

The rabies reporter

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Raccoon strain rabies continues to climb

Beverly Stevenson, Ministry of Natural Resources and Forestry

The discovery of raccoon strain rabies in the Hamilton area in December 2015 had a huge impact on the number of reported rabies cases during the first half of 2016 due mostly to increased surveillance efforts.

A total of 134 cases (terrestrial and bat strain) were reported from January to June. The last time this many cases were reported during the first six months of any year in Ontario was in 1994, when there were 300 confirmed cases from January to June.

Of the 134 cases, eight were in big brown bats. This is comparable to the previous five years when six, five, five, nine, and five cases were reported. The bats were scattered throughout southern Ontario occurring in the counties of Ottawa-Carleton, Peterborough, Toronto, Halton (2), and Niagara. Typically, less than 5% of the bats submitted for testing in Ontario are found to have rabies and only bats which are behaving abnormally and have had contact with people or pets are submitted for testing. The prevalence of rabies in the overall bat population is likely much lower than 5%. The percentage positive for the first half of 2016 is slightly higher at 6.5% (8 out of 123 submitted).

Of the remaining 126 cases, 80 occurred in raccoons and 46 occurred in skunks. With the exception of one skunk from Perth County, all were infected with raccoon strain rabies virus. The skunk from Perth County was infected with fox strain rabies virus and was located in close proximity to the rabid calf detected in December 2015.

The other 45 skunks were all located in the City of Hamilton; approximately one third of the raccoon strain cases have occurred in skunks. The 80 confirmed raccoon cases were spread out over a larger area but most were located within Hamilton. The breakdown of raccoon cases by location is: Hamilton (70), Haldimand-Norfolk (4) and Niagara (6).

All 126 cases were tested through MNRF's enhanced surveillance program using the Direct Rapid Immunohistochemistry Test (DRIT). Those test results were confirmed by the Canadian Food Inspection Agency (CFIA) Centre of Expertise for Rabies using the gold standard Fluorescent Antibody Test (FAT). Between January - June 2016, MNRF has tested more than 3100 animals using DRIT. MNRF only tests wildlife which do not meet the submission criteria for rabies testing (i.e. have not had any known or potential contact with humans or domestic animals).

MNRF will continue the enhanced surveillance and rabies control programs to limit the further spread of raccoon and fox strain rabies in southern Ontario.

Spring is in the air and so is our staff!

Beverly Stevenson, Ministry of Natural Resources and Forestry

With the arrival of warm weather and the end of raccoon-mating season, it was time once again to start thinking about aerial rabies control operations.

Raccoon strain rabies was confirmed in the Hamilton area in December 2015. Due to the warm weather at that time of year, approximately 220,000 baits were distributed by hand and air in a 25 km radius around the confirmed cases. Hand-baiting operations were suspended in late December due to the arrival of cold weather; aerial baiting operations were completed before the cold weather arrived.

One of the factors contributing to the need to distribute baits immediately was that the wildlife population in the Hamilton area was naïve to rabies and the vaccine. Areas in the northwestern part of the City of Hamilton were baited in 2012 and 2013 – but they were very small areas. Very little of the entire Golden Horseshoe area had been baited in the previous five years meaning that there would be little to no immunity to rabies in wildlife in that area.

From April 1-7, an EC130 helicopter was used to distribute approximately 53,000 baits in green spaces in urban areas within a 25-50 km radius of Hamilton and in a separate area of Hamilton where a focus of rabid skunks was located (Figure 1). Baits need to be distributed at a higher density and closer spacing when targeting skunks because their home ranges are much smaller than raccoons.

Also during this time period, approximately 23,000 baits were distributed in an 8km x 8km plot in Perth County surrounding the locations of the rabid calf and skunk. Due to the cold weather when the rabid calf was diagnosed in December 2015, this was the first opportunity to distribute baits around this case. Although the vaccine is still viable over prolonged periods in the field, the vaccine is liquid and would be frozen and therefore would not immunize an animal if they attempted to eat the bait during winter. Helicopter baiting was already scheduled in response to the first fox strain case when the sick skunk was reported. DRIT testing by MNRF indicated that it was positive for rabies. Since the helicopter was already in the area, it was decided to expand the baiting area to encompass the second case before receiving confirmation (and strain typing) from the Canadian Food Inspection Agency (CFIA). It was the right decision as CFIA confirmed shortly afterwards that the skunk was infected with fox strain rabies virus as expected.

From April 16-20, a Twin Otter airplane was used to distribute approximately 345,000 baits in rural areas within a 25-50 km radius around Hamilton. Baits were distributed at a density of 75 baits/km² (Figure 2).

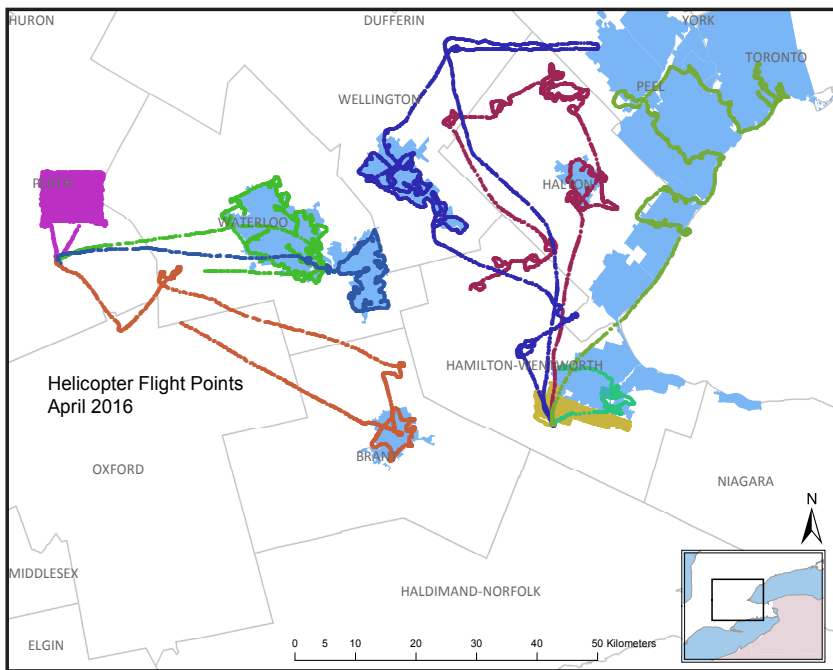


Figure 1. Flight lines depicting where helicopter baiting occurred in southwestern Ontario this spring.

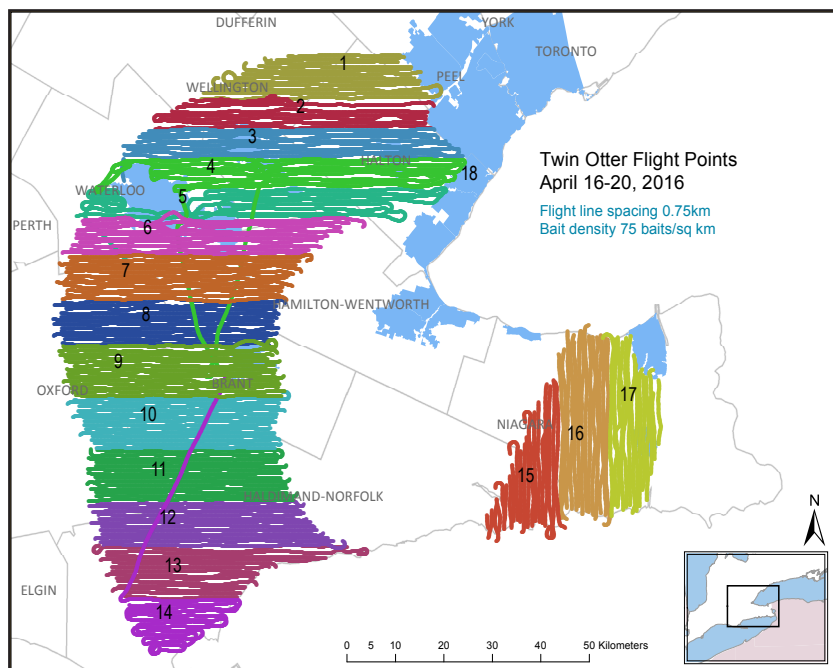


Figure 2. Twin otter flight lines over rural southern Ontario. The central area around Hamilton was previously baited in December 2015.

On June 1, the helicopter was once again commissioned to distribute baits in two small areas near Flamborough and Caistor Centre. Approximately 19,800 baits were distributed in these two areas as a result of additional confirmed rabid raccoons. Until those cases, all of the previous cases had been clustered in and around Hamilton. Even though the new outliers were still well within the baited zone, it was decided to re-bait a small plot in each area to boost herd immunity levels.

The entire area will be re-baited again in late summer to vaccinate the juvenile animals which were too young to be immunized with vaccine baits during the spring baiting campaigns. The second baiting will also help increase herd immunity levels which should further slow the spread of the disease.



Left: Wildlife research technician, Mark Gibson, distributes baits by hand; Right: An aerial baiting crew gets ready for another flight.

Hand-baiting crews hit the ground again

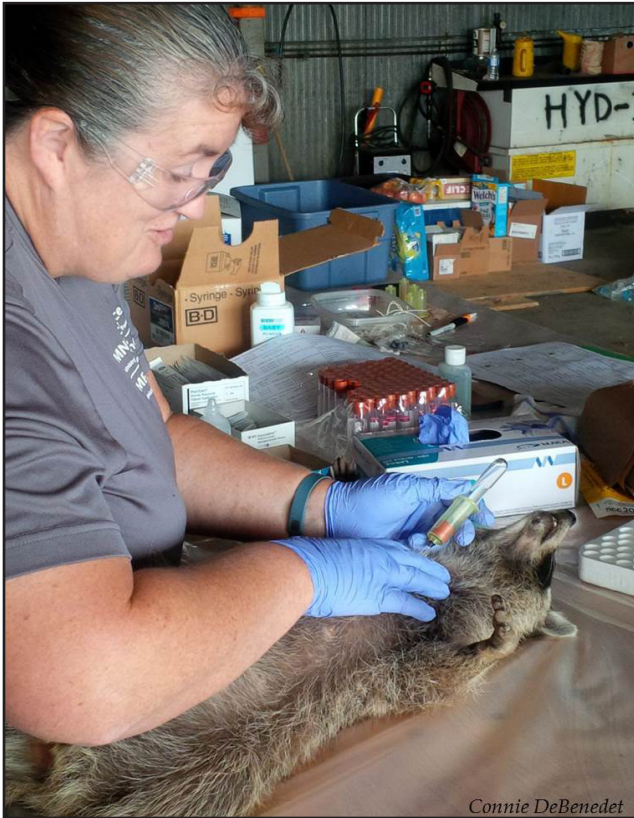
Sophia Konieczka, Ministry of Natural Resources and Forestry

From the first day raccoon-strain rabies was detected in Hamilton, Ontario, hand-baiting operations started. Crews hit the ground running in December while the weather was still warm enough to ensure baiting efforts were effective; distributing baits from trucks and on-foot throughout the Hamilton area. Laboratory rabies testing of animals collected by various organizations throughout southwestern Ontario and the Golden Horseshoe, in conjunction with MNRF continued throughout the winter, continuously adding to the picture painted by the growing number of cases.

On April 11, 2016 spring hand-baiting resumed. Hand-baiting consists of two-person crews driving the streets of urban and industrial areas distributing Ultra-lite ONRAB® vaccine baits into promising raccoon and skunk habitat. Such habitat as flowerbeds, bushes, shrubs and dumpsters where animals may be foraging, as well as fence lines and large culverts often used by travelling animals are prime target areas for baits. Green spaces such as forested parks, along railways and small hydro cuts are also targeted for hand-baiting. In this way, hand-baiting augments both rotary and fixed wing aerial baiting by penetrating dense urban centres where dropping baits from the air is neither practical nor as accurate as is required due to the high density of houses.

During the spring hand-baiting campaign, 164, 985 baits were distributed between April 11 and June 22, 2016. Baiting began in the Hamilton area before moving to Brantford. From there, crews travelled around the shore of Lake Ontario through Burlington, Oakville, Mississauga and the GTA ending around Etobicoke and Brampton

before sweeping back through Halton Hills, Milton and on to the Guelph and Kitchener–Waterloo region. By baiting such a large area, the hope is to create a buffer zone of vaccinated animals around the known positive cases. Vaccinated members of the population are protected in the event they come into contact with a rabid animal and in this way the spread of the rabies virus may be slowed and even stopped as the infected animals die off prior to the successful transmission of the virus.



Beverly Stevenson, MNRF, takes a blood sample from a sedated raccoon during the spring serology study.

Spring baiting in Ontario, along with urban baiting of this magnitude, has never been attempted using the Ultra-lite ONRAB® baits; an Ontario made product. Typically, baits are distributed in the fall, starting after July when the young of the year are mature enough for effective vaccine uptake and when animals are most active looking for food as winter approaches.

Because of the novelty this situation presents, serologic analysis of samples collected from animals within the various baiting zones will be conducted in order to assess the effectiveness of spring baiting in urban areas. Results will be compared amongst the varying bait densities employed in urban (150 and 300 baits/km²) and rural (75 baits/km²) areas to inform the design of future management strategies. Results from the serology experiment should be available in late fall/early winter of 2016.

Rabies testing keeps lab staff busy this spring

Janet Greenhorn, Ministry of Natural Resources and Forestry

Since the first reported case of raccoon rabies in Hamilton in December 2015, MNRF has been conducting rabies testing on raccoons and skunks from Hamilton and the surrounding area. Animals for testing are collected by our surveillance partners - a group of over twenty humane societies, animal control services, and other municipal agencies - focusing on animals that have been found dead, roadkill, or euthanized due to illness or strange behaviour. Most of these animals come from the city of Hamilton, and the surrounding counties of Brant, Haldimand, Niagara, Wellington, Waterloo, Oxford, Perth, and Norfolk, or the Greater Toronto Area. Testing has focussed mainly on raccoons and skunks, the most common vector species for raccoon rabies, but occasionally foxes, coyotes, and bats are also tested. The results of this weekly testing provide up-to-date knowledge on the locations of rabies positive animals, and allow vaccine-baiting operations to be adapted accordingly.



Figure 4. Kim Bennet, MNRF, performs a direct rapid immunohistochemical test (dRIT) at the Trent University laboratory in Peterborough, ON.

The laboratory where testing is conducted is located at Trent University in Peterborough, Ontario, and is run by MNRF Wildlife Research and Monitoring Section staff. In a typical week, the lab tests 80-150 animals, although over 250 animals were tested during a few particularly busy weeks in early 2016. The test used is a direct rapid immunohistochemical test (dRIT), which indicates individuals with a high probability of being rabies positive. Samples from all potentially positive animals are then sent to the Canadian Food Inspection Agency (CFIA) in Ottawa for confirmation.

From the beginning of January to the end of June, MNRF tested 3158 animals, 126 of which have been confirmed positive for rabies. Eighty of these positive animals were raccoons, and the other 46 were skunks. Most were from the Hamilton area, although four positive raccoons from the Niagara Region, three positive raccoons from Brantford, and two positive raccoons from Haldimand County were also identified. One skunk from Perth County was found to be positive for fox-strain rabies.

Public Health response to raccoon rabies in Hamilton

Connie DeBenedet and Jane Murrell, City of Hamilton Public Health Services

On December 4, 2015, Hamilton Public Health's rabies program changed in response to a report of a rabid raccoon in Hamilton with raccoon strain rabies. Changes included new data collection and policies, new communication and education outreach, and new low cost rabies vaccination options in Hamilton. The response continues and changes to the program are expected to remain in place for the next five years or until raccoon rabies strain can be eliminated from Ontario.

Background

On December 4, 2015 the City of Hamilton Public Health Services received a call from the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA) that the Canadian Food Inspection Agency had confirmed a raccoon infected with raccoon strain rabies virus. The raccoon was involved in an altercation with two dogs in a Hamilton Animal Services vehicle earlier that week. This raccoon was the first case of terrestrial rabies in Hamilton since 1994 (fox strain), the first raccoon rabies strain case in Ontario since 2005, and the first case of raccoon strain rabies ever in southwestern Ontario. Initial suspicions were that the raccoon was a stowaway transported through the Niagara Region/United States border however in June 2016, Hamilton Public Health was informed by CFIA that it was more likely that the raccoon originated from the southeastern parts of New York State based on genetic analysis of the infecting virus.

MNRF implemented a surveillance system in Hamilton on December 6, 2016 and by the end of December 2015, nine rabid raccoons were identified from Hamilton and surveillance and control efforts continue. As of December 4, 2015, Hamilton Public Health implemented a raccoon rabies response program to complement MNRF's response to contain the spread of raccoon rabies and to protect people from rabies exposure. The response program includes three main elements: 1) changes to internal processes, 2) communication and education, and 3) increased low cost rabies vaccination options in Hamilton.

Internal Process Changes

City of Hamilton Public Health Services' rabies program now includes a follow up investigation of all rabid animals tested through the Ministry of Natural Resources and Forestry (MNRF) surveillance system and confirmed by CFIA. This required a change in process from routine bite and scratch reports as only animals with no known human or domestic exposure should be tested through MNRF's surveillance program. All of the information gathered under the MNRF Rabies Surveillance Program is captured using a newly designed form and data is collected in a new database separate from the routine animal exposures. Additionally, rabies investigation worksheets were re-designed to allow for greater ease of use. And, the current risk assessment tool used by Public Health Inspectors was modified to include Hamilton as higher risk area compared to other areas not experiencing confirmed terrestrial rabies.

The follow up on positive reports is done for due diligence to protect human health to ensure no human exposures are missed. Public Health obtains caller information from Animal Services who then interview the people who reported the sick, injured, or dead wild animal to rule out any rabies exposure or to recommend post exposure prophylaxis if an exposure is uncovered. And if Hamilton Public Health learns through investigating that there may have been domestic animal exposures to the rabid animals these are referred to the Ontario Ministry of Agriculture, Food, and Rural Affairs (OMAFRA) for their review.

Communication and Education Outreach

Education changes were needed as public knowledge about rabies in land animals has been lost over the last twenty years. Since 1994 only bats were positive in Hamilton. People lost their fear of land animals and instead want to help animals that are sick or are behaving strangely. The days when rabies was more predominant in pop culture with movies like *Cujo* or *Old Yeller* has passed and has not been seen by new generations, nor have they heard stories from friends about rabid animals being found on the farm, for example. Instead people are drawn to rescue or rehabilitate any animals they find that appear unwell or lost without knowing the potential rabies risk that could be present. People are also unaware of the serious outcome of rabies. When Public Health Inspectors are discussing the importance of getting rabies post exposure prophylaxis after a high risk animal exposure they hear questions from the exposed person like, “What are the symptoms of rabies? I could just go to the doctor if I get sick.”. People are often shocked to hear that rabies is fatal and is the deadliest disease on earth, yet it can also be 100% preventable (Global Alliance for Rabies Control, 2016).

An all-encompassing awareness campaign was developed by Hamilton Public Health to educate the public on the risks, responsibilities and precautions to take to prevent the possibility of any human related rabies cases. This included some messaging not commonly included in public health rabies material like always supervising pets in yards, telling residents not to feed, touch or relocate wildlife, telling people to keep their distance from seemingly domestic unknown animals, avoiding contact with dead animals and reminding pet owners to keep food and water bowls inside.

Wild animals continue to test positive in Hamilton through the MNRF Rabies Control and Surveillance Program, and Hamilton Public Health shares that information weekly on the City’s website (www.hamilton.ca/rabies) and through media releases. These updates are coordinated and timed simultaneously with MNRF, the Ministry of Health and Long-Term Care (MOHLTC), OMAFRA, and with all other affected Health Units (Niagara Region, Brant County, and Haldimand-Norfolk) so messaging and statistics are consistent. Social media tools like City of Hamilton’s Twitter and Hamilton Animal Services’ Facebook page are used to share messaging with residents.

Several training sessions have been provided in partnership with MNRF to high risk groups including wildlife nuisance workers, trappers and animal control officers. Key messages were shared with these groups and the importance of rabies pre-exposure vaccination was also stressed. Various exposures, not commonly seen in routine suspect animal exposures also proved to be higher risk. For example, a trapper unknowingly skinning a rabid raccoon, or a raccoon incubating rabies, could be at risk if any nerves or other components of the central nervous system become exposed; in combination with open wounds on the trapper’s hands this presents an uncommon, but high risk exposure. Questions and concerns also arise about how potentially rabid carcasses should be discarded to prevent further transmission, as little is known about how long rabies can survive inside a deceased host.

School aged children were also the target of the Hamilton rabies education efforts. Two channels were used; one through school boards requesting a letter be sent to the schools, school staff and parents. The letter provided updates about the current rabies situation in Hamilton and provided important rabies messages. The second channel was to target grade two and three children by distributing Hamilton Public

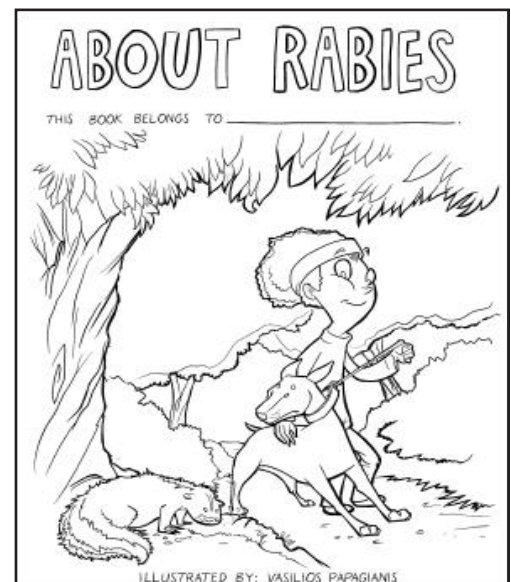


Figure 5. Hamilton Public Health Services Rabies Activity Book

Health's rabies activity book (Figure 5) to these grades in public, separate and private schools.

Another resource was created by Hamilton Public Health Services (Figure 6) to provide education to transportation services (truck drivers, mariners and cargo haulers) about the risks associated with translocating wildlife. The resource was distributed to transport truck drivers at the largest national truck show in Canada, at Canada Border Services, at various truck stops, at Ministry of Transportation weigh stations as well as local Port Authorities.

In Hamilton, the rabies cases are across all areas - the urban core, rural areas and everywhere in between. Rabid animals have been collected for the MNRF surveillance program from parks, golf courses, trails, backyards, roadside, and just about anywhere people are! With 115 cases confirmed in Hamilton between January-June 2016, there are residents that still remain unaware that rabies is circulating in the area. Hamilton Public Health Services is exploring new creative ways of sparking interest and ensuring the rabies messages are reaching the most people possible. A new rabies campaign will be launched in Hamilton at the same time the City hosts its first Low Cost Rabies Clinic in recent history; strategically planned in September to support World Rabies Day.

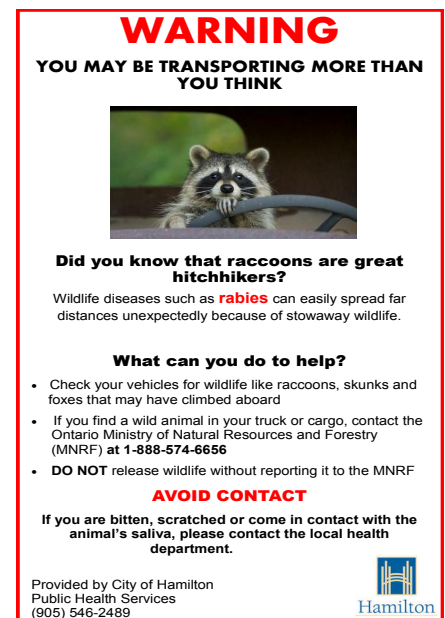


Figure 6. Hamilton Translocation Resource, 2016

Low Cost Vaccination Options

Letting the family pet out in the backyard, unsupervised, puts them at much greater risk of coming in contact with rabies. This is especially concerning, because fewer than 50% of domestic cats and dogs involved in animal exposures are vaccinated against the rabies virus (Hamilton Public Health Statistics, 2010). To increase the vaccination rates in Hamilton, in September Hamilton Public Health and Animal Services are hosting a low cost rabies clinic.

Hamilton Public Health has explored other low cost options for the community and through outreach to veterinarians in 2016 Hamilton now has several options. Some veterinarians offer low cost clinics on a weekly basis while others are open to a voucher system coordinated through Hamilton Public Health. It is expected more veterinarian clinics will participate in some level of low cost rabies vaccination.

Conclusion

Hamilton Public Health staff continues to be vigilant; for every rabid animal reported, human and other domestic animal rabies risk exposures must be ruled out. We continue to strive to get important rabies messaging to Hamiltonians. By Hamilton Public Health continuing to work and support activities by MNRF, OMAFRA, MOHLTC, CFIA, and Hamilton Animal Services, the spread of raccoon rabies should be controlled. However the raccoon rabies situation in Hamilton happened in an instant and it can happen anywhere, in an instant as well. With such vast transportation systems, covering great distances, any public health unit in Ontario could be faced with a case (s) of terrestrial rabies of any strain as a result of translocation.

A unique approach to managing dog populations in the North

June Morrow, TBS (reprinted with permission, originally published in Topical)

When a rabid puppy was diagnosed in Kaschechewan in 2013, Dr. Catherine Filejski, the public health veterinarian with the Ministry of Health and Long-term Care, was brought in to respond to the situation.

The puppy was one of about 1,000 free roaming dogs, mainly huskies or husky-mixes, in the James Bay communities of Northern Ontario. Like most of these, the rabid puppy hadn't been micro-chipped and had no rabies vaccination records.

Few of the actions the vet would normally take with responding to a rabid dog in a community – for example, assessing all of the animals who had been in contact with the dog and putting any dogs who hadn't been vaccinated into quarantine – proved possible in the remote Northern area.

"It got me thinking that we need a better approach," said Filejski.



A public health issue

Free-roaming dogs increase the risk of bites, harm to children and the spread of infectious diseases. When females go into heat, the situation is compounded as the male dogs form packs chasing the females, become aggressive and people are more likely to get caught in the middle of dog fights.

Left with no other options, northern communities in Canada have in the past resorted to managing overpopulation with dog culls; however, the Cree elders in the James Bay area were concerned about the psychological impact this would have on the children and youth in the communities.

"Quite frankly, these communities have much bigger problems than animal welfare issues," says the public health vet. "There's substance abuse, youth depression and suicide, infrastructure problems, and a lack of potable water."

The Weeneebayko Area Health Authority (WAHA), a First Nations-controlled entity overseeing medical services and facilities in the region, had identified dog overpopulation as a public health issue prior to 2013 but no coordinated regional approach to the problem had yet to be tried.

Occasional visits to the region by private veterinarians to do surgical spay-neuter clinics were not making enough of an impact, and there was a lack of information-sharing between these clinics.

“If you only spay 20 per cent of the female dogs and you have 80 per cent still running around being impregnated in the community, you’re not doing anything to change things year over year,” says Filejski.

A long-term solution

Instead, what was needed was a multi-pronged approach to:

- assess the number of dogs in the communities from year to year
- microchip the dogs so that they are permanently identifiable
- inoculate them against rabies
- interrupt the reproductive cycle so the population becomes more manageable
- measure the impact of this approach

“We were looking for a much more cost, time and resource effective way where we could track results and show them year over year,” says Filejski.

Under her leadership, MOHLTC partnered with WAHA, the Porcupine Public Health Unit, Dogs with No Names, Health Canada, and PetSmart Charities of Canada to take a fresh approach to the problem.

A completely new technology for birth control

Most intact female dogs in the area rarely live past three years due to the demands on their bodies of constantly giving birth and feeding puppies. Male dogs, by comparison, typically live six to seven years.

“If you’re going to address the problem, the cheapest, fastest way to do it is to take the females out of the reproductive cycle,” says Filejski. Given the lack of equipment, facilities and ability to monitor the animals post-operatively, however, traditional spaying is very difficult in the North.

Instead, Filejski’s team brought in a unique injectable contraceptive for the female dogs.

“It’s a slow release drug that interrupts their hormone cycle,” she explains. “The first time you inject a dog, they won’t go into heat for 12 months. If you re-inject that same dog the following year, it will stay out of heat for another two years after that.”

Her team also microchipped as many dogs as possible, vaccinated them against rabies and other core infectious diseases in dogs, left their health records in a single database for each community, and created a regional summary for WAHA.

Last year, the entire project (which took about six weeks) processed 513 dogs. This year, the team will be returning with enough supplies for 900 dogs.

“We anticipate most of the dogs we see will already be microchipped and vaccinated so it will be a question of re-vaccinating the males, re-implanting the females, and then only having to repeat last year’s full protocol with any of the dogs we didn’t handle last year,” says Filejski.

Putting care in the communities’ hands

Moving forward, Filejski’s team is looking at teaching community members how to vaccinate their own dogs against rabies and do basic dog care like deworming.

They’re also working to bring dog behaviour education courses into the schools so that children are better able to read and understand dog behavior to reduce the number of dog bites.

This year Filejski won an Amethyst Award for her work; however, she is quick to share the spotlight.

“None of this would have been possible had WAHA and the First Nations themselves not already identified the problem and been searching for a solution,” says the public health vet. “For me, it was not a question of what we could come in there and do for the communities. It was more about how we could work together to create something that would be sustainable in the longer term.”



Dr. Catherine Filejski and one of the dogs treated in the program she leads.

Get in touch:

email: info.mnrfscience@ontario.ca

visit: <http://intra.net.gov.on.ca/mnrsrb>

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Animal Rabies Report: January to June 2016

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

Rabies Cases January to June 2016

- ▲ Bat (8)
- Raccoon (80)
- Skunk (46)

0 20 40 80 Km

