



# **Ontario Chronic Wasting Disease Surveillance Program**

## **2015 to 2016 Program Update**

**Wildlife Research and Monitoring Section**

## 2015 to 2016

### Program Update

Wildlife Research and Monitoring Section  
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## Summary

During 2015, as part of Ontario's chronic wasting disease (CWD) surveillance program, a total of **305** white-tailed deer (*Odocoileus virginianus*) samples from the Sudbury, North Bay, Parry Sound, and Huntsville areas were collected and tested. This sample size was below the target sample size of 460 but is sufficient to detect if CWD was present in 5% or more (94% confidence level) of the population within the surveillance zone. Most samples (94%) were collected in the first two weeks of November 2015 during the gun hunt, with the remainder collected during the archery season from October through December. CWD was not detected in any of the samples. Since the CWD surveillance program began in 2002, 10,722 samples have been analyzed. To date, no cases of CWD have been detected in wild deer populations in Ontario.

## Introduction

CWD is a fatal disease that infects members of the cervid family. The disease is caused by abnormally folded proteins called prions, which cause brain lesions leading to death. The disease is not known to naturally infect species other than those in the cervid family. CWD is endemic in several states in the western United States (i.e., Colorado and Wyoming) and has been identified in two western Canadian provinces (Alberta and Saskatchewan). Since 2003 it has also become established in several eastern U.S. states (e.g., Wisconsin, Illinois, Pennsylvania, Maryland, West Virginia). Currently, CWD is not known to exist in Ontario but has been discovered in all five bordering states: Minnesota (2002), New York (2005), Michigan (2008 in captive animals, 2015 in free-ranging animals), Pennsylvania (2012), and Ohio (2014). In the primary infection area of the western U.S., white-tailed deer (*Odocoileus virginianus*), elk (*Cervus canadensis*), and mule deer (*Odocoileus hemionus*) have been shown to be very susceptible to CWD and several moose (*Alces alces*) have also tested positive for CWD.

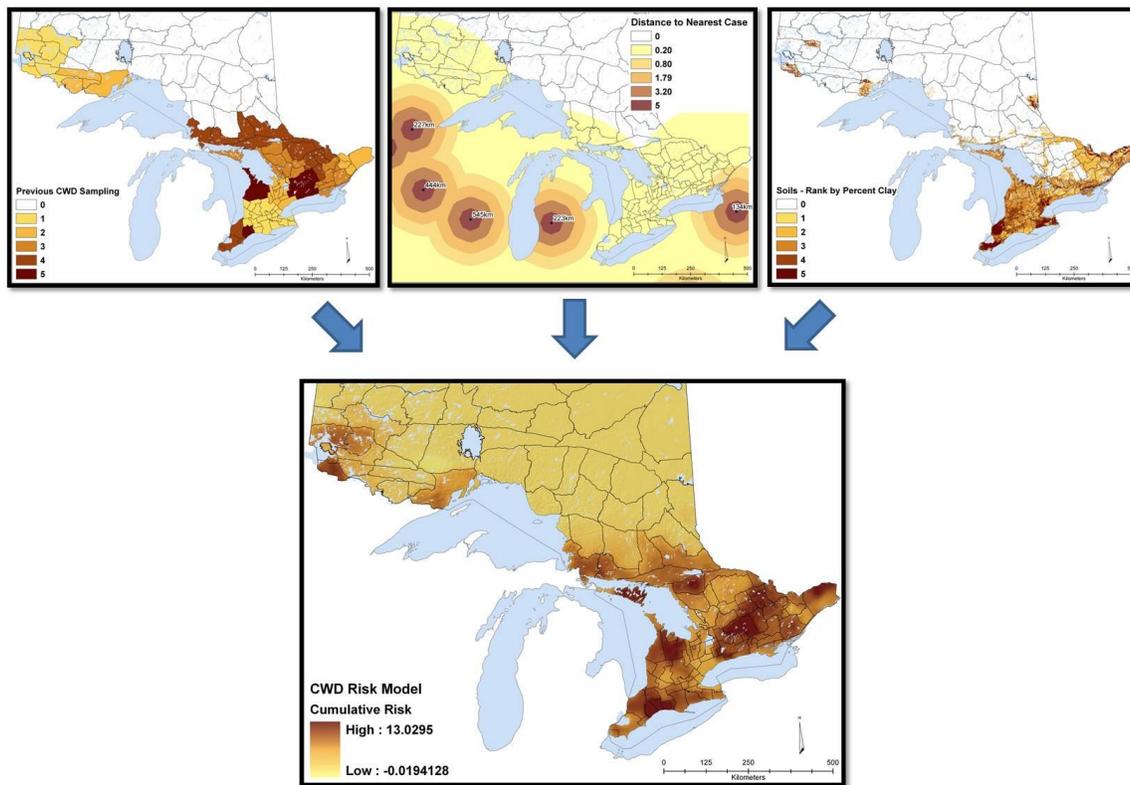
## Ontario surveillance program background

Due to increasing concern about diseases in Ontario's white-tailed deer and restored elk populations, a surveillance pilot project was initiated in 2002 to determine whether CWD was present in Ontario's wild cervid populations. The *Ontario Chronic Wasting Disease Surveillance* program became operational in 2003.

Each year, surveillance samples are collected from hunters during the fall. Small crews of MNRF staff roam patrol areas in the predetermined surveillance area, asking hunters for permission to remove a brain and lymph node sample from their harvested deer. Hunters also have the option of dropping off deer heads at depots within the surveillance area.

Assuming random sample distribution, a sample size of 460 is adequate to detect if CWD was present in 1% or more (99% confidence level) of the population within the surveillance zone. Initially in 2003, the province was divided into 14 CWD surveillance zones prioritized by CWD risk factors, with one zone surveyed per year. To expedite surveillance of the province, the number of CWD zones surveyed per year was increased from one to three zones per year between 2005 and 2010. In 2010, when surveillance of all 14 CWD zones was complete, several factors (new research findings,

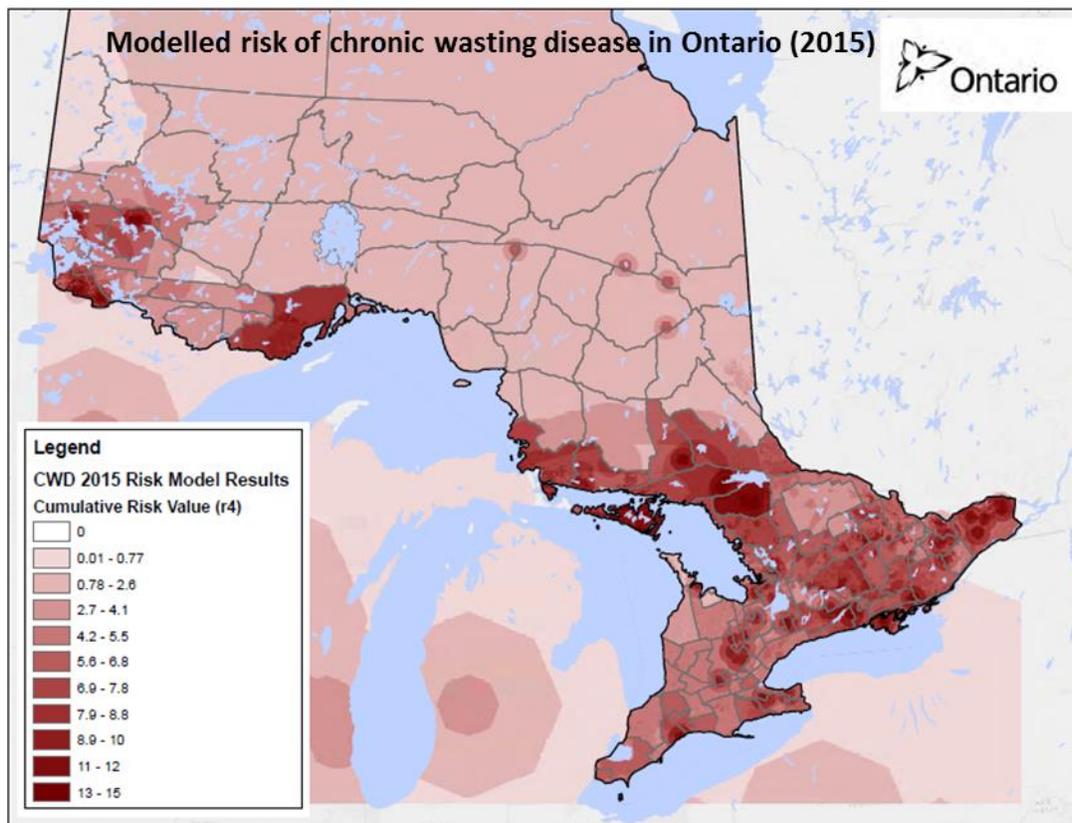
financial pressure, and maturation of the program) led to the development and use of a dynamic risk-based surveillance program, and a decrease in the number of surveillance zones monitored each year. Instead of following a pre-determined schedule of zones to be tested each year (as in the past), a dynamic model was developed to predict highest risk areas of the province annually (Figure 1). Risk inputs used in the current model are (in order of importance): estimated cervid farm density, estimated wild deer density, proximity of neighbouring CWD outbreaks, years since last surveillance, presence of restored elk population, deer wintering concentrations, and soil type. Each year, new data are input to determine the areas with the highest risk, which informs the choice of surveillance area for that year.



**Figure 1. Example of risk layers compiled to produce a spatially quantified risk assessment for chronic wasting disease in cervids to help inform choice of surveillance areas in Ontario.**

## 2015 Results

Using the Ontario CWD risk model, we identified the area south of Sudbury and North Bay to Parry Sound and Huntsville as having the highest risk of CWD in 2015 (Figure 2). Accordingly, CWD surveillance was conducted in Sudbury, Parry Sound, and Muskoka counties, which included [Wildlife Management Units](#) (WMU) 42, 46, 47, 49, and 50 (Figure 3). Freezer depots were established at seven locations throughout the sampling area. Depots were opened in mid-October and remained open throughout the entire hunt so archery hunters could drop off their deer heads. Most of the samples (78%) were collected by MNRF crews during the two week firearm hunt (Nov. 2-15, 2015). The remaining samples (22%) were collected by the depots. Fourteen of the samples deposited at the depots were collected during the archery season (5%), while 80 additional samples (26%) were deposited at the depots during the firearm season. All samples were screened for CWD at the Animal Health Lab in Guelph, Ontario, using enzyme-linked immunosorbent assay (ELISA) tests. In total, 305 white-tailed deer were sampled and screened for CWD; all tested negative. Though our target was 460 individuals, which would have been adequate to detect if CWD was present in 1% or more (99% confidence level) of the population within the surveillance zone, 300 samples is adequate to detect CWD presence in 5% or more (94% confidence level) of the population within the surveillance zone. [Annual test results are posted on the Internet.](#)



**Figure 2. Modelled risk of chronic wasting disease in Ontario for 2015. The darker the area, the higher the expected risk.**

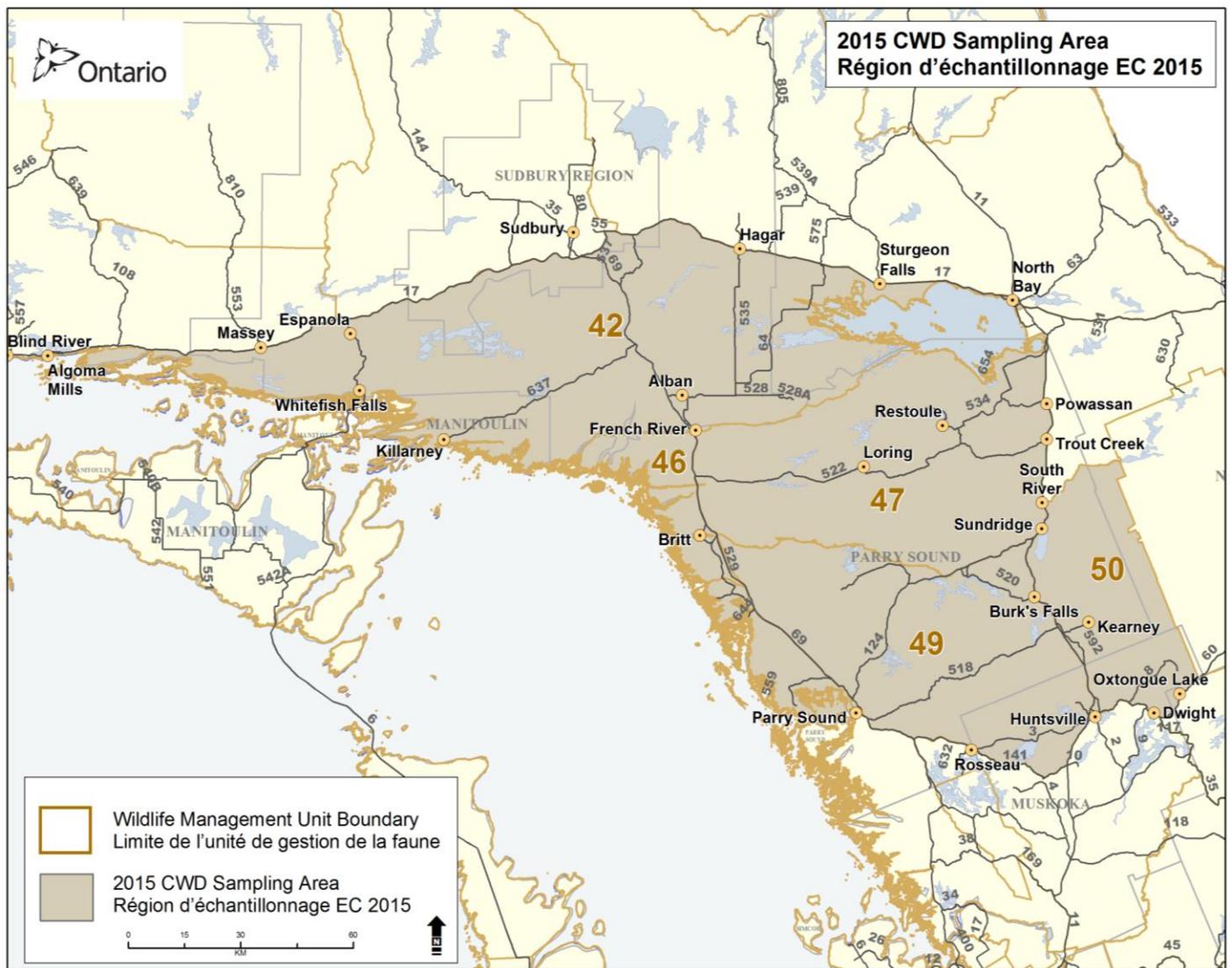
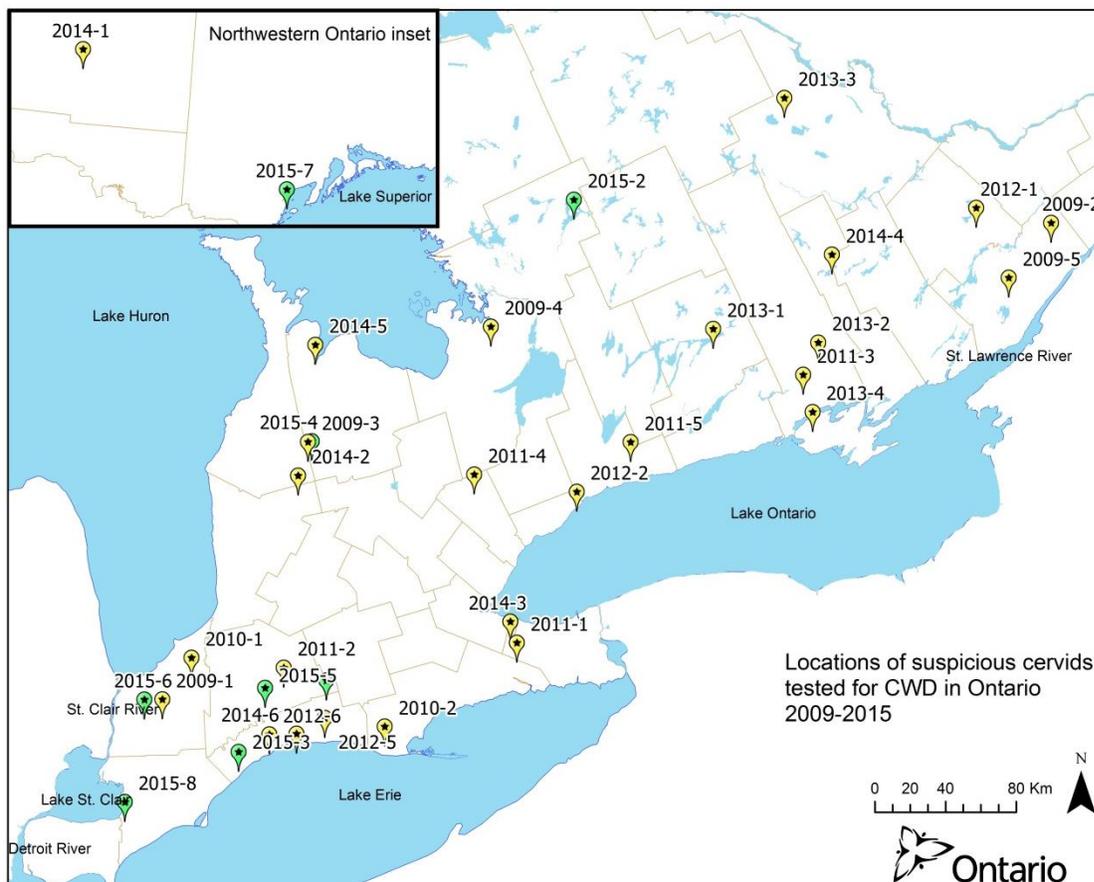


Figure 3. Area of 2015 chronic wasting disease (CWD) surveillance in central Ontario.

## Other sampling

In addition to our annual surveillance, we also opportunistically test samples from deer that display CWD-like symptoms as reported by the public or MNRF offices during any time of the year, from anywhere in the province. In 2015, nine deer with abnormal behaviour or appearance were tested, one each from Harrietsville, Dwight, West Lorne, Hanover, Delaware, Petrolia, Thunder Bay, Lambton County, and the St. Clair National Wildlife Area. Post-mortems on these animals were performed by the Canadian Wildlife Health Cooperative (CWHC) in Guelph, Ontario. All animals tested negative for CWD. Suspected causes of abnormal appearance or behaviour were: emaciated and uncoordinated, very skinny and bold, three unknowns, falling and very skinny, brain abscess, and unknown, respectively. Since 2009, 35 cervids displaying abnormal, CWD-like behaviour have been necropsied and tested for CWD (Figure 4).



**Figure 4. Locations of cervids displaying abnormal or CWD-like symptoms tested in Ontario since 2009. Green markers indicated 2015 samples.**

## Program results to date

This was the 13th operational year of the CWD surveillance program. All areas of the province with significant deer populations have been surveyed at least once, and many of the highest priority areas have been surveyed two or three times. To date, 10,722 wild cervids (10,710 white-tailed deer and 12 elk) have been tested for CWD during regular surveillance (Table 1).

**Table 1. Numbers of surveillance samples collected per year in Ontario.**

Year	Surveillance area	Wildlife Management Units	Deer tested
2002	Owen Sound-Hanover	82, 84 (pilot year)	183
2003	Ottawa-Cornwall	64, 65, 66	471
2004	Toronto-Barrie	76, 77, 78B-E, 81	427
2005 <sup>1</sup>	Guelph-Goderich	79C, 80, 85, 86, 87A, 87C	269
2005 <sup>1</sup>	London-Niagara Falls	79D, 87B, 87D-E, 88, 89, 90, 91, 92	467
2005 <sup>1</sup>	Kingston-Brockville	62, 66A, 67, 68B, 69	500
2006 <sup>2</sup>	Kenora-Fort Frances	5, 6, 7, 8, 9, 10, 11A	491
2006 <sup>2</sup>	Lindsay-Peterborough	60, 71, 72, 73, 74, 75, 78A	520
2006 <sup>2</sup>	Owen Sound-Hanover	82, 83, 84	371
2007	Pembroke-Bancroft	48, 51, 55, 57, 58, 61	393
2007	Windsor-Sarnia	93, 94	249
2007	Sault Ste. Marie-Sudbury	36, 37, 38, 39, 45	239
2008	Kingston-Lanark	59, 62, 63, 67, 68, 69, 70	487
2008	Manitoulin	43, 44	480
2008	Parry Sound-North Bay	42, 46, 47, 49, 50, 53, 54, 56	521
2009	Thunder Bay-Ignace	11B, 11C, 12, 13, 14, 28	110
2009	Ottawa-Cornwall	64, 65, 66	349
2009	Toronto-Barrie	76, 77, 78B-E, 81	298
2010	Guelph-Goderich	79C, 80, 85, 86, 87A, 87C, 92A	518
2010	London-Niagara Falls	79D, 87B, 87D-E, 88, 89, 90, 91, 92D	513
2010	Kenora-Fort Frances	5, 6, 7, 8, 9, 10, 11A	362
2011 <sup>3</sup>	Peterborough-Bancroft	57, 60, 74, 75	495
2012	London-Sarnia	90B, 92, 93	488
2013	Pembroke-Mattawa	48, 55, 58, 59, 63	495
2014	Owen Sound-Goderich	82, 83, 84, 85	496
2015	Parry Sound-North Bay	42, 46, 47, 49, 50	305
<b>Total</b>			<b>10,722<sup>1,2</sup></b>

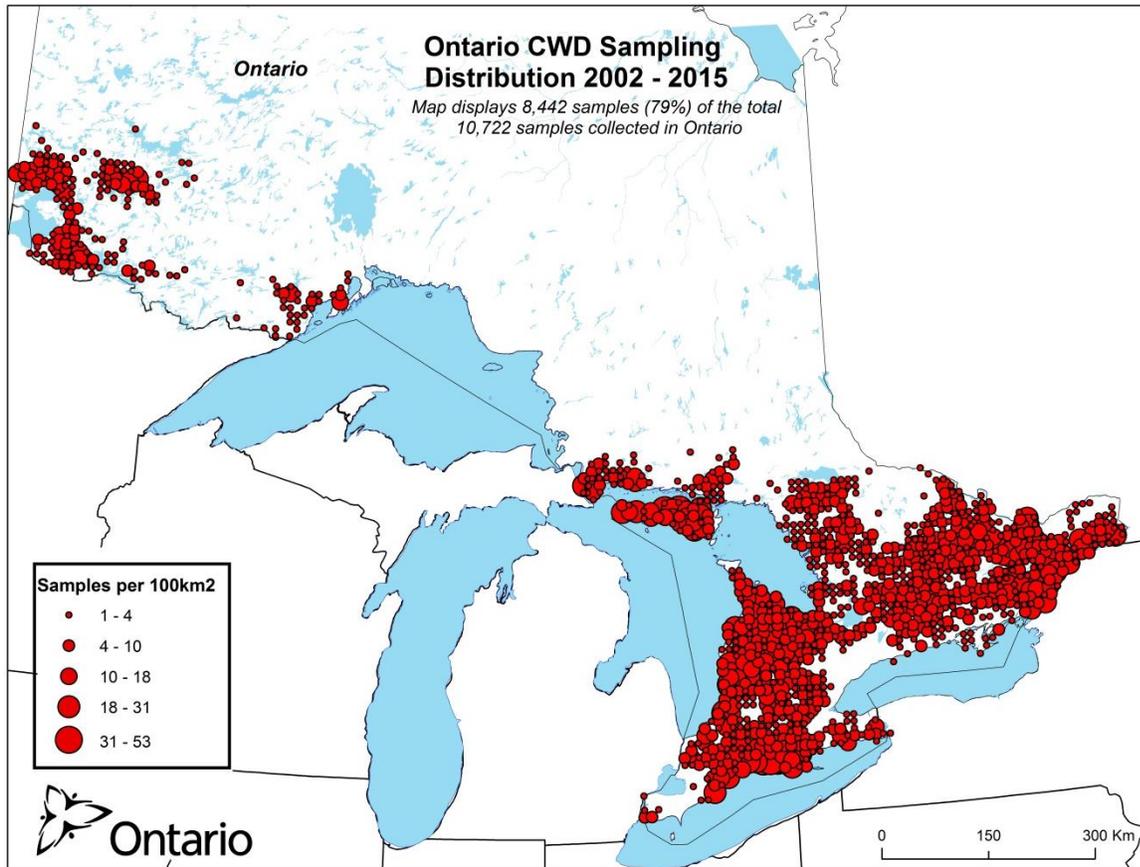
<sup>1</sup>An additional 175 samples were collected in 2005, but zones not recorded.

<sup>2</sup>An additional 50 samples were collected in 2006, but zones not recorded.

<sup>3</sup>Twelve of the 2011 samples were wild elk harvested from the 2011 elk hunt.

Sampling in Ontario is confined to areas with medium to high deer population densities. Much of northern Ontario either contains very low or no deer populations. Sampling is therefore confined to southern, central, and northwestern Ontario. In southern Ontario, the sampling has

been relatively evenly distributed (Figure 5), but with high concentrations in southeastern and southwestern Ontario where some WMUs have been sampled three times. Areas such as Windsor may appear to have had little or no sampling, but this is an artifact of differences in location data (townships vs. bird breeding squares) resulting in sample locations not being displayed on the map. The only areas of southern Ontario that have not received adequate sampling are the Greater Toronto Area (GTA) and Algonquin Provincial Park. This is due to lack of deer hunting in the former and hunting restrictions in the latter. In northwestern Ontario, sample distribution is a function of suitable deer habitat and is focused around the Thunder Bay, Fort Frances, Dryden, and Kenora areas.



**Figure 5. CWD sample collection locations in southern and northwestern Ontario between 2002 and 2015. (Note: Reflects 79% of the total samples collected and tested.)**

### Neighbouring jurisdictions

CWD has been detected in all five U.S. states that share a border with Ontario. No further cases have been discovered in New York State since the initial seven cases detected in 2005 (five cases on a cervid farm and two cases in wild white-tailed deer) near Syracuse (130 km south of the Ontario border near Kingston). After extensive testing over six years turned up no new cases of CWD, in 2010 the containment area restrictions were lifted (Figure 6).

In Minnesota, the first case of CWD was discovered in 2010 in a wild deer in the southeast part of the state, which initiated the implementation of a CWD management zone in a seven mile radius of the case. Over 4,000 deer in that area were tested for CWD and all tested negative. It appears the Minnesota response may be another successful example of vigorous surveillance, early detection, and rapid response preventing further CWD spread. The Minnesota wild deer case was approximately 450 km south of the border with northwestern Ontario.

In Michigan, a case of CWD was diagnosed in 2008 on a game farm near the city of Grand Rapids (220 km west of the Ontario border at Windsor). A containment area was established in the townships around the game farm, and extensive testing did not discover any further cases. In May 2015, presumably independently, a free-ranging deer near Lansing was Michigan's first confirmed case of CWD in a wild deer. It was located about 100 km east of the previous case and about 120 km west of Windsor. As of July 2016, more than 5,200 deer have been tested with seven deer testing positive for the disease. All were found within the CWD management zone.

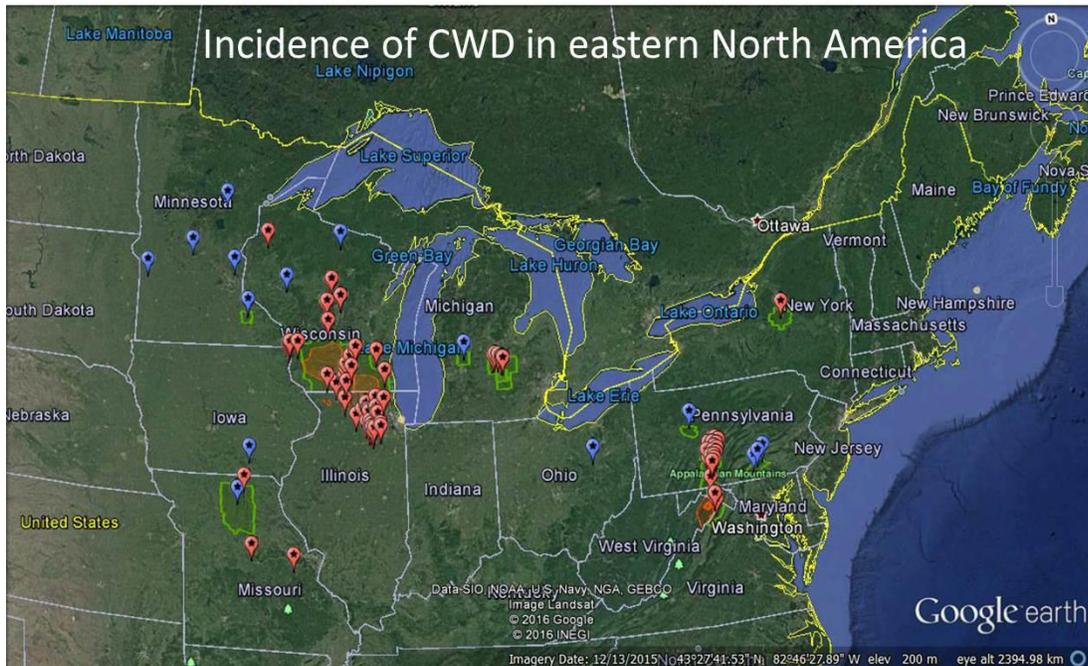
In Pennsylvania, the first cases of CWD were discovered in 2012 in two locations within the state. Several cases were detected on game farms in the southeast part of the state (near Harrisburg) and three cases were detected in wild deer shot during the 2012 hunt in the south-central part of the state (120 km east of Pittsburgh). In 2013, another case was discovered in a hunted wild deer from the south-central outbreak area of the state. In September 2014, an adult white-tailed deer died on a game farm 120 km northeast of Pittsburgh. This case was located about 200 km south of the Ontario border at Fort Erie, and is considered to be the source of the recent CWD case on an Ohio game farm. Over 1,000 cervid game farms are operating in the state of Pennsylvania. In 2015, 12 additional white-tailed deer with CWD were detected in southcentral Pennsylvania ( $\approx$ 400 km south of the Ontario border), more than doubling the cases from 2012 to 2014 cases.

In October 2014, Ohio announced their first cases of CWD, in the state with 19 positive cases on a game farm located in the northeast part of the state (100 km south of Cleveland). The farm had been under quarantine since April 2014 after an investigation determined that the farm had a known connection with a game farm in Pennsylvania with animals that tested positive for CWD.

Ontario's Canadian neighbours (Quebec and Manitoba) remain CWD free and have ongoing surveillance programs.

Two large outbreaks of CWD exist in eastern North America (Figure 6). A very large outbreak in the southern Wisconsin-northern Illinois border area has persisted and grown since 2002, with more than 3,300 cases detected. Approximately 35 to 40% of adult male deer in the core area of the southwestern outbreak are infected with CWD. The prevalence continues to increase in affected deer populations in Wisconsin. This outbreak area is approximately 550 km west of the Ontario border at Windsor. The second, more recent, outbreak area is in the West Virginia-Virginia-Maryland-Pennsylvania area. It is a smaller area with lower prevalence rates of CWD

but the disease is probably spreading. This outbreak area is centred approximately 400 km southeast of the Ontario border at Niagara Falls.



**Figure 6. Incidence of chronic wasting disease (CWD) in eastern North America as of 2015. Red markers indicate cases of CWD found in wild white-tailed deer, blue markers indicate cases detected on game farms. Orange polygons indicate outbreaks (areas with numerous cases of CWD); green polygons are state implemented CWD containment zones.**

In 2016, the first detection of CWD in Europe occurred in a female free-ranging reindeer (*Rangifer tarandus tarandus*) in South-Norway. This is also the first detection of natural CWD infection in reindeer worldwide. Two more cases of CWD were detected in moose in Norway in May and June. Plans are underway to develop more information on CWD prevalence in reindeer and moose in Norway and to evaluate any potential changes in cervid populations.

## Acknowledgements

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Brian Tapscott at the Ontario Ministry of Agriculture, Food, and Rural Affairs has provided advice about the Ontario captive cervid CWD surveillance program. MNR staff from the Sudbury, Espanola, North Bay and Parry Sound district offices assisted with logistics, local knowledge, and inquiries from the public and media. Bart Brown (wildlife technical specialist,

Parry Sound), Mitch Turcott (conservation officer, Espanola area) and Paul Kennedy (resource technician, North Bay) helped us find depot locations.

MNRF staff: Charlotte Hooper from Fish and Wildlife Services Branch coordinated hunter information mail-out packages. Freya Long, also of Fish and Wildlife Services Branch, coordinated website updates and assisted with communications. Chris Heydon from Biodiversity Branch developed and maintained MNRF's CWD policies and CWD response plan document. MNRF regional biologists Brad Allison, Mike Gatt, and Peter Davis provided regional expertise and advice. Zaur Aliyev of Communication Services Branch posted test results online.

MNRF Wildlife Research and Monitoring Section staff Kevin Middel and Val von Zuben created maps and maintained the databases for the program. Kevin Middel was an integral developer of the Ontario CWD risk model and updates the model annually. Beverly Stevenson organized advertising campaigns, media requests, and internal communications and approvals. Mark Gibson led the surveillance crews and managed depot locations, sample logistics, and supply management. Tore Buchanan, Chris Heydon, Deanna Miller, and Chris Davies reviewed this report.

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Crew staff: Steve Bennett, Kelly Boadway, Laura Bruce, Tore Buchanan, Mike Elgar, Isaac Hebert, Riley Hotrum, Kraig Kavanagh, Sophia Konieczka, Derek Lipskie, Gord Meadows, Amanda Palahnuk, Haley Patterson, Lisa Pollock, Natalie Pulham, Matt Purvis, Allison Rosien, Bev Stevenson, Scott Taylor.

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