An Overview of the Ontario Wildlife Rabies Control Program

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Rabies…

- One of the oldest known zoonotic diseases
- Caused by a virus that attacks the CNS
- Any mammal can get rabies, including humans
- Spread to humans through contact with infected saliva (bite/scratch from domestic or wild animal)
- Once symptoms develop, rabies is fatal

In Ontario, rabies control is implemented to:

- Protect the health and safety of the public, their pets and livestock, and provincial wildlife populations ...

- Prevent economic losses

Strains of the Rabies Virus in Ontario

	‘arctic’	‘raccoon’	‘bat’
Species primarily affected…	striped skunks livestock domestic pets red foxes raccoons arctic foxes wolves	raccoons (130) striped skunks (2)	bats humans
Confirmed in wildlife…	1954 – present	1999 – 2005	1961 – present

Ontario has a 20-yr history of rabies control…

Methods have varied depending on the rabies vector species involved

(fox vs. raccoon vs. skunk)

Aerial baiting, OS bait
ERA oral vaccine
20 baits/km^2 – 2.0km spacing

PR, TVR & Aerial baiting
Imrab®3 & V-RG vaccines
75 baits/km^2 – 0.75km spacing

Aerial baiting, UL bait
ONRAB oral vaccine
300 baits/km^2 – 0.5km spacing

First large rabies control program was implemented in E Ontario to control 'arctic' rabies in red foxes…

<u>Method</u> → Aerial Baiting (OS baits + ERA vaccine)

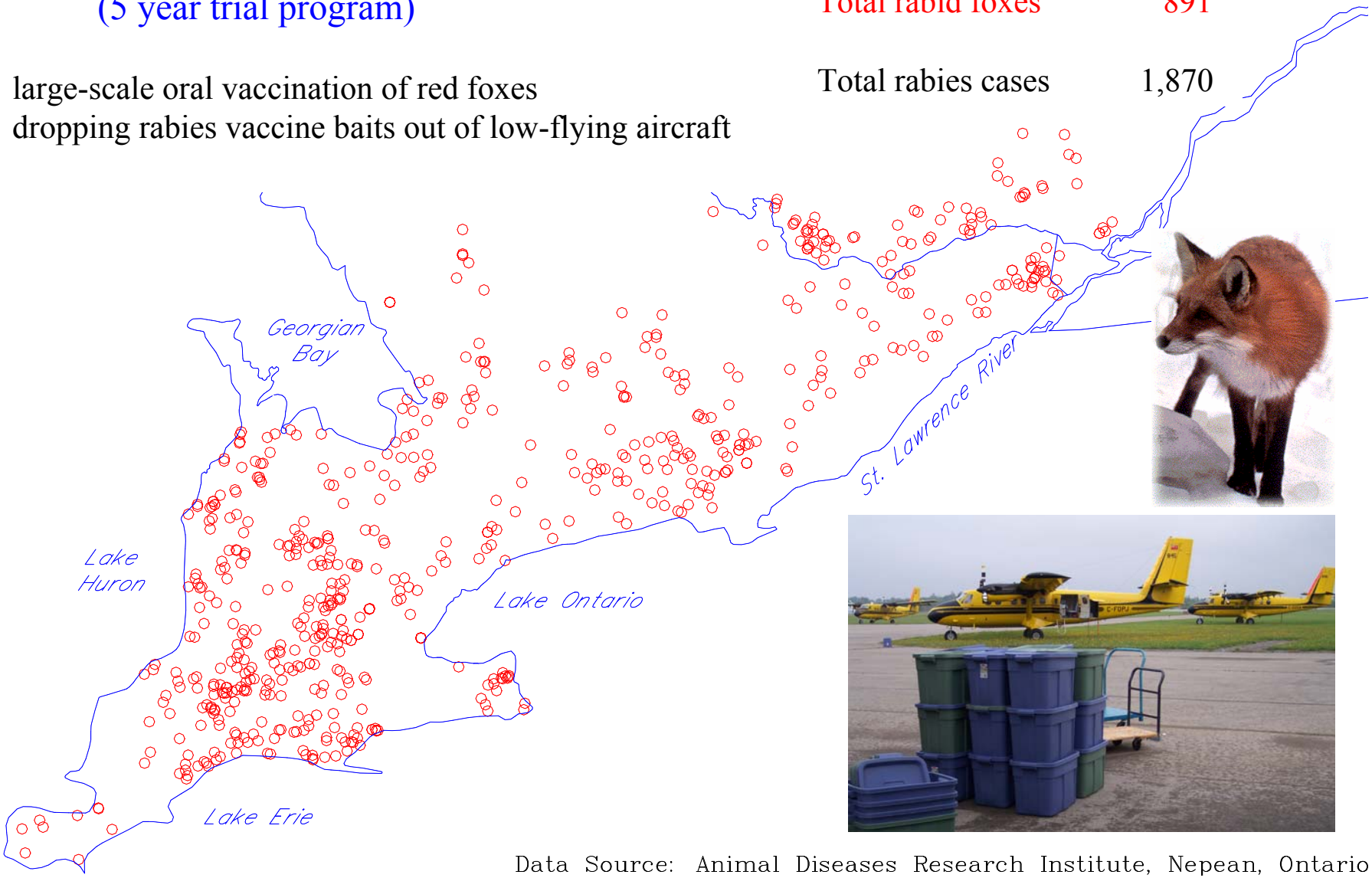
Drop large numbers of oral rabies vaccine baits (≥ 500,000) in late summer/early fall using MNR Twin Otter aircraft

Oral Rabies Vaccination (ORV)
Supported by WHO (1966)

1989 – Start of aerial baiting program in E Ontario (5 year trial program)

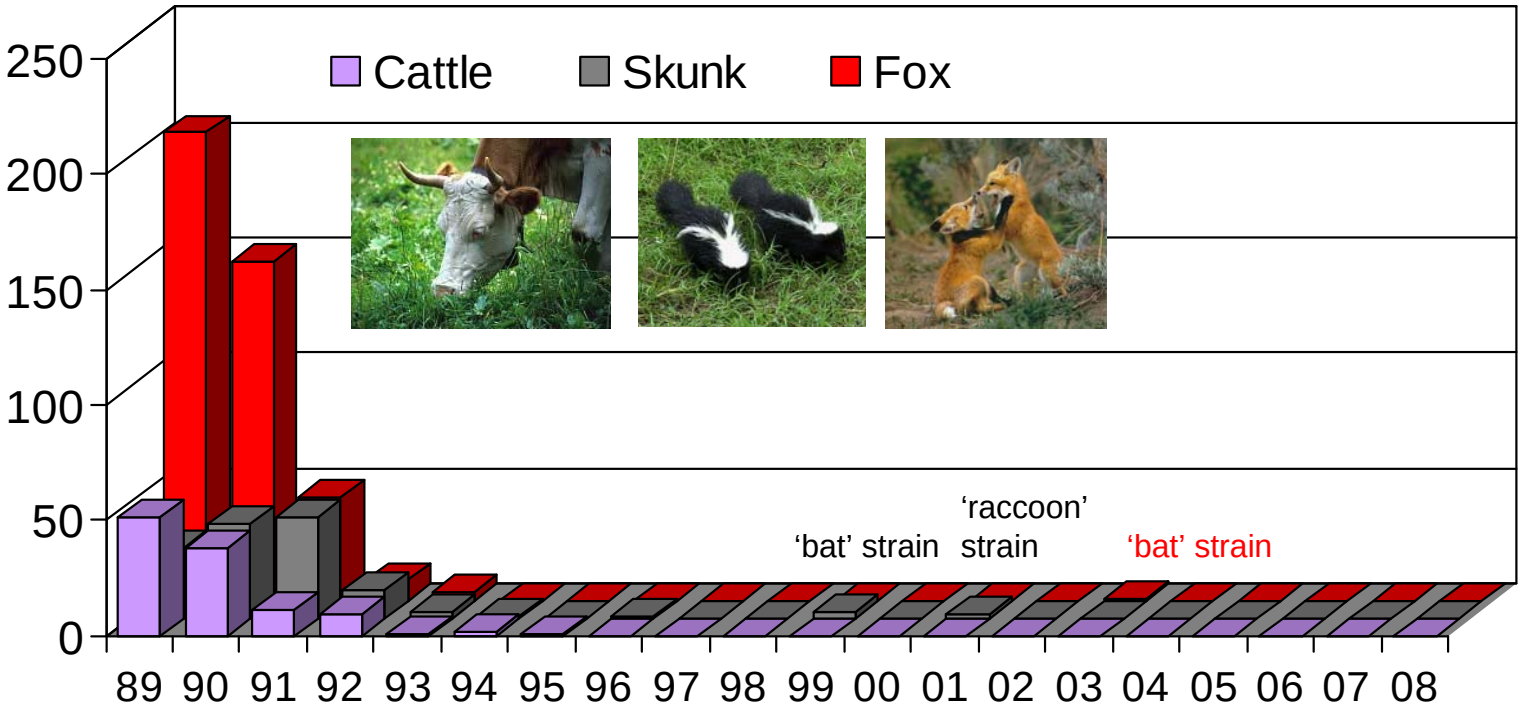
Rabid foxes in E Ontario	203
Total rabid foxes	891
Total rabies cases	1,870

- large-scale oral vaccination of red foxes
- dropping rabies vaccine baits out of low-flying aircraft



Data Source: Animal Diseases Research Institute, Nepean, Ontario

Decline in ‘arctic’ strain rabies in E Ontario 1989 - 2008



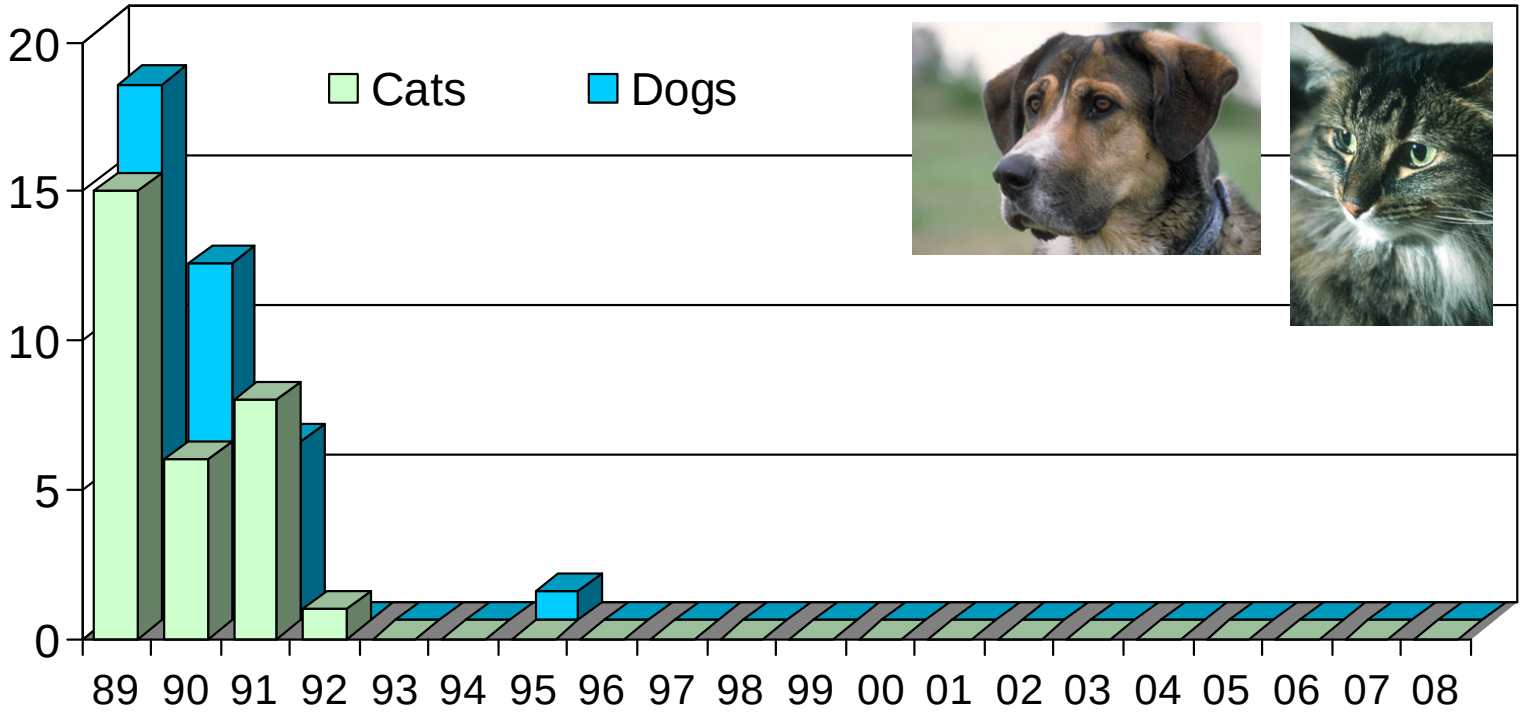
No rabid foxes with ‘arctic’ strain rabies since 1994

No rabid cows since 1996

No rabid skunks with ‘arctic’ strain rabies since 1997

Aerial baiting begins In Eastern Ontario

Decline in ‘arctic’ strain rabies in E Ontario 1989 - 2008

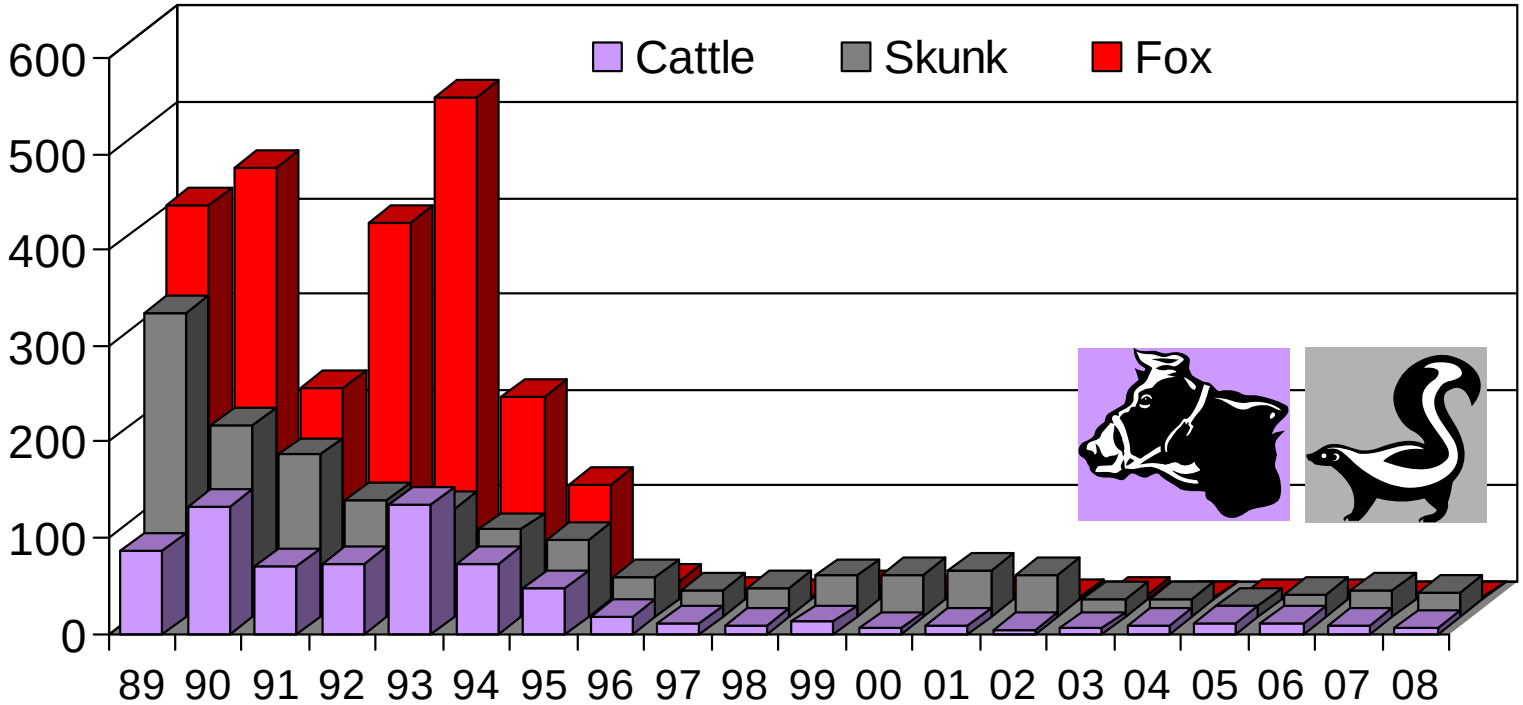


No rabid cats since 1993

Aerial baiting begins
In Eastern Ontario

No rabid dogs since 1996

Decline in ‘arctic’ strain rabies in SW Ontario 1989 - 2008



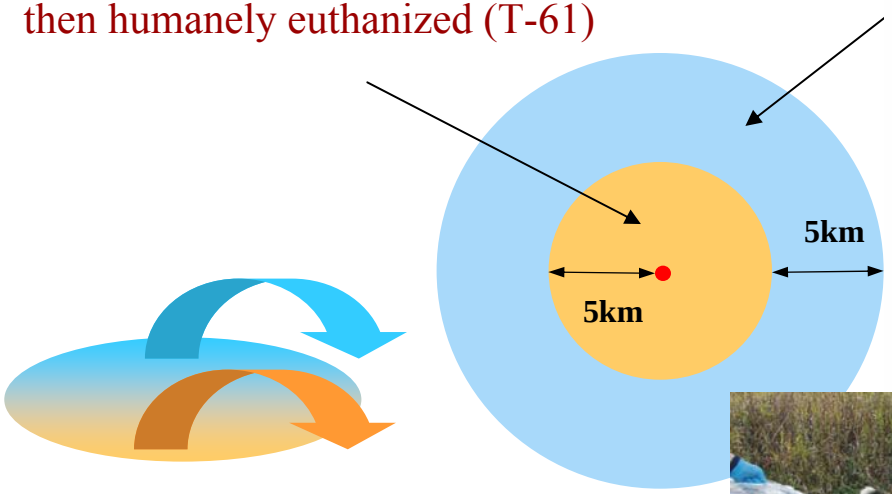
Aerial baiting begins
in C and SW Ontario

Second rabies control program was implemented in E Ontario to control 'raccoon' rabies in raccoons…

<u>Methods</u> → Population Reduction, Trap-Vaccinate-Release & Aerial Baiting (V-RG)

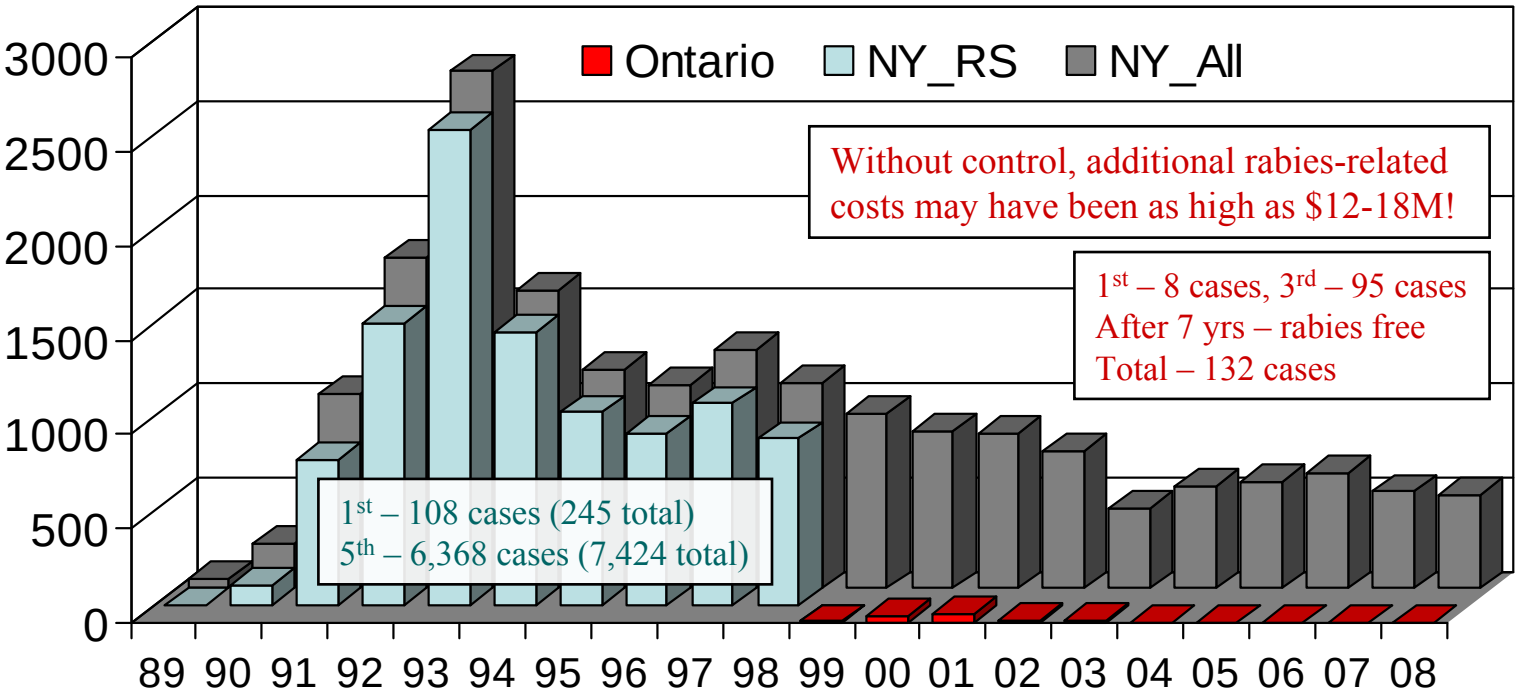
TVR – Vaccinated (Imrab®3), ear-tagged and then released at the point of capture

PR – Live-trapped, anesthetized and then humanely euthanized (T-61)



- Remove clinically rabid animals or animals incubating the virus

Support for rabies control programs...

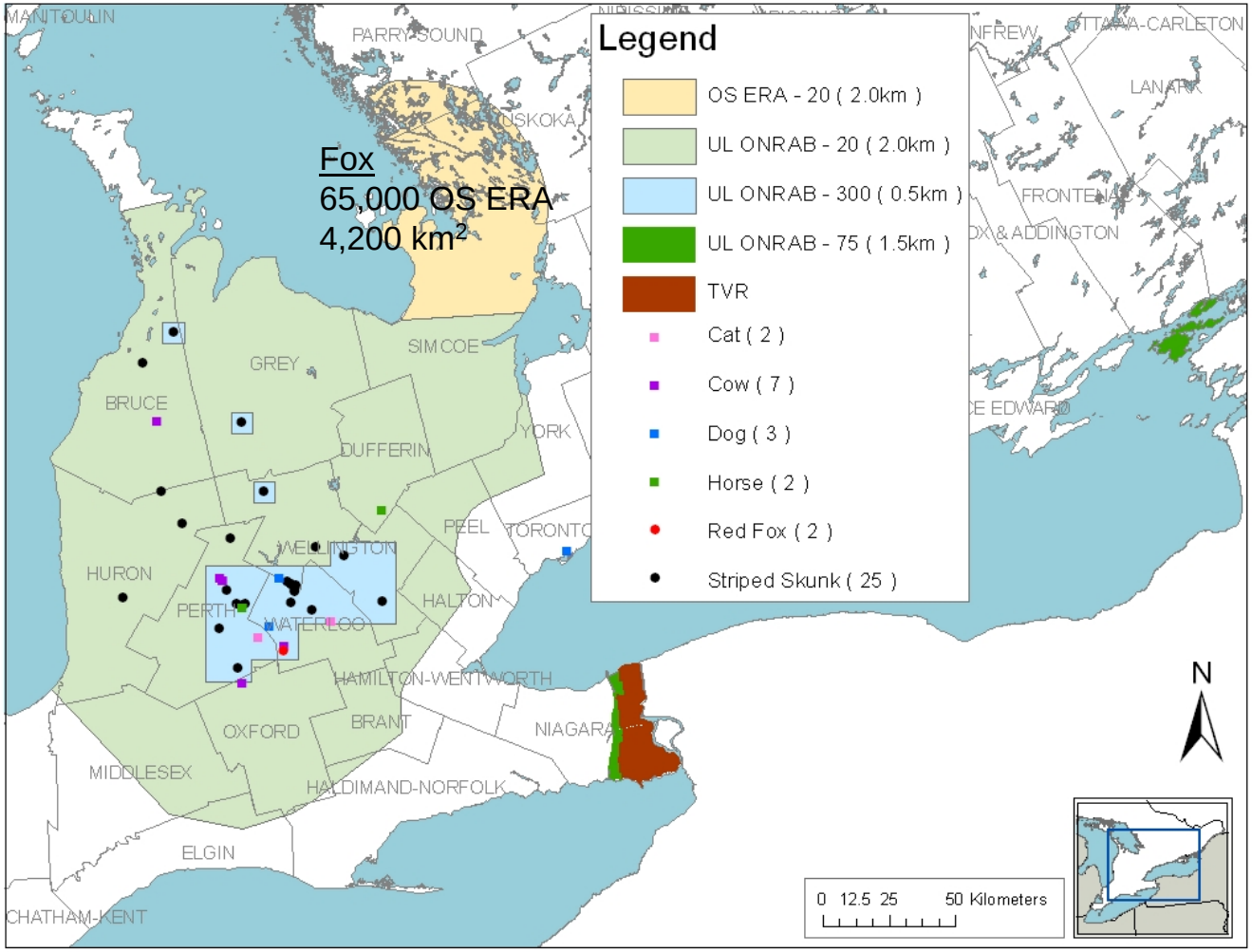


'Raccoon' rabies enters Ontario
Rabies control = PR + TVR + ORV

'Raccoon' rabies enters NY State
No rabies control

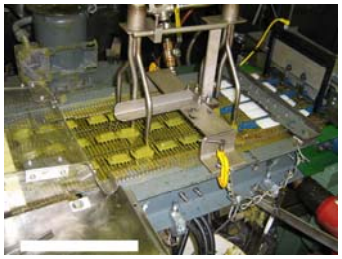
Rabies control begins in NY State:
ORV using V-RG rabies vaccine

Oral rabies vaccination program in 2008



Fox
430,000 UL ONRAB
25,000 km^2
20 baits/km^2

Skunk plots
516,000 UL ONRAB
2,500 km^2
300 baits/km^2



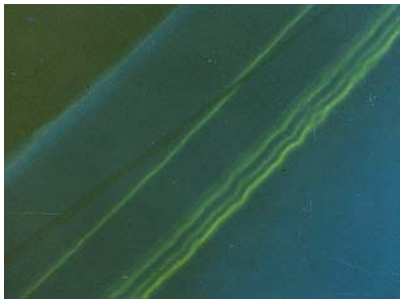
Current research...

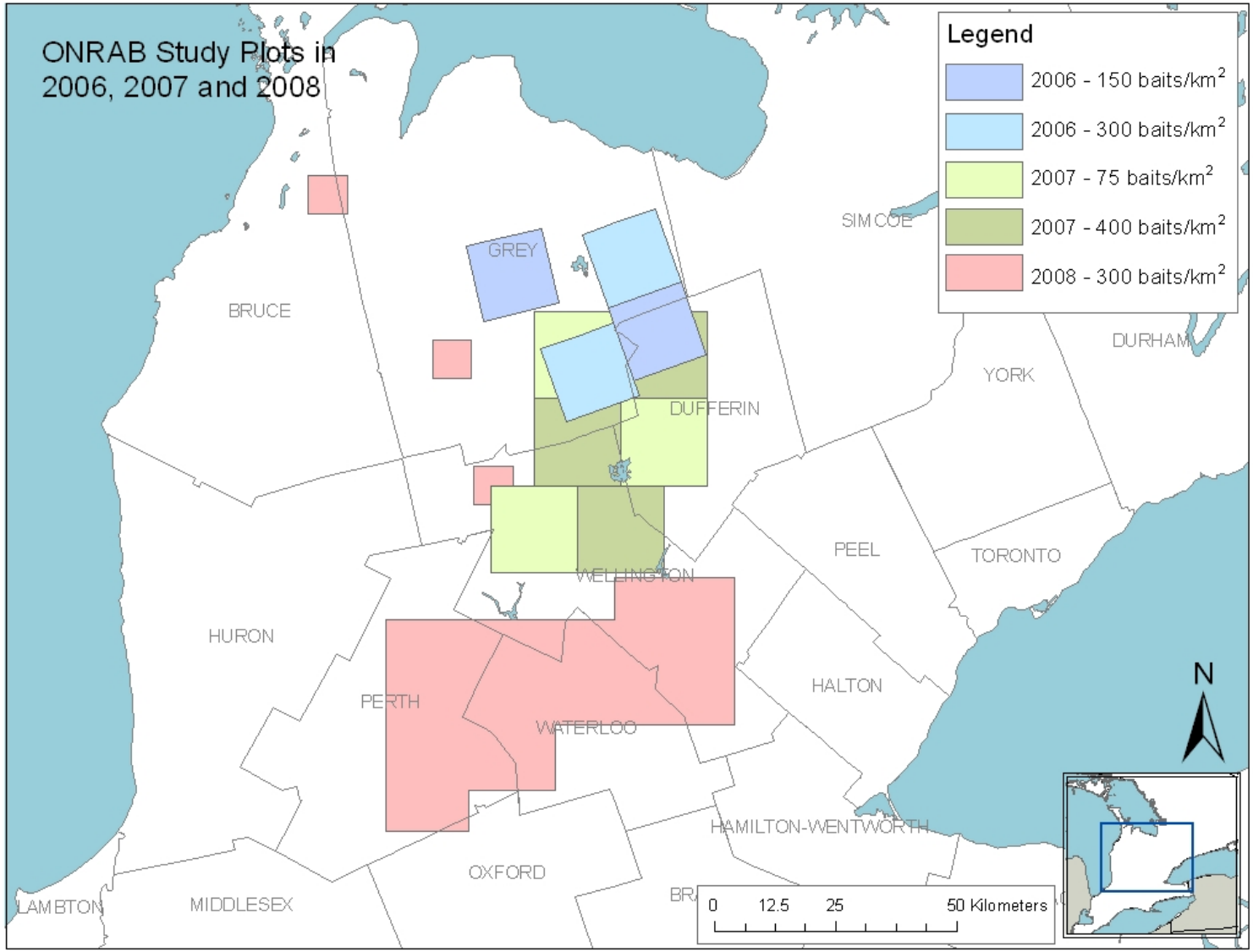
Longitudinal serology studies using captive animals

Year	Species	Vaccine	Bait	Sera sampling	Challenge Complete
2003	RAC	V-RG	OS	0, 1-16	Yes
	RAC	IMRAB®3	NA	0, 1-16	Yes
2007	RAC	ONRAB	UL	0, 1-16	Yes
	SSK	ONRAB	UL	0, 1-16	Yes
2008	RFX	ONRAB	UL	0, 1-16	No
2009	SSK	ONRAB	UL	0, 5	No
	SSK	ONRAB	Oral	0, 5	No

Field research...

Bait acceptance, serology, and vaccine efficacy in raccoons and striped skunks




ONRAB Study Plots in
2006, 2007 and 2008
Legend
2006 - 150 baits/km2
2006 - 300 baits/km2
2007 - 75 baits/km2
2007 - 400 baits/km2
2008 - 300 baits/km2
SIMCOE
GREY
BRUCE
DURHAM
YORK
DUFFERIN
PEEL
TORONTO
WELLINGTON
HURON
HALTON
PERTH
WATERLOO
N
HAMILTON-WENTWORTH
OXFORD
LAMBTON
MIDDLESEX
0
12.5
25
50 Kilometers

Pattern of infection…

1. Raccoon bitten by a rabid animal.

2. Rabies virus enters the muscle through infected saliva.

3. Incubation (3-12 wks)... virus spreads from the muscle to the spinal cord and brain within nerves.

The animal does not appear ill during this time.

Also, a bite by the animal during this period does not carry a risk of rabies because the virus is not in saliva.

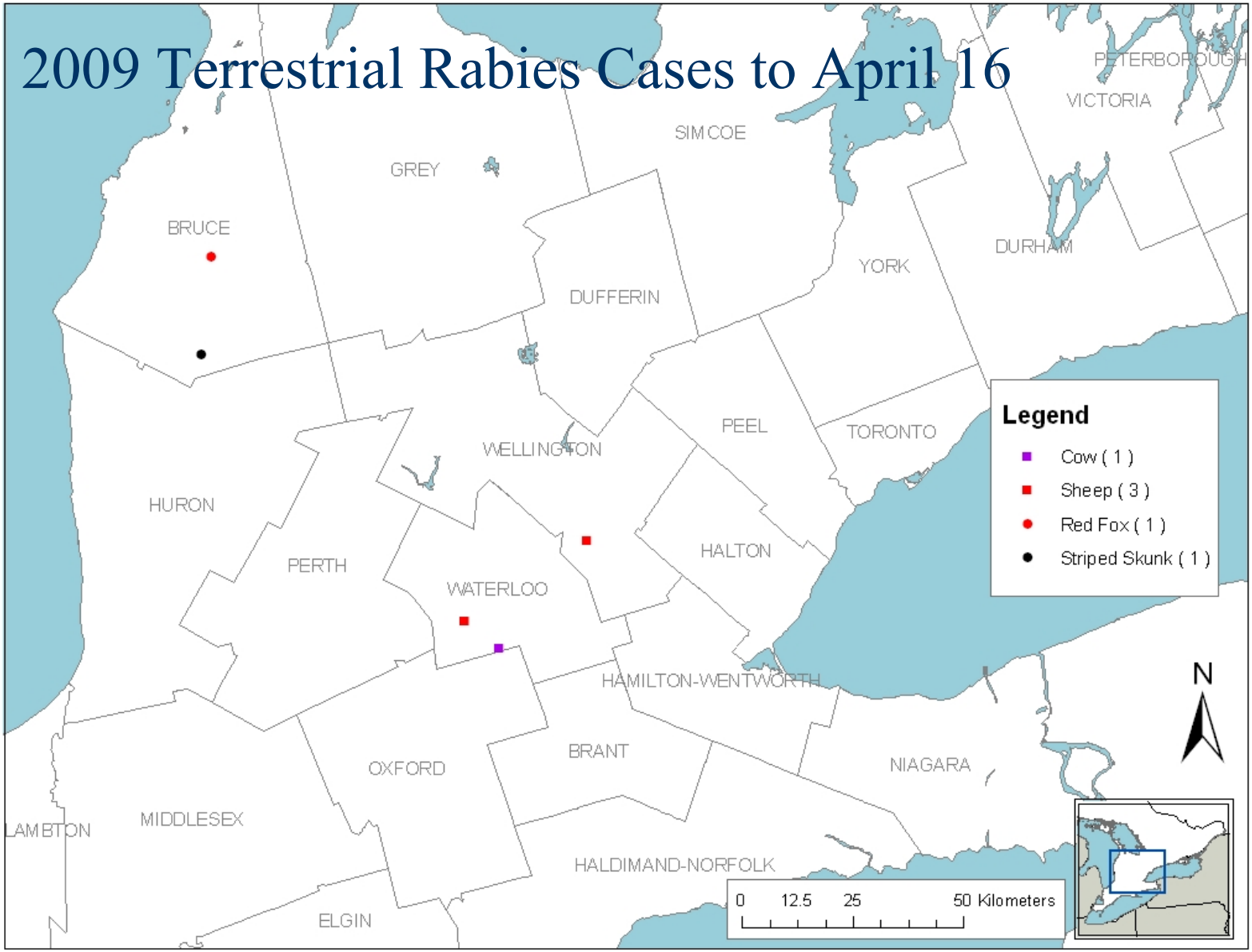
4. Virus multiplication... in the brain the virus multiplies rapidly and then passes to the salivary glands and saliva.

Most animals begin to show signs of disease at this time.

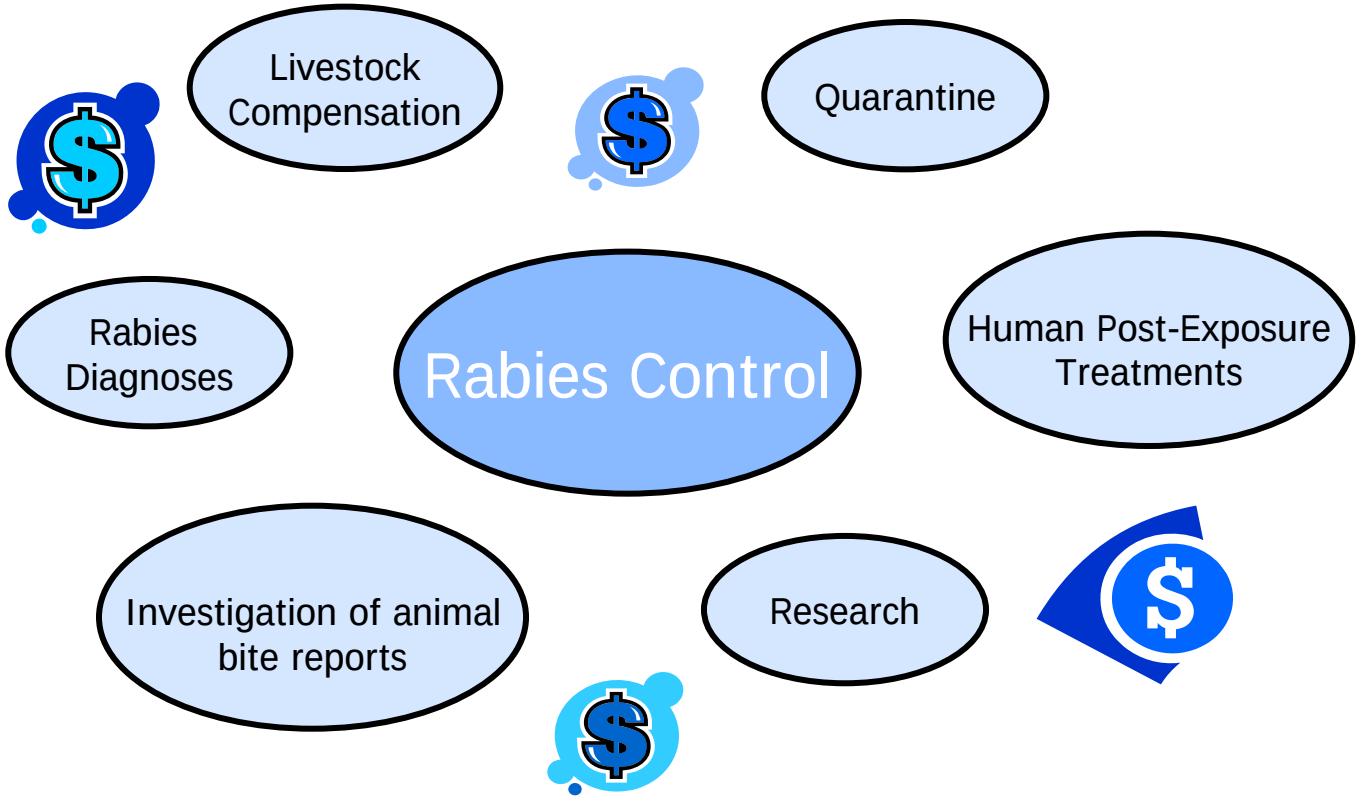
5. Infected animal usually dies within 7 days of becoming sick.

Respiratory & cardiac failure

2009 Terrestrial Rabies Cases to April 16



It is currently cheaper to control rabies than to payout for all rabies-related costs in an uncontrolled situation.



e-mail: lucy.brown@ontario.ca

http://rabies.mnr.gov.on.ca/

Collaborative Agencies:

Artemis Technologies – vaccine development & bait production

Canadian Food Inspection Agency – sera sample analyses & rabies challenge experiments

Centre for Disease Control, Atlanta, GA – rabies challenge experiment