

DEAD BIRD SURVEILLANCE

Introduction

To date, approximately 150 species of birds in North America are known to have been infected by WNV.^{3,8,9} In Canada, wild birds such as crows, ravens, blue jays, gray jays and stellar's jays have been found to be susceptible to WNV and often die from the infection due to inflammation of the brain and other organs.⁹

The American crow, *Corvus brachyrhynchos*, has been found to be the most sensitive indicator of WNV activity. In 2002 in the United States, crows, blue jays and other members of the family *Corvidae* (called "Corvids") accounted for 90% of WNV-infected birds, with crows having the highest rate of WNV infection.⁴ Consequently, it is crows that are most closely monitored by health authorities, including Peel Health.

The wild bird surveillance program operated by the Canadian Cooperative Wildlife Health Centre (CCWHC) has been in place since May 2000.² The program tests only members of the crow family (e.g. crows, gray jays, ravens and magpies). In 2000, 2,288 birds were examined and none were found to have WNV present. In 2001, 3,911 birds were tested and 128 (3%) were found to have the virus. In 2002, 3,478 birds were examined and 563 (16%) were found to be WNV-infected.

Surveillance programs for dead birds entail finding birds freshly dead in the wild during mosquito season, collecting their carcasses and testing them for the presence of the virus in their tissues.² Factors such as the density of the human population in a given area will affect the number of dead bird sightings in that area. It is important to understand that the purpose of dead bird surveillance is not to monitor the status of bird health with respect to WNV, but rather to establish whether or not WNV is present in a given area.¹⁰ The presence of WNV in dead birds serves as an early warning of risk to human health.

Information about the presence of WNV is important for decision making on WNV control measures. In any given year, once it has been established that WNV is present among some of the birds within a given area, it is assumed that WNV infection exists throughout the flocks of birds in that area, and that any large 'die-offs' are due to WNV. Therefore further testing is no longer required.¹⁰

Methods

In the spring and summer of 2002, members of the public were asked to contact public health authorities if they found dead crows, taking note of the location and condition of the bird. Municipal animal control services initially collected the dead crows, and public health sent the specimens to the CCWHC laboratory in Guelph, Ontario. Tissue



samples taken in Guelph were sent to Health Canada's National Microbiology Laboratory in Winnipeg for WNV testing and results were then reported back to public health agencies. Beginning in 2003, testing will be done with a new rapid test by the CCWHC laboratory in Guelph, decreasing the time to receive results.

Information on the locations of the dead crows was collected from callers and/or by obtaining actual latitude and longitude measures using hand-held global positioning system (GPS) devices. The information, including date collected and test result, was entered into a geographic information system. Analyses were conducted by week of collection. The numbers used throughout this report to describe the weeks of the year can be found in Appendix A.

The number of dead crow specimens that could be tested in 2002 was limited because of capacity issues at the CCWHC and Health Canada laboratories. Once the virus was identified in crows in Peel, testing was discontinued as it was established that WNV activity was present in the area. Limited testing of dead crows resumed in the fall to see the seasonal extent of WNV infection in birds. Dead crow sightings continued to be reported throughout the fall; however, dead crows were not picked up and sent for testing after October 28, 2002.

Results

The first WNV-infected dead bird of 2002 in all of Canada was found in Peel on May 19, 2002. A total of 1,436 dead crow sightings were reported to Peel Health in 2002. As of December 17, 2002, at least one positive dead bird had been found in every health unit area across Ontario with the exception of Timiskaming.¹¹

Dead birds were collected from May to October, with the last WNV-positive dead bird found on the 28th of October in Caledon. A sharp increase in the number of sightings began to occur in the third week of July (Week 30 – see Figure 1). With the exception of the 2nd week in August (Week 33), this increase continued until it peaked during the last two weeks of August (Weeks 34 and 35), with 245 and 242 dead bird sightings, respectively. The sharp increase in dead bird sightings occurred one-to-two weeks earlier in Mississauga than in Brampton, and appeared to move from the Lake Ontario shoreline northward.

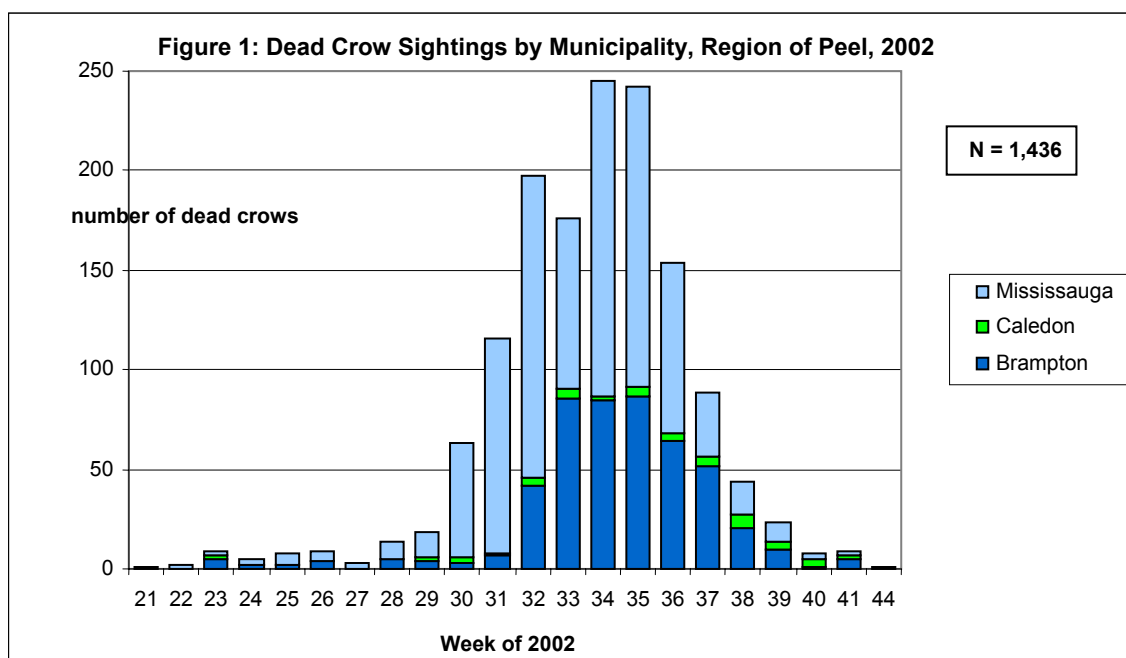
All three area municipalities reported dead crows in 2002; however as expected, more were found in populated areas than in rural areas (Figures 2 and 3). Densities of dead crows reported per square kilometre, were mapped by Forward Sortation Area (FSA – the first three-digits of the postal code) and are depicted in Figure 3. Higher densities of dead crows occurred in the southern areas of Mississauga, with the highest bird densities per square kilometre occurring in the L5H and L5G areas where between 8 and 9.99 dead birds per square kilometre were sighted.



West Nile Virus in the Region of Peel 2002

Of the 71 dead crows submitted for testing, 20 (28%) were WNV-positive – nine in Mississauga, six in Caledon and five in Brampton (Figure 2). With the exception of a grouping of four positive crows found in one postal code area (L5J), the rest were fairly evenly distributed across the Region.

A comparison of numbers of WNV-positive crows found in various Ontario health units is shown in Appendix B. Only Simcoe County had a higher number of birds found to be positive (21) than the Region of Peel (20). However, this is a function of testing patterns. For example, testing in an area was stopped after the first few positive results, and then resumed later in the fall to see whether WNV activity in crows had tapered off. In Ontario, a total of 281 dead birds tested positive for WNV in 2002.¹²



Summary

Surveillance programs for dead birds attempt to establish the presence of WNV in the bird population, which serves as an early warning of risk to human health.

By the end of the 2002 mosquito season, over 1,400 dead crows had been sighted in the Region of Peel. Members of the public reported nearly 250 dead crow sightings per week in each of the last two weeks in August.



In conjunction with the CCWHC, the testing of some of the dead crow specimens established that WNV was present in flocks of birds in Peel. Twenty out of the 71 dead crows that were submitted for testing were found to be positive for WNV.

The first WNV positive bird in Canada in 2002 was found in Mississauga on May 19th. However, it was a sharp rise in dead crow sightings starting in late July (Week 30 – July 21-27) along with a number of positive WNV mosquito pools that led to the public being notified of a possible increased risk of human illness from WNV using a mailed letter from the Medical Officer of Health to households in Peel.

Research has shown that the presence of dead birds found to be positive for WNV precedes an increased risk for human illness by a period of two to six weeks.¹³ A more detailed temporal analysis comparing the timing of dead bird sightings, positive mosquitoes and human cases in one municipality of Peel will be shown in a later section of this report.



Figure 2: Locations of Dead Crow Sightings, Region of Peel, 2002

