

The Rabies Reporter

February 1993

Volume 3, Number 4

ISSN 1186-8961

In This Issue

1992 In Review

The 54th Midwest Fish and Wildlife Conference

1992 IN REVIEW

We are no longer number 1! The total of rabies cases in Ontario during 1992 was 1303, significantly less than New York State, which reported 1761. That is the first time in over 25 years that Ontario has not had more rabies cases than any state in the U.S.A. For more details of the New York situation, see the Insider in this issue.

The year was fairly 'normal' in Ontario. The exception to that statement was, of course, the eastern part of northern Ontario, centered on the Timiskaming area. Even there, the worst was over by mid-summer. The slowing of the invasion was especially interesting. When I went to Kapuskasing in late June, the nearest cases were not far away, and the area was braced for its first cases to occur in July. Nothing happened! Although there were a flurry of reports of rabid foxes around Cochrane, few of these were submitted for diagnosis. One rabid skunk in the Cochrane District in June was the first ever reported that far north, even

though skunks are quite common as far north as Moosonee.

In southern Ontario, the hot areas for rabies were in the Lake Erie and Grey-Bruce areas, but each of these was well within the normal range of fluctuation in rabies cases. Regional totals are shown in Figure 1. Eastern Ontario had very few cases. Over the period 1970-1990, eastern Ontario averaged 385 cases per calendar year, with a high of 923 in 1983, and a low of 157 in 1982. The 112 cases in 1991 and 34 in 1992 show that the bait program is really successful.

The number of humans treated because of exposure to a rabid animal was estimated at 2402. This seems high, and will be checked in next issue. The number of livestock compensation cases was down sharply in eastern Ontario, but up by a large margin in northern Ontario.

There was one rabid fox in Carleton whose virus was typed as ERA, the vaccine we are dropping in baits. That makes a total of three cases of vaccine-rabies. The others were one skunk in Bruce during 1991, and a raccoon in Hastings in 1992. We dropped 17,000 baits in eastern Hastings at the end of the 1992 drop, baits that were left over after we had covered the normal drop area.

Charles D. MacInnes
MNR Rabies Unit, Maple

The 54th Midwest Fish & Wildlife Conference

December 6-9 1992

The 54th Midwest Fish & Wildlife Conference was held at the Regal Constellation Hotel in Toronto December 6-9, 1992. It was well attended with over 1,000 people participating in the lectures and exhibits. Presentations of approximately 20 minutes were given simultaneously in nine different rooms from 8:30am - 4:30pm. As well, there was a room that had videos running throughout the day, and a room with both commercial and non commercial displays of interest to conference participants.

Tuesday December 8, was THE DAY for Rabies enthusiasts. Starting at 8:30am and continuing until 4:10pm, (with a break for lunch at noon), "Control of Rabies in Wildlife" was held in the Aquarius room. There were 17 presentations given by scientists from Canada and the United States.

The following is a brief summary of the presentations given on rabies:

Speaker: **C.D. MacInnes**, Rabies Research Unit, OMNR, Maple

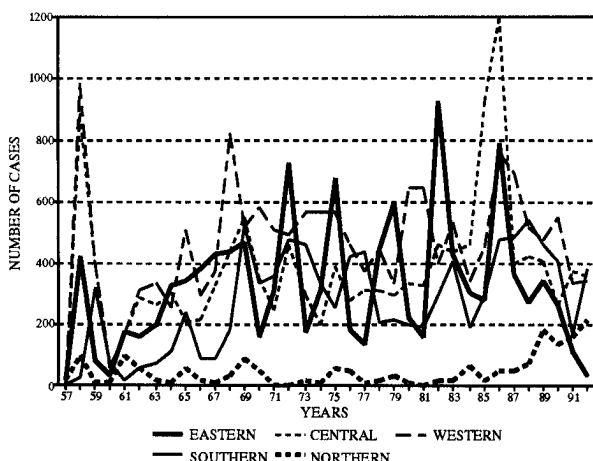


Figure 1. Annual totals of rabies cases in Ontario, by the regions used in the tables of the Rabies Reporter.

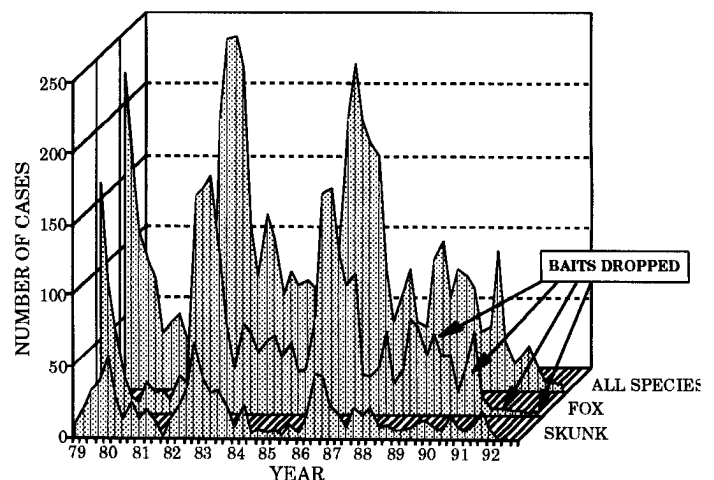


Figure 2. Quarterly numbers of rabies cases in Eastern Ontario.

Topic: Is rabies control a wildlife management issue?

Synopsis: Rabies is spread by wildlife, but its major impacts are on public health and agriculture. The management of rabies control must involve health authorities, agricultural departments and wildlife agencies since the disease affects all of these groups. The main problem faced by all is funding.

Topic: Measuring the success of a vaccine bait program.

Synopsis: The Ontario Ministry of Natural Resources has developed a system for large scale baiting of foxes using an oral vaccine bait that is distributed by aircraft. The success is measured by an estimate of the animal/bait contact using two methods:

1. a biomarker (tetracycline) in the outer coating of the bait will be found in the teeth of the fox.

2. contact with vaccine should produce rabies neutralizing antibodies in the blood of the fox.

Topic: The success of rabies control in eastern Ontario.

Synopsis: For the past three years OMNR has conducted a massive field trial with air dropped baits containing an oral rabies vaccine for foxes. Their goal is to eliminate rabies in eastern Ontario as a starting point for control across all of southern Ontario. The incidence of fox rabies has gone down since July 1991 despite a continuing incidence in neighbouring Quebec and New York. The decrease in cases has no parallel with the patterns of previous years.

Speaker: **R.C.Rosatte**; *Rabies Research Unit, OMNR, Maple*,

Topic: Rabies control for urban skunks, foxes and raccoons.

Synopsis: There are two control tactics being used in Metropolitan Toronto for the control of rabies in striped skunks, raccoons and red fox. For skunks and raccoons, T-V-R (trap-vaccinate-release) is presently the most efficient. The area in Toronto where this program is in effect has been skunk rabies free for 3 years (to July/92) even during an epizootic of skunk rabies in 1991. Rabies vaccine baits have been hand distributed throughout the ravine system of Toronto to target the fox population. The area has been free of reported fox rabies for 1 1/2 years (to July/92).

Topic: A strategy for preventing a raccoon strain of rabies from invading Ontario, Canada.

Synopsis: As of July/92, the raccoon strain of rabies was less than 50km from southern Ontario. A task force has been formed to draft plans to prevent this strain from becoming established in Ontario. Recommendations for actions include:

1. Enhanced surveillance for early detection of raccoon rabies. 2. Establish a buffer zone of vaccinated animals in the Niagara area using T-V-R. 3. Population reduction & T-V-R in the vicinity of point infections. 4. Establish a communications plan to educate the public. 5. Develop an effective oral vaccine bait for raccoons.

Speaker: **A.I.Wandeler**; *Animal Diseases Research Institute, Agriculture Canada, Nepean, Ontario*

Topic: Oral rabies vaccines for the control of rabies in wildlife.

Synopsis: Field trials with vaccine baits in Europe have documented that it is possible to immunize enough animals by bait in order to stop the spread of rabies into rabies-free areas, and to eliminate the disease from an enzootic area. The Ontario oral rabies vaccine is not effective in species other than the fox so efforts are being made to develop other vaccines for other species.

Speaker: **C.A.Schubert**; *Zoology Department, University of Guelph, Guelph, Ontario*

Topic: Will rabies control increase vector population density?

Synopsis: Using the rabies study area in Scarborough and a control area, population densities were analyzed from 1985-1991. During that period population numbers of skunk and raccoons in the area of rabies vaccination increased. However, there was little rabies in either the control zone or the T-V-R area, so it is too early to say whether T-V-R is successful, or whether it affected the population increase.

Speaker: **R. Tinline**; *Department of Geography, Queens University, Kingston, Ontario*

Topic: Historical patterns of rabies incidence in Ontario.

Synopsis: Rabies entered Ontario in the 1950's from northern Canada. It has persisted in southern Ontario because:

1. The red fox is the primary vector & the skunk is the secondary vector.

2. There is a strong 3-6 year cycle of the disease in southern Ontario. 3. The existence of rabies "units" that have distinct temporal and spatial patterns of incidence. By examining these patterns a vaccination scheme can be planned. There is also a possibility of a unit by unit control to minimize costs and a 'fire-break' method to prevent any reintroduction in a rabies free area.

Topic: Planning rabies control: the use of computer simulation.

Synopsis: The most efficient way to explore questions relating to the location and timing of a rabies bait air drop is by a computer simulation model of a fox population with rabies. Field data of fox behavior from the Ministry of Natural Resources was used, and experiments were tried on the computer model. It showed that the success of an air dropped vaccine is strongly related to the timing and location of the drop, and the density of the animal population. In high density areas the vaccination program must follow the rabies incidence peak, while in low density areas the timing is not as critical. These findings have helped to plan the major rabies control experiment that is currently being used in eastern Ontario.

Topic: Analysis of fox habitat using thematic mapping imagery.

Synopsis: Thematic mapping imagery is used to define land use and edge categories as a method to measure fox habitat in Renfrew County, Ontario. The

The Rabies Reporter, a scientific newsletter about current issues in rabies research and control, is a joint effort of the Rabies Research Unit, Ontario Ministry of Natural Resources; the Food Production and Inspection Branch of Agriculture Canada; The Ontario Ministry of Health and the Department of Geography, Queens University, Kingston.. Article for future issues will be welcomed by the editor. Comments, letters, submissions and enquiries should be sent to:

The Rabies Reporter
Rabies Research Unit,
Wildlife Research
Ontario Ministry of Natural Resources
P.O. Box 5000,
Maple, Ontario L6A-1S9
Telephone: (416) 832-7110
Fax: (416) 832-7149

distribution of fox populations is hard to analyze because of the low actual fox location data. Simulation methods are used to develop the test statistics for correlation analysis. The results show a definite correlation between reported locations of foxes and the edges of pasture/woods areas. These methods could be used in other regions to locate fox populations.

Speaker: **C.P.Nunan**; *Rabies Research Unit, OMNR, Maple, Ontario*

Topic: **Optimizing density and dispersion of vaccination baits for foxes.**

Synopsis: There is currently under way an experimental program to vaccinate wild foxes in Ontario. Aerial distribution of an oral rabies vaccine bait has been found to be a feasible means of vaccinating foxes over a large geographical area. By optimizing the distribution patterns and the density of baits it is hoped that the maximum number of foxes are vaccinated while minimizing the number of baits required.

Speaker: **C.V.Trimarchi**; *Rabies Laboratory, New York State Department of Health, Albany, New York*

Topic: **The status of raccoon rabies in New York State.**

Synopsis: Raccoon rabies arrived at New York's southern boundaries in early 1990. The disease has spread northward in New York at an average of 25-35 miles/year. It is pandemic in the southern half of the state, affecting 33 counties, including metropolitan New York City. There is also concern of its appearance in new areas more than 50 miles ahead of the front. The total rabies cases in New York State has increased from 84 cases in 1989, to 1180 by the end of August, 1992. Sixty-nine per cent of the rabies cases are raccoons. Humans requiring post exposure rabies prophylaxis has increased from 81 in 1989 to 965 in 1991.

Speaker: **S.M.Stehman**; *Diagnostic Laboratory, College of Veterinary Medicine, Cornell University, Ithaca, New York*

Topic: **Raccoon rabies in New York State: current status and future directions of proposed control programs.**

Synopsis: A task force was created to look at potential and available means for controlling rabies in wildlife in New York State with a focus on raccoons. T-V-R,

based on the Ontario program, was initiated in Ithaca, New York. Raccoon densities were about 50/km² higher than in Scarborough, but not higher than the greatest local density in Scarborough. There is also a proposed use of the experimental oral vaccinia rabies glycoprotein recombinant vaccine.

Speaker: **C.E.Rupprecht**; *Department of Microbiology & Immunology, Thomas Jefferson University, Philadelphia, Pennsylvania*

Topic: **Field trials of recombinant rabies vaccine baits containing V-RG recombinant vaccine.**

Synopsis: Three field trials of a vaccinia-rabies glycoprotein (V-RG), recombinant virus vaccine have occurred between August/90 and October/92. The objective of the first two was an environmental assessment of the innocuity of the V-RG virus within limited ecosystems. The third trial objective was to develop an "immune barrier" to prevent an impending raccoon rabies epizootic. Observations were made on the vaccine purity, potency, stability and, the safety of the vaccine was confirmed. It was found that further studies must be made to address such topics as: 1. Population densities before, during, and after a rabies outbreak. 2. Bait density requirements. 3. Carnivore dispersal. 4. Disease surveys. 5. Cost effective surveillance methods. 6. Studies on specific lures for mammalian carnivores. These studies may help answer the question as to whether oral vaccination is a viable disease management option.

Speaker: **L. L. Bigler**; *Diagnostic Laboratory, N.Y.S. College of Veterinary Medicine, Ithaca, New York*

Topic: **Commensal raccoons, oral rabies baits, and refuse: a preliminary report.**

Synopsis: During July and August 1992, interactions between raccoons and oral rabies baits and refuse storage containers were recorded using a remote control, low-light videography system. Initial impressions suggest that rural raccoons readily accepted and consumed the chicken-tallow fox baits and the fishmeal polymer raccoon bait. The urban raccoons generally rejected them. Both groups liked the control baits of plain marshmallow or the marshmallow/commercial raccoon bait. It was found that plastic bags and 20-25 gallon refuse containers were

easily accessed if the container lids were not secure. The 90-95 gallon containers seemed to prevent raccoon access. Further studies are planned in the near future.

Speaker: **D.J.Briggs**; *Department of Veterinary Diagnostic Investigation, College of Veterinary Medicine, Kansas State University, Manhattan, Kansas*

Topic: **Rabies in Kansas - Epidemiology and potential for control in wildlife.**

Synopsis: Rabies is enzootic in the striped skunk population with some periods and/or areas of epizootic rabies. The trends of rabies in Kansas have been analyzed. Since 1969 there have been three peaks in rabies incidence approximately ten years apart. The majority of positive cases have been between April and July. Also it was found that an increased number of submissions has resulted in an increase in the number of positive rabies cases. In a study involving 105 counties it was revealed that an increased number of rabid skunks were located in counties with a warmer yearly temperature, higher amounts of rainfall and higher skunk and human populations. Kansas would appear to be an ideal study site to use to determine the feasibility of oral vaccination in striped skunks.

Speaker: **R.B.Miller**; *Animal and Plant Health Inspection Service, U.S. Department of Agriculture, Hyattsville, Maryland*

Topic: **USDA requirement for the release of genetically engineered animal vaccines into the environment.**

Synopsis: The Animal and Plant Health Inspection Service of the

U.S. Department of Agriculture must assure that all animal biological products licensed for manufacture in the United States or permitted for importation for distribution and sale are pure, safe, potent, and efficacious. The product must cause no harm in laboratory animals, host animals, or to the environment.

Sarah J. Crosgrey
Rabies Research Unit

Animal Rabies Report: October to December 1992

Animal Type		Fox		Skunk		Other Wildlife		Dog		Cat		Livestock		Total							
County or Area	#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative							
		92	91		92	91		92	91		92	91		92	91						
Eastern																					
Stormont	1	1	1		1	2		1					0	1	2	5					
Dundas												2		0	0	4					
Glengarry		1				1		2					1	0	2	3					
Prescott		1	6	2	4	2			1			5	2	2	10	12					
Russell			5			1								0	0	7					
Carleton	1	1	13		3	13	4	3	1			1	4	1	9	36					
Renfrew			3			20		2	2				3	0	1	33					
Lanark		3	1		1	3		1				2		0	6	5					
Grenville					1	1								0	1	1					
Leeds								1						0	0	1					
Frontenac						2		5						0	0	7					
Lennox-Addington		1	1		1				1			1		0	3	2					
Central																					
Hastings	2	57	32		6	6	1	7	2		3	4		5	4	1	8	2	4	86	50
Prince Edward		9	40		2	7		2	1		1	3			2	1	8	6	1	22	59
Northumberland	1	13	15	2	4	10	1	10	2		2	0	2	2	3	1	6	9	7	37	39
Victoria	10	48	13	7	16	12	2	5	2	2	3	1			0	4	15	7	25	87	35
Haliburton		1	30		3	6			1			0						4	0	4	41
Peterborough	1	16	10	2	10	7			4			3	1	4	2		2	5	4	32	31
Durham	6	17	1	5	16	6		2	3		1	2		1		2	2	1	13	39	13
York Region	2	2	1	2	2	11		1	7	1	1			1		1	1		6	8	19
Scarborough																					
East York																					
City of Toronto																					
City of York																					
North York																					
Etobicoke																					
Simcoe	1	22	46	2	7	22	1	2	4	1	2	3		1		5	11	12	10	45	87

Breakdown not available.

[illegible]

Animal Rabies Report: October to December 1992

Animal Type	Fox			Skunk			Other Wildlife			Dog			Cat			Livestock			Total		
County or Area	#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative		#	Cumulative	
		92	91		92	91		92	91		92	91		92	91		92	91		92	91
Northern (continued)																					
Thunder Bay																					
Rainy River																					
Kenora																					
Subtotals																					
Eastern	2	8	30	2	12	44		4	16			6			8		10	12	4	34	116
Central	23	185	188	20	66	87	5	29	26	4	13	16	3	14	11	15	52	46	70	359	374
Western	53	164	118	22	84	128	1	11	11	3	9	4	4	14	10	16	60	63	99	342	334
Southern	50	227	62	18	39	36		10	14	5	17	3	10	27	12	11	34	41	94	354	168
Northern	3	136	115	3	26	24	1	5	9	1	7	4		5	3	1	35	9	9	214	164
Totals	131	720	513	65	227	319	7	59	76	13	46	33	17	60	44	43	191	171	276	1303	1156

Other Wildlife - This quarter: Big Brown Bat - 1; Coyote- 3; Raccoon - 1; Wolf - 2;

Other Wildlife - All Year: Big Brown Bat - 20; Silver-haired Bat - 1; Black Bear - 2; Coyote - 17; Raccoon - 13; Wolf - 2, Fisher - 1

CLINICALS This Quarter: Bovine - 19, Sheep - 1; All Year: Bovine - 97, Sheep - 4, Pig - 1

Raccoon Rabies in New York State

RACCOON RABIES IN NEW YORK STATE - A REVIEW OF 1992.

There were 1761 rabid animals confirmed in New York State in 1992, an increase of 71% from the 1991 total, and 18 times greater than the average for the previous 5-year period. The total provides New York State with the dubious distinction of having the greatest number of rabid animals recorded in one year in the history of the United States, and represents about 21% of the U.S.A. total for 1992. Although fox rabies in the north, and bat rabies across the state also contributed to the totals, the vast majority of cases (91%) were associated with the mid-Atlantic raccoon rabies epizootic.

Raccoon rabies continued to spread northward from the 1991 boundary at a rate of 40 - 65 km/year along a 500 km front (Fig. 1). In July, rabies suddenly appeared in the Albany area, more than 65 km ahead of the front. The cause of this jump is unproven, but human transport, either intentional or accidental, is

suspected. Similar jumps have also been reported in Connecticut, Massachusetts and New Hampshire. The potential for the inadvertent import of raccoons into Canada from the U.S. was demonstrated by the delivery of a raccoon (not rabid) from Mount Vernon NY, as described in the Rabies Reporter, Vol.3 #2. The point of origin was just being invaded by raccoon rabies when the truck left for Canada.

The impact of raccoon rabies is exemplified by the New York statistics: 54% of raccoons captured in infected counties were rabies-positive, 30/1392 (2%) had bitten humans, 340/1392 (24%) had non-bite human contact, and 970/1392 (70%) had contact with domestic animals. Coincident with the invasion of raccoon rabies, the number of humans treated with vaccine increased from 85 in 1989 to 1146 in 1992.

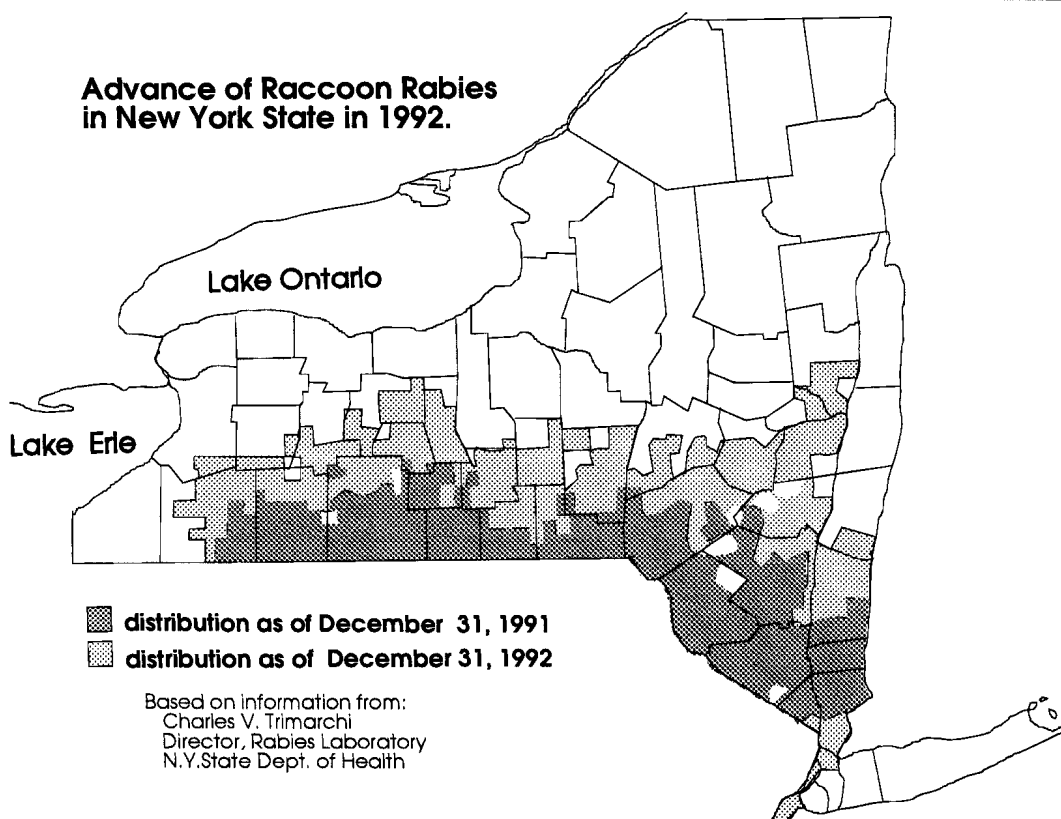
The ratio of rabid cats to dogs, 5:1 (N=43), is similar to the observed incidence in other states affected by raccoon rabies. Conversely, in the northern Part of New York, affected by fox rabies, the ratio of cats to dogs was 1:8 (N=17). In

Ontario in 1992, the ratio was 1.3:1 (N=106).

Table 1. Summary of rabies in New York State during 1992.

Species	Number Rabies Positive	Percent of Total Rabies	Animals Checked	% Positive of Checked
Raccoon	1392	79	2983	45
Bat	61	3	1346	5
Rodent Lagomorph	18 ^a	1	738	2
Striped Skunk	106	6	354	30
Fox red/gray	88	5	288	35
Other Wild	14	1	398	3
Cat	36	2	1794	2
Dog	7	<1	806	1
Cow	20	1	177	11
Other Domestic	7	<1	113	6
TOTAL	1761	100	8997	20

Advance of Raccoon Rabies in New York State in 1992.



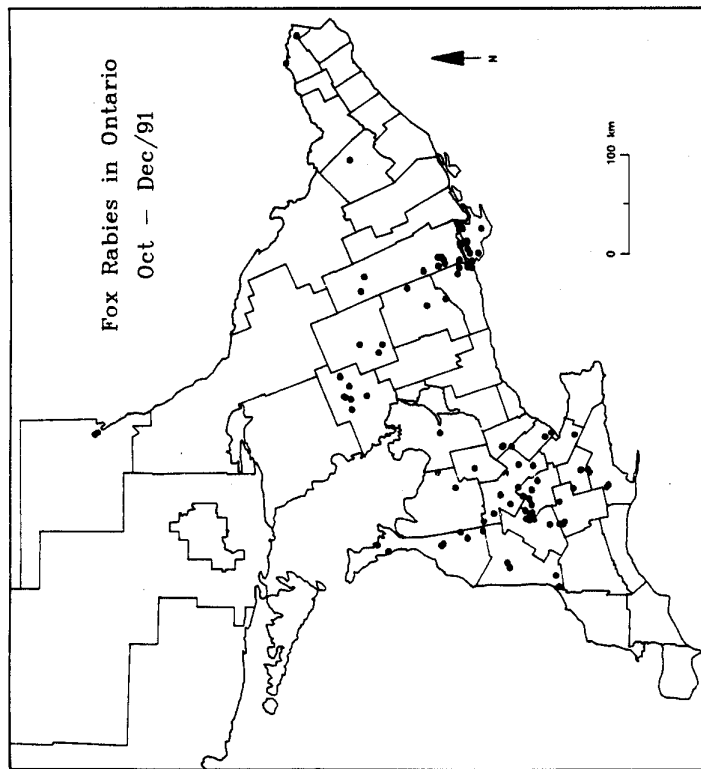
^aAll groundhogs

^b5 White-tailed deer, 3 Opossums, 2 Coyotes, 1 Muskrat, 1 Beaver

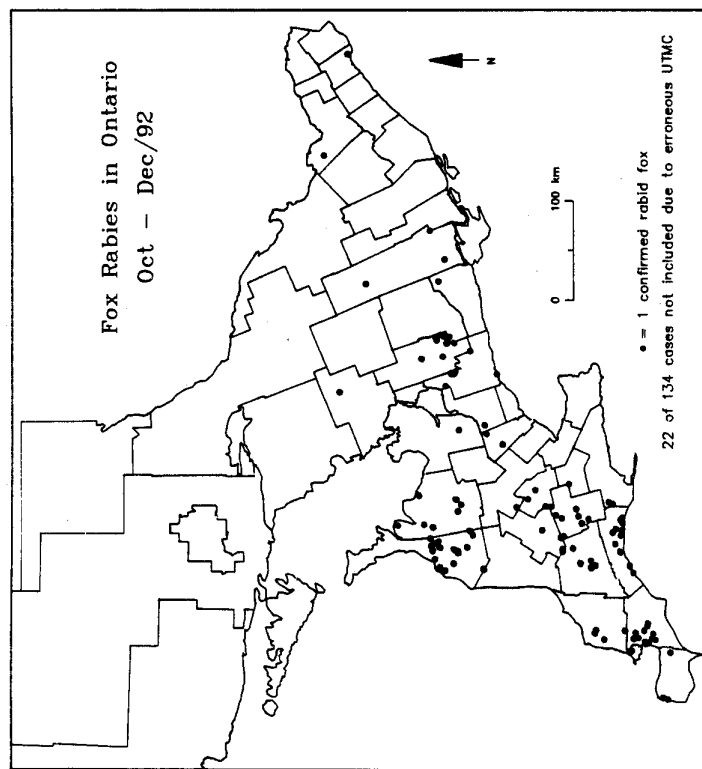
During 1992 the red fox epizootic continued in north-eastern New York and adjacent Quebec. This area therefore continues to be a potential source of reinfection for eastern Ontario, where oral vaccination has reduced rabies to near-zero levels.

Note that New York State has a very effective reporting system for rabies, compared to other states. Therefore, levels of rabies in other states may appear lower than they really are.

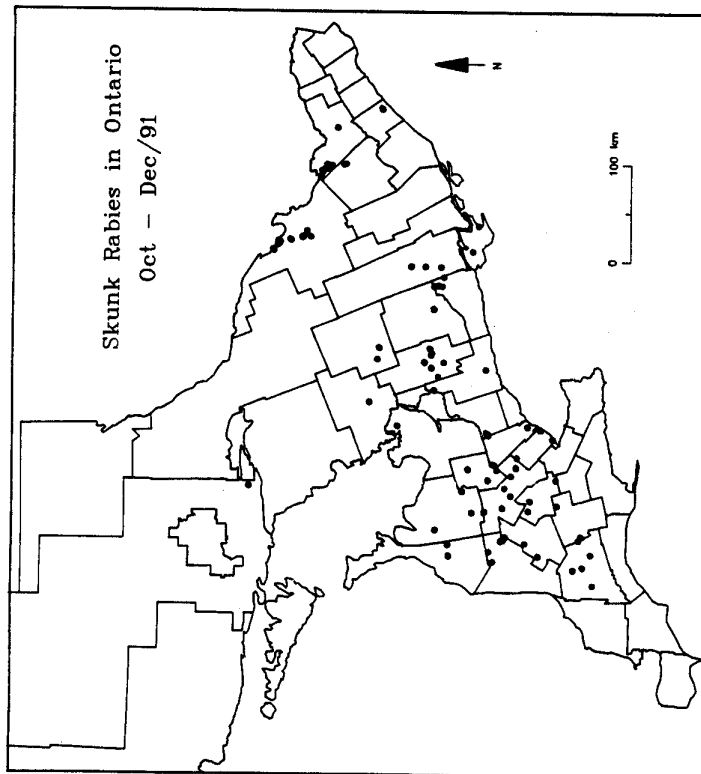
David H. Johnston
MNR Rabies Unit,
Maple



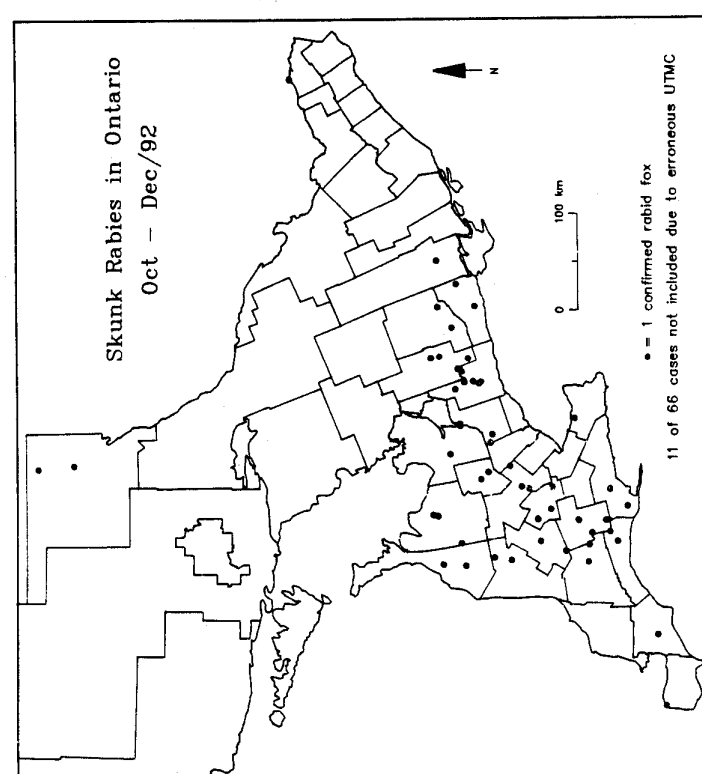
Department of Geography, Queen's University



Department of Geography, Queen's University



Department of Geography, Queen's University



• = 1 confirmed rabid fox
11 of 66 cases not included due to erroneous UTM

Department of Geography, Queen's University