

The Rabies Reporter

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The Rabies Reporter, a scientific newsletter about current issues in rabies research and control, is a joint effort of the Rabies Research Unit of the Ontario Ministry of Natural Resources; the Food Production and Inspection Branch of the Canadian Food Inspection Agency; the Ontario Ministry of Health; and the Geographic Information Systems Laboratory of the Department of Geography at Queens University, Kingston. Articles for future issues will be welcomed by the editor. The Rabies Reporter is not refereed, and should not be cited in papers intended for refereed journals. Send contributions, letters and inquiries to:

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THE RACCOON RABIES PICTURE IN EASTERN ONTARIO

There have been 36 rabid raccoons in eastern Ontario from 14 July 1999 to the end of June 2000. Hopefully this outbreak is now on the wane. It has been a busy time for the raccoon rabies team; so busy, in fact, that none of them had time to write about what they were doing, because they were out there "doing", full

time and overtime. The first four cases were during the summer and fall of 1999, 14 July, 26 July, then 17 and 27 September. Then there was a gap until 9 December, when a rabid raccoon was discovered on Wolfe Island, over 50 km west of the original cases.

Wolfe Island had been treated by TVR

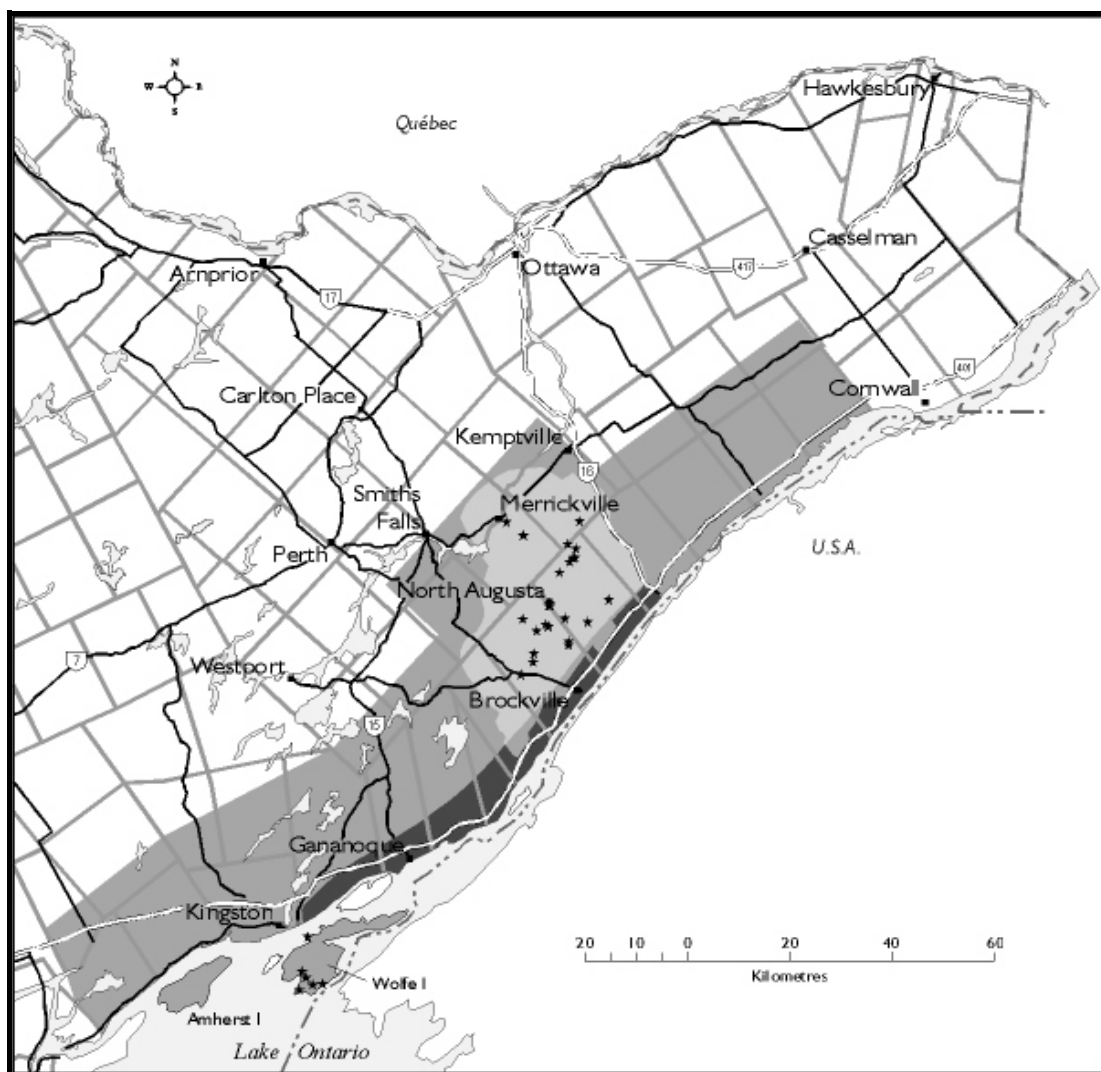


Figure 1. Map of the locations of rabid raccoons in eastern Ontario. The darkly shaded area along the St. Lawrence is the 2000 TVR zone. The medium shading shows the area baited on 24-26 June 2000. The palest shading shows the location of the depopulation operation, 3 April—7 July 2000. Map courtesy of Joanne Lemoine and Derek Pinto.

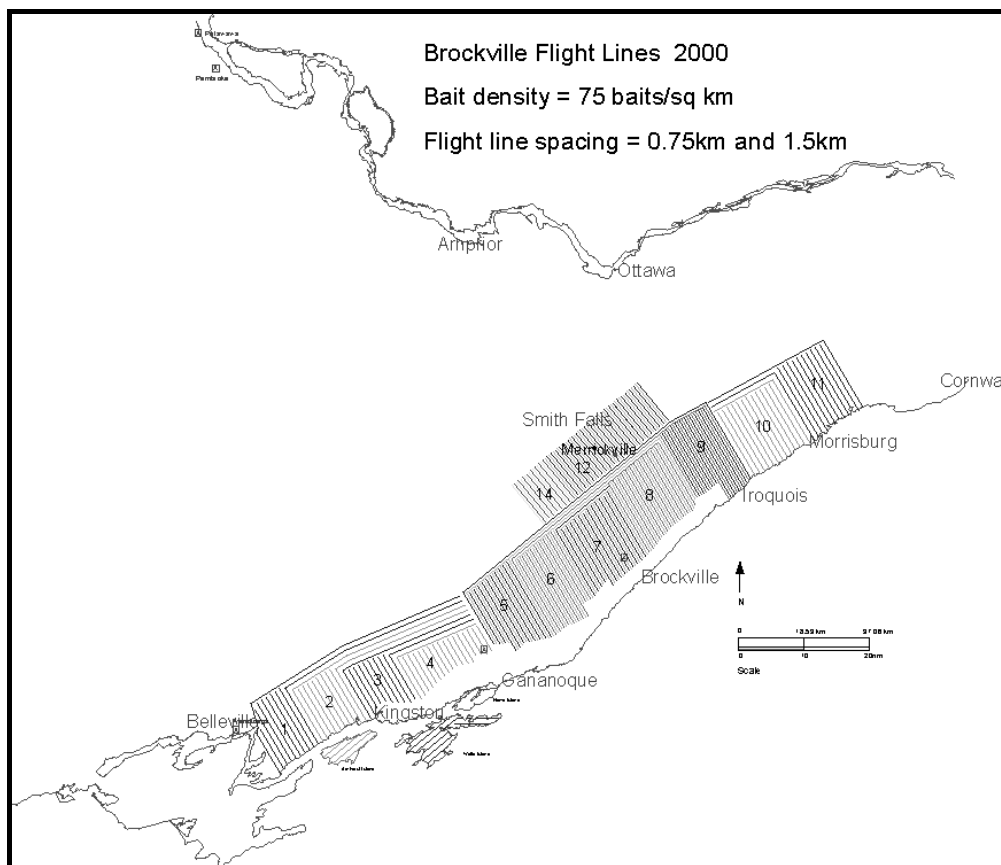


Figure 2: Distribution of VRG baits dropped in eastern Ontario, June 2000.

since 1995. Unfortunately, the 1999 treatment was interrupted, when the trapper was pulled from the island to help with the Point Infection Control (PIC) operations at Domville, and Jellyby, the first two cases in Ontario. Another trapper was hired in the fall to complete the island, but when the dust settled, the data were entered, and the computer spit out the result, it turned out that only an estimated 50% of the raccoons on the island were vaccinated. It is hard to catch raccoons in winter, but when the rabid raccoon was detected in December, Rick Rosatte hired two trappers to get what raccoons they could, mostly by cleaning out animals dened in barns. In the process they encountered two dead raccoons, both of which turned out to be rabies positive. Other rabies cases trickled in, for a total of six. The good news, however, is that the last rabid raccoon on Wolfe Island was taken on 18 January, so it looks as though that outbreak may be over.

On the mainland, the first rabid raccoon after the first four was encountered on December 14, in North Augusta. Concern generated by the first cases was reinforced by the new case, and local surveillance became much better than "normal", whatever that really is. These also stimulated the Rabies Unit ground operations team to a high level of activity, as soon as the weather began to warm up. The Unit decided to remove and euthanize all the raccoons in the area around the 1999 cases (see Figure 1), since that was where the new rabid animals were appearing. That operation started 3 April, and finally ended 7 July. The original area had to be extended when an outlier case occurred in Merrickville. While this was still within the zone treated with baits in 1999, it was perilously close to the edge. The totals of raccoons and skunks removed by these operations were 1201 and 337 in 1999, and 1900+ and 450+ in 2000. One of the

unfortunate aspects of reducing populations in April, May and June was that lactating female raccoons were taken. But, a lactating female in the population reduction sample tested positive for rabies: she would have died of rabies within a few days anyway.

A question which must be asked is how many of the cases we have seen would have been detected by normal passive surveillance, by waiting for the public to submit suspect animals. Nine rabies positive animals were detected from brain samples coming from the population reduction operations. These animals were not detected as rabid in the traps. Let's be fair to the trappers, however. Raccoons in live traps show a wide range of behaviors, from very calm to extremely aggressive. Considering that the trappers load the raccoons, still in their traps, into a truck and take them to a central lab for processing, it is not surprising that they do not have time to watch each animal for several minutes, and it is less than surprising that the raccoons are upset. Next come the 12 specimens which MNR trappers found dead, etc. Most of these would not be submitted under normal circumstances. So one conclusion is that we might have seen half as many cases if the surveillance had not been greatly enhanced. Ten of the 30 mainland cases occurred so close to each other that they do not show up on the map. One such cluster was in North Augusta, and another was a few km to the south, where there were 5 cases on a single farm. One set were submitted by a Rabies Unit trapper, the second by the owner of one farm. How many of these would have been submitted routinely is an open question.

The second conclusion is a lot more sweeping. The Point Outbreak operations in 1999 were clearly not entirely successful: there were more cases in the area. However, when we compare the numbers of cases on the

New York side in 1997, 8, and 9, we can see that what happened since December was much less than happened in New York in an equivalent time period, and the surveillance in New York was not likely as thorough as in Ontario. The area covered in New York was much larger, and, although there certainly were efforts to publicize rabies and underline the need to submit suspicious animals, there was no team of trappers who had all worked on the control projects.

The Point Outbreak efforts in 1999 were much better than doing nothing. Hopefully the more intense operation in 2000 did what was intended, namely clean up the leftovers from last year.

The third conclusion is very important. The cases stemming from the POC operations this year were taken between April and June. These were ticking time bombs, successfully intercepted by the population reduction effort. It will take time to see how many infected animals were missed!

There is an optimistic sign: the second and third last cases occurred on June 12. There were 7 raccoon-rabies-free weeks up to the time of publication (which coincided with the newest case on August 8). Last year, there was an almost 20 week gap between the initial four cases, and the onset of the next round. Now that the population reduction operation is over (except for a small area around the latest case), we are almost entirely dependent on "normal" surveillance, but with a highly sensitive human population.

In addition to the special operations listed above, two regular projects were started this summer. As shown in Figure 1, the TVR zone was extended eastward this year, to pass on our side of the river the easternmost rabies cases on the New York side. Then, on 24-26 June, 297,000 baits were deployed inland of the TVR, to make a barrier 30-35 km wide from Napanee to Cornwall (Figure 2). Baits were also placed by

hand in town within the TVR zone, notably Brockville. The bait zone will be widened in September, when another 500,000 baits will become available.

Embedded within both bait zones is an experiment. The whole area was baited at 75 bait/km². In some parts the baits were put down at 0.75 km flight line spacing. In other parts the distance between lines was 1.5 km. The question under study is: will wider line spacing change the acceptance of baits, and the vaccination rate, of raccoons? Using the wider line spacing means less flying per bait, so it reduces the cost of the bait on the ground. We were able to handle the higher drop rates, around 8 baits/second quite smoothly, thanks to Marc Benoit, Dan Berndt, and Andrew Silver's effort to improve the bait machine. The high drop rate is made possible by the "Ontario Slim" bait, as there are 216 baits/tray. The crew loading baits in the aircraft are limited by the number of trays they can handle in a minute. High bait numbers per tray means that higher baiting rates are sustainable, because the number of trays is not raised proportionally. On 26 June we actually put out 115,000 baits with one aircraft!

Meanwhile, on the New York side of the St. Lawrence, the situation is dramatically improved over last year. To the end of July there had been 10 rabid animals, compared to over 60 last year. Now, part of this decrease would have happened anyway, because last year's high rabies level must have reduced raccoon numbers. However, in September 1999, the Cornell-MNR joint project dropped baits all along the New York rabies zone, from the east end of Lake Ontario as far east as Malone NY, and south to the 500m level in the Adirondacks. A sure sign that part of the reduction in cases resulted from baiting is that the 10 rabid

animals have been 5 raccoons and 5 skunks. Skunks are not attracted to the baits as strongly as raccoons.

It appears that the multi-faceted approach to controlling raccoon rabies is working. Now we have to decide how many different treatments are really essential. Clearly, one Point Infection Operation is not always enough. At the other end of the scale, as I circled over heavy woodland on Wolfe Island, dropping baits, I wondered whether this was really essential. After all, there had been TVR last year, and soon would be again. There had been depopulation, both in the winter, and again as the spring passed in to summer. On the other hand, some of Wolfe Island is hard for trappers to access, because of wetland and thick forest. There could well be raccoons surviving in there, and we know there was rabies on the island. But then again, my ancestors were Scots, and I always try to save money. These are not simple or easy decisions.

What would we do if there was a rabid raccoon taken in the Niagara TVR zone? The answer is that TVR has been very successful there for several years, so we do not believe that Point Infection is necessary, or that baiting would increase the herd immunity level enough to justify the expense. However, you can be sure that the Rabies Unit would look at the local TVR results in the immediate vicinity of the case, to be sure that the area was properly protected. It is easy to use all the means of rabies control at our disposal in one area, but it is also very expensive. Charting the dual path of effective control, but reasonable cost results in tough choices. You can be sure there are short fingernails in the Rabies Unit this summer.

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VERMONT BAIT DROPS IN 2000

There were 215,000 baits to drop in Vermont. The plane - OPG - flew from Sudbury to Peterborough, picked up staff and equipment, and flew on to Burlington VT on Monday 24 July. After arrival we set up the radios, loaded baits into tubs, and generally got ready to go. There were 12 flights planned. We did 5 on Tuesday, in really excellent weather - clear and sunny, no morning ground fog, and no turbulence. Wednesday was similar, and we did another 5 flights. Rain was forecast Wednesday night and all day Thursday, but it never reached Burlington. The view from the hangar underlined Neil Ayers wisdom in insisting that the mountain flights be done early, in the good weather. On Thursday there were clouds wrapped around all the peaks, and we felt fortunate that all the remaining flights were on the Lake Champlain lowlands.

It was nice to renew acquaintances with the USDA-APHIS-Wildlife Services staff. Kathy Nelson, Tim Alge, and Beth Jones were with us the whole project, while others were in and out, as they could. They all learned to navigate, they all flew in the back of the plane, they made sure we had breakfast and lunch, and they are all good company!! On Thursday the Vermont Rabies hotline was routed to a cell phone in their truck. It rang and rang and rang. Most calls seemed to have to do with bats. There was one call about a rabid badger. Since badgers do not occur within hundreds of miles of Vermont, the biologist started to ask diplomatic questions, and before long the badger became a woodchuck!

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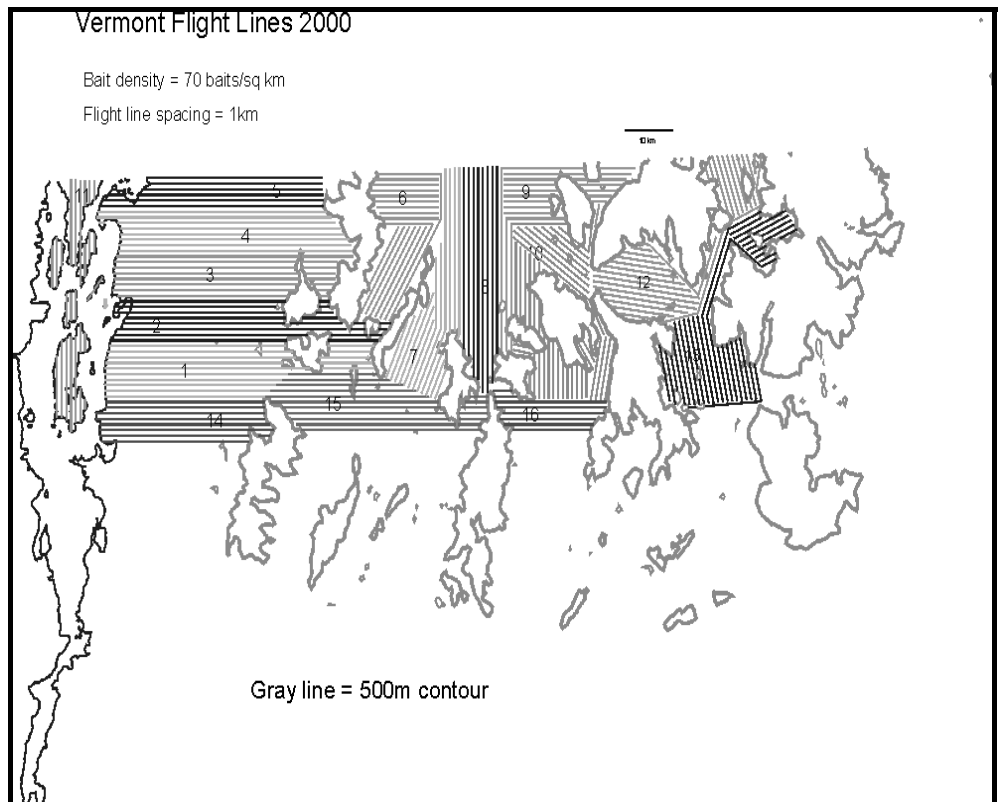


Figure 3. Map of the planned Vermont and New Hampshire flight lines for 2000. We were unable to fly the easternmost flights, in New Hampshire, due to the late confirmation of the number of baits available, and lack of lead time to get the pre-drop communications into effect. The broken up appearance of flights is due to the fact that we avoid dropping baits above 500 meters, as there are fewer raccoons at higher altitudes. There will probably be a bait zone in Quebec put down this fall, immediately north of the lines on this map.

RABIES IN ONTARIO IN THE SECOND QUARTER OF 2000

Ho! Hum! That summarizes the second quarter. The raccoon rabies situation is described in detail in the lead article. We hope it is disappearing.

Fox strain rabies was active in three areas, but not spectacularly so. Skunks continue to maintain the disease in Grey, Bruce and neighboring counties. After a hot start, things seem to have quieted a good bit.

I mistakenly identified a case reported from Timmins in the first quarter as probably having occurred fur-

ther north. Three more cases, one in Timmins, one in Tunis and one in Iroquois Falls, make it clear that there is rabies activity in that northeastern agriculture belt. We are not likely to drop baits up there this year, but stay tuned.

The third area of fox rabies activity is the far northern settlement of Fort Severn, not far from the Manitoba border on the Hudson Bay coast. There probably is always rabies in the Hudson Bay lowlands, but there are so few people living there that it is hard to estimate where rabies is. It is a huge area, so baiting all of it is clearly out of the question.

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ORAL VACCINATION AGAINST RACCOON RABIES DEVELOPMENTS ON THE INTERNATIONAL FRONT.

Start with the good news. There has not been a single case of raccoon rabies in Ohio this year. Not in the oral rabies vaccination (ORV) zone, not anywhere in the state, so the Ohio program is a great success. ORV along the St. Lawrence, New York has reduced cases dramatically, but it is too soon to expect complete elimination. Coyote rabies is almost gone from Texas. Fox rabies is disappearing from southern Ontario. The conclusion from all of this is that ORV works, if you go at it with determination, and make sure your treated areas are large enough.

The biggest obstacles to elimination of raccoon rabies are now political, rather than scientific. Single states and provinces can eliminate rabies within their borders, but it will then be expensive to keep it out, unless neighbors can get together. Ohio began its ORV program to stop the westward spread of raccoon rabies within its own state. Now, unless action is taken in neighboring areas, it will cost much more to keep the disease out of the state. Getting everyone together is not easy. For example, New Brunswick just elected a tight money conservative government. Can we expect them to react to the cases of raccoon rabies in Calais, Maine, right on the NB border, especially when the government of Maine has resolutely kept out of ORV?

One federal agency, USDA-APHIS-Wildlife Services, has a clear mandate in the USA to combat rabies in wildlife. WS now has a Memorandum of Understanding with the Centers for Disease Control and Prevention in Atlanta—that is the federal agency charged with protecting humans against rabies (and many, many other diseases and health hazards), so the US federal government has a unified approach. However, Wildlife Services must be invited to take ac-

tion in any given state. In this era of tight money policies, some contribution from the state is also a good idea.

There is great variation from state to state in policies respecting rabies. For example, the New York Department of Health will pay for post-exposure treatment of humans exposed to rabies if the individuals are not covered by insurance. In neighboring Vermont, the state is not involved in supporting post-exposure treatment at all. This is relevant to oral vaccination because it makes cost-benefit analysis different from state to state. A major selling point of our program in Ontario is the amount that will be saved from future health costs if we are successful in keeping raccoon rabies out of the province, and especially out of the Toronto and Ottawa population centers.

Wildlife Services has several requests for additional funding in various stages of progress through the US federal budget process. In the short term, there are three requests for emergency funding for use this year. Two of these are being positively received, and will, if approved, give an immediate shot in the arm, for a maximum of three years, for ORV efforts. At the other end of the scale, there is an application for over \$70 million, spread over 5 years, to begin in about 2003. How that will progress this year is anybody's guess. On one hand there is a presidential election in progress. If Mr. Bush, the pundit's choice this month, is elected, we should see tightening of federal spending. On the other hand, the federal budget surplus is being predicted at almost a trillion dollars, so there may be some extra money to consider for rabies control.

The success of the Ohio ORV program is threatened by an end run. After several years of slow progress,

raccoon rabies appears to have crossed the Appalachians in West Virginia, and threatens to sweep down the Ohio River valley. Ohio can counter this by extending its vaccination zone westward on its side of the river, but there are, in the long run, hundreds of miles of the valley. Kentucky is also threatened with invasion if raccoon rabies moves downstream along the Ohio. The logical move is to extend the Ohio vaccination barrier south into West Virginia. This would cost less, and protect more people and states. And if you are more scientifically than politically inclined, Ohio would get better protection if the wall of vaccination were moved eastward into Pennsylvania, to provide a buffer east of the Ohio border. If one of the Wildlife Services funding requests is approved, and if appropriate state authorities can agree to oral vaccination in their state this fall, we will be asked to drop baits in West Virginia during September 2000.

Consider the attitude of the Vermont government. Before ORV started, raccoon rabies had covered most of the state. At the moment, the efforts reported on page 4 are clearly directed toward keeping raccoon rabies out of Canada, and they cover only a small part of the state, and a lightly populated section at that. What benefit would there be to Vermont taxpayers to spend money protecting Canada is the basis of current Vermont policy. Of course, we Canadians can counter that, once the barrier at the north end of the state is rabies-free—it can start to move southward, with the ultimate objective of freeing the whole state. Not only will that benefit Vermont residents, a direct contribution from Vermont would hasten the process.

Wildlife Services have developed an economic cost-benefit analysis of the case of putting a barrier from

Lake Erie to the Gulf of Mexico, to prevent further westward movement of raccoon rabies. This predicts that under almost all conditions, economic benefits would exceed costs. This is a good start, and, if developed to cover cases like Vermont's, will help to free some state funds. The whole basis of the study is avoidance of costs associated with having rabies in an area. This can go in many directions, and there is lots of need to focus this new tool on a variety of problems.

There is a short version of a regional plan to eliminate raccoon rabies from New England, discussed in previous issues of the Rabies Reporter. (see, for example, 10(4):11-12). The short term objective of this is to prevent further spread of raccoon rabies to the north and east. The medium objective is to eliminate the disease from the region. The long term objective is to coordinate with other regions to eliminate the raccoon rabies altogether. There is a similar approach under development in the midwestern states, led by the Ohio team. There were observers from several as yet uninfected states present during the April bait drop, so there clearly is interest. Dennis Slate, regional rabies co-ordinator, told me as we ate together during the Vermont bait drop that Louisiana, Kentucky and Tennessee have all expressed interest in ORV, under the leadership of Wildlife Services.

Progress within Canada has been slower. There has never been a federal agency in Canada equivalent to the Wildlife Services group in USDA. (An ancient name for Wildlife Services was the Bureau of Predator and Rodent Control, but the agency now has a much wider mandate to deal with nuisance and pest warm-blooded vertebrates). The Canadian Food Inspection Agency has a clear mandate to protect domestic animals against rabies, but its jurisdiction over wildlife, even when the issue has to do with domestic animal

health, is questionable. Foxes and raccoons, being non-migratory, clearly fall under provincial wildlife agencies, not the Canadian Wildlife Service. On the other hand, I have been invited to talk about the problem of raccoon rabies with staff of the Nova Scotia government. Interest is there at the biologist, veterinarian and public health staff level. Now we have to sell it to Deputy Ministers and Ministers

I fear that you have heard a lot of this from me before. But progress is being made, even if it feels like wading chest-deep through molasses! Wildlife Services have provided leadership, and substantial funding, to help in Ohio, New York and Vermont, as well as Texas. Combined efforts have raised awareness of the benefits of controlling rabies in wildlife in many states. Demonstrations such as those in New York and Ohio, that oral vaccination really works, are changing minds all over. Don Lein, of Cornell University, a passionate lobbyist in Albany and Washington, says that he is gaining admission to offices which formerly brushed him off. And Wildlife Services is getting money. Not as much or as fast as passionate ORV advocates might wish, but more than last year. I really have to compliment Dennis Slate and his bosses in the innovative ways they have tried to fund joint efforts. I am also much impressed with the scientific efforts that Wildlife Services have made in support of the theory and practice of ORV.

What should we do in Ontario if no-one offers to help us keep raccoon rabies away? We can bait a belt in Niagara, and most of eastern Ontario, or we could put blocking walls in New York. Because raccoon rabies does not get into the Adirondack mountains, the belt in New York would be less expensive, monetarily. Unless Quebec made a comparable effort in Vermont, our barrier would be subject to end runs.

I also doubt that we can sell putting baits south of the border forever, unless there is good evidence of real contributions from state and federal sources in the USA.

Dr. Jacqueline Carlson, Chair of Ontario's Rabies Advisory Committee and I met with Drs. Paul Sockett and Peter Buck of Health Canada, seeking better federal coordination of Canadian efforts against rabies in wildlife. Our presentations was favorably received, and it will be interesting to see if we can advance this part of the fight. I also met with the Quebec rabies committee, in company with Drs. Lein and Bigler from Cornell. That was also a good meeting. Although there were some bumps along the way, it broke loose substantial Quebec funding for baits for Vermont and southern Quebec. I was much impressed with Dr. Richard Massé, Associate Deputy Minister of Health for Quebec. He remembered in detail the briefing he had received a year ago, and held us to the scientific principles of that, namely that it was still necessary to put baits in Quebec, until there were no cases within at least 30 km of the border.

In summary, there is interest on both sides of the border, and among states and provinces, toward a unified approach to ridding ourselves of rabies. Let's hope this goodwill translates into enough money to get the job done.

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Animal Rabies Report: April to June 2000

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Animal Rabies Report: April to June 2000

Animal Type	Fox			Raccoon			Skunk			Other Wildlife			Bat			Dog			Cat			Livestock			Totals		
County or Region	#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative	
		00	99		00	99		00	99		00	99		00	99		00	99		00	99		00	99		00	99
Northern																											
Muskoka																								0	0	0	
Parry Sound																								0	0	0	
Nipissing																								0	0	0	
Sudbury																								0	0	0	
Cochrane	3	4																						3	4	0	
Timiskaming																								0	0	0	
Algoma																								0	0	0	
Thunder Bay																								0	0	0	
Rainy River																								0	0	0	
Kenora	2	2																						2	2	0	
Regional Totals																											
Eastern				13	29								4	5	1									17	34	1	
Central						1			1						1									0	0	3	
Western		1	2				10	25	15				1	1				1				2	5	8	13	32	26
Southern													1	1	1									1	1	1	
Northern	5	6																						5	6	0	
TOTALS	5	7	2	13	29	1	10	25	16	0	0	0	6	7	3	0	0	1	0	0	0	2	5	8	36	73	31

Notes for this quarter: Livestock were 1 horse and 1 cow.

Bats were all big brown bats.

The raccoon in Central region in 1999 was infected with arctic fox strain rabies.

