The Rabies Reporter

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Inside this issue:

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 Ottawa Laboratory (Fallowfield) 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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Rabies in the Fourth Quarter and a Review of Rabies in 2007 - *Not One Rabid Fox in All of Ontario!*

By the end of 2007, there were 106 confirmed cases of rabies in Ontario. This is up substantially from the 82 cases in 2006 but it is not cause for concern.

Since rabies became established in Ontario approximately 50 years ago, there has been a significant change in the prevalence of the disease. From 1957 until large-scale rabies control operations were implemented in 1989, Ontario averaged approximately 1,500 cases per year. In the past decade, there has been an average of 120 cases per year and more recently this number has been closer to 100 (Figure 1). The incidence of rabies in wildlife has decreased so much that bats have accounted for over 50% of all rabies cases in four of the past five years.

During the past 50 years, there has also been a change in the number of post-exposure treatments (PEP) administered in Ontario. During the 1960s and 1970s, approximately 10,000 PEPs were administered each decade to people exposed to rabid or potentially rabid animals. This number practically doubled during the 1980s. As rabies cases decreased with the implementation of large-scale rabies programs, PEPs have also decreased but not as rapidly as might be expected. Most PEPs are administered because the animal which an individual was exposed to is not available for testing i.e. the animal ran away or in the case of bats, flew away away before capture.

Of particular note for 2007 is the absence of rabid foxes. This is the first time ever since rabies became established in Ontario in 1957 that there has not been a single rabid fox anywhere in the province.

From 1958 until 1989, Ontario averaged 651 rabid foxes per year. The peak occurred in 1986 when there were 1,651 rabid foxes. Once large-scale rabies control operations were implemented, these numbers quickly dropped. In the past five years, there have only been 16 confirmed rabid foxes in Ontario.

I should mention though that we just squeaked by without a rabid fox in 2007. A rabid fox from the Fort Severn area was obtained for testing on January 1, 2008. Fort Severn is located near the Polar Bear Provincial Park on the Hudson Bay coast. Rabies is probably always present in far northern Ontario. However, the area is so sparsely populated with humans that it is not possible to determine the extent of rabies in this area. It is only when a rabid animal enters one of the communities and comes in contact with a person or pet that the animal is likely to be submitted for testing.

There were 20 rabies cases in the final three months of 2007. Of these, there were 11 skunks, five bats, and four livestock cases.

The five rabid bats were located in Perth (1), Wentworth (1), Elgin (2) and Muskoka (1) counties. This brings the total for the year to 62. This is an almost 50% increase from 2006 when the total was 42. However, 2006 was not a representative year for bats. For the past six years, the average number of rabid bats per year has been 61 making 2007 a very average year.

The rabid skunks were located mostly in western Ontario: Wellington (6), Waterloo (3) and Grey (1) counties. There was also one skunk from Simcoe county in central Ontario. This made a total of 30 rabid skunks for 2007—up slightly from the 23 cases in 2006.

All of the livestock cases were located in western Ontario. There was a rabid ovine in Wellington county which was closely associated with a rabid skunk. The remaining

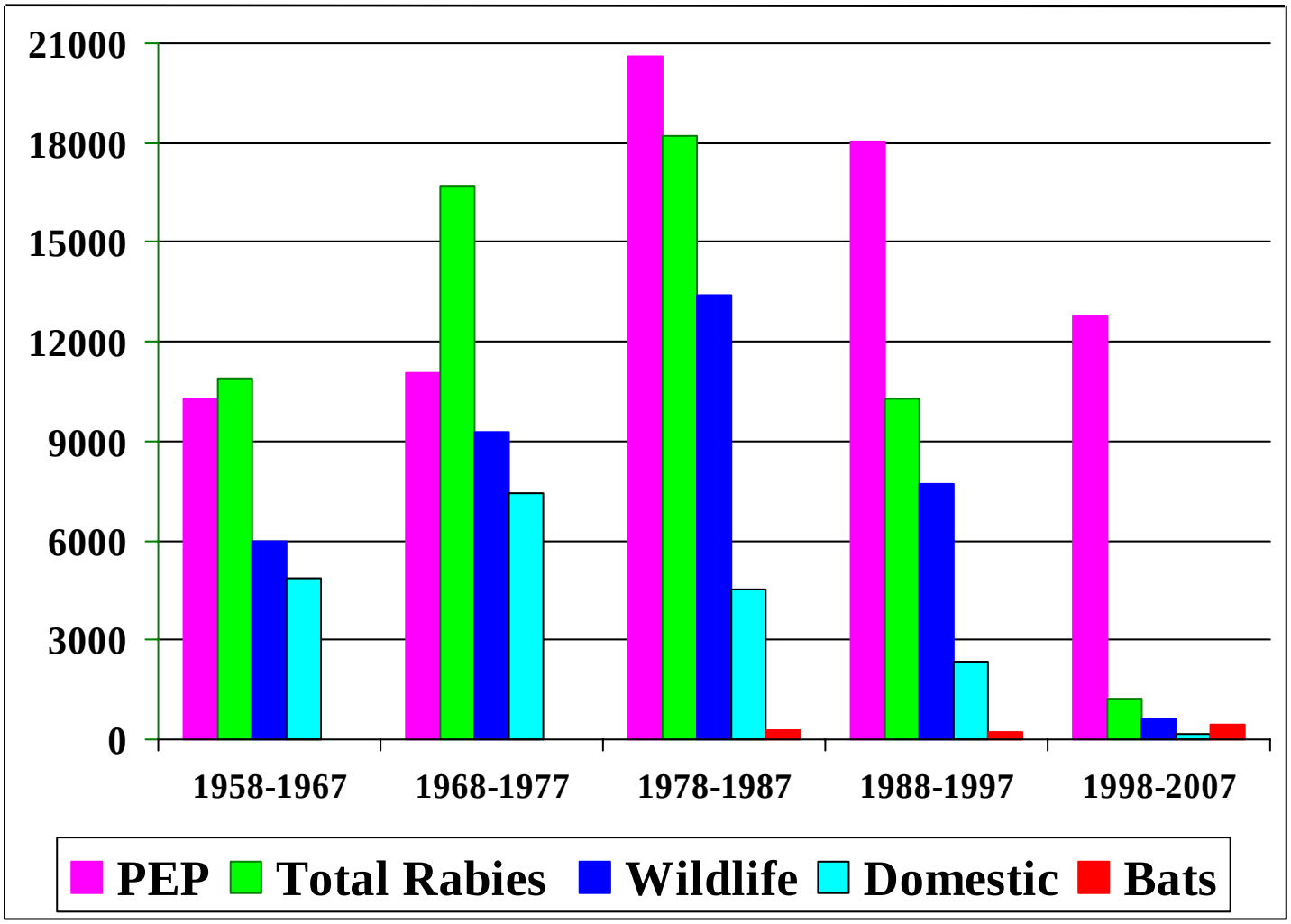

Figure 1. Comparison of rabies case distribution and post-exposure treatments (PEP) since 1958 (the year after rabies was confirmed in Ontario). [**Note:** Bats were not separated from other wildlife cases prior to 1980.]

The PEP data for 2007 is not yet available. *PEP data was provided by the Ontario Ministry of Health and Long-Term Care.*

cases were bovines in Waterloo (1) and Huron (2) counties. None of the bovine cases were closely associated with rabid skunks indicating that there are still rabid animals out there that are being missed by surveillance.

Several years ago, it was estimated that approximately one out of every ten rabid animals was actually discovered and submitted to the lab. With increased surveillance efforts, especially for raccoon strain rabies, and fewer cases in wildlife, we hope that this percentage has become much higher in recent years. However, there will always be some animals which contract rabies and die of the disease without ever encountering humans or pets.

There was little change in the number of rabid pets. In 2007, there were two rabid dogs and no rabid cats. In 2006, the opposite was true—there were two rabid cats and no rabid dogs.

There was an absence of rabies in other wildlife species which was unchanged from 2006. Typically, rabies in non-vector wildlife species (i.e. any species other than fox, raccoon, or skunk) is limited to an occasional case despite the fact that any mammal can be infected with rabies.

Ontario also continued to be free of raccoon strain rabies in 2007. There has not been a case of raccoon strain rabies since September 2005. Based on international standards, Ontario is now considered to be free of raccoon rabies. There was a rabid raccoon from Grey county in 2006 but this animal was infected with arctic fox strain rabies.

Although it has been more than two years since our last case of raccoon strain rabies, it is important to maintain our vigilance. Raccoon strain rabies is still present near the Canada-US border in both the St. Lawrence and Niagara regions . There was a rabid raccoon on Wellesley Island (in the St. Lawrence River) on December 27th. This is less than 10 km from the international bridge. Raccoon strain rabies is also approximately 70 km from the Ontario-Quebec border in the Montérégie region of Quebec.

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Human Rabies - Alberta, Canada 2007

Reprinted from MMWR

On April 26, 2007, a patient from Alberta, Canada, died after 9 weeks in an intensive care unit (ICU) from encephalitis caused by a rabies virus variant associated with silver-haired bats. This report summarizes the clinical course of disease in that patient, who was treated using the Milwaukee Protocol, an experimental treatment protocol similar to one used for the rabies survivor described in 2005 (*1*). This report also describes the subsequent epidemiologic investigations by three regional public health departments in Alberta. Rabies continues to be a cause of human death in the developed and developing world. The findings in this report underscore the need for continued public education that promotes rabies prevention and postexposure prophylaxis while emphasizing the importance of bat exposure in rabies transmission.

Case Report

During August 2006, a man aged 73 years was bitten by a bat on his left shoulder while sleeping at home in rural Alberta. He killed and disposed of the bat and did not seek medical attention. The patient had no history of previous rabies vaccination and became ill on February 14, 2007, when he had onset of left shoulder pain. The pain was radicular, severe, and progressive and evolved to include left hand weakness during the next few days. The man sought care at a local emergency department on February 15, 17, and 19, and was administered analgesics.

On February 21 (the seventh day of clinical illness), the patient was admitted to the local hospital with general weakness, anorexia, and dysphagia. His family described the patient as irritable and not himself. Forty-eight hours after admission, the patient had left arm myoclonus and gasping respirations, suggestive of inspiratory spasms. His illness progressed with high fever, hypoxia, hypersalivation, and a decreased level of consciousness. He required intubation and was transferred to a tertiary-care hospital ICU on February 23 (the ninth day of clinical illness) with a presumptive diagnosis of aspiration pneumonia and sepsis. The history of a previous bat bite was not obtained at that time.

A computerized tomography scan of the head on admission to the tertiary-care hospital was unremarkable. A lumbar puncture was performed, and analysis of cerebrospinal fluid (CSF) indicated no white blood cells, normal glucose, and marginally elevated protein. A chest radiograph revealed a right lower lobe infiltrate, and treatment for presumed pneumonia with broad-spectrum antibiotics was initiated. The patient continued to deteriorate with cardiac dysrhythmias, profound hemodynamic lability, opisthotonic posturing, hypersalivation, and diffuse spasticity. Because of this evolution of the patient's symptoms, rabies was considered as a possible diagnosis on February 26 (the 12th day of clinical illness). When asked about bites or other exposures, the patient's family recalled that the patient had been bitten by a bat approximately 6 months before.

A nuchal biopsy specimen and saliva sample were sent to the Canadian Food Inspection Agency in Ottawa, Ontario, where the rabies diagnosis was confirmed on March 1 (the 15th day of clinical illness). Presence of viral antigen and viral RNA was detected by direct fluorescent antibody test (DFA) and reverse transcription polymerase chain reaction (RT-PCR), respectively. Subsequently, the rabies virus RNA was typed as a variant associated with silver-haired bats (*Lasionycteris noctivagans*).

Rabies immune globulin was administered (1,200 units intramuscularly) on March 1. After discussion with the family regarding the diagnosis, the poor prognosis, and possible management strategies, a decision was made to initiate the Milwaukee Protocol, a recently described experimental therapy for rabies (*1*). This regimen involves

1) induction of therapeutic coma,
2) waiting for an adaptive immune response to evolve and neutralize and clear virus from the central nervous system and periphery, and
3) supportive antiviral and metabolic therapies.

In 2004, this protocol resulted in survival and good neurologic outcome for an unvaccinated female patient aged 14 years in Milwaukee, Wisconsin (*1*). On March 2 (the 16th day of clinical illness), the treating physicians initiated the Milwaukee Protocol, including parenteral ketamine infusion (2 mg/kg), midazolam infusion (0--20 mg/hour), ribavirin (560 μg every 8 hours), and amantadine (200 mg once daily); the protocol was modified to include L-arginine (35 g every 24 hours), enteral administration of tetrahydrobiopterin (150 mg every 8 hours), and vitamin C (500 mg once daily) to supplement possible deficiencies and to improve cerebral blood flow autoregulation. The immunologic response and peripheral viral clearance were monitored via detection of viral RNA in saliva by quantitative RT-PCR and titration of rabies virus neutralizing antibodies in sera and

CSF using a rapid fluorescent focus inhibition test.

The patient's severe hemodynamic lability improved gradually on ventilatory and low-dose pressor support. Rabies immunoglobulin G (IgG) and immunoglobulin M (IgM) were detected in serum on March 6 and in CSF on March 11, a total of 20 and 25 days, respectively, after onset of neurologic symptoms. Baseline serum and CSF tested negative for the presence of IgM and IgG against rabies virus, and subsequent development of an IgM response was thought to represent an immune response to the infection. The patient was weaned from sedation and, on April 1 (the 46th day of clinical illness), sedation was removed completely. However, no neurologic recovery occurred despite detection of low titers of virus-neutralizing antibodies (0.46--1.16 IU/mL) in CSF and normal cerebral perfusion.

Levels of virus-neutralizing antibodies in serum increased slowly and reached 0.9 IU/mL on April 24 (the 69th day of clinical illness). During the disease course, detectable rabies virus decreased markedly in the peripheral tissues, with a negative DFA on the skin biopsy and a small amount of viral RNA detected by PCR in saliva. During the same period, the patient had cardiac arrhythmias, autonomic instability, syndrome of inappropriate antidiuretic hormone secretion, hemolysis attributed to ribavirin, and ventilator-associated pneumonia.

A nuclear medicine brain death scintigraphy study revealed preserved brain perfusion; however, on April 23 (the 68th day of clinical illness), repeated magnetic resonance imaging demonstrated diffuse severe signal abnormality of the cortex, white matter, basal ganglia, and thalami. Clinical examination, including apnea testing, was consistent with brain death. After discussion with the family, life-support was withdrawn on April 26, approximately 8 weeks after initiating therapy, and the patient died. DFA staining of the autopsied brain stem and cerebral cortex demonstrated an abundance of rabies viral inclusions. These results were confirmed by RT-PCR. Microscopic examination revealed extensive and virtually complete loss of cortical neurons, whereas the cerebellum and brainstem had preservation of neurons.

Public Health Investigation

In conjunction with the admitting tertiary-care hospital, the public health departments of three Alberta health regions traced the household and health-care--associated contacts of the patient starting from 1 week before onset of neurologic symptoms, a practice consistent with previous similar investigations (*2*). Postexposure prophylaxis (PEP) was recommended for health-care workers and close contacts of the patient with a possible exposure (defined as a bite, scratch, or exposure of nonintact skin or mucous membrane surface to saliva, CSF, tears, or brain tissue). A total of 19 contacts received PEP. All family members (the patient's wife and his two sons) were administered PEP with rabies immune globulin and vaccine. Sixteen health-care workers, who had reported exposures of mucous membranes or nonintact skin to the patient's saliva, were administered PEP; 15 (six from the primary referring hospital and nine from the tertiary-care hospital) received rabies immune globulin and vaccine. One health-care worker, who had been vaccinated previously, received 2 booster vaccine doses. To date, none of the persons who received PEP have demonstrated illness consistent with rabies.

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Editorial Note:

In Canada, 24 documented human rabies cases, including the one described in this report, have occurred since 1924 (*2*,*3*). Since 1970, six of the seven cases have been attributable to rabies virus variants associated with bats (*2*,*3*). Bats are an increasingly common source of human rabies in the United States, accounting for 37 (92.5%) of the 40 indigenous cases of rabies since 1990 (*4*). Passive surveillance of bats in western Canada during 1985--1989 indicated that 4.8% of bats submitted for testing were positive for the presence of rabies virus; the prevalence has remained stable since 1965 (*5*). The rabies virus variant associated with *L. noctivagans* bats in North America has been implicated in multiple indigenously acquired human rabies cases in the United States in recent years and also was responsible for a case of human rabies in Quebec, Canada, in 2000 (*6*).

After an exposure, human rabies is preventable by local wound care and administration of PEP (*3*,*7*,*8*). Patients with no previous rabies vaccination require rabies immune globulin and a 5-dose series of rabies vaccine (*7*,*8*). However, as the case in this report illustrates, persons are not always aware of the importance of seeking

attention and PEP after bat exposures. In addition, clinicians need to recognize that a majority of patients with human rabies transmitted by bats might have no recollection of a bat bite. Thus, PEP should be considered in circumstances in which the likelihood of a bite cannot be reasonably excluded (*7*,*8*). PEP can be administered any time after an exposure, up to the onset of neurologic illness, but effectiveness of prophylaxis decreases with time; therefore, early administration of PEP is critical. After infection, the usual incubation period for rabies is 20 to 60 days, although it can vary from several days to years (*8*).

Only one unvaccinated rabid patient (the girl in the Milwaukee case) has survived. Several other attempts to use the Milwaukee Protocol have been unsuccessful (*9*). Compared with the Milwaukee patient, the patient in this report 1) had advanced age; 2) had encephalitic disease with high levels of viral load in saliva and no detectable antibody response at the time of diagnosis; and 3) had received rabies immune globulin. Immune globulin administration during clinical rabies has not been demonstrated to be useful and is not part of the Milwaukee Protocol because of concerns that it might alter the kinetics of the immune response (*10*).

Sixteen health-care workers received PEP after the public health investigation. The indication for PEP includes exposure of nonintact skin or mucous membranes to potentially infectious body fluids (e.g., saliva) or neuronal tissue; standard infection-control precautions can minimize health-care workers' risk for exposure to rabies virus (*7*,*8*). To date, no cases of transmission of rabies to persons exposed through health-care activities have been documented.

This report underscores the need for increasing public awareness of the risk for rabies after contact with bats. Underestimation of the importance of such exposures can lead to a fatal outcome. Persons bitten by a bat should immediately 1) wash the wound thoroughly with soap and water; 2) capture the animal, if this can be done safely (otherwise call local animal-control services for assistance), and submit the bat for testing; 3) report the incident to local or regional/state public health officials; and 4) visit a physician for treatment and evaluation regarding the need for PEP. Timely submission of the bat (or other possibly rabid animal) to public health officials facilitates testing for the presence of rabies virus, helps to ensure rapid administration of PEP when indicated, and minimizes the unnecessary use of PEP if the animal is not rabid.

An experimental approach to treat rabies in humans requires early diagnosis. Therefore, rabies should be included in the differential diagnosis of any unexplained acute, rapidly progressive viral encephalitis.

Rabies is a fatal but easily preventable disease that has no established effective therapy after onset of clinical disease. In addition to animal vaccination, continued public education regarding rabies exposure and timely and appropriate prophylaxis is a primary strategy for human rabies prevention.

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Aerial Baiting 2007
Second Year for ONRAB Baiting

After some very promising results in 2006 with our new bait and vaccine, we decided to do a similar bait distribution in 2007 which required us to start our aerial baiting program a few days earlier than usual.

Our baiting campaign for this year started in Collingwood. Then we headed east to bait Wolfe, Howe, and Simcoe Islands in the St. Lawrence River near Kingston. From there, we moved to Bromont, Quebec to help our neighbours to the east with their aerial baiting program as a result of the increase in raccoon rabies cases that was occurring there.

From there, the aircraft were off to Poland, Ohio to bait the Appalachian Ridge (Ohio, Pennsylvania, Maryland and West Virginia) while some of the crew went on to do helicopter baiting in the ravine systems throughout Toronto. After a short break, we finished off the baiting with the Twin Otters in south-western Ontario from the Stratford airport.

Collingwood, Ontario

On August 13th, the newly hired baiting crews were off to meet up with the bait machine crew at Collingwood who were installing the bait machines in OGC and OPJ. Once the planes landed and equipment was offloaded, the bait machine crew installed the bait machines and electronics. After that, we had our usual safety, baiter and navigator training and refreshers to do before we could get our first flights of the day up.

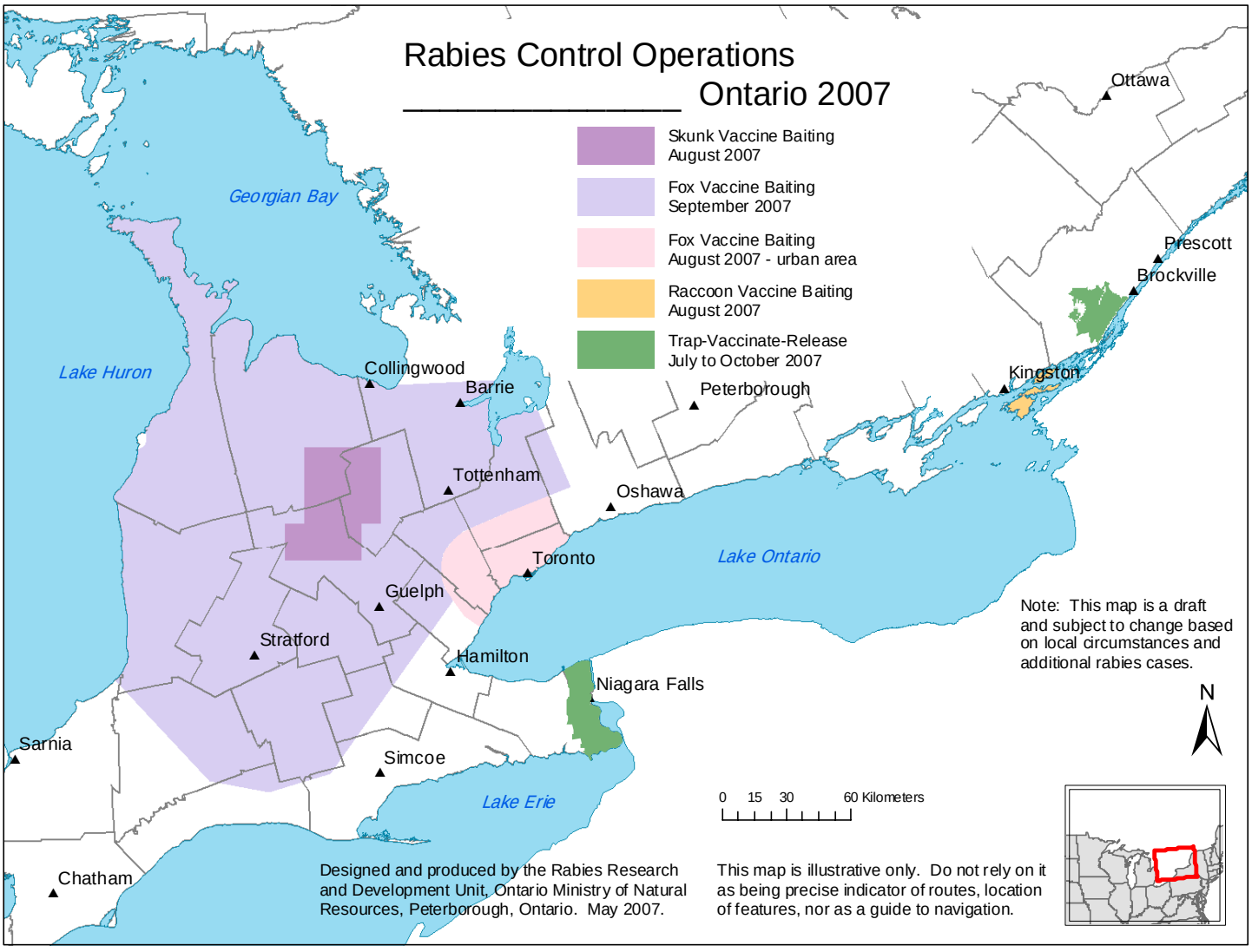

Figure 2. Location of the aerial rabies vaccine baiting and trap-vaccinate-release regions in Ontario in 2007.

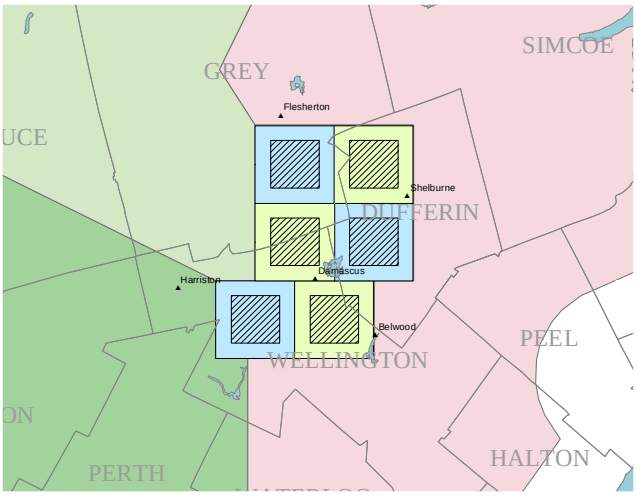

Figure 3. Field trial plots for the ONRAB experimental area.

By 4 o'clock, we loaded the baits onto each plane; one was off to do a high density flight and the other was doing a low density flight.

The weather this year was in our favour and the crews had a much easier first flight than the ones that greeted us last year at this time. By the time the planes landed, we had dropped 57,898 baits. We did a few small modifications at sunset and then it was time to head for the hotel and find something to eat.

The morning of the 14th looked like another good day. The planes were loaded with baits and crews and were in the air by 7:30. We did some number crunching and it appeared that both of yesterday's counts were off a little (i.e. the number of baits loaded and unloaded did not correspond exactly to the number counted by the computer) so if it wasn't navigator error some adjusting needed to be done.

The rest of the day continued without a glitch and we managed to get a total of eight flights done (four high and four low density) for a total of 239,788 baits for the day.

The 15th started off well and the two remaining flights got off the ground on time to finish things up. The plane doing the high density flight came back with too many baits so we decided that the flight needed to be reflown to meet our target bait density. After our last flight, we managed to get 63,136 baits out for a total of 360,822.

Once this was done the planes were loaded with gear. After a quick lunch, one plane was off with a baiting crew to bait the islands in eastern Ontario while the other plane continued on to Quebec. The remainder of the crew on the ground made the lengthy drive to Quebec. Thankfully, it was a beautiful, sunny day to make the seven hour drive.

Kingston, Ontario

On the way over, the plane was loaded with a crew and enough baits for Wolfe, Howe and Simcoe Islands. With the help of one of the engineers, we managed to get the target number of 12,626 baits out before touching down in Kingston to refuel. After refuelling, we departed for Bromont, Quebec.

Bromont, Quebec

Once we landed, we offloaded our gear and headed to our hotel, Le Menhir, for the next few days which is nestled at the bottom of one of the area's popular ski hills. Then it was off to the restaurant next door as the crews which were driving began to trickle in.

We were up bright and early the next day to get a jump on the day. The planes were loaded and off on a flight just south of Montreal. There were a lot of highways and houses to contend with as well as lots of vehicles and people as some of the fields were in the process of being harvested. It was a good thing that there wasn't as much air traffic as expected as the weather was starting to look a little iffy.

The first planes' crew headed in for an early lunch until the second plane returned. After running into some rain, the crew in the back of the second plane had a rougher flight judging by their lack of colour.

After waiting for the weather to move through, the planes were up again. The next flight was more rural (at the base of some of the mountains) so the only real off time was when we flew over a few lakes, roads, and a scattering of chalets. We just finished as the next wave of rain cells came through;

Region	Date	Habitat	Distribution Method	Bait	Oral Vaccine	Area (km^2)	Number of Baits
SCONT	Jul 23-27	Urban	Ground	OS	ERA		7,321
SCONT	Aug 27-29	Urban	Helicopter	OS	ERA		20,513
SWONT	Aug 13-15	Rural	Aerial	UL	ONRAB	1,944	357,265
SEONT	Aug 15	Rural	Aerial – Wolfe & Howe Islands	UL	ONRAB	176	12,626
SWONT	Sept 17-21	Rural	Aerial	OS	ERA	11,433	180,974
SWONT	Sept 17-21	Rural	Aerial	UL	ERA	11,641	195,162
SWONT	Sept 17-21	Rural	Aerial	UL	ONRAB	4,810	83,647

Figure 4. Baits distributed in Ontario during 2007.

this time with some lightning which helped the pilots make the decision to scrub the rest of today's flights. We did manage to distribute 206,338 baits before we called it quits at around 4:00 after putting the remaining baits back in the reefer.

The 17th was slated to be a media day so everyone made sure to wear a clean shirt in case we were filmed. After checking the weather, it was decided that we needed to try and get a couple of the flights to the west done as the weather was slated to get worse this afternoon. After some calculations, it looked like we were going to have a surplus of baits so we decided to increase the bait densities in the southeast where the biggest rabies concern was.

The media really started to pour in just before the flights came back which slowed things down a bit while they got their stories, photos and footage. One flight was switched because the fog was a little thick and there were some balloons flying around to make things more interesting.

The next flights returned in time for lunch as the next set were off as the clouds started to build and the winds started to pick up. When one plane finished their flight and the crew in the back was in rough shape, they decided to contact the other aircraft and call it a day. We ended the day with 169,466 baits being distributed even with the media and bad weather.

The crews were up at the usual time on the 18th to get started when one of the pilots came down to tell us that the weather wasn't likely going to lift until 9:30 or later so the crews could hang out at the hotel for a while. The weather still wasn't cooperating and it was 11ish before we could get up and going. The crews were biting at the bit to get the last four flights done in Quebec and the pilots and engineers were keen to move to Ohio before any more weather slowed things down. The planes finally got up and things ran smoothly. We ended up distributing 109,288 baits out for a grand total of 485,092 baits.

On the 19th, the pilots, engineers and a small crew were off to Ohio to beat the bad weather while the rest of us had breakfast before our drive back home to Ontario.

For the first time since 1995, the aerial baiting in New York, Vermont, New Hampshire and Maine was done by our competing company. Those projects still have a direct impact on Canada as they attempt to prevent and/or stem the influx of mid-Atlantic raccoon rabies along the border areas of Ontario, Quebec and New Brunswick.

Poland, Ohio

Ontario's share of the Appalachian Ridge project grew in size in 2007. This project was initiated in 2002 by the United States Department of Agriculture (USDA) to stem the tide of mid-Atlantic raccoon rabies moving westward using the Appalachian Ridge as a barrier. As part of Ohio's spring baiting on April 24, 2007, Ontario distributed a total of 121,500 coated sachets. Then, from August 23 - September 5, under a cost recovery contract with USDA, OMNR aircraft distributed another 2,323,552 coated sachet baits along portions of the barrier in Ohio, Pennsylvania, Maryland and West Virginia.

Toronto, Ontario

In response to skunks diagnosed with arctic strain rabies in the Bolton/ Nobleton area in 2006, much of the Greater Toronto Area (GTA) was again included in the ORV zone. Due to the very high levels of urbanization in this area, oral baits were delivered using a helicopter instead of a fix winged aircraft.

From August 27-29th, a small crew of two navigators and two baiters headed to Buttonville Airport on the east side of Toronto to meet up with the OMNR Long Ranger helicopter. During the three days of operation, 20,513 baits containing ERA oral rabies vaccine were dispersed along the 12 ravine systems of Black Creek, Rouge, Don and Credit Rivers throughout the GTA. The ravines surrounding Pearson International Airport had been hand-baited by MNR staff, rangers and volunteers earlier in the summer.

Stratford, Ontario

On September 17th, the flight crews headed to Stratford to meet up with Twin Otters OPJ and OGC to complete the baiting in south-western Ontario. We had the usual chores to complete such as putting up the antennae and getting the various training and refreshers completed before beginning the first of the flights.

The first day, we managed to get a total of four flights done and we distributed 58,992 baits. Since our regular motel was booked solid, it was time to check into the newly renovated River Garden Inn and have a late dinner.

The morning of the18th was cool but clear and the day went without a hitch. We managed to get four flights per plane done for a total of 120,224 baits dropped.

The morning of the 19th was a different story and we had to wait out the morning fog before we could start the days baiting. We still managed to finish eight flights by the end of the day for a total of 117,582 baits dropped.

The morning of the 20th was picture perfect and the flights got off at the crack of dawn. OPJ headed north to fly the Bruce Peninsula before the afternoon winds picked up. We managed to get nine flights done and dropped 146,427 baits. This left us with just one flight to do on the 21st so we started to take the electronics and bait machine out of the plane that was not going to be used.

On the morning of the 21st, we finished dropping the last 16,558 baits. With a total of 30 flights, we dropped 459,783 baits at the end of our five days in Stratford and wrapped up our baiting for another year.

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Canadian Rabies Management Plan

The Canadian Rabies Committee was established to address prevention and management of all rabies variants from the perspectives of surveillance, assessment of risk, policy development, advice, public education, epidemiological studies and research, and outbreak preparedness, response and control. The committee includes members from provincial governments, the Public Health Agency of Canada, Canadian Food Inspection Agency and Environment Canada.

In response, the Canadian Rabies Committee has developed a national plan for the management of rabies.

Key topics addressed in the plan include disease surveillance and diagnosis, wildlife disease management strategies (planning, prevention and control), management of human exposures, education and training, and communication.

- Surveillance of rabies variants should result in improved effectiveness of control measures, including a reduction in associated costs. Rabies surveillance should be supported by improved scientific methods and facilities. The plan describes the surveillance systems currently in place to monitor rabies activity in Canada, and how development of a comprehensive national rabies surveillance system can occur.
- Successful long-term wildlife disease management strategies are achieved through the development of an adaptive risk assessment and response framework. The various strategies for control include an element of advance planning which incorporates a cost benefit assessment for approaches to management. Prevention, control and eradication strategies include movement control, monitoring and control of population densities, and wildlife immunization methodologies. Also included is a component on the evaluation of response activities.
- Recommendations for the management of human exposures are provided by the National Advisory Committee on Immunization. The rabies management plan describes additional scientific research that is required in order to improve the overall management of human exposures. It also outlines a risk communications strategy, including approaches to improve public education on preventative measures.
- Education and training initiatives are identified that will improve disease prevention and management capabilities.
- Communication is essential to achieve the goals of the national plan, and to inform all sectors about issues related to the prevention and overall management of rabies in Canada. A coordinated multi-agency and multi-sector communication network is required.

To achieve the goals of the National Rabies Management Plan, the dedicated cooperation and participation of international, federal, provincial, territorial, regional, and local agencies, authorities, and institutions, as well as a community organizations and the general public will also be required.

Jacqueline Badcock
Canadian Rabies Committee

New York State *2007 Annual Rabies Summary*

There were 515 rabid animals diagnosed at the Wadsworth Center laboratory in 2007, representing 5.2% of all animals tested during the year. This total included 282 raccoons, which was 15.5 % of all raccoons examined during the year (positivity rate); 104 bats (2.4%); 75 skunks (23.5%); 17 cats (1.0%); 17 gray fox (51.5%); 8 red fox (11.3%); 6 woodchucks (5.6%); 2 horses (7.1%); 2 deer (1.6%); 1 dog (0.14%) and 1 fisher (20%).

In 26.4% of the animal rabies cases there was a reported human exposure, including 49 bites to humans and an additional 87 other direct human contacts with saliva or nervous tissue from the laboratory-confirmed rabid animals. Most notable is the greater than 50% positivity rate found in submitted grey foxes, and among these rabid grey foxes, 33% had bitten one or more humans. This is in contrast to 2.4% of the 282 rabid raccoons and 8.6% of the 104 rabid bats that had bitten one or more humans in 2007. In 54% of the rabid animals there was reported exposure to a domestic animal. This figure certainly underscores the importance of pet vaccination and the prompt and proper management of animals with a potential rabies exposure.

The Wadsworth Center's rabies diagnostic laboratory tested 9730 animals in 2007. This was the fourth busiest year in the history of the lab and represented an increase of 712 specimens over the average annual specimen total for the previous ten year period.

The specimens included 7,189 wild animals (73.8 % of total) and 2,541 domestic animals (26.2%), with 57 species of animals represented. These included 4,345 bats (44.6% of

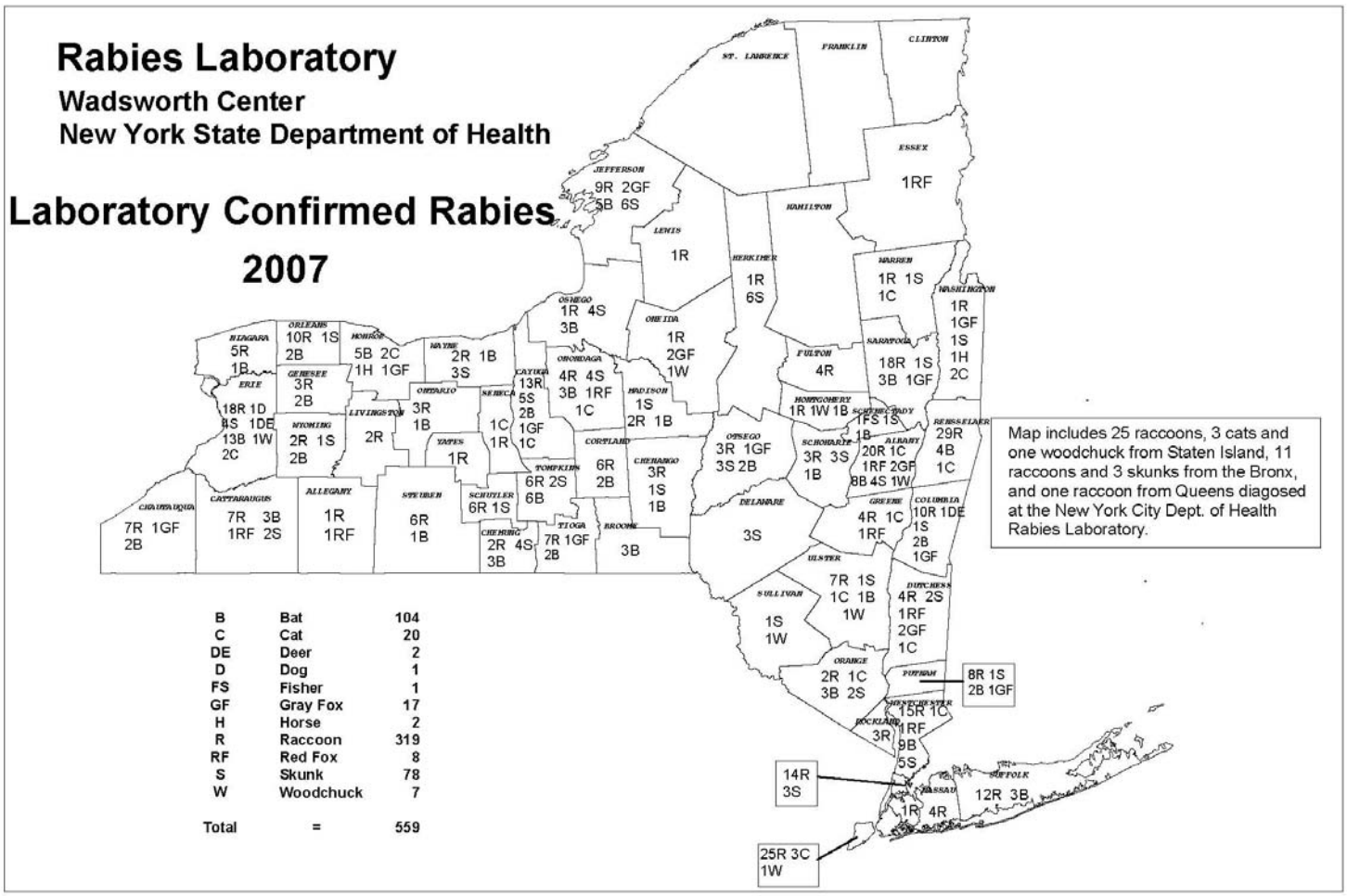

Figure 5. Rabies incidence in New York state during 2007.

all animals tested), 1820 raccoons (18.7%), 1,662 cats (17.1%), 715 dogs (7.3%), 373 other wild species (3.8%), 319 skunks (3.3%), 254 rodents and lagomorphs (2.6%), 107 fox (1.1%), 91 other domestic (0.93%) and 73 cattle (0.75%). In 35.4% of all animals tested there was either a bite to a human, or human contact with saliva or nervous tissue.

The 4,345 bats tested during 2007 ranks second in number only to the 4,564 bats examined in 2000. Of all submitted bats 2.4% were found to be infected with rabies virus. There were 2,958 big brown bats examined and 90 of those were positive for rabies for a 3.0 % positivity rate for that species. Rabies was detected in 8 of 888 little brown bats examined (0.9% positivity), none among 103 silver-haired bats, 3 of 61 red bats (4.9%), 1 of 125 unidentified (0.80 %), 2 of 159 hoary bats (1.30%), none among 46 northern long-eared bat and none among 5 eastern pipistrelle bats. The 90 rabid big brown bats accounted for 86.5% of the 104 rabid bats detected in New York State during the year.

During 2007 the rabies diagnostic laboratory at the New York City Department of Health and Mental Hygiene examined 789 specimens, including 305 raccoons, 245 cats, 89 dogs, 65 opossum, 49 bats, 21 skunks, 4 muskrats, 4 squirrels, 3 groundhogs, 1 guinea pig, 1 hamster, 1 ferret, and 1 rabbit. Among these animals 44 (5.6%) were positive for rabies, including 37 raccoons, 3 cats, 3 skunks and one groundhog.

The Wadsworth Center rabies laboratory tested 2,167 human sera for rabies virus neutralizing antibody. These tests generally are performed to determine the need for booster vaccinations for individuals wishing to maintain current rabies pre-exposure vaccination status. The laboratory also examined 1,389 raccoon sera for rabies antibody in support of wildlife oral rabies vaccination programs (ORV). The laboratory performed 132 virus-variant typing assays using a panel of monoclonal antibodies directed against the rabies virus nucleocapsid protein, to aid in the study of rabies epizootiology in the state.

Wadsworth Centre
New York State

HOW TO REACH US:

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Animal Rabies Report: October to December 2007

Animal Type	Fox			Raccoon			Skunk			Other Wildlife			Bat			Dog			Cat			Livestock			Totals		
County or Region	#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative	
		07	06		07	06		07	06		07	06		07	06		07	06		07	06		07	06		07	06
Eastern																											
Stormont, Dundas & Glengarry																									**0**	**0**	**0**
Prescott-Russell																									**0**	**0**	**0**
Ottawa-Carleton													2												**0**	**2**	**0**
Renfrew																									**0**	**0**	**0**
Lanark																									**0**	**0**	**0**
Leeds and Grenville													3	1											**0**	**3**	**1**
Frontenac													3												**0**	**3**	**0**
Lennox & Addington													1												**0**	**1**	**0**
Central																											
Hastings																									**0**	**0**	**0**
Prince Edward																									**0**	**0**	**0**
Northumberland																									**0**	**0**	**0**
Victoria																									**0**	**0**	**0**
Haliburton														1											**0**	**0**	**1**
Peterborough													5	5											**0**	**5**	**5**
Durham													5	3									1		**0**	**6**	**3**
York Region									1				1	5											**0**	**1**	**6**
Toronto													2	2											**0**	**2**	**2**
Simcoe							1	2	1				4	3											**1**	**6**	**4**
Western																											
Peel								1	3				4	1											**0**	**5**	**4**
Halton														1											**0**	**0**	**1**
Dufferin								2	1															1	**0**	**2**	**2**
Wellington							6	10	6				2	1							1	1	2	4	**7**	**14**	**12**
Waterloo							3	6	2				1	2		1					1		4	1	**3**	**12**	**6**
Perth								5	2				1	1									1	2	**1**	**7**	**4**
Grey			1			1	1	2	4					1		1									**1**	**3**	**7**
Bruce			1					1	1				1	4								1	1	2	**1**	**3**	**8**
Huron									2				2									2	3	2	**2**	**5**	**4**

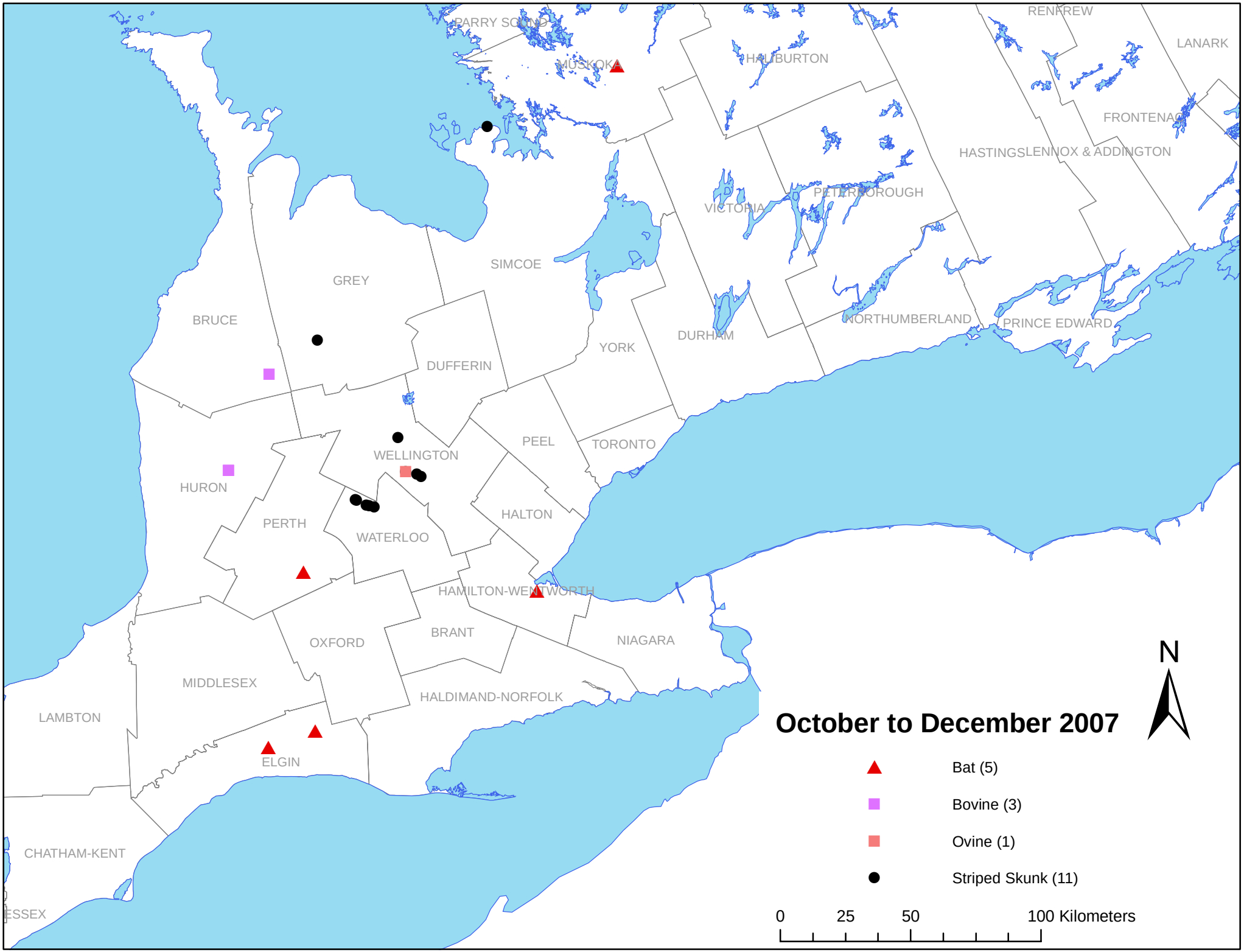
Animal Rabies Report: October to December 2007

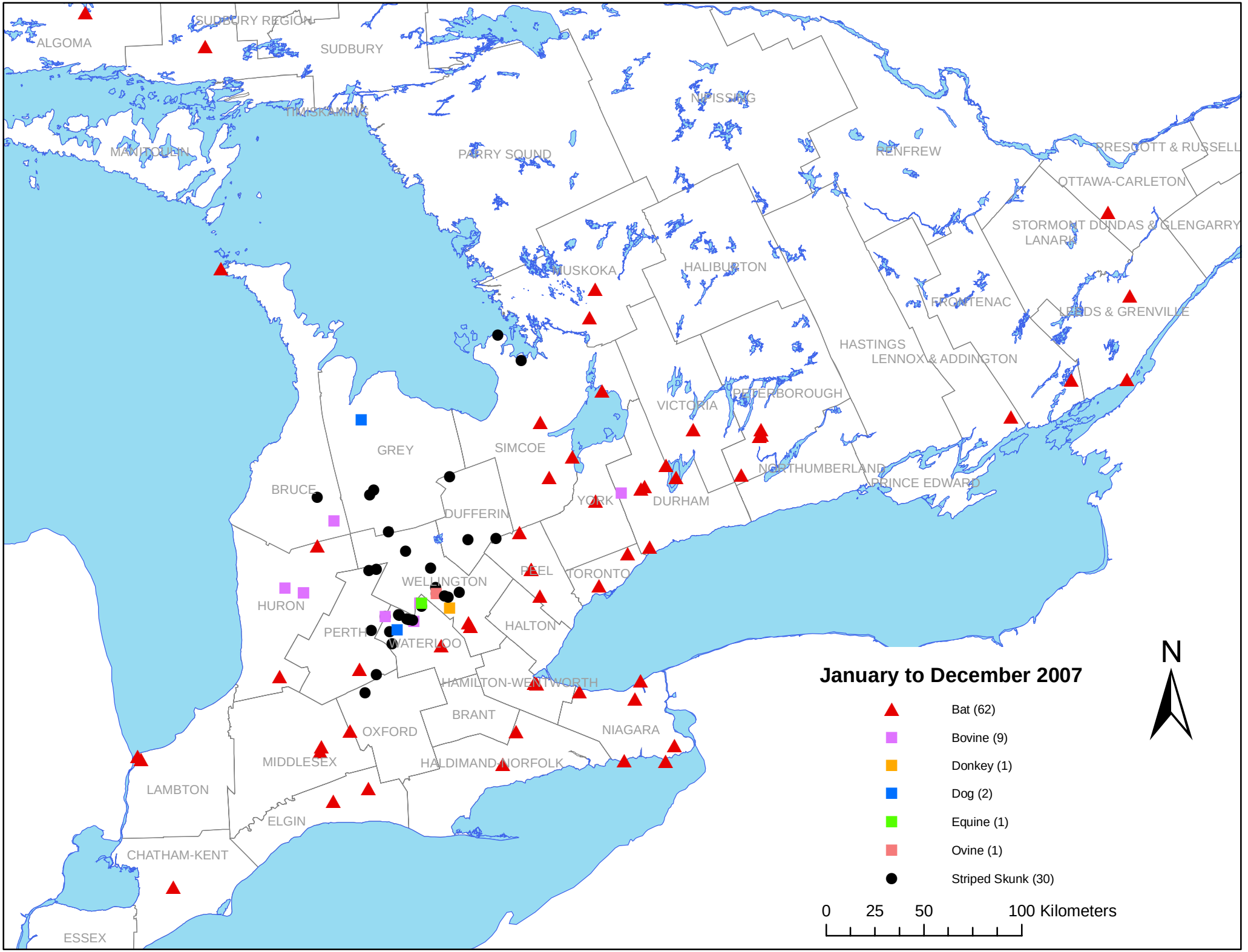
Animal Type	Fox			Raccoon			Skunk			Other Wildlife			Bat			Dog			Cat			Livestock			Totals		
County or Region	#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative	
		07	06		07	06		07	06		07	06		07	06		07	06		07	06		07	06		07	06
Southern																											
Wentworth													1	5											**1**	**5**	**0**
Haldimand-Norfolk														2	1										**0**	**2**	**1**
Brant																									**0**	**0**	**0**
Niagara														6	4										**0**	**6**	**4**
Elgin													2	2	1										**2**	**2**	**1**
Oxford								1						1											**0**	**2**	**0**
Middlesex														2	3										**0**	**2**	**3**
Lambton														2	2										**0**	**2**	**2**
Kent														1											**0**	**1**	**0**
Essex																									**0**	**0**	**0**
Northern																											
Muskoka													1	2	1										**1**	**2**	**1**
Parry Sound																									**0**	**0**	**0**
Nipissing																									**0**	**0**	**0**
Sudbury														1											**0**	**1**	**0**
Cochrane																									**0**	**0**	**0**
Timiskaming																									**0**	**0**	**0**
Algoma														1											**0**	**1**	**0**
Thunder Bay																									**0**	**0**	**0**
Rainy River																									**0**	**0**	**0**
Kenora																									**0**	**0**	**0**
Regional Totals																											
Eastern	0	0	0	0	0	0	0	0	0	0	0	0	0	9	1	0	0	0	0	0	0	0	0	0	**0**	**9**	**1**
Central	0	0	0	0	0	0	1	2	2	0	0	0	0	17	19	0	0	0	0	0	0	0	1	0	**1**	**20**	**21**
Western	0	0	2	0	0	1	10	27	21	0	0	0	1	11	10	0	2	0	0	0	2	4	11	12	**15**	**51**	**48**
Southern	0	0	0	0	0	0	0	1	0	0	0	0	3	21	11	0	0	0	0	0	0	0	0	0	**3**	**22**	**11**
Northern	0	0	0	0	0	0	0	0	0	0	0	0	1	4	1	0	0	0	0	0	0	0	0	0	**1**	**4**	**1**
Totals	**0**	**0**	**2**	**0**	**0**	**1**	**11**	**30**	**23**	**0**	**0**	**0**	**5**	**62**	**42**	**0**	**2**	**0**	**0**	**0**	**2**	**4**	**12**	**12**	**20**	**106**	**82**

Notes for this quarter: All of the bats were big brown bats. The livestock were bovines except for one ovine in Wellington county.

CFIA·ACIA

GIS Geographic Information Systems


PARRY SOUND
MUSKOKA
HALIBURTON
RENFREW
LANARK
FRONTENAC
HASTINGS
LENNOX & ADDINGTON
PETERBOROUGH
VICTORIA
SIMCOE
GREY
BRUCE
DUFFERIN
YORK
DURHAM
NORTHUMBERLAND
PRINCE EDWARD
PEEL
TORONTO
WELLINGTON
HURON
PERTH
WATERLOO
HALTON
HAMILTON-WENTWORTH
BRANT
OXFORD
NIAGARA
MIDDLESEX
HALDIMAND-NORFOLK
LAMBTON
ELGIN
CHATHAM-KENT
ESSEX
N
October to December 2007
Bat (5)
Bovine (3)
Ovine (1)
Striped Skunk (11)
0
25
50
100 Kilometers


ALGOMA
SUDBURY REGION
SUDBURY
TIMISKAMING
NIPISSING
MANITOULIN
PARRY SOUND
RENFREW
PRESCOTT & RUSSELL
OTTAWA-CARLETON
STORMONT DUNDAS & GLENGARRY
LANARK
MUSKOKA
HALIBURTON
FRONTENAC
LEEDS & GRENVILLE
HASTINGS
LENNOX & ADDINGTON
PETERBOROUGH
VICTORIA
GREY
SIMCOE
NORTHUMBERLAND
PRINCE EDWARD
BRUCE
YORK
DURHAM
DUFFERIN
PEEL
TORONTO
WELLINGTON
HURON
HALTON
PERTH
WATERLOO
HAMILTON-WENTWORTH
BRANT
OXFORD
NIAGARA
MIDDLESEX
HALDIMAND-NORFOLK
LAMBTON
ELGIN
CHATHAM-KENT
ESSEX
N
January to December 2007
Bat (62)
Bovine (9)
Donkey (1)
Dog (2)
Equine (1)
Ovine (1)
Striped Skunk (30)
0
25
50
100 Kilometers