

The Rabies Reporter

The Ministry of Natural Resources and Forestry
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The Rabies Reporter is a scientific newsletter about current issues in rabies research and control. It 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 The Rabies Reporter is not peer reviewed and should be cited as a newsletter. Send contributions, letters and inquiries to: rabies@ontario.ca.

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Rabies control operations on track in 2020

Anne McCarthy, Ministry of Natural Resources and Forestry

Our MNRF Rabies Control team is happy to report that we are making steady progress towards our goal of controlling and eliminating terrestrial rabies in Ontario. In 2020 we saw a total of 49 cases of rabies in the province. Of the 49 cases, only nine cases were raccoon strain rabies and no cases of fox strain rabies were detected (Figure 1). This is down from 2019 which had a total of 65 cases, of which 22 were raccoon strain rabies and none were fox strain rabies. In 2020 we tested 3,358 samples from sick, strange acting, found dead, or roadkill wildlife, less than in 2019 (4,425), however similar to 2018 (3,535). We also reduced the rabies control zone for the first time since the outbreak began in 2015. The control zone was reduced by 4,137 km² as it had been over two years since a case was detected in the western part of the fox zone.

Raccoon strain: Between January and December, only nine cases of mid-Atlantic raccoon rabies were detected. Cases were found in the City of Hamilton, which had two cases (skunks), and in Niagara county, which had seven cases (three raccoon and four skunks). During the same period last year, there were a total of 22 cases detected in 4 counties (Brant, Hamilton, Niagara, and Waterloo).

Fox strain: There were no fox strain cases detected for the second year in a row. Monitoring and sampling continues to be done regularly for dead, sick or strange acting animals within the surveillance area.

Bat strain: There were 40 cases of bat strain rabies detected in 2020, which is similar to the 43 cases detected in 2019. Cases included one terrestrial animal (skunk) and 39 bats (37 big brown bats, 1 little brown bat, and 1 silver haired bat). The cases were detected in Bruce, Dufferin, Grey, Haldimand, Haliburton, Halton, Hastings, Huron, Kent, Niagara, Norfolk, Northumberland, Ottawa-Carleton, Peel, Renfrew, Simcoe, Stormont Dundas and Glengarry, Sudbury, Waterloo and York.

Bat strain rabies cases are not related to the outbreak of fox and raccoon strain rabies, or MNRF's rabies control efforts in southern Ontario. Bats are difficult to vaccinate against rabies, as they feed on insects. The Ministry of Health (MOH) works with MNRF to educate the public on the risks of bat strain rabies.

Between December 2015 and the end of December 2020, there were a total of 480 raccoon strain and 21 fox strain cases detected in Ontario (Figure 2). MNRF will continue surveillance and rabies control efforts throughout 2021.

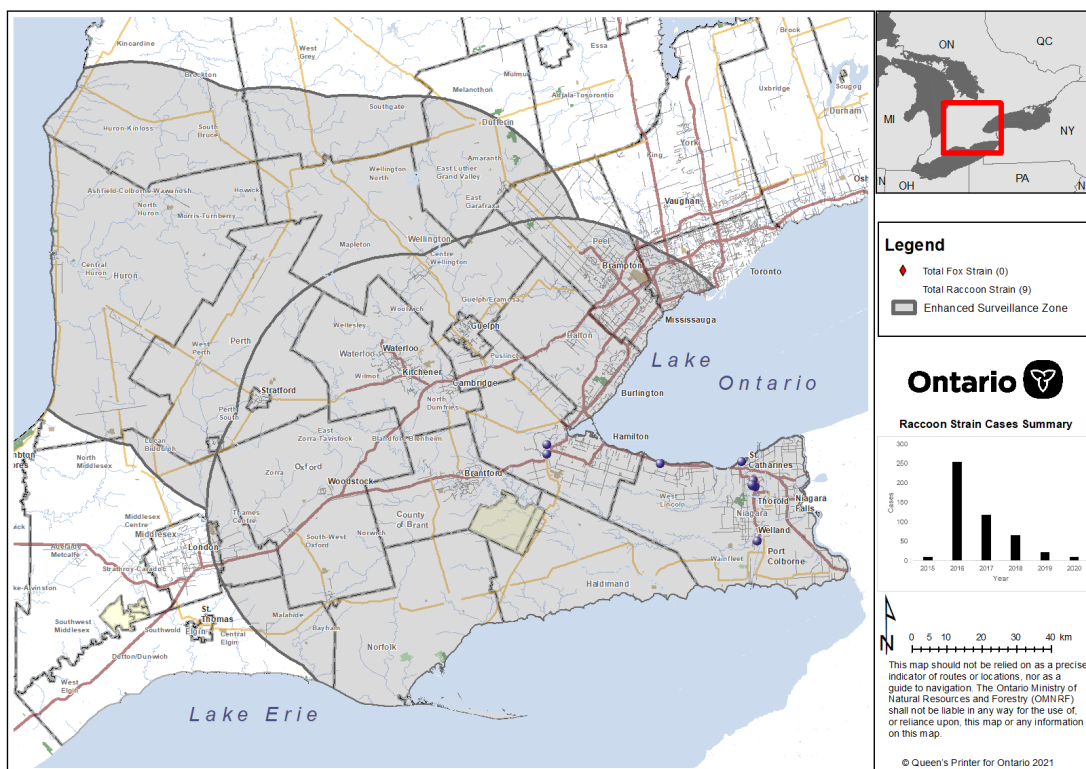


Figure 1. Terrestrial rabies cases (N=9) detected in southern Ontario from January–December 2020.

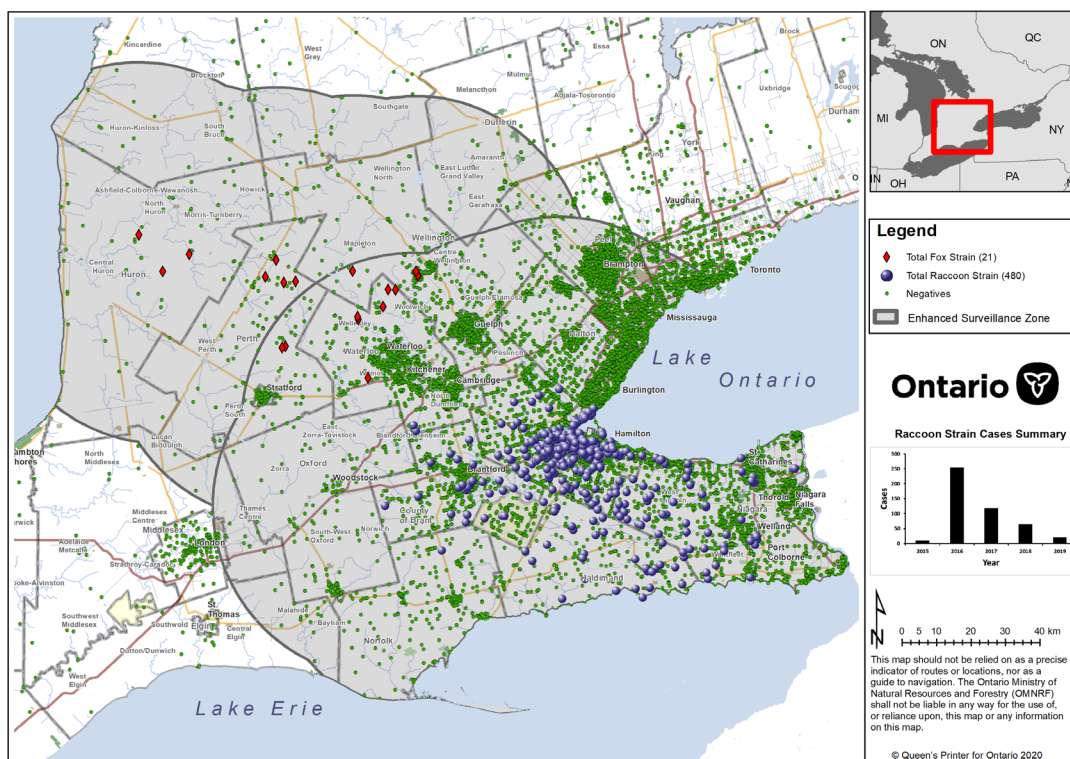


Figure 2. Total terrestrial rabies cases in southern Ontario from December 2015–December 2020 along with the surveillance and control zone.

Rabies surveillance and control program – 2020

Ministry of Natural Resources and Forestry

In 2020 we continued efforts to control terrestrial rabies in southern Ontario and the number of cases detected continued to decrease. This year, a total of 49 rabies cases were detected in the province of which only 9 were raccoon strain cases. All the terrestrial rabies cases detected were within the rabies control zone, in the Hamilton and Niagara areas. The control zone was reduced for the first time since the outbreak began by 4,137 km² at the northern edge of the zone. This reduction occurred as it had been over two years since any cases had been detected in the area.

We continued to focus on oral rabies vaccine distribution using the ONRAB bait, trap-vaccinate-release (TVR) and enhanced surveillance within 50 km of any positive cases (Figure 3). In 2020, over 1.1 million baits were distributed in southern Ontario by hand and air. Enhanced surveillance focused on the collection of sick, strange acting, or found-dead wildlife for rabies testing.

When Ontario began implementing measures in March 2020 to stop the spread of COVID-19, we adapted to ensure that the rabies control program could continue to operate. Rabies control operations are essential to public health and to the health of wildlife. Using the best available information from Public Health Ontario, our team responded quickly, developing and implementing additional health and safety measures that allowed operations to continue safely and without interruption.

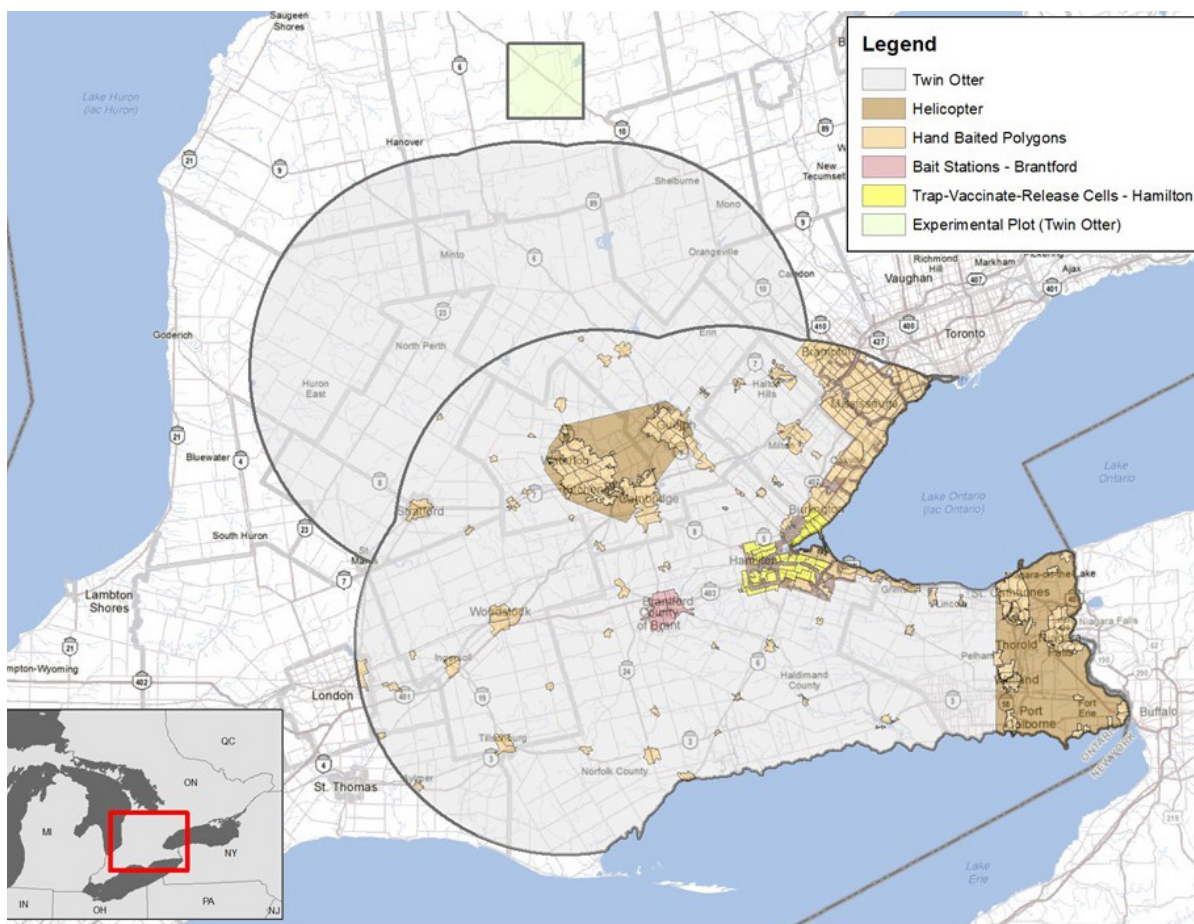


Figure 3. Southern Ontario aerial baiting, hand-baiting and trap vaccinate release was conducted from June to October; over 1.1 million baits were distributed in 2020.

Aerial baiting

We conducted helicopter baiting flights from August 10-11. In Southwestern Ontario we distributed 18,600 baits across 124 km² at a density of 150 baits/km², and in Kitchener-Waterloo we distributed 17,475 baits across 262km² at a density of 75 baits/km² (Figure 3). We also distributed 664,116 baits throughout rural southwestern Ontario from August 17-25, at 75 baits/km² by fixed wing aircraft (Figure 4).

From September 8-11, we distributed 52,825 baits by helicopter at 75 baits/km² in the Niagara area east of St. Catharines to the Ontario-USA border.

We baited an experimental plot on August 18 covering an area of 324 km² in Grey Highlands with 20,700 baits by fixed-wing aircraft. This plot was part of a study to compare vaccination rates against historical data collected from the previous outbreak.

Ground Distribution

Our staff on the ground distributed baits by hand (hand-baiting) and via bait stations. Hand-baiting targets urban skunk and raccoon habitat where the use of aircraft would not be practical or feasible (Figure 3). Hand-baiting also gives staff the opportunity to interact directly with members of the public, educating them about the rabies program and that rabies may be present in the area.

Hand-baiting was done throughout the summer in the Golden Horseshoe area from June 30 to September 11. Our crews distributed 213,313 baits at 150 baits/km² covering an area of 1,504 km² (Figure 3).

Bait stations

In 2020, we used bait stations to distribute baits in the city of Brantford from July 29th until Sept 30th. We baited six cells at 150 baits/km² (Figure 3). Stations were rebaited with the same number of baits each week (10 baits/station) for the course of three weeks. A total of 299 stations were set up throughout the city. At the end of nine weeks, crews had distributed 8,970 baits using these stations.

We also installed 40 bait stations along the escarpment in Hamilton (Figure 4). Stations were rebaited with 75 baits per station once per week. After six weeks, the crew had distributed 9,000 baits via these stations.

After a positive rabies case was detected in Grimsby in July, we installed 47 bait stations in the area along the Niagara escarpment. The stations were deployed for three weeks and baited once weekly with 75 baits. After three weeks of work, the crew had distributed 10,575 baits.

All together, we dispensed 28,545 baits using bait stations in three areas (Brantford, escarpment in Hamilton and Grimsby) in 2020.

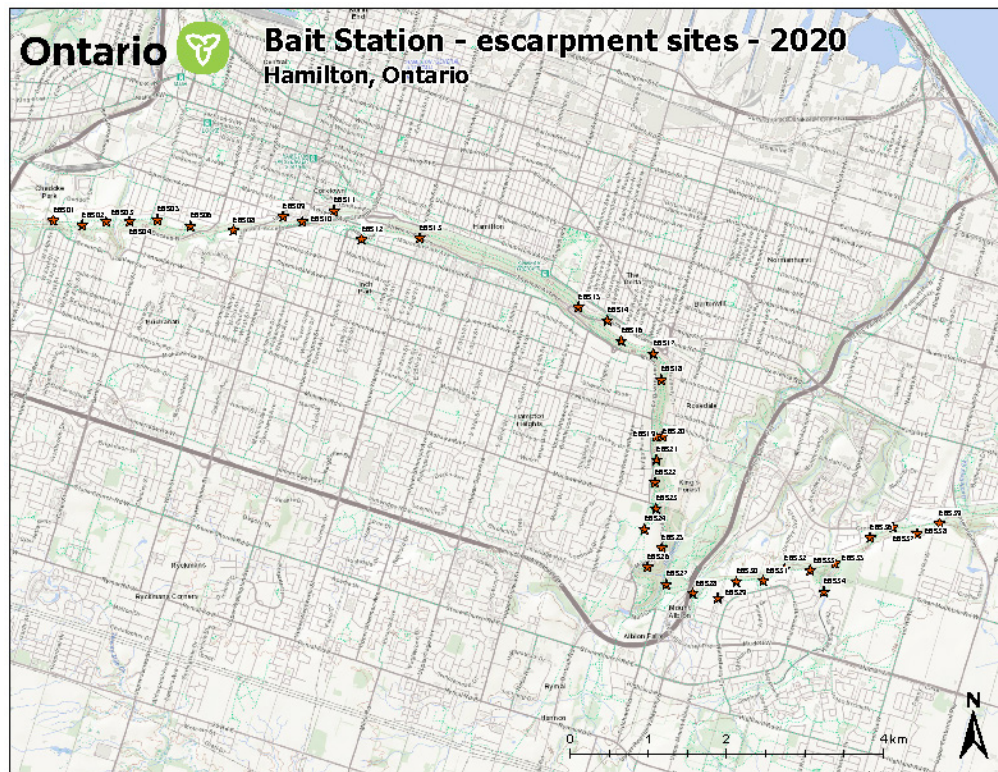


Figure 4. 2020 Niagara escarpment bait stations.

Eastern Ontario proactive baiting

To help prevent another re-incursion of raccoon strain rabies from New York State, we distributed 25,050 ONRAB baits by fixed wing aircraft over a 431 km² area along the St Lawrence River (Figure 5) on August 6. This area on the mainland borders the St. Lawrence River near Kingston and Wolfe Island. Baits were dropped at a density of 75 baits/km² over agricultural and forested habitats. From August 4-6, our hand-baiting crews distributed 4,800 baits in the city of Cornwall (Figure 5). Once again, we also partnered with the Mohawks of Akwesasne First Nation to provide 1,550 baits for distribution on Cornwall Island (Akwesasne).

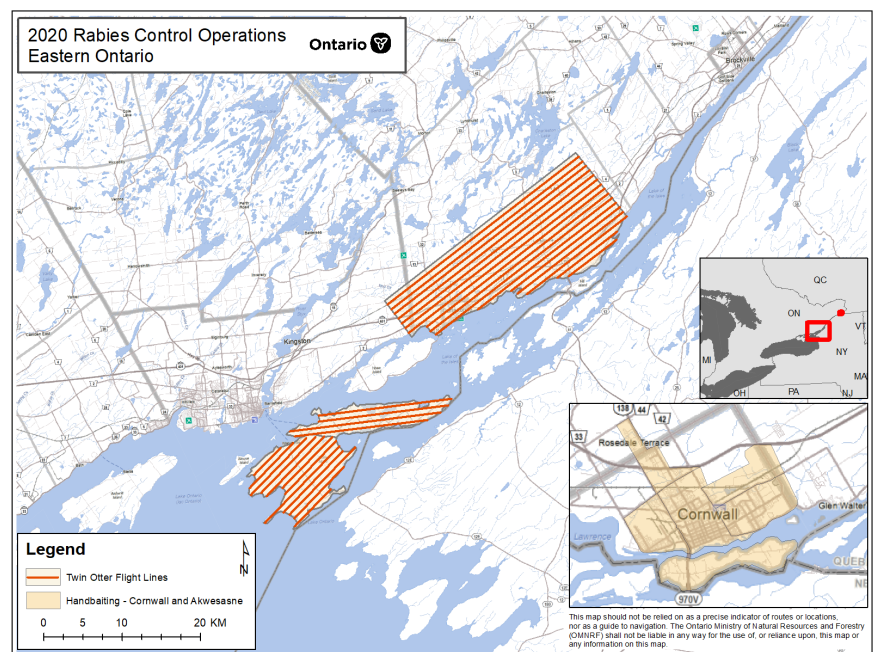


Figure 5. Eastern Ontario baiting occurs to prevent re-entry of the rabies virus.

Trap-vaccinate-release

Our trap-vaccinate-release (TVR) program operated between July 1 and October 16, in Burlington, Dundas, Hamilton, St. Catharines, and Welland (Figure 6). Our crews trapped 32 cells covering approximately 188 km² and four spot treatment areas covering 50km². Staff targeted strategic areas where rabies cases were ongoing and helped to create a wall of vaccinated animals to prevent the spread of rabies into Toronto and to target high risk areas. Animals were captured and vaccinated with an intramuscular injection of IMRAB3 rabies vaccine. Staff also applied ear tags with unique identification numbers so that mark recapture data could be used to estimate raccoon and skunk population density and the percentage of animals vaccinated. In 2020, our staff vaccinated 3,478 raccoons, 646 skunks, 14 red foxes, and four coyotes.

In October, we conducted a study to estimate what proportion of the raccoon and skunk populations were successfully vaccinated during the 2020 baiting campaign. To do this our staff collected blood samples from live-trapped raccoons and skunks to test for rabies antibodies, which indicates that the animals have been successfully vaccinated. This was done in four cells in Burlington and Oakville and in four rural cells in Grey Highlands similar to cells sampled during serology studies in 2007. The overall proportion of animals that were seropositive (an indication of protection against rabies) was consistent with the previous three years.



Figure 6. Rabies program staff live trapping and vaccinating a raccoon in 2020

MNRF 2020 rabies control program communications

Anne McCarthy, Ministry of Natural Resources and Forestry

Public education and outreach are an important part of the rabies program. We work closely with municipal and ministry partners to inform and engage the public and key audiences about rabies in wildlife. The 18 rabies social media posts on Facebook and Instagram that were published in 2020 reached over 960,000 people and engaged (the number of interactions with the post e.g. like, comment, share etc.) over 5,000. Staff also responded to approximately 50 questions from the public over social media about rabies and rabies operations in Ontario. Visitation to the rabies in Ontario.ca rabies webpages was down 36% in 2020, marking a return to pre-2019 levels (2019 saw a 40% increase on previous years).

In 2020, we developed 2 new products, a rack card (information handout) and a door hanger, to support operations. The rabies rack cards were developed to help increase rabies surveillance samples from target areas through veterinarians and public health units. TVR staff used the new door hangers to provide a contactless method to inform landowners and obtain permission to access private property.



Figure 7. Rabies program messaging posted at ONRoute stations along Highways 400 and 401 in 2020

In 2020 we advertised on Fish ON-Line website and on digital message boards at ONRoute rest stations along Highways 400 and 401. Messaging asked the public to check trucks, trailers and gear for unwanted wildlife hitchhikers to help prevent the spread of rabies in Ontario (Figure 7). The ad was posted on the Fish ON-Line website from the 25th of August until the 24th of September and it was posted at 23 ONRoute locations.

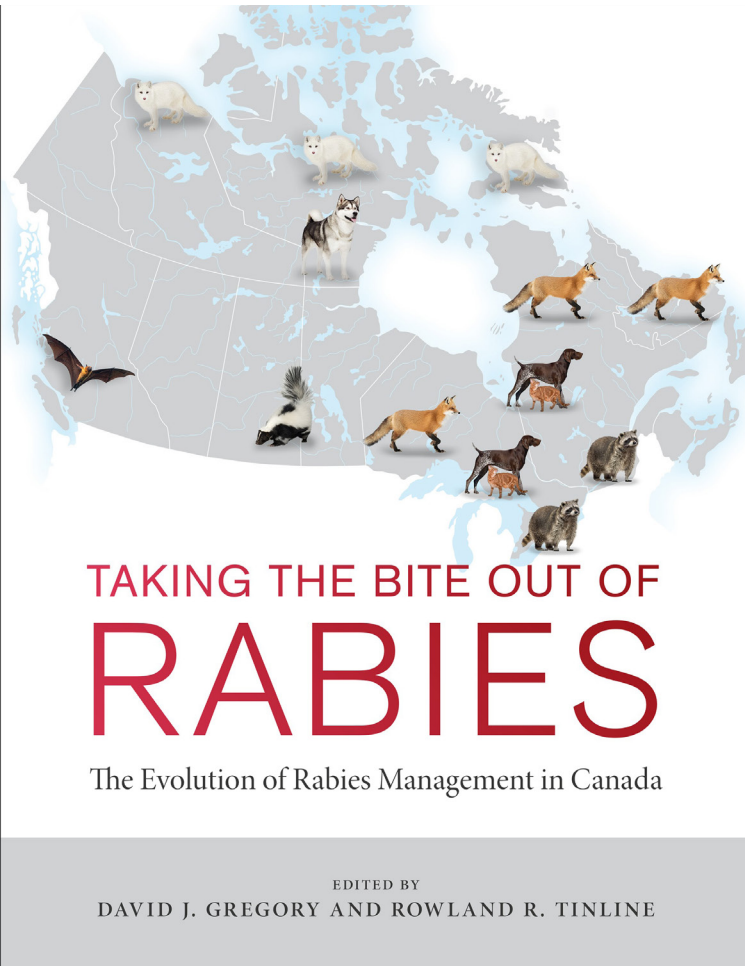
In 2020, the rabies information line received over 400 calls – down about 15% from 2019. Over 30% of the calls requested pickup of dead, sick or strange-acting wildlife for rabies testing. Approximately 20% of calls were for advice regarding sick or strange acting animals, and 16% of calls were about ONRAB vaccine baits. Calls about baits included queries about the baiting schedule, baits found by dogs, etc. Other topics included bats (10%), chronic wasting disease (2.5%), etc.

Taking the bite out of rabies

Beverly Stevenson, Ministry of Natural Resources and Forestry

Wildlife research staff played a key role in a recently released book on the history of rabies and rabies management in Canada that reinforces Ontario's status as a world leader in rabies control. The book provides a retrospective look at the disease, related science and research, management programs, and the provincial responses after rabies became established in each province.

As well as reviewing several chapters, staff wrote chapters on:



- The history of rabies management in Ontario
- Vaccine bait development
- Development of aerial baiting
- Biomarkers
- Direct rapid immunohistochemical test for detecting rabies
- Effect of raccoon ecology on raccoon rabies
- Rabies in red foxes
- Communication strategies at the provincial level
- Costs of rabies management
- Trapper participation in rabies control

This book highlights the contributions of Canadians and Canadian agencies to rabies management and control, and the connections to the international rabies research community. This comprehensive resource will likely become a key reference for future researchers and wildlife managers.

Thanks to all the staff who helped make this a success.

The book, Taking the Bite Out of Rabies: The Evolution of Rabies Management in Canada, is available from University of Toronto Press.