Ontario

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The rabies reporter

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Rabies resurfaces in Ontario in the last half of 2015

Beverly Stevenson, Ministry of Natural Resources and Forestry

Both raccoon strain and fox strain rabies made a reappearance in Ontario during December with the discovery of multiple cases.

There were 24 diagnosed cases of rabies in Ontario during 2015 - 13 bats, 10 raccoons, and 1 bovine. Twelve of the bats were big brown bats (*Eptesicus fuscus*) and one was a hoary bat (*Lasiurus cinereus*). The number of bats submitted for rabies testing in 2015 (n=332) was lower than in the four previous years (n=495, 603, 519, and 379 during 2011, 2012, and 2013, and 2014 respectively); however, the proportion of bats testing positive (4-5%) was similar in all years.

The distribution of rabid bats was: Ottawa-Carleton (1), Hastings (1), Durham (1), York (1), Simcoe (1), Waterloo (1), Hamilton (2), Haldimand-Norfolk (1), Niagara (2), Peel (1), and Sudbury (1).

For the first time in four years, there was a rabid bovine. The three month old calf was from Perth County and was located within kilometres of the location of the last confirmed Ontario fox strain case in southern Ontario in 2012. Although the landowner had observed a sick skunk (most likely infected with rabies) a few weeks prior to the rabid calf case, he had not reported the skunk and did not have it euthanized.

There were no **reported** rabid skunks for the third year in a row. Since 2008, rabies control efforts in Ontario have focused on eliminating Ontario fox strain rabies in striped skunks (*Mephitis mephitis*). Skunks became the main rabies reservoir in southwestern Ontario following a very successful ORV campaign targeting rabies in red foxes (*Vulpes vulpes*). ONRAB® was first tested on skunks in Ontario in 2006 and 2007 and results were promising. In 2008, high-density baiting using ONRAB® around rabid

The Rabies Reporter, a scientific newsletter about current issues in rabies research and control, is a joint effort of the Widlife Research and Monitoring Section of the Ontario Ministry of Natural Resources and Forestry; the Rabies Laboratory at the Ottawa Laboratory (Fallowfield) of the Canadian Food Inspection Agency; and the Ontario Ministry of Health and Long-Term Care. 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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skunk cases began. Since then, the numbers of skunks confirmed rabid has dropped dramatically. In 2011 and 2012, there was only one confirmed case of rabies in skunks each year; there were no cases in 2013, 2014, or 2015. In the 25 years prior to rabies control, rabid foxes and skunks ranged from 400-1,000 and 150-700 per year, respectively.

For the first time since 2005, Ontario had confirmed cases of mid-Atlantic raccoon strain rabies. On late Friday afternoon of December 4th, we were notified of a rabid raccoon. A couple of days prior, two bull mastiffs had been picked picked up by Hamilton Animal Services. Staff were attempting to deliver the dogs back to their owner when the dogs and raccoon ended up out of their cages. Since there was some contact between the animals and the raccoon had been picked up because it appeared sick, the raccoon was submitted for rabies testing. The raccoon was positive and raccoon rabies had once again established a foothold in Ontario. (At the time, the dogs were unvaccinated so were quarantined for a 3 month period reiterating the importance of keeping your pets properly vaccinated against rabies. In Ontario, it is mandatory to have dogs and cats vaccinaed against rabies. Some health units also require horses to be vaccinated.)

The previous cases of raccoon rabies had been contained to a small area in eastern Ontario. The current cases are all located in the Golden Horseshoe area in southern Ontario - a highly populated area on the west end of Lake Ontario with approximately 8 million residents.

The remaining nine raccoons were detected through MNRF's enhanced surveillance program. After the discovery of the incident case, surveillance efforts were increased in the 50 km radius surrounding the initial case. Rabies suspect animals (animals behaving abnormally, appearing sick, found dead, and roadkills) were collected from animal control agencies, humane societies etc. All of the additional confirmed cases were located within the municipality of Hamilton.

The numbers of domestic pets, livestock, and wildlife submitted for rabies testing in 2015 was slightly higher than in 2014 but was still lower than in the previous three years. The decrease in submissions was likely due to the transition of specimen collection from the Canadian Food Inspection Agency to the province. By mid-2015, a collection system was fully in place with the Ministry of Health and Long-Term Care and the Ontario Ministry of Agriculture Food and Rural Affairs.

Oral rabies vaccination in Ontario, Quebec, and New Brunswick during 2015

Beverly Stevenson, Ministry of Natural Resources and Forestry

Southwestern Ontario

Traditionally, baits have been distributed in Southwestern Ontario (SWONT) by MNRF Twin-Otter (DHC-6) aircraft flying approximately 150m above ground along parallel flight lines spaced 2.0 km apart, at a density of 20 baits/km^2. This ORV was conducted to control rabies in foxes and help prevent re-infection of fox populations by isolated cases of rabid skunks in SWONT, and to help to contain 'Ontario fox' strain rabies to this area and prevent it from re-entry into the rest of southern Ontario.

The initial ORV program for SWONT was in 1994. Since that time, portions of SWONT have been baited annually. As of June 2014, southern Ontario had been free of 'Ontario fox' strain cases for two years. The World

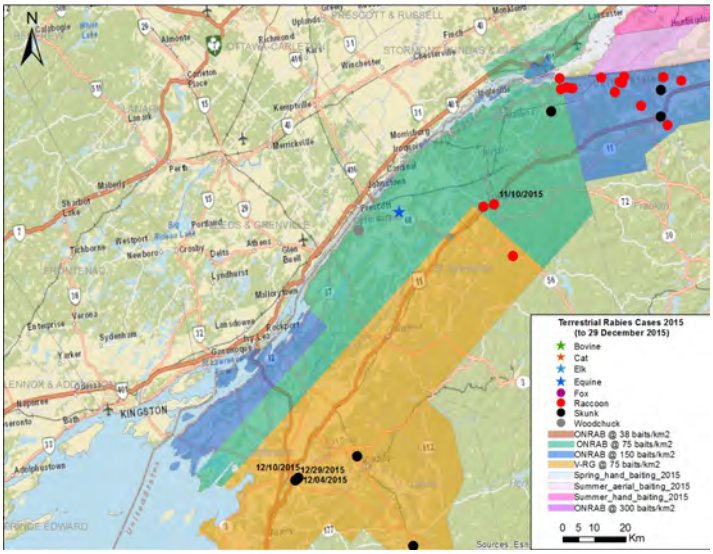


Figure 1. Location of rabies baiting in the St. Lawrence area in relation to recent rabies cases in New York.
Data provided by Wadsworth Center, New York State Dept. of Health

Organisation for Animal Health recommends that an area can be declared free of rabies after two full years without a case. As a result of this accomplishment, traditional fox and skunk oral rabies vaccination (ORV) was not conducted in southwestern Ontario during 2015.

Southeastern Ontario

In order to prevent re-incursion of raccoon strain rabies from New York State, UL baits containing ONRAB® were distributed in an area along the St Lawrence River in eastern Ontario (Figure 1).

On August 15th, 21,750 baits were distributed on the mainland bordering the St. Lawrence River near Cornwall. All baits were dropped along flight lines spaced 0.75 km apart and distributed at a density of 75 baits/km^2 over non-urban, agricultural and forested habitats. Approximately 4,200 baits were also distributed by hand in the city of Cornwall on August 15th and 16th due to the proximity of cases in Quebec and New York State. A cluster of cases had occurred in Franklin County, New York in the spring with one case occurring on St. Regis Island (Akwesasne) in Quebec close to the Vermont border. As a result of these cases, Cornwall Island (Akwesasne) in Ontario was handbaited by Akwesasne staff on June 9 and again on August 17-19 with approximately 3,250 baits. Akwesasne is a large First Nations reserve which straddles portions of Ontario, Quebec, and New York State and had not been baited by any jurisdiction in recent years.

The St Lawrence River area was once a hot spot for 'raccoon' strain rabies but there has not been a case in eastern Ontario in the past decade.

Niagara region

In order to prevent re-incursion of 'raccoon' variant rabies from New York State and to maintain a buffer of vaccinated raccoons on the Niagara peninsula between Ontario and New York, urban areas (300 baits/km^2) and rural areas (75 baits/km^2) were baited aerially using an EC130 helicopter (rotary wing) and MNRF staff. A total of 55,845 baits were distributed over 627 km^2 during August 26–27, 2015. We were once again able to distribute baits more efficiently in many areas in 2015 using the EC130 helicopter, thereby reducing staffing and time to complete the project.

The remainder of the Niagara area (680 km^2 in total), which was inaccessible by helicopter, was hand-baited by 6 MNRF staff during the period of August 25 – September 3. We drove around the areas inaccessible by helicopter, mainly high density urban areas such as the core of Niagara Falls and Fort Erie, tossing baits from vehicles at a density of approximately 300 baits/km^2, delivering 26,195 ONRAB® rabies vaccine baits to the area.

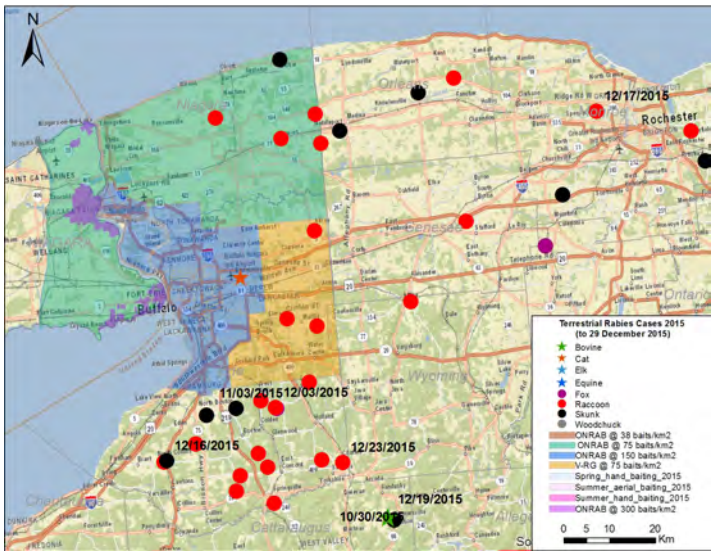


Figure 2. Location of rabies baiting in the Niagara area in relation to recent rabies cases in New York.
Data provided by Wadsworth Center, New York State Dept. of Health

High Density ONRAB® Point Infection Control (PIC)

As of June 2014, southern Ontario had been free of 'Ontario fox' strain cases for two years and as such the need for high density PIC baiting was deemed to be minimal. Residual pockets of rabies may still exist. This makes it increasingly important to manage individual cases as soon as they occur. As a result, a Point Infection Control program will be implemented within 48 hours (seasonally dependent) in response to each diagnosed Ontario fox or mid-Atlantic raccoon strain rabies case.

During the assessment of each case, we consider the following questions:

- Is the area accessible from the ground or is aerial baiting required?
- Is this an isolated case, meaning that an 8 km by 8 km plot is sufficient, or is this a cluster of cases requiring a larger area;?
- Is the case in an area where high density baiting has already occurred this year?
- Are the animals still active or should the baiting be postponed until the following spring?

There are benefits to both ground and aerial bait distribution. Ground baiting specifically targets the habitat where target species are likely to be present and it provides the opportunity to interact with most landowners in the area. This interaction is an opportunity to let landowners know that rabies is present in the area, educate them about rabies, and remind them to ensure that their pets' vaccinations are current. However, ground baiting can be very time consuming and some landowners can be unreachable or they may refuse to grant access to their property. (MNRF seeks permission from landowners in advance of handbaiting on property.)

Helicopter baiting can either target wildlife habitat or can follow predetermined parallel flight lines. Helicopter baiting is much faster and allows a more rapid response to each case. The entire area can also be covered with helicopter baiting since individual landowner permission is not required. (The public is notified in advance through news releases and public notifications.)

For both methods of baiting, the local health unit, CFIA office, and Ministry of Natural Resources and Forestry staff are notified of the baiting operations. For helicopter baiting, the local airport and police are also notified as they may receive calls about low-flying aircraft.

High density ONRAB® PICs in response to individual rabies cases were implemented in southwestern Ontario in the fall of 2009. Since then, 13 PICs have been conducted – 1 in 2015, 2 in 2012, 2 in 2011, 6 in

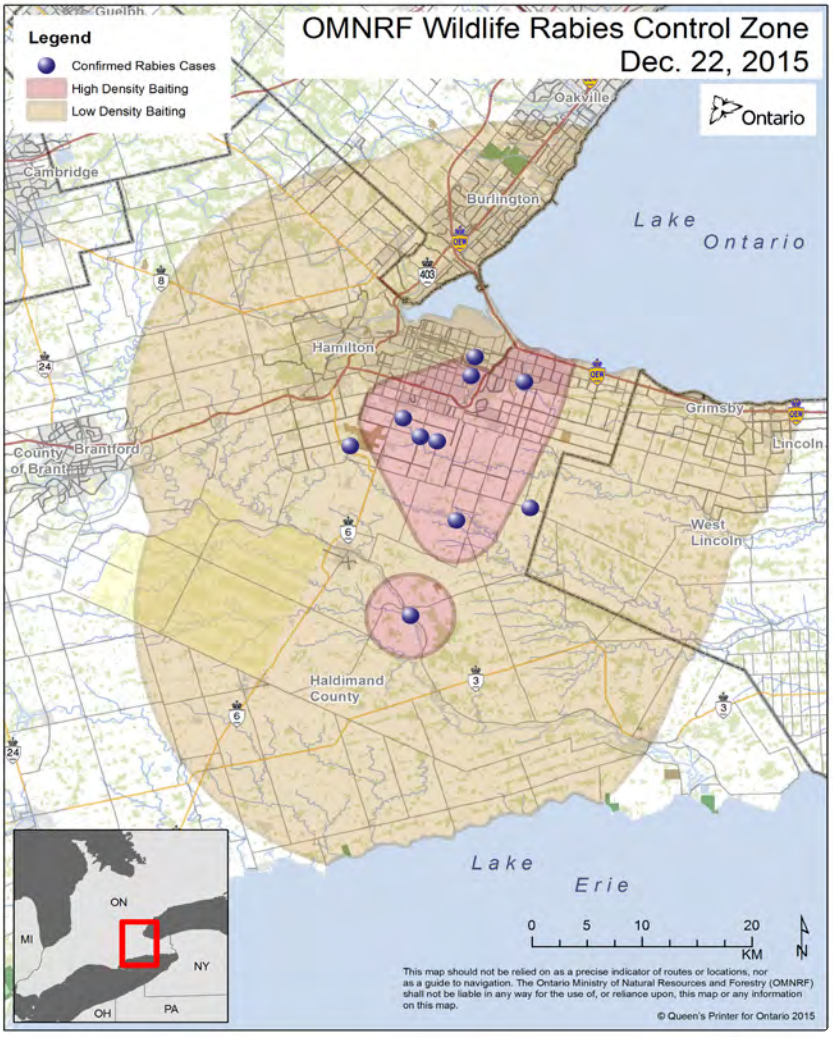


Figure 3. Rabies cases and ORV response in the Hamilton area in December 2015.

2010, and 2 in 2009. No PICs were conducted in 2013 or 2014.

In early December, a case of mid-Atlantic raccoon rabies was discovered in an urban area of Stoney Creek (near Hamilton). Within days of confirmation of the strain type, staff began distributing baits by hand and helicopter at a density of 300 baits/km^2 and a flightline spacing of 250m in the area immediately surrounding the case (Figure 3). Although baiting would not normally be conducted at this time of year, it was extremely mild weather and raccoons had not entered their normal periods of inactivity and winter denning.

The following week, three additional cases were detected through enhanced surveillance. As a result, the PIC baiting was expanded to encompass each of the additional cases. The new cases were located in more rural areas. Baits were distributed by hand and helicopter at a density of 150 baits/km^2 and a flightline spacing of 750m.

As additional cases were discovered in the Hamilton area during December, it was decided to bait a 25 km radius around all confirmed cases. Baits were distributed by hand, helicopter and airplane at a density of 75 baits/km^2 and a flightline spacing of 750m.

From December 7-23, 18,836 baits were distributed by hand. From December 9-19, 100,125 baits were distributed by helicopter. From December 15-17, 99,900 baits were distributed by airplane. Handbaiting operations were not completed throughout the entire urban area before the end of December due to the arrival of cold weather which makes raccoons less active and would result in greatly reduced bait uptake. Handbaiting operations will be completed in the spring of 2016.

Oral rabies vaccination in Quebec

In 2015, UL baits containing ONRAB® were distributed in southern Quebec through a cooperative partnership between the Ministère des Forêts, de la Faune et des Parcs and MNRF (Figure 4). This was the tenth consecutive year that baiting was conducted in Quebec to help contain the spread of 'raccoon' strain rabies. From August 17-19, a total of 356,275 baits were distributed using an MNRF Twin Otter (DHC-6) aircraft over an area of 3,501 km^2 adjacent to the Vermont border. Due to the incredible weather conditions and staff eager to complete the project, a record 16 baiting flights were completed in just three days.

The objective was to create a buffer zone of protected wildlife in the event that animals infected with 'raccoon' strain rabies crossed over from Vermont where this strain still persists in local raccoon and skunk populations. Flights were flown 150m above ground at an average ground speed of 265 km/h. The plane flew along predetermined parallel flight lines spaced 0.75 km apart at densities of 75, 100, and 125 baits/km^2 over both agricultural and forested habitats.

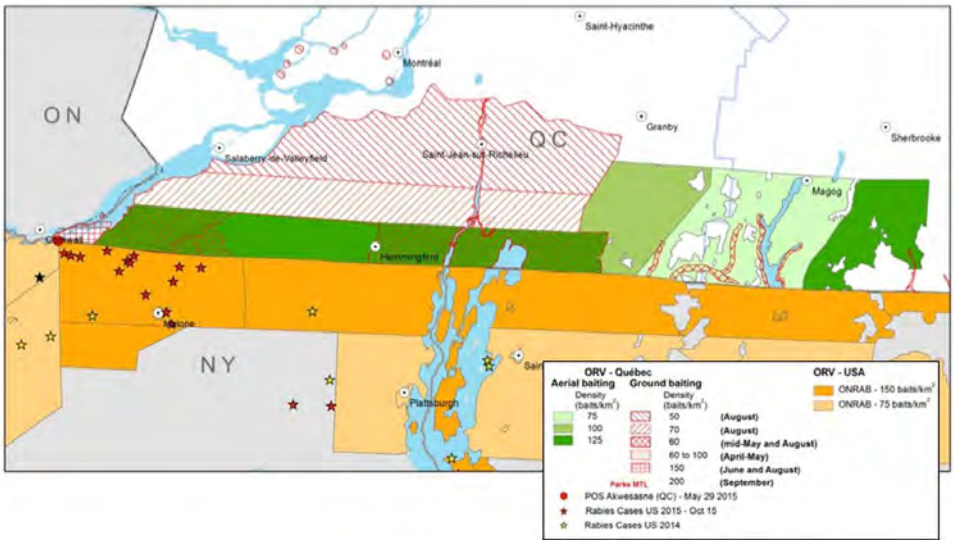


Figure 4. Rabies cases in northern Vermont and Quebec ORV zone.

Oral rabies vaccination in New Brunswick

In 2015, UL baits containing ONRAB® were distributed in southeastern New Brunswick through a cooperative partnership between the Department of Agriculture, Aquaculture and Fisheries (DAAF) and MNRF (Figure 5).

This was the second time that ONRAB® baits were distributed in New Brunswick. In 2008, baits were distributed in an experimental plot along the Maine border to do a comparison trial with V-RG. This was the first time that ONRAB® was used in New Brunswick to try to control raccoon strain rabies.

From August 21-24, a total of 157,725 baits were distributed using an MNRF Twin Otter (DHC-6) aircraft over an area of 2,470 km^2 adjacent to the Maine border. Unlike Quebec, the weather conditions in New Brunswick were not favourable for baiting. As a result, it took 4 days to complete the 6 flights.

The objective was to create a buffer zone of protected wildlife in the event that animals infected with 'raccoon' strain rabies crossed over from Maine where this strain occurs in local raccoon and skunk populations. The plane flew along predetermined parallel flight lines spaced 0.75 km apart and disbtributed baits at a density of 75 baits/km^2 over mostly forested habitats.

Since 1989, MNRF has distributed 80,118,092 baits in Ontario, Quebec, New Brunswick, Texas, New York, Vermont, New Hampshire, Maine, Florida and Appalachian Ridge zone (including Ohio, Pennsylvania, Virginia, West Virginia, Georgia, Alabama and Tennessee). Of those, 79,246,727 baits were distributed by aerial means and 871,365 by hand baiting on the ground.

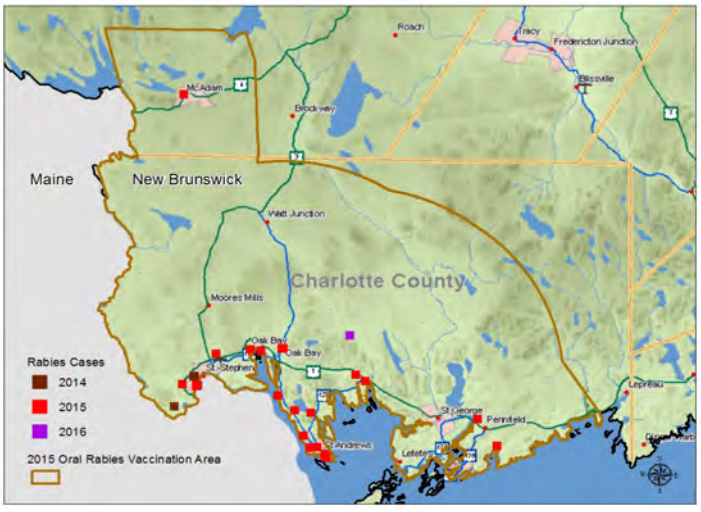


Figure 5. Rabies cases and 2015 ORV response in New Brunswick.

New Brunswick rabies update

Jim Goltz, Department of Agriculture, Fisheries and Aquaculture

New Brunswick has detected 27 wild animals (25 raccoons and 2 striped skunks) with raccoon rabies variant since the current incursion began in late May 2014 (Figure 5). Three rabid raccoons were detected in the fall of 2015 after an oral rabies vaccine bait (ONRAB®) distribution was completed in high risk areas and one has been detected in 2016. All of these cases occurred within the geographic zone in which vaccine baits had been distributed. No cases have been detected in domestic animals in New Brunswick.

Funding has been secured and plans have been prepared to expand heightened surveillance and continue the distribution of oral rabies vaccine baits in an expanded control zone in the western part of the province in 2016, factoring in risks of rabies spreading to New Brunswick from locations where it is being detected nearby in Maine.

Since early October, 2015, two cases of bat variant rabies have been detected in big brown bats in Fredericton, NB. In recent years, a number of non-hibernating bats of this species have been found in winter in and around houses. Since the conservation status of this species is considered to be "sensitive", some efforts have been made to rehabilitate bats that are in good body condition when found. Rehabilitation was attempted in a bat found in a home on January 1, but the bat stopped eating about a month later, began to chew at its feet and died. This bat tested positive for rabies. Prior to these two cases of rabies in bats, 13 other rabid bats had been detected in the province since the mid 1970s. Now that several bat species are considered to be "at risk", the management of situations of bats appearing in homes requires extra scrutiny and risk assessment to balance public health concerns with conservation concerns.

An overview of 2015 Raccoon Rabies Surveillance and Control in Québec

Marianne Gagnier, Ministère des Forêts, de la Faune et des Parcs

With 15 raccoon rabies cases discovered less than 15 kilometers from the QC-US border in 2015, the Québec government had a very good incentive to keep its Raccoon Rabies Control Program active and adapted. 2015 was the tenth consecutive year during which raccoon rabies control and surveillance actions were implemented. Spring and late summer vaccination campaigns conducted along the QC-US border coupled with enhanced surveillance and communications to encourage public awareness were once again the cornerstones of Quebec's program. This strategy will remain appropriate until the raccoon rabies epidemic front is pushed south. The Québec government is actively working on this with the collaboration of neighboring jurisdictions (Ontario, New Brunswick and United States).

In April 2015, following the discovery of rabid raccoons a few kilometres across the QC-US border, in Franklin County, New York State, Québec government quickly enhanced its surveillance near the emerging outbreak. The first control activities of the season were also done a few weeks earlier than was originally planned.

However, on May 29 2015, a case of raccoon rabies was confirmed in the Québec portion of the Akwesasne aboriginal reserve. The raccoon was involved in a fight with a dog and was reported to the Quebec authorities by MNRF collaborators. Since a vaccination campaign to immunize wild animals against rabies had never been conducted in this area, the oral rabies vaccination (ORV) plan was promptly adjusted. The Québec part of Akwesasne was hand baited twice in 2015, with the collaboration of the Aboriginal authorities. This occurred at the same time as the Ontario section of the reserve was baited with ONRAB®. The required effort was made to reduce the chances of raccoon rabies spreading into other regions of the province and 2015 results were encouraging, proving the effectiveness of the immunization barrier in Quebec along the US border.

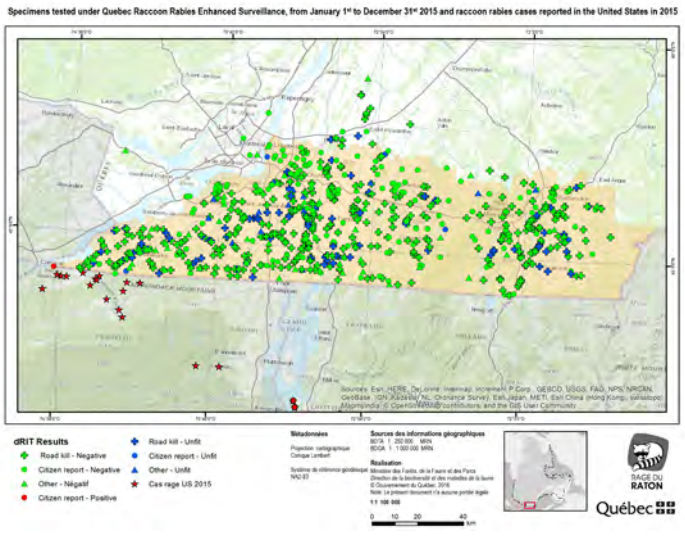


Figure 6. 2015 Enhanced Surveillance in Québec.

Throughout 2015, a total of 792 specimens were collected under raccoon rabies enhanced surveillance activities in southern Québec, mainly in Estrie and Montérégie regions (Figure 6). Of these, 79% (n=624) were raccoons, 16% (n=130) were skunks and 3% (n=25) were foxes. Most of these animals were collected through road patrol (66%) or following a citizen reporting a strange acting animal (24%).

ORV was conducted along the Québec-US border, in the same regions as the enhanced surveillance activities. ORV operations included both hand (late-April and early-September) and aerial baiting (mid-August). Overall, 686 315 ONRAB® baits were distributed over 6 900 km^2. In 2015, bait densities ranged from 50-100 baits/km^2 (hand baiting) and 75-125 bait/km^2 (aerial baiting). As usual, the baits were distributed in preferred raccoon habitat, forest patches and adjacent edges of crop fields.

A post-ORV study was conducted from October 12-22 2015 to assess the percentage of raccoons positive for rabies virus antibodies in the areas where ONRAB® baits were used. Three cells of 100 km^2 each were sampled, with a total of 309 raccoon serum samples collected. Antibody prevalence ranged from 43-52% (c-ELISA, CFIA), with a 48 % average. This represents an encouraging increase from 2014's results

For further information on the Québec rabies surveillance and control program, please contact Marianne Gagnier at marianne.gagnier@mffp.gouv.qc.ca / 418-627-8694 ext.7422

Animal Rabies Report: July to December 2015

Animal Type	Fox			Raccoon			Skunk			Other Wildlife			Bat			Dog			Cat			Livestock			Totals		
County or Region		Cumulative			Cumulative			Cumulative			Cumulative			Cumulative			Cumulative			Cumulative			Cumulative			Cumulative	
	#	15	14	#	15	14	#	15	14	#	15	14	#	15	14	#	15	14	#	15	14	#	15	14	#	15	14
Eastern																											
Stormont, Dundas & Glengarry																									**0**	**0**	**0**
Prescott-Russell																									**0**	**0**	**0**
Ottawa-Carleton														1	1										**0**	**1**	**1**
Renfrew																									**0**	**0**	**0**
Lanark																									**0**	**0**	**0**
Leeds and Grenville															1										**0**	**0**	**1**
Frontenac															1										**0**	**0**	**1**
Lennox & Addington																									**0**	**0**	**0**
Central																											
Hastings														1											**0**	**1**	**0**
Prince Edward																									**0**	**0**	**0**
Northumberland																									**0**	**0**	**0**
Victoria																									**0**	**0**	**0**
Haliburton																									**0**	**0**	**0**
Peterborough															2										**0**	**0**	**2**
Durham														1	1										**0**	**1**	**1**
York Region														1											**0**	**1**	**0**
Toronto																									**0**	**0**	**0**
Simcoe														1											**0**	**1**	**0**
Western																											
Peel													1	1											**1**	**1**	**0**
Halton																									**0**	**0**	**0**
Dufferin																									**0**	**0**	**0**
Wellington																									**0**	**0**	**0**
Waterloo														1	2										**0**	**1**	**2**
Perth																						1	1		**1**	**1**	**0**
Grey																									**0**	**0**	**0**
Bruce																									**0**	**0**	**0**
Huron															1										**0**	**0**	**1**

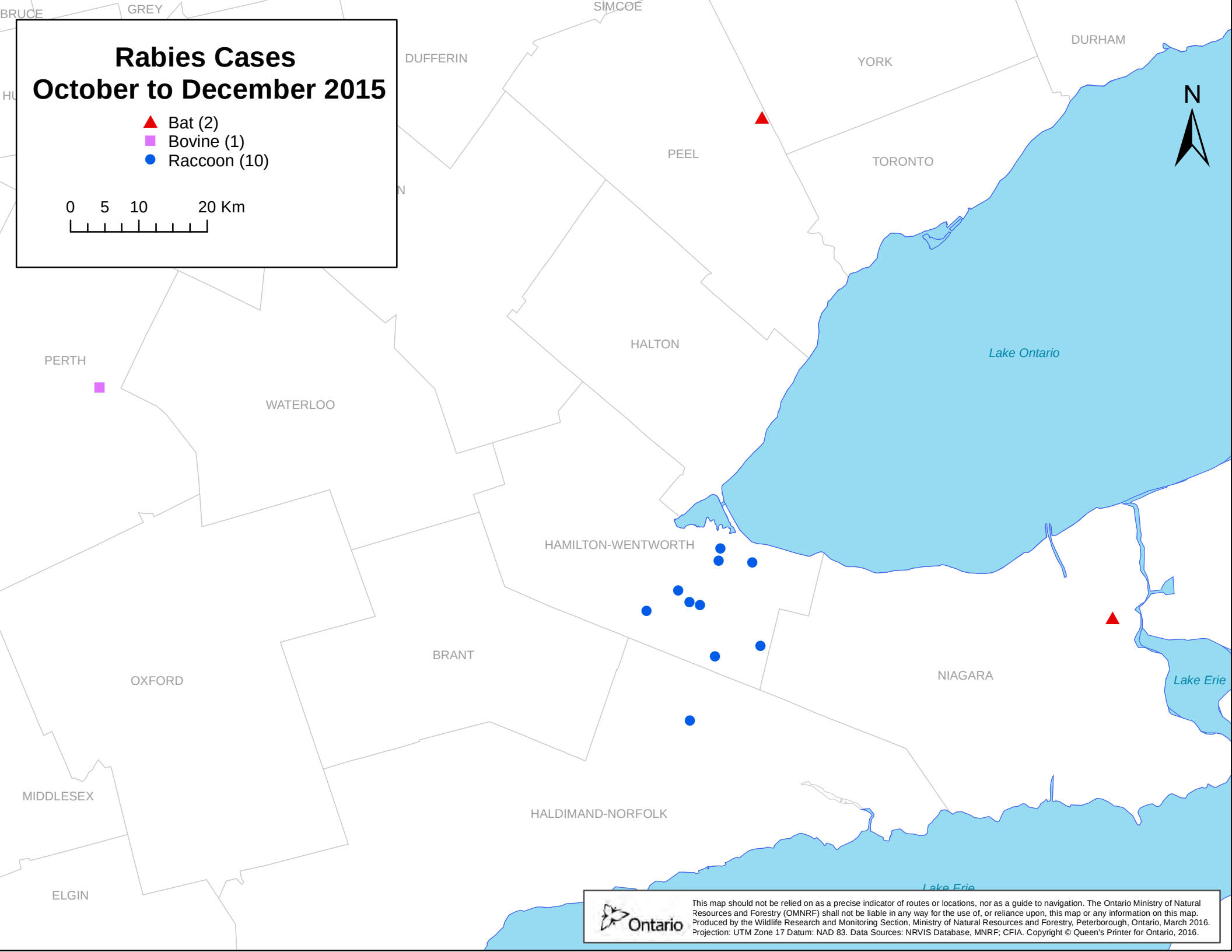
Animal Rabies Report: July to December 2015

Animal Type	Fox			Raccoon			Skunk			Other Wildlife			Bat			Dog			Cat			Livestock			Totals		
County or Region		Cumulative			Cumulative			Cumulative			Cumulative			Cumulative			Cumulative			Cumulative			Cumulative			Cumulative	
	#	**15**	**14**	#	**15**	**14**	#	**15**	**14**	#	**15**	**14**	#	**15**	**14**	#	**15**	**14**	#	**15**	**14**	#	**15**	**14**	#	**15**	**14**
Southern																											
Hamilton				9	9									2	1										**9**	**11**	**1**
Haldimand-Norfolk				1	1									1											**1**	**2**	**0**
Brant															1										**0**	**0**	**1**
Niagara													1	2	3										**1**	**2**	**3**
Elgin															1										**0**	**0**	**1**
Oxford																									**0**	**0**	**0**
Middlesex															3										**0**	**0**	**3**
Lambton																									**0**	**0**	**0**
Kent																									**0**	**0**	**0**
Essex																									**0**	**0**	**0**
Northern																											
Muskoka																									**0**	**0**	**0**
Parry Sound																									**0**	**0**	**0**
Nipissing																									**0**	**0**	**0**
Sudbury														1											**0**	**1**	**0**
Cochrane																									**0**	**0**	**0**
Timiskaming																									**0**	**0**	**0**
Algoma																									**0**	**0**	**0**
Thunder Bay																									**0**	**0**	**0**
Rainy River																									**0**	**0**	**0**
Kenora																									**0**	**0**	**0**
Regional Totals																											
Eastern	0	0	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0	0	0	0	0	0	0	0	**0**	**1**	**3**
Central	0	0	0	0	0	0	0	0	0	0	0	0	0	4	3	0	0	0	0	0	0	0	0	0	**0**	**4**	**3**
Western	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	0	0	0	0	0	0	1	1	0	**2**	**3**	**3**
Southern	0	0	0	10	10	0	0	0	0	0	0	0	1	5	9	0	0	0	0	0	0	0	0	0	**11**	**15**	**9**
Northern	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	**0**	**1**	**0**
Totals	**0**	**0**	**0**	**10**	**10**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**2**	**13**	**18**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**0**	**13**	**24**	**18**

CFIA·ACIA

Notes for this quarter: The bat in Peel was a hoary bat. All other bats were big brown bats. The livestock case was a bovine.

Ontario


Rabies Cases
October to December 2015
Bat (2)
Bovine (1)
Raccoon (10)
0 5 10 20 Km
N
BRUCE
GREY
SIMCOE
DUFFERIN
YORK
DURHAM
PEEL
TORONTO
HALTON
Lake Ontario
PERTH
WATERLOO
HAMILTON-WENTWORTH
BRANT
OXFORD
NIAGARA
Lake Erie
MIDDLESEX
HALDIMAND-NORFOLK
ELGIN
Ontario
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