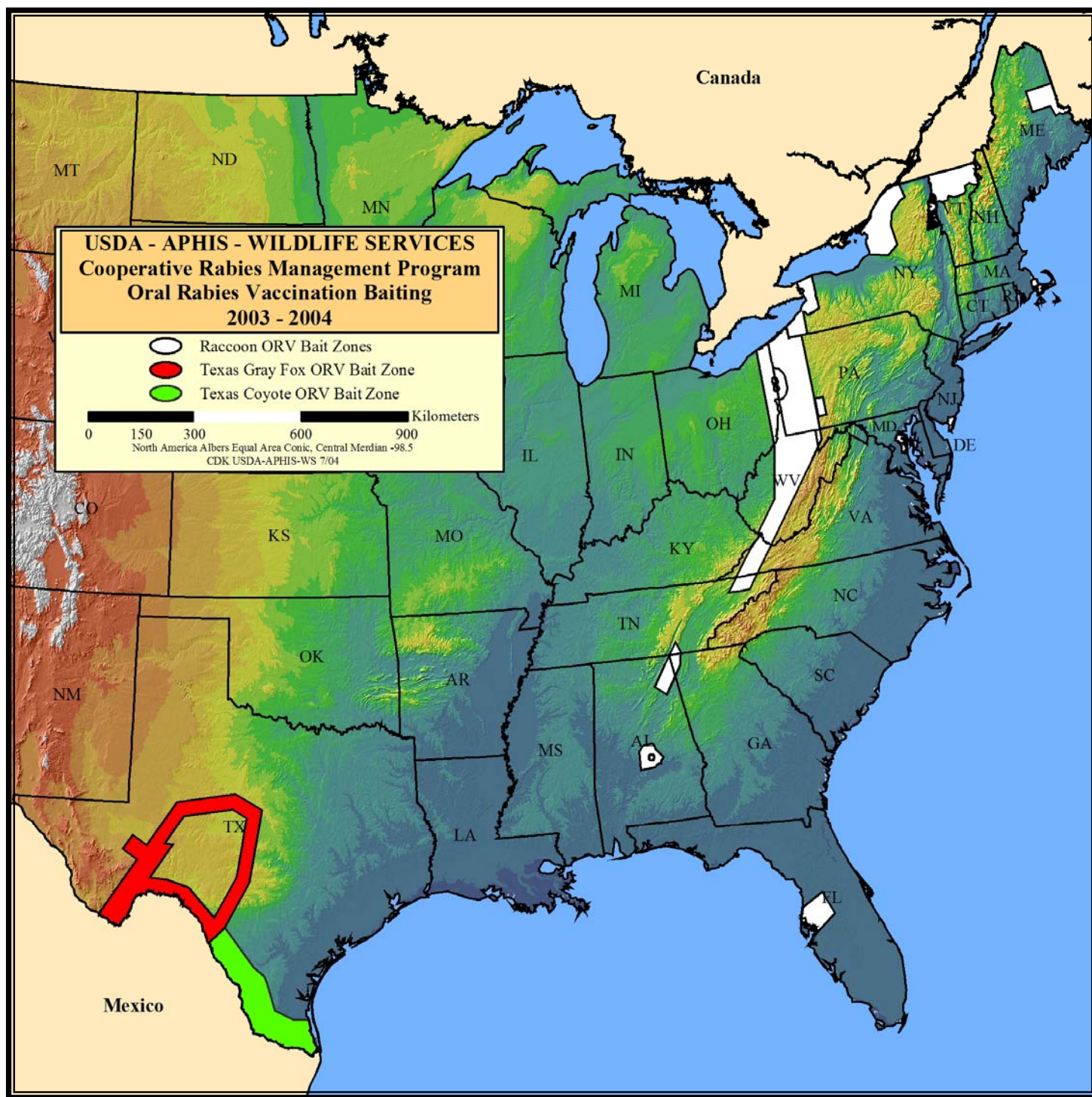


Figure 9. Map of oral rabies vaccination bait zones in the United States.  
 (Map courtesy of Craig Kostrzewski, USDA—APHIS—Wildlife Service)

On August 23<sup>rd</sup>, we checked out of the motel and headed to Dunkirk, NY. We encountered few problems at the border and arrived in Dunkirk in early afternoon. Upon arrival, we checked into the motel and left some vehicles at the airport for the pilots and engineers that would be arriving later.

On the 24<sup>th</sup>, we designated crews for the Niagara Falls flight and loaded

enough baits for seven flights. With the crew on board, it was a quick flight to the Niagara Falls airport. The New York volunteers received training and safety briefings. The excitement was building as the Navajo had joined us to do its first set of flights. Some of the flights close to the airport were required to do extra flying because air traffic was busy. As a result, the last

line on OGB's flight was scrubbed because they were getting low on fuel. The 3<sup>rd</sup> Twin Otter (OPJ) had arrived in Dunkirk so the bait machine was installed and tested for the following day.

August 25<sup>th</sup> in Dunkirk started off with a great sunrise but the day got progressively windy. There was another batch of fresh faces eager to fly

once the training and safeties were completed. Some were none too fresh looking when they landed on terra firma. The day was a success with each of the 4 aircraft completing three flights.

The 26<sup>th</sup> was another moving day. The weather was overcast with a low ceiling so the planes didn't depart until 11:00. Once the vehicles were loaded with personal gear, it was time to gas up and grab a Tim's coffee for our trip to Odgensburg. When we arrived, the road crew was quickly enlisted to fly the last four flights of the day. One of the computers was not generating any information in the cockpit so it returned to the airport where it was determined that one of the connections had been hit and the cable was damaged. A new cable was quickly installed. We still managed to complete six flights.

We started early on the 27<sup>th</sup> with a bad weather forecast. The first flights of the day were loaded quickly as we only had a small window of time to get in and out of Fort Drum. More staff training was needed for the new volunteers. The team managed to complete 15 flights by day's end.

On the 28<sup>th</sup>, we were up at our usual start time despite fog and a low ceiling. The new volunteers were eager to go so briefings were completed just in case the weather cleared. The day stayed humid and the weather didn't clear so we called it quits by mid-afternoon. Some staff decided to visit our favourite Carhartt store while others relaxed at the hotel. By late afternoon, swimming and volleyball were in full swing and pizza had been ordered..

August 29<sup>th</sup> didn't look much better than the previous day. Crews headed out to the airport on schedule and played euchre and Frisbee while we waited for the weather to clear. Around 1:00, the pilots decided to give things a try and all planes managed to complete a flight but those would be the only four of the day as the ceiling proceeded to get progressively worse.

On the 30<sup>th</sup>, the day was a wash right from the start. The skies opened up and the rain poured down on and off

all day. Most people took the opportunity to do laundry, catch up on correspondence, or go shopping while others lounged around watching tv.

August 31<sup>st</sup> looked as promising as the 30<sup>th</sup> but the pilots said that we should be able to fly by noon. We went to the airport and proceeded with the training as a few blue patches started to show. By 10ish, we were away on our first set of flights. The day went without a hitch and we managed to complete 12 flights and finish baiting in New York.

September 1<sup>st</sup> was spent packing vehicles and loading planes. There was a crew change today as two pilots were leaving for home and Kim Bennett was going to a duck banding project. The replacement pilots were Jeff McClain and Carl Hansson.

The transition into the Green – Cold Hollow Mountains while we were driving was quite a change from the flatter terrain we had been baiting over in the last few weeks. We managed to complete nine flights today.

On the 2<sup>nd</sup>, it was much the same routine as before with breakfast, training and flights up as soon as possible. The scenery on the route over towards Burlington was worth the wait. There was some switching of bait machine belts for the fishmeal polymer baits. We were finished with the lighter sachet baits, so the Navajo was sent home. With three flights per plane completed today, the Vermont flights were almost done leaving a days worth of flying in Maine tomorrow.

On September 3<sup>rd</sup>, we started early and at breakfast the pilots reported that both pilots would be required as the weather reports warranted them flying IFR. This meant a few less baiters were able to go. Once the tubs, baits and crew were put aboard, we were off. Upon landing in Houlton, we were greeted with gusty winds and the same crew in bright orange outfits as last year. (The core of our volunteers were with Search and Rescue.) Once we completed the training, the flights began at about 11:00. One flight had four long flight lines from the airport out and back to do.

The first crew had barely made it halfway through the flight when our pilot decided it would be better to land and take on a new baiting crew. The volunteers on the ground were pretty quick to volunteer with only two lines left to do. They didn't realize that there was still over an hour of flying to do. Once this flight was completed, we baited our last six flights and we were on our way back to Newport for the evening. We had a small wrap up party before some of us headed back to Ontario and others continued on to do the Ohio baiting.

On September 4<sup>th</sup>, we packed for our trip home and said our goodbyes to each other for another year.

*Mark Gibson  
RRDU  
Peterborough, ON*

## Ohio ORV— Here Come the Hurricanes

Three aircraft with a contingent of six pilots, three engineers and two Rabies Unit staff left Vermont and arrived in Ohio on September 4th. Baiting crews weren't scheduled to arrive until September 7th so we had two days to make modifications to the baiting equipment, clean the aircraft, and get some rest.

September 7th was a fabulously sunny, calm day—perfect weather for flying. The day was dedicated to training the staff on safety procedures and proper use of the baiting machinery. Early in the afternoon, plans were modified. It was decided to postpone some of the training and send each of the aircraft out to complete a flight. The effects of hurricane Frances were expected to hit Ohio the following day. It was a good thing we did complete three flights on the 7th as we were grounded on both the 8th and 9th. The rain had stopped by the 9th but much of the area to be baited

was under water. (A third of the runway was flooded as well.) Although we could have flown today, there were concerns that any baits distributed would end up floating or being washed away into another state.

By the 10th, the weather had finally cleared and we were able to complete nine flights. There was still a lot of moisture remaining in the air which created early morning fog for a few days. Despite the fog, we did complete ten flights on the 11th and ten on the 12th.

The new week started off much better (and drier) than the previous one. We completed 12 flights on the 13th, 14th, and 15th. We were finally making progress and the end was in sight. One very full day and we would be finished with the baiting and on our way home.

On the 16th, we completed nine and a half flights leaving only four and a half flights to go. We were trying to complete as many flights as possible since we had been awaiting the effects of Hurricane Ivan for several days. Fortunately, Ivan was kinder to us than Frances had been and we were only grounded for one day.

Most crews had other work commitments and were required to leave on the 17th. The remaining staff would be required to do back to back flights in order to get the job done. As it turned out, some of the regular fliers were ill during the first flight on the 18th and were unable to complete the second set of flights. Some staff who did not normally fly but were at the airport volunteered to take their places. We were able to finish the remaining flights as well as two small additional flights to get rid of the surplus baits.

After a quick farewell and loading our equipment and luggage into the aircraft, we were on our way home. For some of us, it had been almost five weeks since we had eaten a home-cooked meal and slept in our own beds.

*Beverly Stevenson  
RRDU  
Peterborough, ON*

## GAT ORV - Fall 2004

On November 4, MNR Twin Otters OGB, OPJ and OPG departed Ontario to assist the United States Department of Agriculture's Wildlife Services to aerially distribute rabies vaccine baits in Georgia, Alabama, and Tennessee (GAT) to help control the spread of the mid-Atlantic strain of raccoon rabies. MNR staff included pilots Red Seguin, Frank Aquino, Jeff McClain, Brent Wood, Corey Burrella and Al Quinn; aircraft engineers Larry D'Andrea, Dan Berndt and Gord Angeconeb; and rabies technicians Kim Bennett and Andrew Silver.

Training of Wildlife Service and local state health department staff began on November 5<sup>th</sup> and baits began to fall to the ground on November 6<sup>th</sup>. The weather was fantastic and there were no delays due to mechanical issues. We quickly completed the baiting program in just three short days.

In total, approximately 448,575 fishmeal polymer baits were distributed using the three twin otter aircraft.

Aircraft flew approximately 500 feet above ground and dropped baits at a target density of 75 baits/km<sup>2</sup>. The parallel flight lines were spaced 500 meters apart. The vaccination zone includes portions of three states and covered approximately 1,170 square miles.

In Alabama, it included the counties of Etowah, DeKalb, Cherokee, Marshall and Jackson; in Georgia it included the four counties of Dade, Walker, Chattooga and Catoosa; and in Tennessee it included the eight counties of Bledsoe, Hamilton, Marion, McMinn, Meigs, Rhea and Sequatchie. All flights were flown out of Albertville municipal airport in Albertville, Alabama.

*Andrew Silver  
RRDU  
Peterborough, ON*

## Rabies Cases on the Rise Everywhere: US ORV Barrier Breaches in 2004

The U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS) has a long history of involvement with federal, state, and local agencies in the fight to prevent the spread of rabies in the United States. Raccoon rabies can be found from Florida to Maine, and as far west as Ohio. APHIS' Wildlife Services (WS) has provided federal leadership and funding for the Oral Rabies Vaccine (ORV) project in a cooperative effort to help create a barrier along the Appalachian Ridge to prevent the westward spread of raccoon rabies.

The ORV bait consists of a fishmeal polymer cube (1 ¼ inches x ¾ inches) that is hollow and manufactured by Merial, Inc. of Athens, GA. A sachet, or plastic packet containing the Merial Raboral V-RG rabies vaccine is inserted into the hollow area of the bait and then sealed with wax. The ORV bait is distributed by hand, helicopter, or airplane. Raccoons are attracted to the fishmeal which can withstand distribution from an aircraft flying at an altitude of 500 feet. Once the raccoon finds the bait and bites into it, the sachet ruptures, and the vaccine is released into the raccoon's mouth.

After the ORV baits have been distributed there is a surveillance period, where raccoons in the area of the drops are captured; vaccinated; sampled for rabies antibodies, age, ORV bait uptake, sex, weight and reproductive condition; ear-tagged; and released. This enables the project to monitor effectiveness of the ORV pro-

-gram.

In 2004, first-time cases of raccoon rabies were found in Lake County, Ohio; Cape Cod, Massachusetts; and Nassau County, New York. These incidents were responded to quickly to prevent the disease from becoming widespread.

### **Cape Cod, Massachusetts**

In 1994, the Cape Cod ORV project began as a cooperative effort led by Tufts University, with funding provided by the Commonwealth of Massachusetts Department of Public Health Department. The goal was to prevent raccoon rabies from spreading across the Cape Cod Canal onto Cape Cod. The canal had served as a strategic "man-made" barrier to complement ORV.

In late February and March 2004, raccoon rabies was discovered on the ocean-side of the Cape Cod Canal for the first time. Leading up to this, there had been an increase in rabies activity within the barrier in 2002 and 2003.

In response to the incident, personnel from USDA-WS and the Cape Cod ORV program trapped, vaccinated and released numerous animals in a span of 13 days. During the program, 490 unique raccoons and 18 unique skunks were captured; vaccinated; sampled for rabies antibodies, age, ORV bait uptake, sex, weight, and reproductive condition; ear-tagged; and released. During this time, 26,897 ORV baits were distributed over approximately 190 km<sup>2</sup>. This was part of a larger effort to distribute ORV baits over approximately 463 km<sup>2</sup> of peninsular Cape Cod to prevent further spreading of the disease.

### **Lake County, Ohio**

On July 20, 2004, the Ohio Department of Health (ODH) confirmed they had found a rabid raccoon in Lake County. The raccoon was found after it had bitten a dog. The dog was protected by a current rabies vaccination,

and the four people who handled the dog received immunizations.

This was the first breach in the vaccination zone in Ohio since it had been implemented in 1997. The vaccination zone has successfully reduced the number of cases of rabies in Ohio. John Forbes, rabies field coordinator at USDA-WS said, "While this breach was, and remains, a challenge to the rabies program, it was not unexpected, and our contingency plan was quickly and effectively implemented."

Several different agencies responded to the breach, including USDA-WS, ODH, the Ohio Division of Wildlife and local area departments of health. WS' primary role in the response was ORV and facilitating enhanced surveillance. Aerial and ground distribution of vaccine was done on Aug. 5 and 6; 132,000 coated sachets were distributed using an airplane and 34,000 fishmeal polymer baits were distributed by hand. The vaccination zone covered 1,432 km<sup>2</sup> in Lake, Geauga and Cuyahoga counties in Ohio. WS trapped, vaccinated and released nearly 1,000 raccoons with the help of wildlife biologists and specialists in 13 states.

Through the end of January 2005, more than 1,500 rabies samples, primarily raccoon, were tested through the Rabies Section of the Centers for Disease Control and Prevention (CDC) and the ODH Laboratory (ODH samples mostly involved human or pet exposure).

### **Nassau County, New York**

On August 9, 2004, the New York State Department of Health confirmed the first case of raccoon rabies reported on Long Island. A raccoon and dog got into a confrontation, and the raccoon bit the dog. The WS handler and the three family members who owned the dog were treated for possible exposure to rabies.

The New York State Department of Health took the lead role in the response. Traps were set within a half a mile radius of the site in a cooperative

contingency effort with help from WS, Nassau County Department of Health and other area agencies. After two more rabid raccoons were discovered in late August, trapping and vaccinating animals was done in a two-mile radius around the area where the first raccoon was found.

Like the other areas, raccoons were trapped, vaccinated and released if they appeared healthy. Sick animals were euthanized and tested for rabies. During this time, 352 raccoons were trapped, vaccinated and released. This was followed by ORV distribution by hand and helicopter. ORV was distributed via helicopter over approximately 32 square miles. Baiting by hand covered approximately 18 square miles. To date, 10 cases of rabies have been reported since August 9, 2004.

*Brienne German and  
Dawn Herrschaft  
USDA-APHIS*

*[The map of all oral rabies vaccination zones in the United States was provided courtesy of Craig Kostrzewski, USDA-APHIS-Wildlife Services.]*

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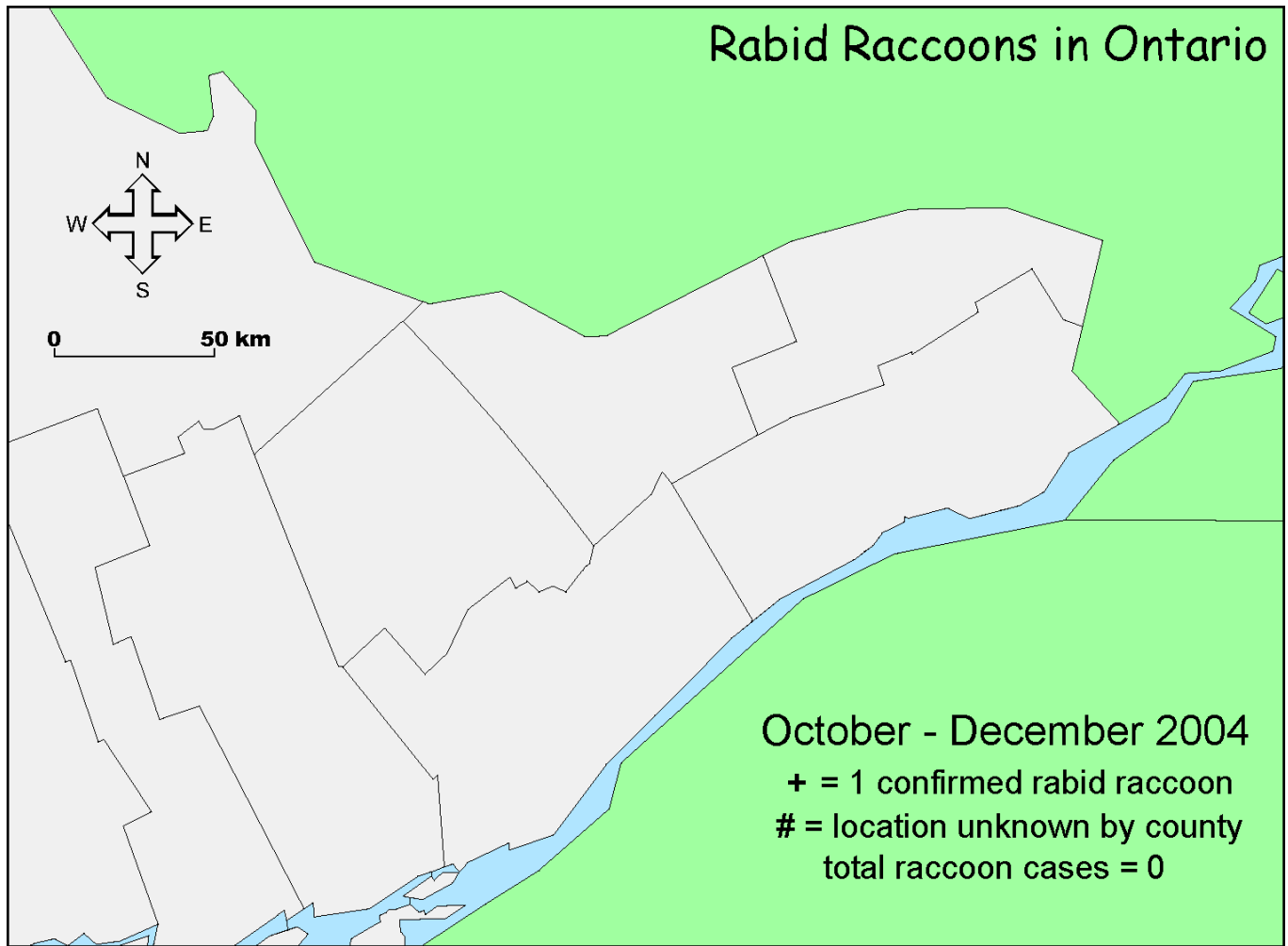
## Animal Rabies Report: October to December 2004

| Animal Type                  | Fox |            |    | Raccoon |            |    | Skunk |            |    | Other Wildlife |            |    | Bat |            |    | Dog |            |    | Cat |            |    | Livestock |            |    | Totals |            |    |
|------------------------------|-----|------------|----|---------|------------|----|-------|------------|----|----------------|------------|----|-----|------------|----|-----|------------|----|-----|------------|----|-----------|------------|----|--------|------------|----|
| County or Region             | #   | Cumulative |    | #       | Cumulative |    | #     | Cumulative |    | #              | Cumulative |    | #   | Cumulative |    | #   | Cumulative |    | #   | Cumulative |    | #         | Cumulative |    | #      | Cumulative |    |
|                              |     | 04         | 03 |         | 04         | 03 |       | 04         | 03 |                | 04         | 03 |     | 04         | 03 |     | 04         | 03 |     | 04         | 03 |           | 04         | 03 |        | 04         | 03 |
| Eastern                      |     |            |    |         |            |    |       |            |    |                |            |    |     |            |    |     |            |    |     |            |    |           |            |    |        |            |    |
| Stormont, Dundas & Glengarry |     |            |    |         |            |    |       |            |    |                |            |    |     | 1          |    |     |            |    |     |            |    |           |            | 0  | 0      | 1          |    |
| Prescott-Russell             |     |            |    |         |            |    |       |            |    |                |            |    |     | 1          |    |     |            |    |     |            |    |           |            | 0  | 0      | 1          |    |
| Ottawa-Carleton              |     |            |    |         |            |    |       |            |    |                |            |    | 5   | 5          |    |     |            |    |     |            |    |           |            | 0  | 5      | 5          |    |
| Renfrew                      |     |            |    |         |            |    |       |            |    |                |            | 1  | 3   |            |    |     |            |    |     |            |    |           |            | 1  | 3      | 0          |    |
| Lanark                       |     |            | 1  |         |            |    |       |            |    |                |            |    |     | 1          |    |     |            |    |     |            |    |           |            | 0  | 0      | 2          |    |
| Leeds and Grenville          |     |            |    |         | 4          | 16 |       |            |    |                |            |    | 5   | 4          |    |     |            |    |     |            |    |           |            | 0  | 9      | 20         |    |
| Frontenac                    |     |            |    |         |            |    |       |            |    |                |            |    | 1   | 4          |    |     |            |    |     |            |    |           |            | 0  | 1      | 4          |    |
| Lennox & Addington           |     |            |    |         |            |    |       |            |    |                |            |    |     | 1          |    |     |            |    |     |            |    |           |            | 0  | 0      | 1          |    |
| Central                      |     |            |    |         |            |    |       |            |    |                |            |    |     |            |    |     |            |    |     |            |    |           |            |    |        |            |    |
| Hastings                     |     |            |    |         |            |    |       |            |    |                |            |    | 1   | 2          |    |     |            |    |     |            |    |           |            | 0  | 1      | 2          |    |
| Prince Edward                |     |            |    |         |            |    |       |            |    |                |            |    |     |            |    |     |            |    |     |            |    |           |            | 0  | 0      | 0          |    |
| Northumberland               |     |            |    |         |            |    |       |            |    |                |            |    |     |            |    |     |            |    |     |            |    |           |            | 0  | 0      | 0          |    |
| Victoria                     |     |            |    |         |            |    |       |            |    |                |            |    | 2   | 1          |    |     |            |    |     |            |    | 1         |            | 0  | 2      | 2          |    |
| Haliburton                   |     |            |    |         |            |    |       |            |    |                |            |    |     |            |    |     |            |    |     |            |    |           |            | 0  | 0      | 0          |    |
| Peterborough                 |     |            |    |         |            |    |       |            |    |                |            |    | 1   | 3          |    |     |            |    |     |            |    |           |            | 0  | 1      | 3          |    |
| Durham                       |     |            |    |         |            |    |       |            |    |                |            | 1  | 2   | 1          |    |     |            |    |     |            |    |           |            | 1  | 2      | 1          |    |
| York Region                  |     |            |    |         |            |    |       |            |    |                |            | 1  | 6   | 4          |    |     |            |    | 1   |            |    |           |            | 1  | 7      | 4          |    |
| Toronto                      |     |            |    |         |            |    |       |            |    |                |            |    |     |            |    |     |            |    | 1   |            |    |           |            | 0  | 0      | 0          |    |
| Simcoe                       | 1   | 1          |    |         |            |    | 2     | 7          | 4  |                |            |    | 2   | 6          |    |     |            |    |     |            |    | 12        |            | 3  | 22     | 10         |    |

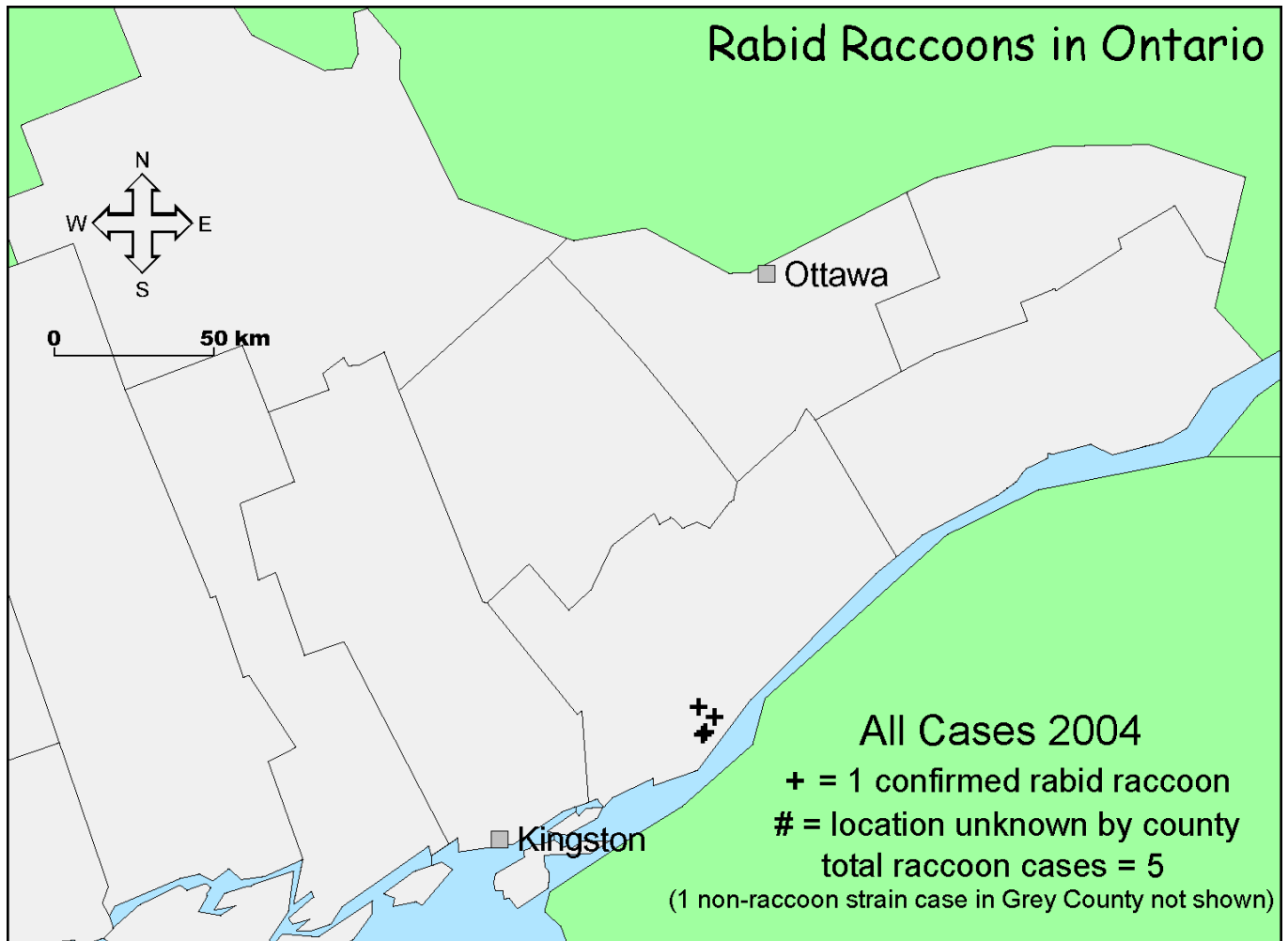
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## Animal Rabies Report: October to December 2004

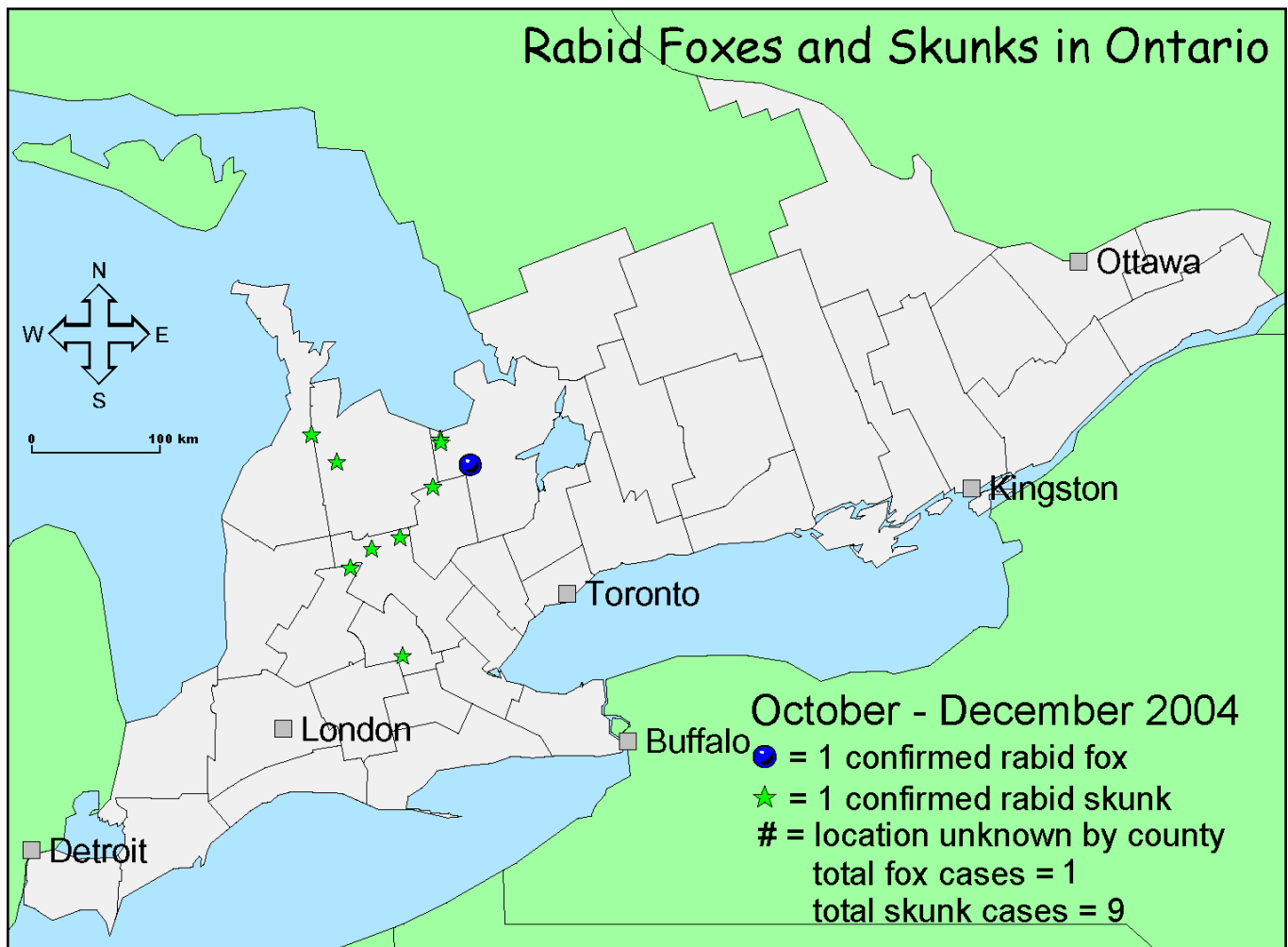
| Animal Type             | Fox                                                                                                                               |            |    | Raccoon |            |    | Skunk |            |    | Other Wildlife |            |    | Bat |            |    | Dog |            |    | Cat |            |    | Livestock |            |    | Totals |            |     |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------|------------|----|---------|------------|----|-------|------------|----|----------------|------------|----|-----|------------|----|-----|------------|----|-----|------------|----|-----------|------------|----|--------|------------|-----|
| County or Region        | #                                                                                                                                 | Cumulative |    | #       | Cumulative |    | #     | Cumulative |    | #              | Cumulative |    | #   | Cumulative |    | #   | Cumulative |    | #   | Cumulative |    | #         | Cumulative |    | #      | Cumulative |     |
|                         |                                                                                                                                   | 04         | 03 |         | 04         | 03 |       | 04         | 03 |                | 04         | 03 |     | 04         | 03 |     | 04         | 03 |     | 04         | 03 |           | 04         | 03 |        |            |     |
| Northern                |                                                                                                                                   |            |    |         |            |    |       |            |    |                |            |    |     |            |    |     |            |    |     |            |    |           |            |    |        |            |     |
| Muskoka                 |                                                                                                                                   |            |    |         |            |    |       |            |    |                |            |    | 1   |            |    |     |            |    |     |            |    |           |            | 0  | 1      | 0          |     |
| Parry Sound             |                                                                                                                                   |            |    |         |            |    |       |            |    |                |            |    |     |            |    |     |            |    |     |            |    |           |            | 0  | 0      | 0          |     |
| Nipissing               |                                                                                                                                   |            |    |         |            |    |       |            |    |                |            |    |     |            |    |     |            |    |     |            |    |           |            | 0  | 0      | 0          |     |
| Sudbury                 |                                                                                                                                   |            |    |         |            |    |       |            |    |                | 1          |    |     |            |    |     |            |    |     |            |    |           |            | 0  | 0      | 1          |     |
| Cochrane                |                                                                                                                                   |            |    |         |            |    |       |            |    |                |            |    |     |            |    |     |            |    |     |            |    |           |            | 0  | 0      | 0          |     |
| Timiskaming             |                                                                                                                                   |            |    |         |            |    |       |            |    |                |            |    |     |            |    |     |            |    |     |            |    |           |            | 0  | 0      | 0          |     |
| Algoma                  |                                                                                                                                   |            |    |         |            |    |       |            |    |                |            |    |     |            |    |     |            |    |     |            |    |           |            | 0  | 0      | 0          |     |
| Thunder Bay             |                                                                                                                                   |            |    |         |            |    |       |            |    |                |            | 1  | 1   |            |    |     |            |    |     |            |    |           |            | 1  | 1      | 0          |     |
| Rainy River             |                                                                                                                                   |            |    |         |            |    |       |            |    |                |            |    |     |            |    |     |            |    |     |            |    |           |            | 0  | 0      | 0          |     |
| Kenora                  | 1                                                                                                                                 | 1          |    |         |            |    |       |            |    |                |            |    |     |            |    |     |            |    |     |            |    |           |            | 1  | 1      | 0          |     |
| Regional Totals         |                                                                                                                                   |            |    |         |            |    |       |            |    |                |            |    |     |            |    |     |            |    |     |            |    |           |            |    |        |            |     |
| Eastern                 |                                                                                                                                   |            | 1  |         | 4          | 16 |       |            |    |                |            |    | 1   | 14         | 17 |     |            |    |     |            |    |           |            | 1  | 18     | 34         |     |
| Central                 | 1                                                                                                                                 | 1          |    |         |            |    | 2     | 7          | 4  |                |            |    | 2   | 14         | 17 |     |            |    | 1   |            |    | 12        | 1          | 5  | 35     | 22         |     |
| Western                 |                                                                                                                                   | 1          | 4  |         | 1          |    | 7     | 18         | 17 |                |            |    | 5   | 12         | 13 |     | 1          |    |     |            | 2  | 11        | 6          | 14 | 44     | 40         |     |
| Southern                |                                                                                                                                   |            |    |         |            |    |       |            |    |                |            |    |     | 14         | 27 |     |            |    |     |            |    |           |            | 0  | 14     | 27         |     |
| Northern                | 1                                                                                                                                 | 1          |    |         |            |    |       |            |    |                |            | 1  | 1   | 2          |    |     |            |    |     |            |    |           |            | 2  | 3      | 1          |     |
| TOTALS                  | 2                                                                                                                                 | 3          | 5  | 0       | 5          | 16 | 9     | 25         | 21 | 0              | 0          | 1  | 9   | 56         | 74 | 0   | 1          | 0  | 0   | 1          | 0  | 2         | 23         | 7  | 22     | 114        | 124 |
| Notes for this quarter: | One bat in Wellington County was a little brown bat. All other bats were big brown bats.<br>The livestock cases were both cattle. |            |    |         |            |    |       |            |    |                |            |    |     |            |    |     |            |    |     |            |    |           |            |    |        |            |     |



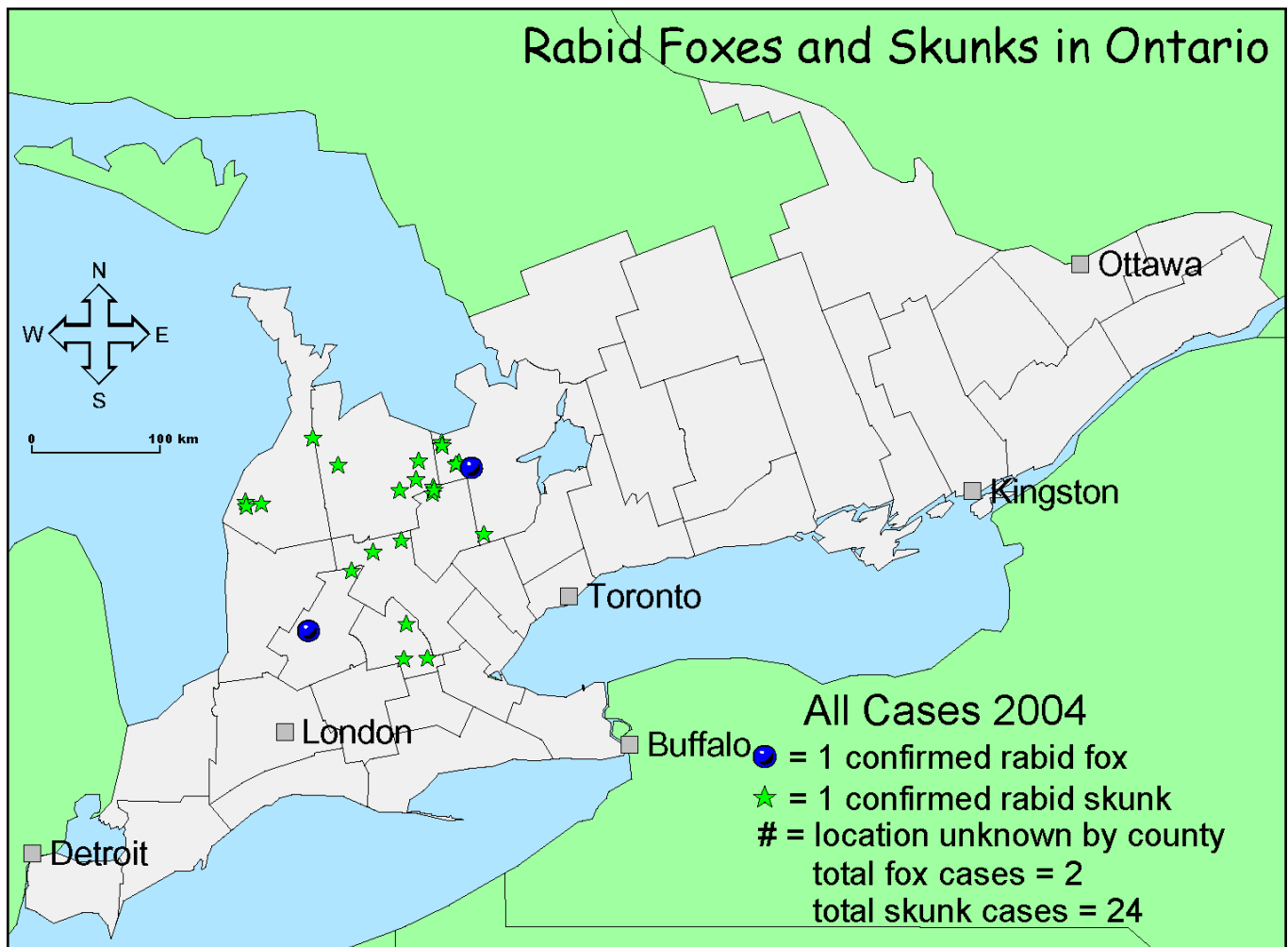
GIS Lab, Queen's University  
Data Source: Ontario Laboratory-Fallowfield (CFIA)



GIS Lab, Queen's University  
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