

The Rabies Reporter

The Ministry of Natural Resources and Forestry
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The Rabies Reporter, a scientific newsletter about current issues in rabies research and control, is a joint effort of the Wildlife 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 be cited in papers intended for refereed journals. Send contributions, letters and inquiries to: rabies@ontario.ca

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Rabies cases down compared to 2016

Beverly Stevenson and Rachel Gagnon, Ministry of Natural Resources and Forestry

There were 83 diagnosed rabies cases in Ontario during the first half of 2017 which is a significant decrease from the first half of 2016 when there were 134 cases.

Of the 83 cases, 1 was in a red fox, 50 were in raccoons, 23 were in skunks, 4 were in bats, 1 was in a cat, and the remaining 4 were in bovines.

Ontario fox strain rabies continued to make its presence known with a rabid skunk and a rabid fox in Waterloo Region and 4 rabid bovines in Huron (1) and Perth (3) counties. The last time a fox was detected with fox strain rabies was in 2009 in Bruce County. Since foxes have fairly large home range, this case could result in additional rabies cases in neighbouring counties. Although Ontario fox strain rabies had been present at low levels since December 2015, the cases had been restricted to Huron and Perth counties.

In the first 6 months of 2017 the number of rabies cases due to the mid-Atlantic raccoon rabies virus strain was approximately half of what they were during the same period in 2016 (Figure 1). The 2017 cases were found within 50 km of the original case from December 2015, however they were more widely distributed than in 2016. In the first half of 2016, the majority of rabid raccoons (70 of 80), and all rabid skunks (45) were found in Hamilton, with additional rabid raccoons found in Haldimand (4) and Niagara (6). In contrast, from January to June 2017, 22 rabid skunks were found in Halton (5), Hamilton (14), Haldimand (1), and Niagara (2), and 50 rabid raccoons were found in Halton (4), Hamilton (24), Haldimand (5), Brant (5), and Niagara (12). The rabid cat was also located in Hamilton which continues to be the epicenter of cases (Figure 2).

There were only 4 rabid bats from January to June this year compared to 8 in the previous year at the same time. The bats were located in Hastings, Bruce, Niagara and Middlesex counties.

The Ministry of Natural Resources and Forestry (MNRF) will continue its enhanced surveillance and rabies control efforts throughout 2017.

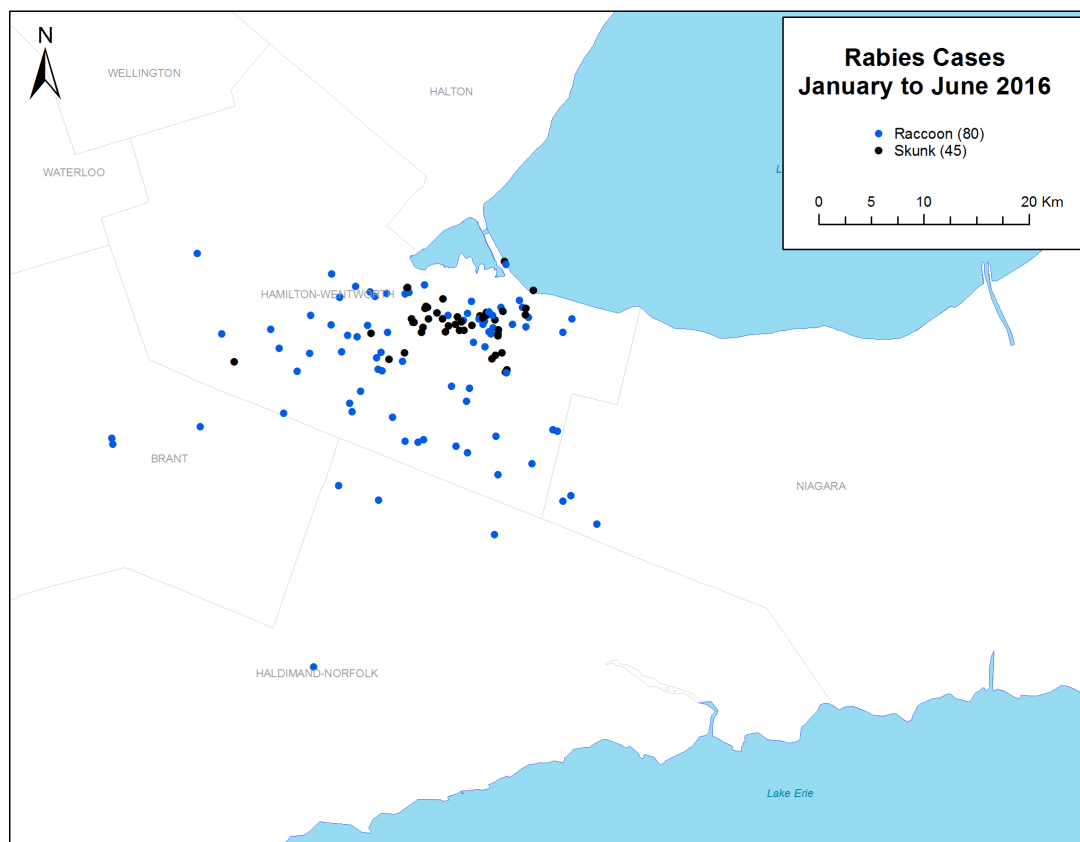


Figure 1. Raccoon strain cases in the Golden Horseshoe area from January to June 2016.

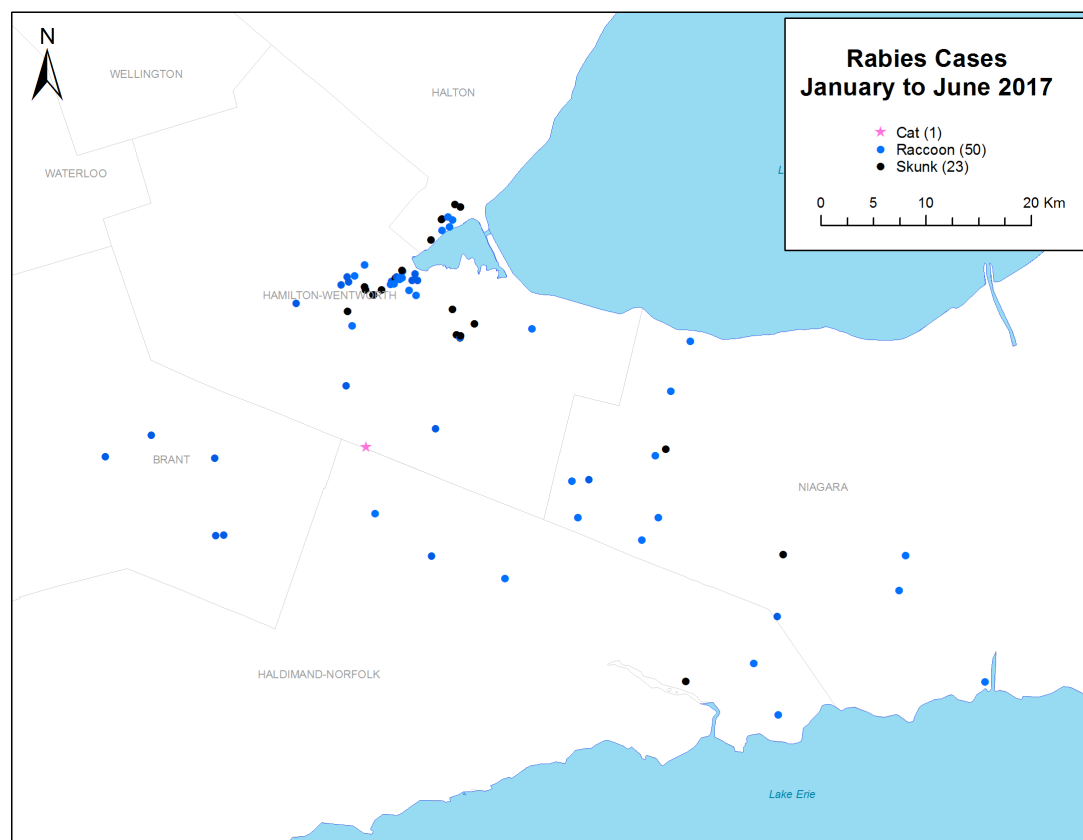


Figure 2. Raccoon strain cases in the Golden Horseshoe area from January to June 2017.

In response to the Huron and Perth cases, the MNRF initiated localized, high-density response baiting in early April. Rabies vaccine baits targeting skunks and foxes were distributed in 8 km by 8 km plots around the rabies cases. Baits were distributed at a density of 300 baits/km² and a flightline spacing of 250 m; skunks have very small home ranges so narrow flightline spacings are required when targeting them.

Flights were conducted out of the Richard W. LeVan Aerodrome in Wingham using an EC130 Helicopter flying at low level (Figure 4).

In total, MNRF staff distributed over 51,000 baits by air and almost 2,000 baits on the ground.

Localized high density baiting was conducted on May 30 in the Wallenstein area after the positive fox was discovered. Approximately 19,500 baits were distributed in this baiting plot. In late June, a skunk was diagnosed in the same area.

These areas will be rebaited as part of the annual oral rabies vaccination zone in late summer / early fall. Rebaiting is necessary later in the year as young of the year would not have been old enough to be immunized against rabies with the vaccine baits.



Figure 4. MNRF staff Grace McCoy distributes rabies vaccine baits targeting wildlife from a helicopter while pilot Andrew Fitch flies along a predetermined grid.

Post-baiting serology program

Sarah Jamieson and Kevin Middel, Ministry of Natural Resources and Forestry

In 2015 and 2016, three responsive baiting campaigns were conducted in the months following detection of a rabid raccoon in Hamilton in December 2015. Oral rabies vaccine (ORV) baiting campaigns using ONRAB® are typically done in the late summer and fall to vaccinate both adults and the young of the year, and to increase the probability that the animals will consume baits as they build fat stores for winter. Following confirmation of the first case of raccoon rabies in the province in 10 years, the MNRF responded quickly by distributing vaccine baits as soon as possible. The late onset of winter and warm temperatures of December 2015 allowed the MNRF to get vaccine baits on the ground almost immediately. That December 218,861 baits were distributed by hand and air within a 25 km radius surrounding confirmed cases in the Hamilton area. This work continued until the arrival of cold weather. The following spring 588,556 baits were distributed by air in rural areas and by hand in urban areas (ranging from 75 - 300 baits/km²). In the fall during the typical baiting period, a further 811,902 baits were delivered aurally and by hand at similar densities.

To measure the success of baiting outside the typical season and to assist with long-term planning, post-baiting studies were conducted to estimate what proportion of the raccoon and skunk populations were successfully vaccinated during each of the baiting campaigns. Results from these studies would also allow analysis of how habitat, baiting techniques, and bait density influence vaccination success. In 2016, animals were trapped in June-July and October. In June and July animals were trapped in areas that had been baited both in December and again in the spring. Each project involved trapping raccoons and skunks and transporting them to a central processing station where they were sedated, had 3-5 ml of blood drawn, and received ear tags and an injection of IMRAB® vaccine (Figure 5). Once recovered, animals were released back to their original capture sites (Figure 6). Blood was then spun using a centrifuge to separate the cells from the sera. Sera were shipped to the Canadian Food Inspection Agency where they were tested for rabies antibody levels. Detection of antibodies indicate that the animal has been successfully vaccinated.

Capture success was high in both trapping seasons, however the portion of the population that were successfully vaccinated was relatively low. Previous studies reported seroprevalence levels of 56% and greater in raccoon following ONRAB® baiting, however, of the 654 raccoons captured in spring, only 19% had rabies antibodies. Seroprevalence in skunks was even lower (4%) though the sample size was small (48). In the fall trapping season only 15% of the 184 raccoons captured and 17% of the 47 skunks were antibody positive. During 2017, intensive baiting programs continue along with research to identify potential causes for the low seroprevalence observed following the 2016 baiting. Despite the lower than expected vaccination rates, we are seeing a positive effect on the ground with fewer positive cases being reported to date than during the same period last year, 4.1% of samples from January – June 2016 tested positive compared to only 3.4% from January – June 2017 and containment of the raccoon rabies outbreak to within 50km of the original case detected in 2015 (Figure 7). The MNRF is also planning further ORV studies in the fall of 2017 to evaluate the changes to the urban baiting strategies and program.



Figure 5. MNRF staff test and vaccinate wildlife at the processing station.



Figure 6. MNRF staff release a raccoon after treatment and vaccination.

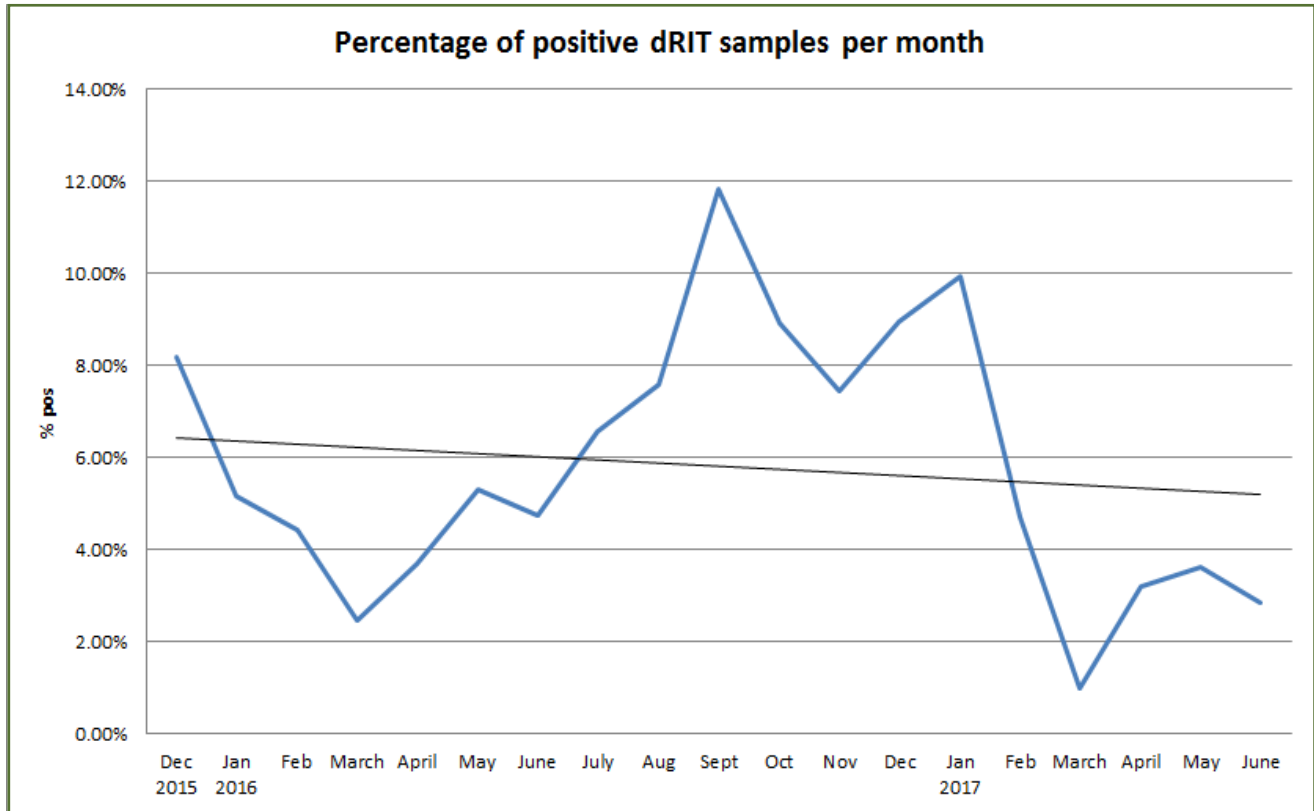


Figure 7. Percentage of dRIT samples that tested positive by month since January 2016

Raccoon rabies surveillance and control in Québec: 2017 summer updates

Ariane Massé, Québec Ministère des Forêts, de la Faune et des Parcs

Québec's Raccoon Rabies and Surveillance Control Program is continuing its activities in 2017 since there is still a threat of reintroduction from the United States; cases of raccoon rabies are detected every year in Vermont and New York State near the Québec border.

As part of the Québec Program, enhanced surveillance is carried out annually along the QC-US border (Figure 8). As of June 30, 363 specimens were collected mainly in Estrie and Montérégie regions. Of these, 82% (n=299) were raccoons, 13% (n=47) were skunks and 2% (n=9) were foxes. Most of these animals were collected through road surveys (64%) or following a citizen reporting a suspicious animal (36%). Communications actions are conducted to encourage public awareness and citizen reports.

Oral rabies vaccination (ORV) activities are planned for mid-August. Overall, 549 000 ONRAB® baits will be distributed with densities of 75/100/125 baits/km² (aerial baiting) and 70 baits/km² (hand baiting) (Figure 9). From approximately August 19 to 24, 289 000 ONRAB® baits will be distributed by plane over an area of 2,640

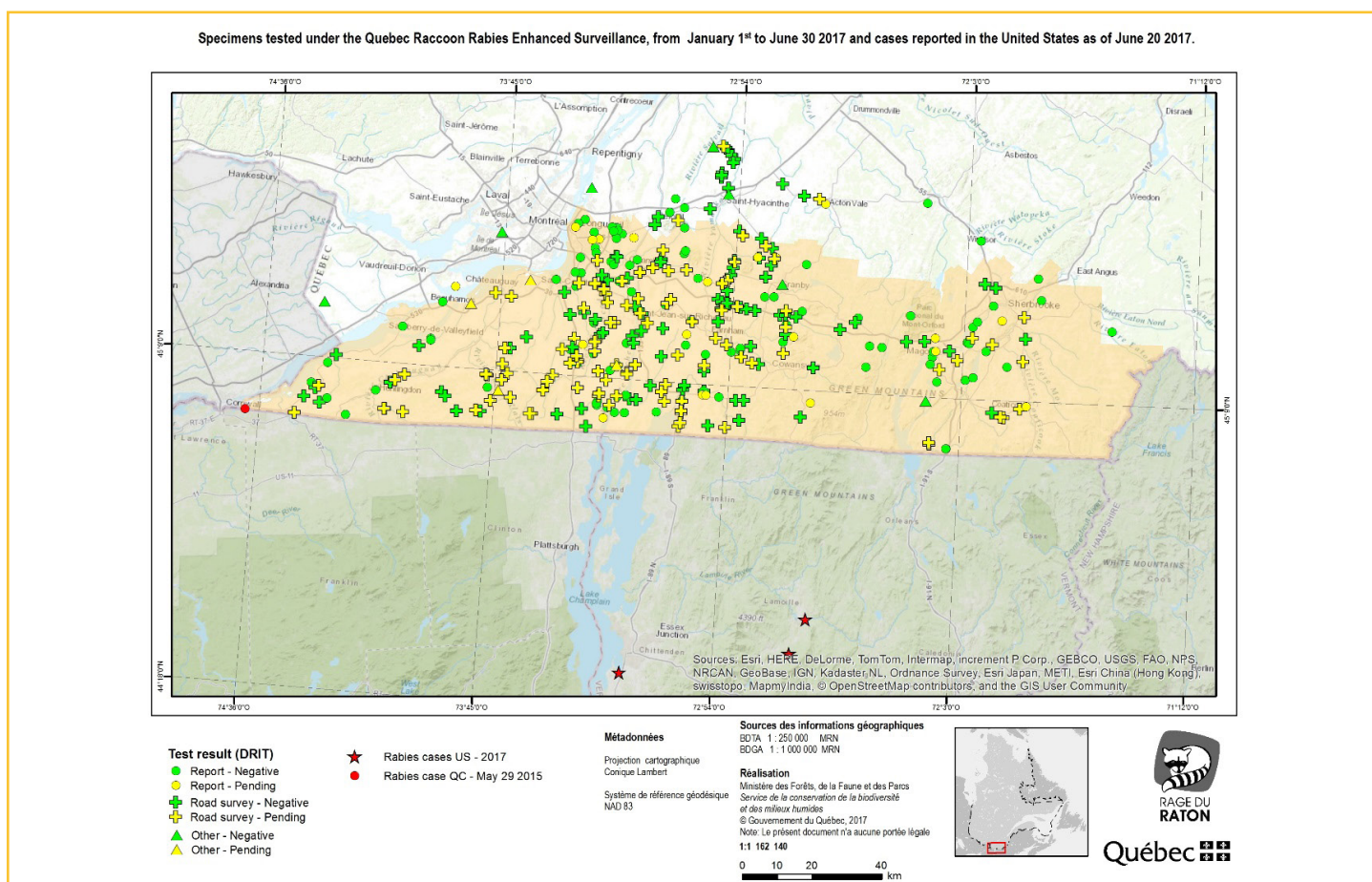


Figure 8. 2017 enhanced surveillance in Québec.

km². Hand baiting will begin as soon as aerial baiting is completed and continue until September 12 in areas of the Montérégie dominated by agricultural fields. About 260 000 ONRAB® baits will be distributed manually over 3,700 km² by professional trappers and wildlife technicians. Hand baiting will be conducted in 73 municipalities and in 9 parks of the Montreal region. As usual, the baits will be distributed in preferred raccoon habitats, such as forest patches, adjacent edges of crop fields and in the vicinity of residential areas.

A post-ORV study is planned from October 9-19 to assess the percentage of raccoons positive for rabies virus antibodies. Five trapping plots will be located along a forest-agricultural gradient in the hand baiting and aerial baiting zones.

Collaborative efforts with neighboring jurisdictions (Ontario, New Brunswick and United States) to prevent any northward return of raccoon rabies is essential for the Québec government. In that sense, surveillance and control activities conducted in Québec in 2017 contribute to the shared objective of pushing the raccoon rabies epidemic front further south.

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.

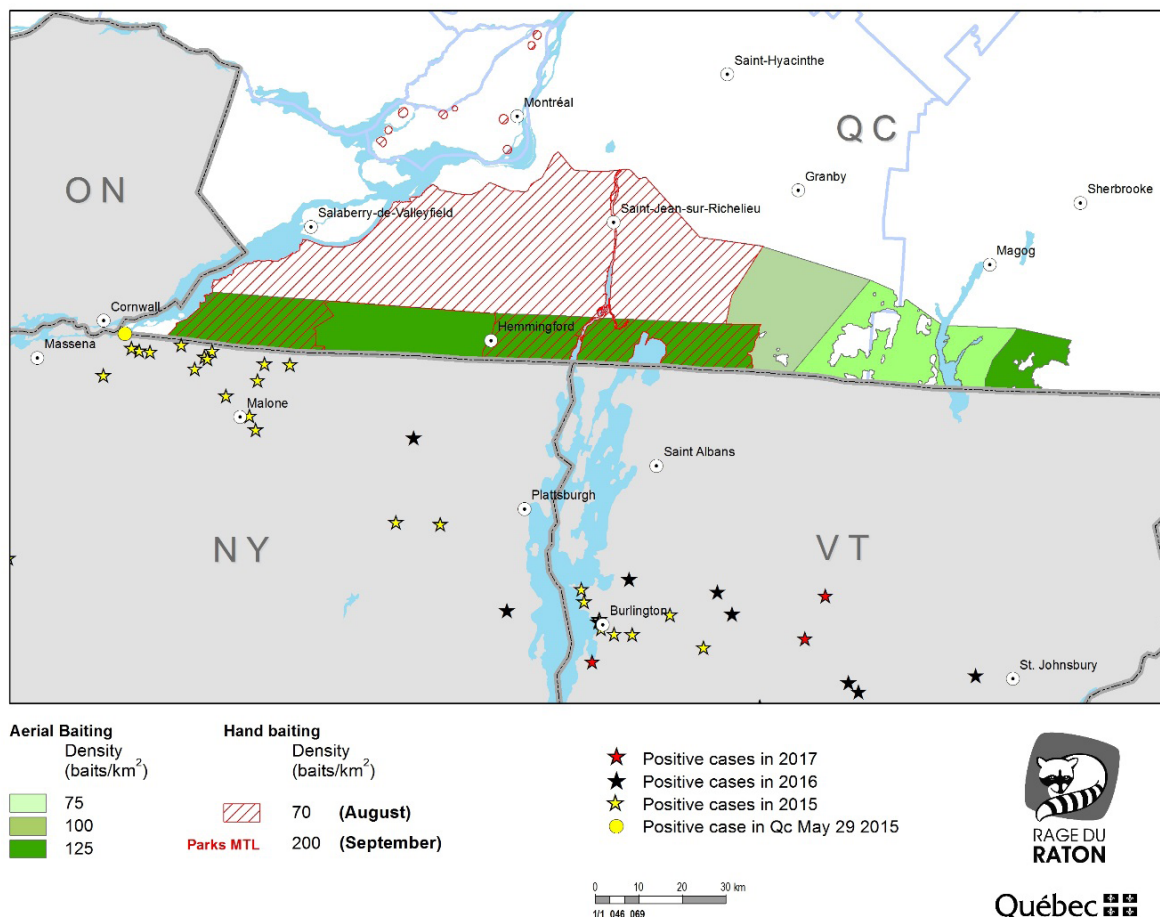


Figure 9. 2017 oral rabies vaccination (ORV) in Québec.

Passing of Ken Lawson

Beverly Stevenson and Andrew Silver, Ministry of Natural Resources and Forestry

It was a sad day in March when we were informed of the passing of Ken 'Doc' Lawson.

Doc was a cornerstone in the Rabies Research Unit even though he didn't join the unit until after his retirement from Connaught Laboratories and most of his time was spent as a volunteer with us.

Doc (before he was Doc) was a World War II Spitfire fighter pilot. He flew reconnaissance flights for the allies over occupied parts of Europe. After the war, Ken retired from the military and decided to go to school to be trained as a veterinarian. Doc then worked for Connaught Laboratories as a veterinarian working on vaccine research. He played a large role in developing the ERA rabies vaccine which the Ministry used to successfully eliminate fox strain rabies from most of southern Ontario.

When Doc retired from Connaught Laboratories, the Ministry's Rabies Research and Development Unit jumped on the opportunity to hire him on contract for bait development. Doc would test different shapes and sizes of vaccine blister-paks and baits as well as different flavours of bait attractants. It would be nothing for Doc to show up with 10-20 different bait flavours ranging from fish, vegetable, cheese, sugar, peanut butter and insect essence.

Doc finally retired from the MNR after developing the current bait size "ultra-lite" that is used today to vaccinate wildlife in Ontario, Quebec and beyond. Along with retiring from the Ministry, Doc also retired from the Rabies Advisory Committee which he was a member of from 1995 to 2010 - but at age 90, it was time to pass the reins on to someone else!

As a tribute to Doc's numerous contributions to the rabies control program and to recognize his incredible life, an "Ad Astra" stone, dedicated to Doc, was placed at the National Air Force Museum of Canada in Trenton, Ontario.

You will be sadly missed Doc, you had a long and amazing life and you will never be forgotten by the rabies community.



Farewell Dr. Chris Davies

Dr. Chris Davies has hung up his hat after 19 years of leading wildlife research and more than 30 years with the Ministry. His remarkable career began in 1987 as a district biologist in Moosonee. Since then Chris has worked in wildlife, wetlands, and terrestrial science in Cochrane, Timmins, Bancroft, and Peterborough. Chris has played an integral role in the ministry's research programs over the years with some of his most notable achievements including:

- Leading the ministry's Rabies Research and Development Unit in the late 1990s in response to the eastern Ontario raccoon rabies outbreak
- Enhancing university and WRMS wildlife research collaborations from three graduate students to more than 20 today
- Being a key player in consolidating the wildlife research group through the construction of the DNA building at Trent University

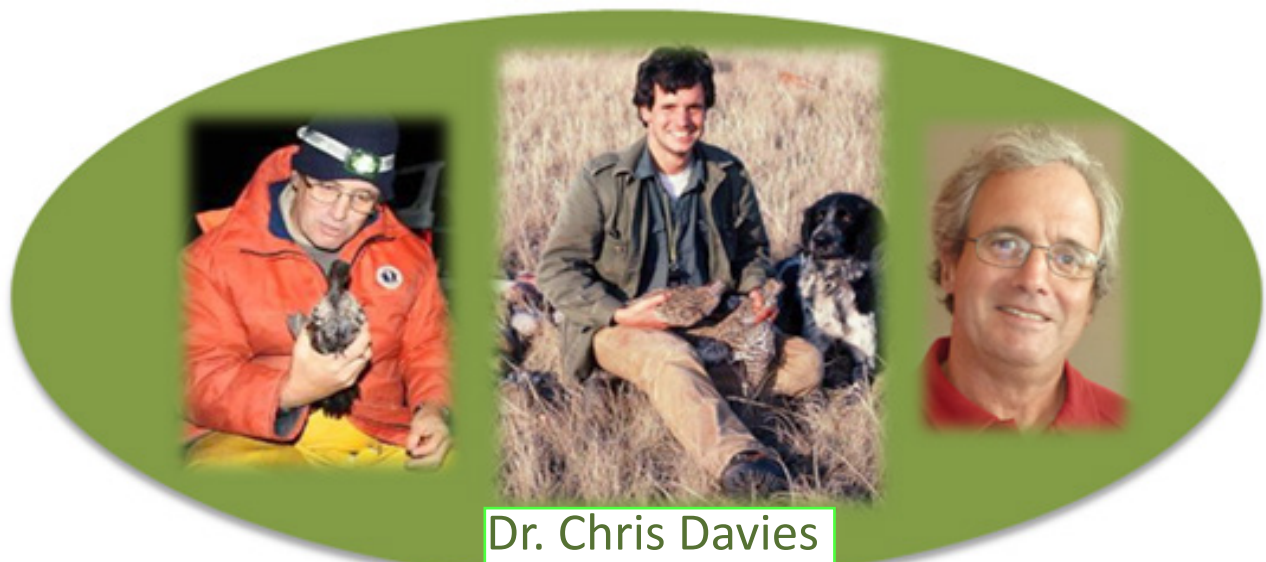
His accomplishments have been recognized through many awards, including a 2014 Amethyst Award acknowledging his leadership in eliminating raccoon rabies. Chris has served, chaired, and provided expertise on many council and committees — e.g. Atlantic Flyway Council and Atlantic Flyway Technical Section — as well many waterfowl joint-venture groups.

Chris's admirable leadership, unwavering loyalty to staff, and expansive knowledge of all things wildlife and waterfowl will be missed across the ministry and beyond.

His parting words?

"Thanks to my family and current and past staff for allowing and supporting what has been an amazing career."

Dr. Davies, we hope you enjoy a retirement filled with ample hunting, curling, and wine!

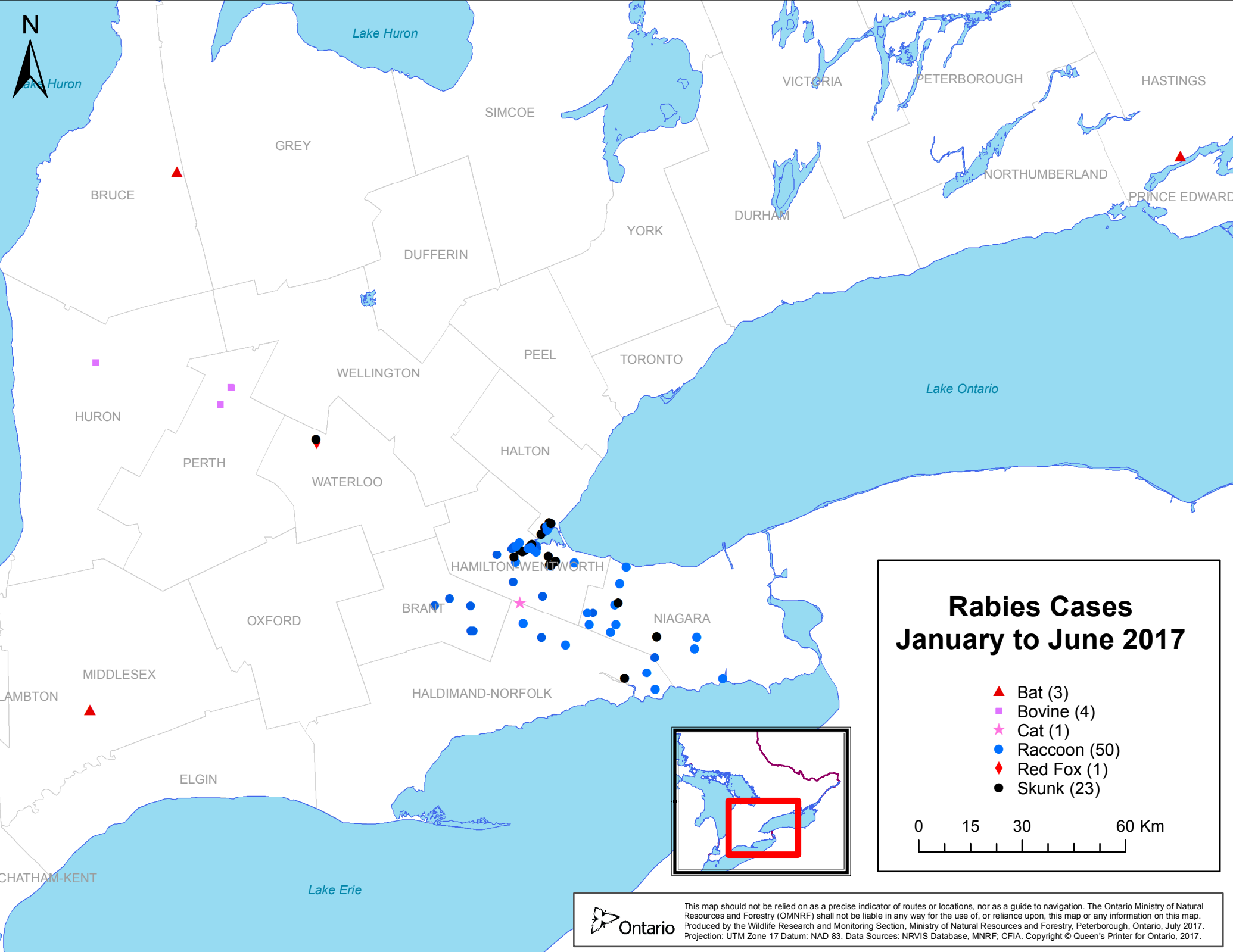


Animal Rabies Report: January to June 2017

Animal Type	Fox			Raccoon			Skunk			Other Wildlife			Bat			Dog			Cat			Livestock			Totals		
County or Region	Cumulative			Cumulative			Cumulative			Cumulative			Cumulative			Cumulative			Cumulative			Cumulative			Cumulative		
	#	17	16	#	17	16	#	17	16	#	17	16	#	17	16	#	17	16	#	17	16	#	17	16	#	17	16
Eastern																											
Stormont, Dundas & Glengarry																									0	0	0
Prescott-Russell																									0	0	0
Ottawa-Carleton														1											0	0	1
Renfrew																									0	0	0
Lanark																									0	0	0
Leeds and Grenville																									0	0	0
Frontenac																									0	0	0
Lennox & Addington																									0	0	0
Central																											
Hastings													1	1											1	1	0
Prince Edward																									0	0	0
Northumberland																									0	0	0
Victoria																									0	0	0
Haliburton																									0	0	0
Peterborough														1											0	0	1
Durham																									0	0	0
York Region																									0	0	0
Toronto														1											0	0	1
Simcoe																									0	0	0
Western																											
Peel																									0	0	0
Halton				4	4		5	5						2											9	9	2
Dufferin																									0	0	0
Wellington																									0	0	0
Waterloo	1	1					1	1																	2	2	0
Perth									1													3	3		3	3	1
Grey																									0	0	0
Bruce													1	1											1	1	0
Huron														1								1	1		1	1	1

Animal Rabies Report: January to June 2017

Animal Type	Fox			Raccoon			Skunk			Other Wildlife			Bat			Dog			Cat			Livestock			Totals		
County or Region	Cumulative			Cumulative			Cumulative			Cumulative			Cumulative			Cumulative			Cumulative			Cumulative			Cumulative		
	#	17	16	#	17	16	#	17	16	#	17	16	#	17	16	#	17	16	#	17	16	#	17	16	#	17	16
Southern																											
Hamilton				24	24	70	14	14	45										1	1					39	39	115
Haldimand-Norfolk				5	5	4	1	1																	6	6	4
Brant				5	5																				5	5	0
Niagara				12	12	6	2	2					1	1	1										15	15	7
Elgin																									0	0	0
Oxford																									0	0	0
Middlesex													1	1	1										1	1	1
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																									0	0	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	0	1	0	0	0	0	0	0	0	0	0	0	0	1
Central	0	0	0	0	0	0	0	0	0	0	0	0	1	1	2	0	0	0	0	0	0	0	0	0	1	1	2
Western	1	1	0	4	4	0	6	6	1	0	0	0	1	1	3	0	0	0	0	0	0	4	4	0	16	16	4
Southern	0	0	0	46	46	80	17	17	45	0	0	0	2	2	2	0	0	0	1	1	0	0	0	0	66	66	127
Northern	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	1	1	0	50	50	80	23	23	46	0	0	0	4	4	8	0	0	0	1	1	0	4	4	0	83	83	134



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	#	17	16	#	17	16	#	17	16	#	17	16	#	17	16	#	17	16	#	17	16	#	17	16	#	17	16
Eastern																											
Stormont, Dundas & Glengarry																									0	0	0
Prescott-Russell																									0	0	0
Ottawa-Carleton													1	1	2										1	1	2
Renfrew																									0	0	0
Lanark																									0	0	0
Leeds and Grenville													1	1											1	1	0
Frontenac															1										0	0	1
Lennox & Addington																									0	0	0
Central																											
Hastings													1	2											1	2	0
Prince Edward																									0	0	0
Northumberland															2										0	0	2
Victoria																									0	0	0
Haliburton															1										0	0	1
Peterborough															1										0	0	1
Durham																									0	0	0
York Region													1	1											1	1	0
Toronto															1										0	0	1
Simcoe															1										0	0	1
Western																											
Peel																									0	0	0
Halton				2	6		3	8							3										5	14	3
Dufferin																									0	0	0
Wellington													1	1											1	1	0
Waterloo		1					1	2																	1	3	0
Perth							1	1	1													3			1	4	1
Grey													3	3											3	3	0
Bruce													1	2											1	2	0
Huron															1							1			0	1	1

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Animal Type	Fox			Raccoon			Skunk			Other Wildlife			Bat			Dog			Cat			Livestock			Totals		
County or Region	Cumulative			Cumulative			Cumulative			Cumulative			Cumulative			Cumulative			Cumulative			Cumulative			Cumulative		
	#	17	16	#	17	16	#	17	16	#	17	16	#	17	16	#	17	16	#	17	16	#	17	16	#	17	16
Southern																											
Hamilton			1	13	37	104	1	15	59				1	1	2					1	1				15	54	167
Haldimand-Norfolk				1	6	15		1																	1	7	15
Brant				1	6	5																			1	6	5
Niagara				1	13	7		2	1					1	5										1	16	13
Elgin													1	1	2										1	1	2
Oxford															2										0	0	2
Middlesex														1	2										0	1	2
Lambton															1										0	0	1
Kent													1	1	1										1	1	1
Essex																									0	0	0
Northern																											
Muskoka																									0	0	0
Parry Sound																									0	0	0
Nipissing																									0	0	0
Sudbury																									0	0	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																											
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Central	0	0	0	0	0	0	0	0	0	0	0	0	2	3	6	0	0	0	0	0	0	0	0	0	2	3	6
Western	0	1	0	2	6	0	5	11	1	0	0	0	5	6	4	0	0	0	0	0	0	0	4	0	12	28	5
Southern	0	0	1	16	62	131	1	18	60	0	0	0	3	5	15	0	0	0	0	1	1	0	0	0	20	86	208
Northern	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Totals	0	1	1	18	68	131	6	29	61	0	0	0	12	16	28	0	0	0	0	1	1	0	4	0	36	119	222

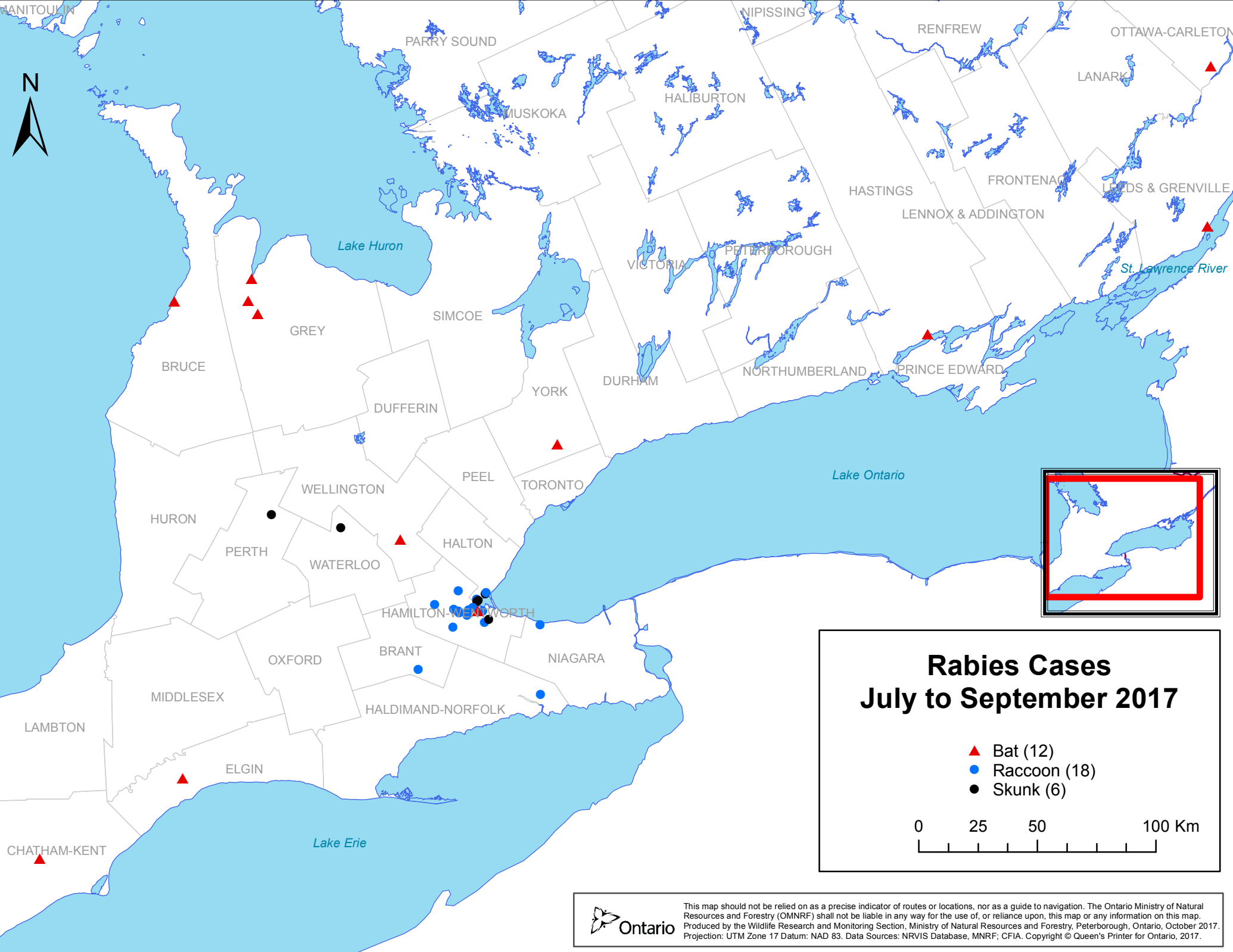


Notes for this quarter: The bats were big brown bats.

Column Legend

#: Cases from July 2017 – September 2017
 17: Cases from January 2017 – September 2017
 16: Cases from January 2016 – September 2016





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