Forest Health Conditions in Ontario 2015

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Forest Health Conditions in Ontario, 2015

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- Ontario Ministry of Natural Resources and Forestry, Crown Forests and Lands Policy Branch, Forest Sustainability and Information Section
- In cooperation with Natural Resources Canada, Canadian Forest Service, Great Lakes Forestry Centre, Sault Ste. Marie Ontario.

Printed in Ontario, Canada

Find the Ministry of Natural Resources and Forestry on-line at:
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For more information on forest health in Ontario visit:
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ISSN 1913-617X (Online)
ISBN 978-1-4606-8524-2 (Print)
ISBN 978-1-4606-8525-9 (HTML)
ISBN 978-1-4606-8526-6 (PDF)

Spruce budworm larva

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Surveying for Insect Damage

Introduction

Forest health monitoring in Ontario is conducted as a partnership between the Ontario Ministry of Natural Resources and Forestry (MNRF) and Natural Resources Canada – Canadian Forest Service (CFS).

The annual forest health monitoring program has five components:

- Aerial mapping of major forest disturbances to quantify their extent and severity (e.g. insect outbreaks, weather events, decline, and disease damage).
- Biomonitoring through the collection of insect and disease samples to track occurrence, changes in range or host species attacked, or changes in abundance.
- Special surveys for pests of interests, particularly invasive species, or pests affecting high value trees, such as plantations or seed orchards.
- Conducting or supporting research projects in forest entomology, pathology, or weather impacts.
- Temporary and permanent sample plots to monitor health of forest ecosystems.

All forested land in the province, regardless of ownership, is monitored and reported on each year. Forest health monitoring in Ontario includes the occurrence of native, non-native, and invasive biotic (e.g., insects, disease) and abiotic (e.g., snow and drought damage) disturbances and events.

Insect diagnostics were executed through a partnership between MNRF, CFS, and the Invasive Species Centre (ISC). Samples collected by the program were identified by the ISC. CFS supported insect diagnostics by providing verification of the original insect identification and by providing use of laboratory space and access to its insect collection.

Disease samples were identified at the Ontario Forest Research Institute (OFRI). Results of the insect and disease collections were entered into the national database managed by CFS.

Maps, tables, and graphs were produced from aerial surveys of major forest disturbances.

Results of the monitoring program were reported provincially at the Ontario Forest Health Review and nationally at the Forest Pest Management Forum. The final results and analyses are described in this report.

Beech bark disease fruiting bodies

Weather patterns

Weather affects the growth, phenology (timing of different life cycle stages), dispersal, and survival of forest insects. Forest pathogens, especially leaf diseases and needle cast fungi, can be more common during periods of wet or humid weather. Also, extreme weather events such as drought, snowfall, flooding, tornadoes, microbursts, frost, freezing, scorch, and rapid fluctuations in temperature can affect tree health, causing foliage or twig death, or tree decline and mortality.

During the first two months of 2015, temperatures were colder than the 30-year average, with lower levels of snowfall throughout much of the province. Cooler than normal temperatures prevailed into March and April and precipitation was below normal. The monthly average temperature and total precipitation for May was close to the 30-year normal. June and July had slightly below average temperatures, with a drier June and damper July. Temperatures rose above normal in late-July, with above average temperatures recorded into August. While total precipitation was slightly higher than normal in July, August was considerably drier. The fall months were hotter than normal, with temperatures soaring in September and staying slightly higher than normal in October. It was a relatively dry September, but total precipitation was markedly higher than normal in October. November and December were unusually warm, with much higher levels of precipitation, the majority of which fell in the form of rain not snow. It was so warm and wet that many areas had a green Christmas in 2015.

The 2015 weather conditions generally favoured tree growth and health; however, the cooler extreme temperatures in the spring slowed foliage development in some species of trees. In the later part of the summer and into the fall, the hotter temperatures were ideal conditions for sawflies.

Extreme weather and abiotic events

In May of 2015, the average monthly temperature was close to normal; however, four consecutive days in the latter part of the month had minimum temperatures below freezing. Frost was seen in many areas in the southern portion of Northeast Region and across Southern Region. The tree species most affected across the two regions was red oak. Northeast Region also saw some slow leaf flushing on trembling aspen and white and black ash, while leaf flush was similarly delayed in Southern Region on white oak, white ash, and sumac. The late leaf flushing may have reduced the available food for gypsy moth populations in Sudbury District, Northeast Region, which experienced a collapse in the infestation in 2015.

Blowdown in Ontario was very limited in area in 2015. The majority of damage was seen in Northwest Region where small scattered pockets were observed in all districts, except for Red Lake District. In

Frost damage on oak

Northeast Region blowdown was recorded only in Sudbury and Chapleau Districts, with a total of 71 ha of damage. No blowdown was recorded in Southern Region.

In 2015, whole-tree mortality caused by whitespotted sawyer beetle maturation feeding was aerially mapped in Northwest Region, predominantly in Red Lake District. Jack pine was the most commonly affected species. This damage was observed in the same area where a heavy snow event had occurred in October of 2012. The snow event caused trees to snap, be uprooted, or bent over due to the load of heavy wet snow. This provided abundant larval feeding material for the opportunistic whitespotted sawyer beetle, which lays its eggs in weakened, dying, or recently dead conifer trees. Larvae spend two years in the host, pupate, and then emerge as adult beetles during the summer. The adults need to feed on the bark of live twigs in order to mature their eggs. This feeding causes the branches to die from the feeding site to tip of the branch. Thus, the trees damaged by snow in October 2012 would have been colonized by the beetles in the summer of 2013. The resultant adults emerged two years later to carry out maturation feeding on live twigs, causing mortality to otherwise healthy jack pine trees. Trees damaged by fires in the area in 2013 likely also contributed to high numbers of sawyer beetles in 2015.

Insect infestations

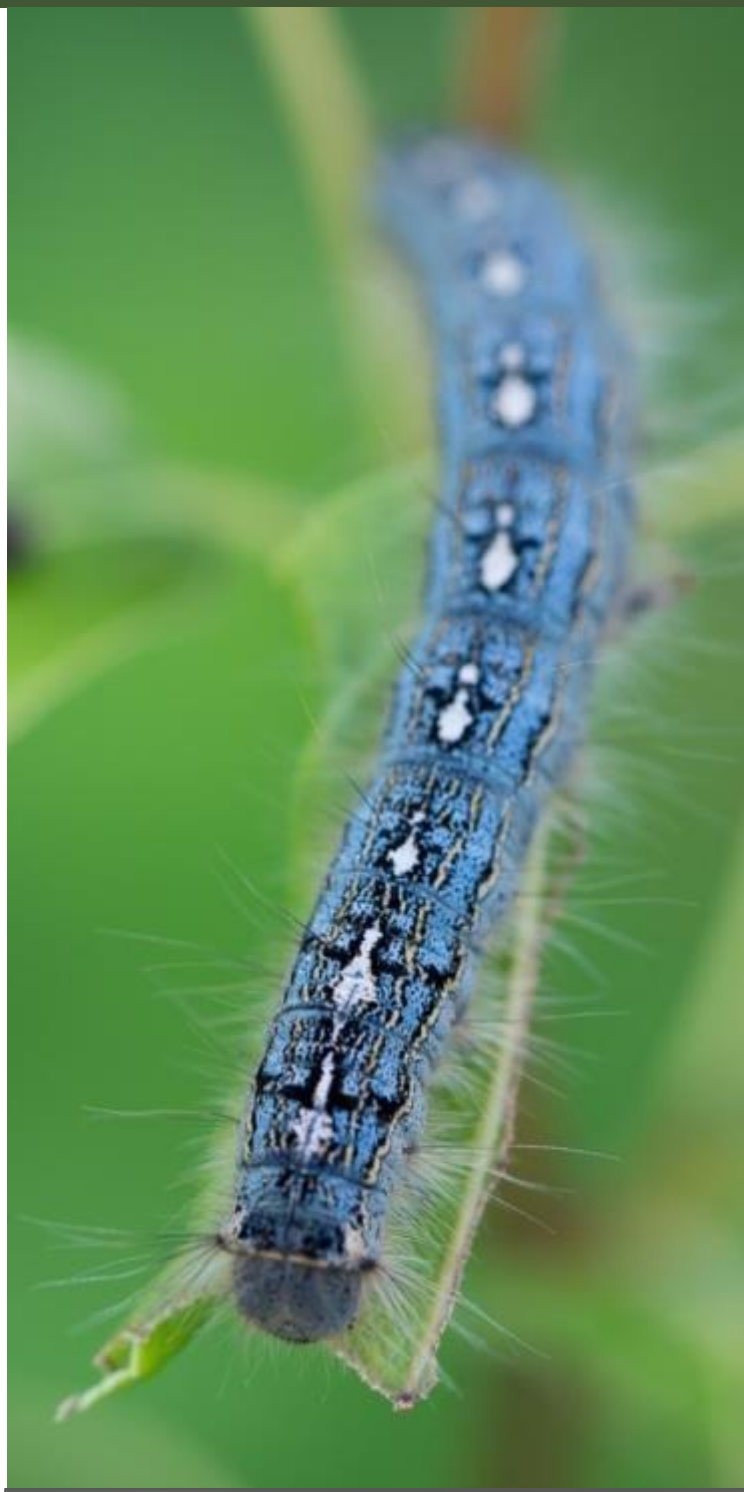
The current jack pine budworm (*Choristoneura pinus pinus* Freeman) outbreak declined slightly in 2015. Moderate-to-severe defoliation was aerially mapped beginning in 2004, with defoliation peaking in 2006 at 740,116 ha. Total area defoliated steadily declined each year thereafter, reaching a low of 27,765 ha in 2011. Defoliation then increased in 2012 to 61,018 ha and again in 2013 to 83,075 ha. The 2013 defoliation was confined to Sioux Lookout District, Northwest Region. In 2014, defoliation was again limited to this district, declining to 22,010 ha. In 2015, the decline continued, but only by 661 ha as a new infestation popped up in Northeast Region. In Northwest Region, there was an overall decline in moderate-to-severe defoliation in 2015, dropping by just over 3,000 ha. The area of defoliation mapped in 2015 was southeast of what was mapped in 2014, with the majority observed in Sioux Lookout District and in a small area reaching into Nipigon District. The new outbreak in Northeast Region was recorded in Matinenda Lake area, Sault Ste. Marie District. Jack pine budworm infestations have been observed in this area before, as recently as 2005. At this time, no insect management programs are expected to be undertaken. Aerial spray programs were undertaken during 2006, 2007, and 2009 – the peak years of defoliation – to protect foliage and keep trees alive in selected high value jack pine stands (control programs are reported in the Provincial Report on Forest Management). The jack pine budworm infestation will continue to be monitored to determine whether the outbreak continues to collapse in Northwest Region and builds in Northeast Region.

Redheaded pine sawfly larvae

Moderate-to-severe defoliation by spruce budworm (*Choristoneura fumiferana* Clemens) collapsed in 2013 with only 253 ha mapped in Northeast Region between Sudbury, North Bay, and Temagami. This was the lowest level in Ontario since 1967. This collapse is significant compared to the 99,797 ha of defoliation in 2012. The spruce budworm population then rebounded in 2014, with 30,317 ha of defoliation in a newly affected part of the region: the border area between Chapleau and Hearst Districts. The previously affected area in Sudbury and North Bay Districts had a slight resurgence with just over 10,000 ha of defoliation. In 2015, the area of moderate-to-severe defoliation jumped considerably in North Bay District to just over 119,000 ha. Defoliation also continued in Chapleau, Hearst, and Sudbury Districts, while new defoliation was mapped in Timmins and Sault Ste. Marie Districts, resulting in a total of 148,542 ha for the province. Susceptible forests of spruce and balsam fir across much of northern Ontario are beginning to reach age classes (i.e. > 40 years) preferred by spruce budworm. Spruce budworm pheromone trapping and aerial surveys will continue to be carried out to detect any significant increases in populations, which may signal the beginning of the next outbreak.

The current forest tent caterpillar (*Malacosoma disstria* Hubner) outbreak increased by over 200,000 ha in 2015, reaching 681,645 ha of moderate-to-severe defoliation. The majority of this (621,994 ha) was aerially mapped in Northwest Region, where all districts experienced defoliation. In Northeast Region, there was a marked increase in defoliation (36,444 ha) in Hearst District, with new areas of defoliation in Chapleau, Cochrane, Sudbury, Timmins, and Wawa Districts. The total area of moderate-to-severe defoliation in Northeast Region was 38,312 ha. Forest tent caterpillar defoliation persisted in Southern Region, with 21,339 ha occurring in woodlots and forested areas near the southern part of Georgian Bay, Midhurst District. Forest tent caterpillar egg-band forecasting and aerial surveys will continue to be carried out to help predict expansion and possible declines. Forest tent caterpillar outbreaks occur approximately every 10-12 years in Ontario. Overall, the current outbreak is behind schedule by 2-4 years relative to the timing and amount of damage predicted based on previous outbreaks.

The warmer than normal temperatures in August and September created an ideal environment for redheaded pine sawfly and introduced pine sawfly, as most sawflies thrive in hot weather. Redheaded pine sawfly populations caused localized defoliation in plantations in Northeast and Southern Regions, while introduced pine sawfly was observed causing low-to-moderate defoliation on open-grown eastern white pine trees in the same two regions in 2015. The higher temperatures in late summer improved the rate of these defoliators. The introduced pine sawfly can have two generations per year if the weather remains warm in the late season. This can result in extensive defoliation on white pine when the second generation feeds on both current and previous year's needles in the fall.



Forest tent caterpillar larva

Several other insects caused localized defoliation or damage in various parts of Ontario. These occurrences did not develop into provincially significant disturbances, but contribute to overall forest health concerns.

Forest pathogens and tree decline

Most tree pathogens do not cause symptoms over large geographic areas to the point where they can be aerially mapped. Nonetheless, foliar diseases can occasionally be mapped when the damage is exceptionally severe, such as brown spot needle blight (*Mycosphaerella dearnessii* M.E. Barr) on Scots pine. This disease was aerially mapped in Sault Ste. Marie and Sudbury District in 2015, totalling 26 ha. This year, numerous foliar diseases took advantage of the wet, cool spring including septoria leaf spot (*Sphaerulina musiva* (Peck) Quaedvlieg, Verkley & Crous) affecting aspen and willow in Northwest and Southern Regions. Moist conditions also attributed to anthracnose on red oak (*Amphiporthe leiphaemia* (Fr.) Butin), sugar maple (*Aureobasidium apocryptum*), basswood (*Apiognomonia errabunda* (Roberge ex Desm.) Höhn.), butternut (*Ophiognomonia leptostyla* (Fr.) Sogonov), and beech (*Apiognomonia errabunda* (Roberge ex Desm.) Höhn.) in Northeast and Southern Regions. Tar spot (*Rhytisma acerinum* (Pers.) Fries) was common on Norway maple, particularly in urban areas, resulting in premature leaf drop in much of the province.

Invasive species

Emerald ash borer (*Agrilus planipennis* Fairmaire) is regulated by the Canadian Food Inspection Agency (CFIA). As of April 1, 2014, all areas previously regulated to control emerald ash borer (EAB) in Ontario were consolidated into one large regulated area. The northern boundary was also expanded in 2014, extending into southern portions of the judicial districts of Algoma, Sudbury, and Nipissing. The CFIA-regulated area includes all of Ontario south of a line from the Montreal River on the eastern shore of Lake Superior, east to Cobalt and the Quebec border. CFIA and MNRF discovered several new locations of EAB within the regulated area in 2014, including new infestations on St. Joseph Island and in Grey, Bruce, Simcoe, and Northumberland counties. In 2015, new finds were recorded in Kincardine, Walkerton, and Bruce Peninsula National Park in Midhurst District. Aerial surveys by MNRF showed that cumulative decline and mortality of ash species had reached 237,656 ha, an increase of 41,402 ha over that mapped in 2014. The decline and mortality spread further east and north into Guelph, Aurora, and Midhurst Districts. The Ottawa infestation spread northwest into Pembroke District and further south in Kemptville District.

In 2015, biocontrol agents were released by CFS for the third consecutive year, as part of a long term strategy to reduce the impacts caused by EAB. The larval parasitoid, *Tetrastichus planipennisi* Yang, native to China, was released at three sites in Ontario in 2013, four sites in 2014 (plus one in Quebec), and five sites in 2015 (plus four in Quebec). The egg parasitoid *Oobius agrili* Zhang and Huang was released for the first time

Emerald ash borer damage

in Ontario in five sites in 2015 (with four release sites in Quebec). Follow-up assessments will be performed in future years to determine establishment of the parasitoids and their impacts on EAB populations.

On April 5, 2013, CFIA declared Asian long-horned beetle (*Anoplohora glabripennis* Motschulsky) eradicated from Toronto and Vaughan. Following initial detection of the pest in 2003, a control program that involved cutting and chipping infested trees and all potential host trees within 400 m was initiated. This was followed by surveys to determine if any Asian long-horned beetles (ALHB) were still present. After five consecutive years in which detection surveys found no beetles or infested trees, the CFIA declared ALHB eradicated.

On August 13, 2013, ALHB was found again in Ontario, in Mississauga. Like the 2003 discovery, the infestation was discovered after a citizen found a beetle on a car. Subsequent surveys by CFIA, MNRF, and the cities of Toronto, Mississauga, and Brampton found approximately 25 infested Norway and Manitoba maple trees. Infested trees were in an industrial area near Lester B. Pearson International Airport, with the exception of one tree found in an adjacent area within the City of Toronto. CFIA again led an aggressive eradication program. During the winter of 2013-14, all infested trees were cut and chipped, along with any host trees within 800 m in the genera most preferred by the insect (*Acer, Betula, Salix,* and *Populus*). During the tree cutting operation, a heavily infested Manitoba maple with over 1000 recent exit holes and innumerable oviposition (eggs) pits dating back to at least 2004 was found within the core infestation. This tree was likely a remnant of the 2003 infestation and the source for beetles that infested the trees discovered in 2013. Follow-up surveys in 2014 and 2015 have not found any more beetles or infested trees.

Hemlock woolly adelgid (*Adelges tsugae* Annand) was initially detected in Ontario in 2012 in a group of five landscape trees in the Etobicoke area of Toronto. This infestation was likely a result of the trees being sourced from an infested area of Pennsylvania seven years previously. CFIA had the trees cut and incinerated. In 2013, two additional infested trees were found, cut, and incinerated by CFIA. A separate infestation consisting of a single hemlock tree in Niagara Gorge was detected in 2013 by CFIA. This tree was cut and burned on-site by the Niagara Parks Commission. In 2014 and 2015, single trees were found again by CFIA, then cut and burned by the Parks Commission. The Niagara Gorge infestation likely originated from eggs or crawler stages of the adelgid transported to the area by birds from infested areas in New York State.

Beech bark disease, which is a combination of an invasive insect (beech scale, *Cryptococcus fagisuga* Linding) and an invasive stem fungus (*Neonectria faginata* (Lohman et al.) Castl. & Rossman), has continued to spread in Ontario. Damage continues to accelerate in several locations with new range extensions occurring in Parry Sound and Sault Ste. Marie Districts. In 2015, more positive sites were found in Sault Ste. Marie, Pembroke, Kemptville, Aylmer, and Midhurst Districts.

Beech scale on American beech

Pest Index – Major Forest Disturbances

Major forest disturbances occur when an insect, disease, or weather event affects a very large area, is not specific to a region, or has affected more than one region in the past. These disturbances are events that are of provincial significance.

Larch casebearer defoliation

Pest Index – Minor Forest Disturbances

Minor forest disturbances have been identified regionally by forest health surveys. These disturbances could have local or regional significance to forest health conditions.

Dooks needle blight damage

Common Name	Latin Name	Type	Page
Greenstriped mapleworm	*Dryocampa rubicunda* (F.)	Insect	90
Hickory tussock moth	*Lophocampa caryae* Harris	Insect	91
Imported willow leaf beetle	*Plagiodera versicolora* (Laich.)	Insect	92
Introduced pine sawfly	*Diprion similis* (Htg.)	Insect	93
Leaf spot of ash	*Mycosphaerella fraxinicola* (Schwein.) House	Disease	94
Northern tent caterpillar	*Malacosoma californicum pluviale* (Dyar)	Insect	95
Pine false webworm	*Acantholyda erythrocephala* (Linnaeus)	Insect	96
Poplar borer	*Saperda calcarata* Say	Insect	97
Redheaded pine sawfly	*Neodiprion lecontei* (Fitch)	Insect	98
Satin moth	*Leucoma salicis* (L.)	Insect	99
Scorch	n/a	Abiotic	100
Septoria leaf spot	*Sphaerulina musiva* (Peck) Quaedvl., Verkley & Crous	Disease	101
Shoot blight of aspen	*Venturia macularis* (Fr.:Fr.) E. Mull. & Arx	Disease	102
Spruce needle rust	*Chrysomyxa nagodhii* P.E. Crane	Disease	103
Tar spot	*Rhytisma* spp.	Disease	104
Western gall rust	*Endocronartium harknessii* (J.P. Moore) Y. Hirats.	Disease	105
White pine blister rust	*Cronartium ribicola* J.C. Fisch.	Disease	106
Woolly alder aphid	*Prociphilus tessellatus,* Fitch.	Insect	107
Yellowheaded spruce sawfly	*Pikonema alaskensis* Rohwer	Insect	108

Woolly alder aphid

Pest Index – Invasive Forest Species

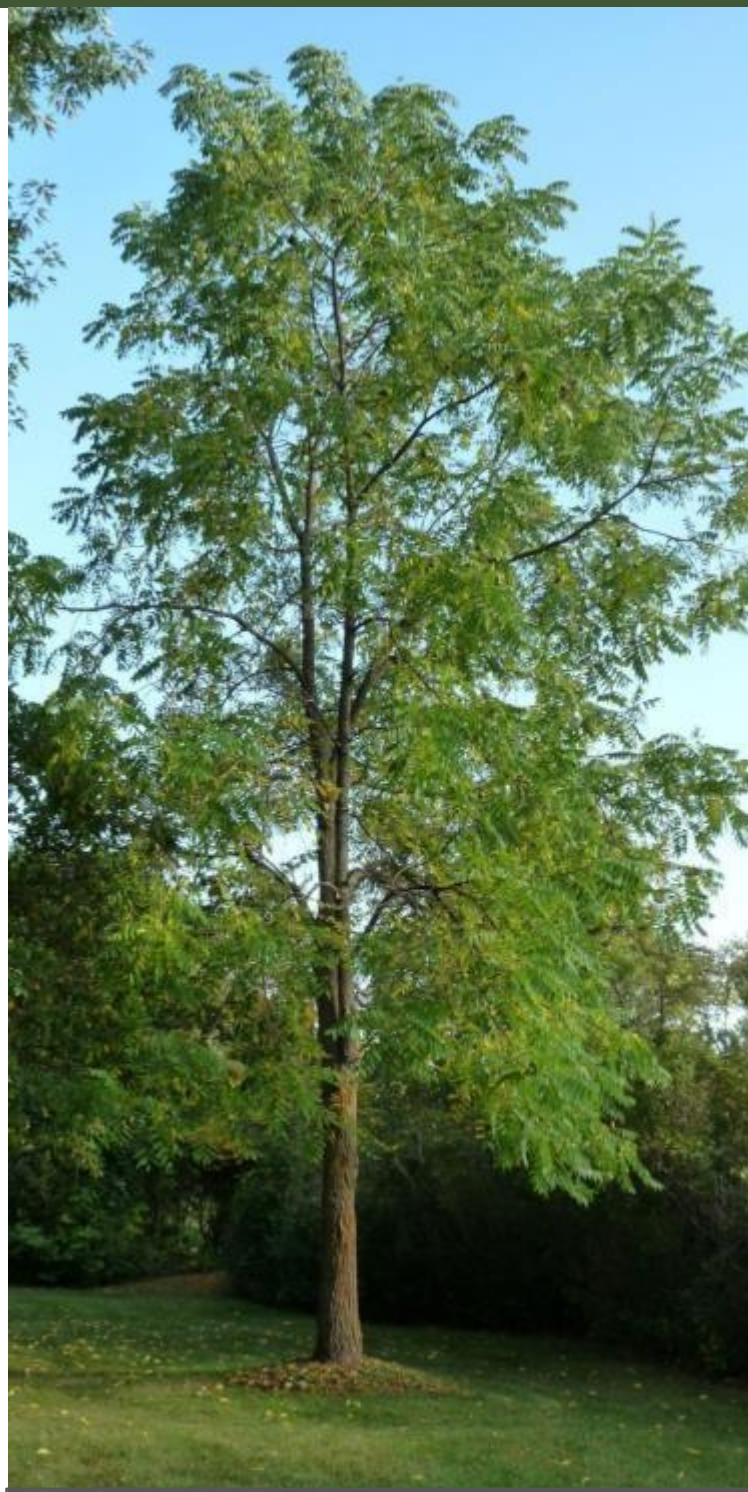
Invasive forest species are insects or diseases that are not native to Ontario. Invasive species have the potential or proven ability to have deleterious effects on forest health, tree health, ecosystem functioning, or social and economic values.

Adult gypsy moth

Host Index

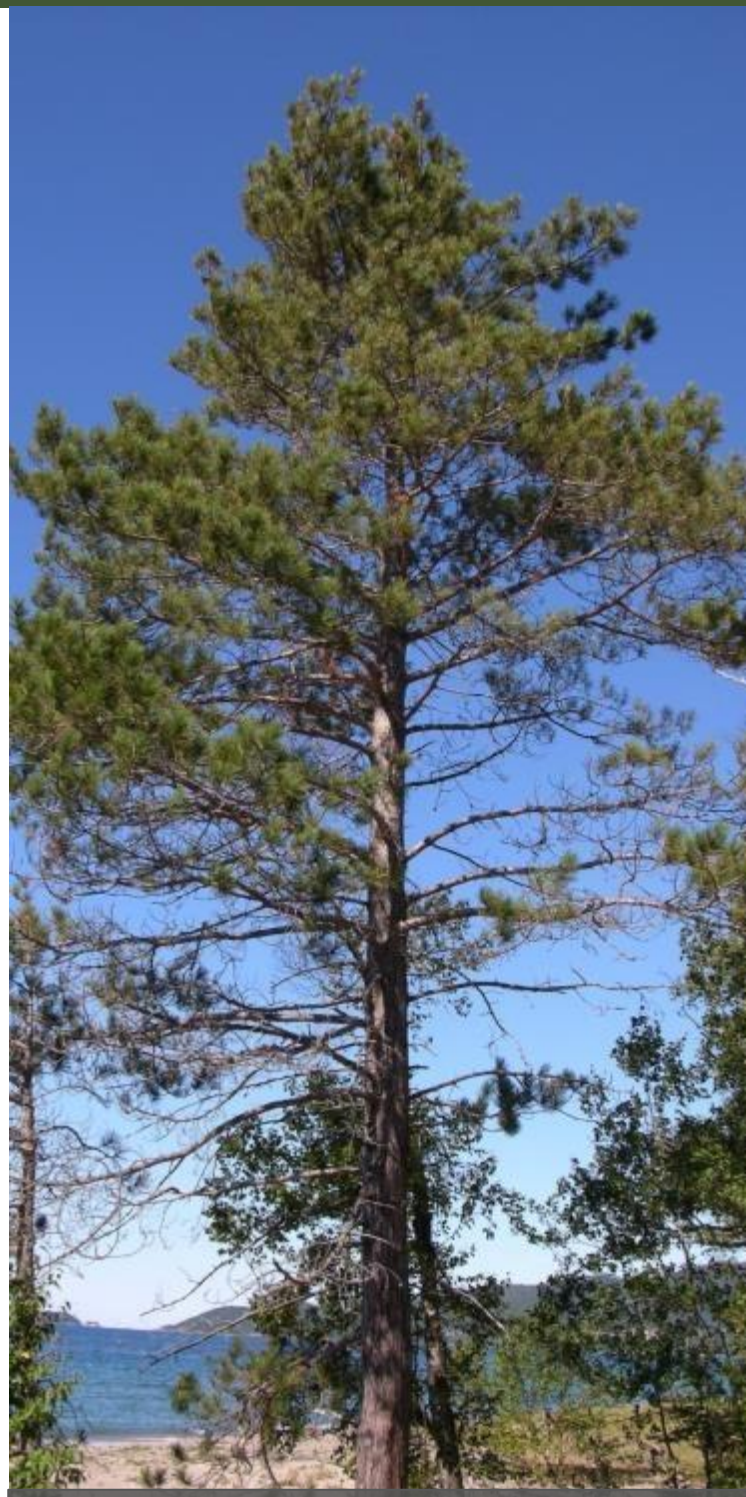
A listing of tree and shrub species and associated scientific names mentioned in this report.

Common Name	Scientific Name
Alder species	*Alnus* spp.
American beech	*Fagus grandifolia* Ehrh.
American elm / white elm	*Ulmus americana* L.
Balsam fir	*Abies balsamea* (L.) Mill.
Balsam poplar	*Populus balsamifera* L.
Basswood	*Tilia americana* L.
Bitternut hickory	*Carya cordiformis* (Wangenh.) K Koch
Black ash	*Fraxinus nigra* Marsh.
Black cherry	*Prunus serotina* Ehrh.
Black oak	*Quercus velutina* Lam.
Black spruce	*Picea mariana* (Mill.) BSP
Black walnut	*Juglans nigra* L.
Butternut	*Juglans cinerea* L.
Carolina poplar	*Populus x canadensis* Moench cv. Eugenei
Choke cherry	*Prunus virginiana* L.
Colorado blue spruce	*Picea pungens* Engelm.
Eastern hemlock	*Tsuga canadensis* (L.) Carrière
Eastern red cedar	*Juniperus virginiana* L.
Eastern white cedar	*Thuja occidentalis* L.
Eastern white pine	*Pinus strobus* L.
European white poplar	*Populus alba* L.
Green ash	*Fraxinus pennsylvanica* Marshall
Hackberry species	*Celtis* spp.
Horsechesnut	*Aesculus hippocastanum* (L.)
Jack pine	*Pinus banksiana* Lamb.



Black walnut

Common Name	Scientific Name
Japanese heartnut	*Juglans ailantifolia var. cordiformis*
Labrador tea	*Rhododendron groenlandicum* (Oeder) Kron & Judd
Largetooth aspen	*Populus grandidentata* Michx.
London plane	*Platanus acerifolia* (Aiton) Willd.
Manitoba maple	*Acer negundo* L.
Norway maple	*Acer platanoides* L.
Pin cherry	*Prunus pensylvanica* L. f.
Red maple	*Acer rubrum* L.
Red oak	*Quercus rubra* L.
Red pine	*Pinus resinosa* Ait.
Red spruce	*Picea rubens* Sarg.
Scots pine	*Pinus sylvestris* L.
Shagbark hickory	*Carya ovata* (Mill.) K.Koch
Silver maple	*Acer saccharinum* L.
Sugar maple	*Acer saccharum* Marsh.
Sumac species	*Rhus* spp.
Swamp white oak	*Quercus bicolor* Willd.
Sycamore	*Platanus occidentalis* L.
Tamarack / eastern larch	*Larix laricina* (Du Roi) K. Koch
Trembling aspen	*Populus tremuloides* Michx.
White ash	*Fraxinus americana* L.
White birch	*Betula papyrifera* Marsh.
White oak	*Quercus alba* L.
White spruce	*Picea glauca* (Moench) Voss
Willow species	*Salix* spp.



Red pine

Mapped Area

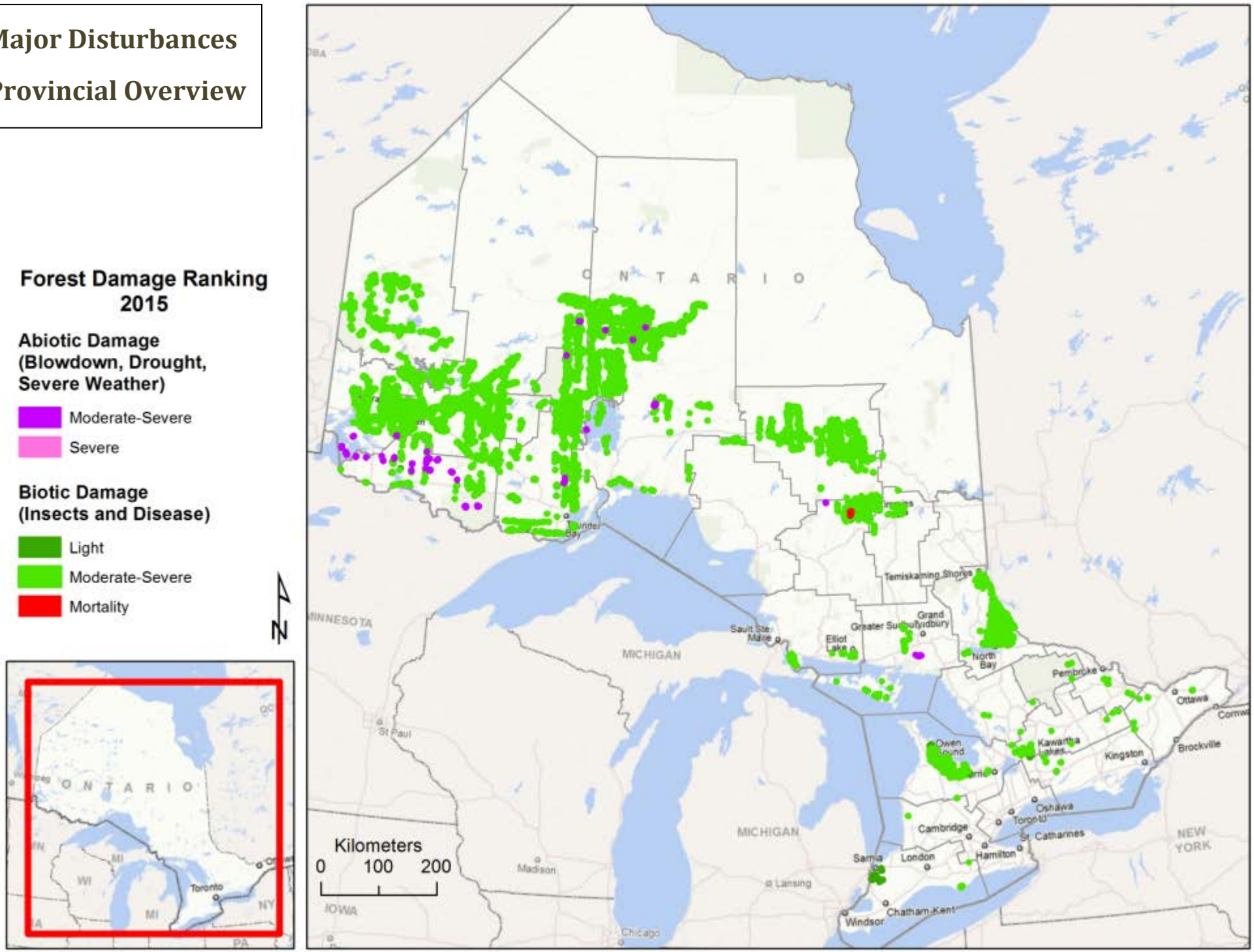
Major forest disturbances are mapped to quantify current status and to provide trend analysis. The following table outlines total area (ha) of mapped damage by severity class for major disturbances in 2015.

Common Name	Light (ha)	Moderate to Severe (ha)	Tree Mortality (ha)	Area Total (ha)
Blowdown	-	2,047	-	2,047
Brown spot needle blight	-	26	-	26
Cedar leafminer	-	511	-	511
Emerald ash borer	58	41,337	8	41,402
Forest tent caterpillar	1,341	681,645	-	682,986
Gypsy moth	1,772	757	-	2,529
Jack pine budworm	-	21,349	-	21,349
Larch casebearer	17	1,869	-	1,886
Pine false webworm	-	3	-	3
Spruce budworm	589	148,542	182	149,313
White spotted sawyer beetle	-	925	-	925

Blowdown damage

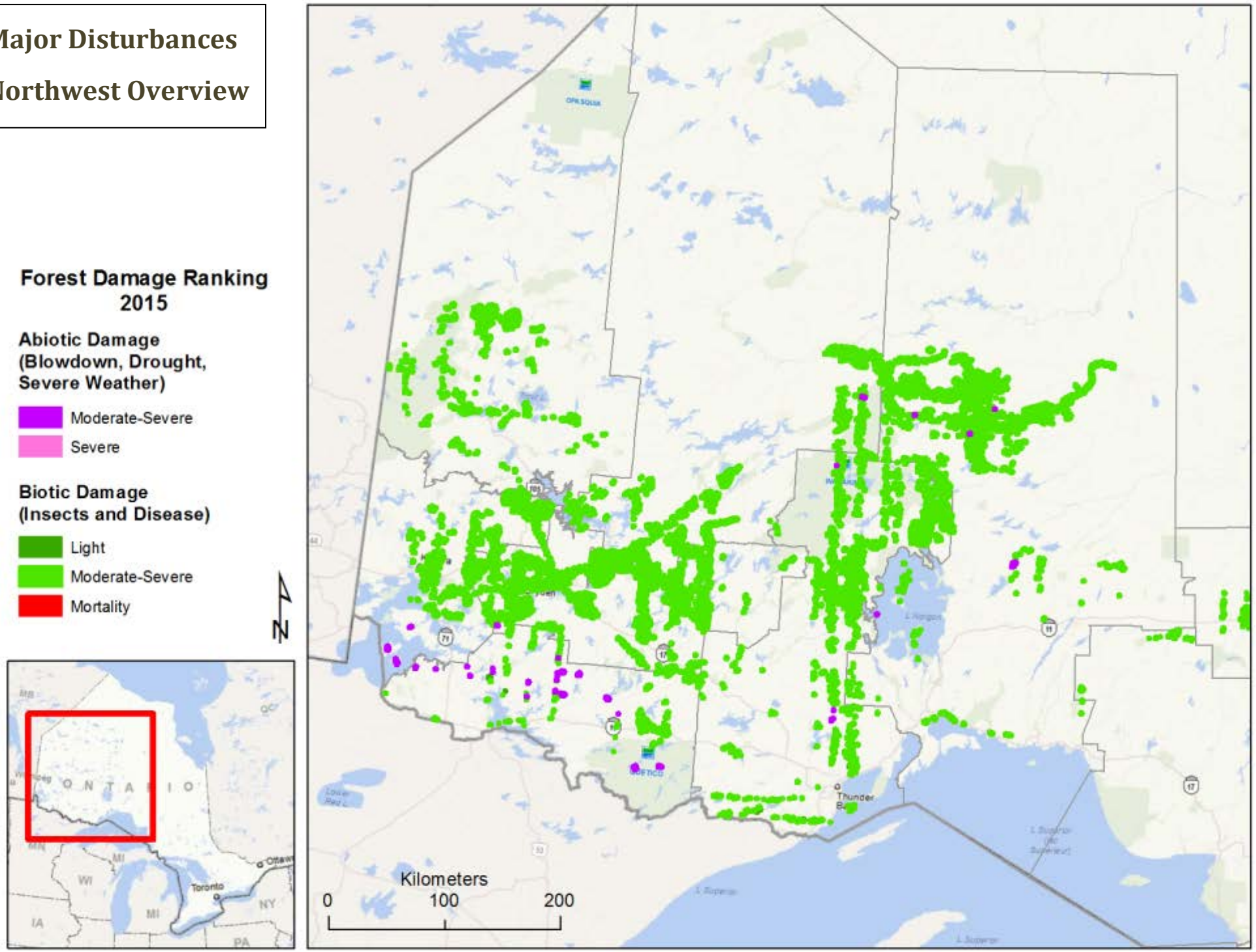
Major Disturbances

Provincial Overview



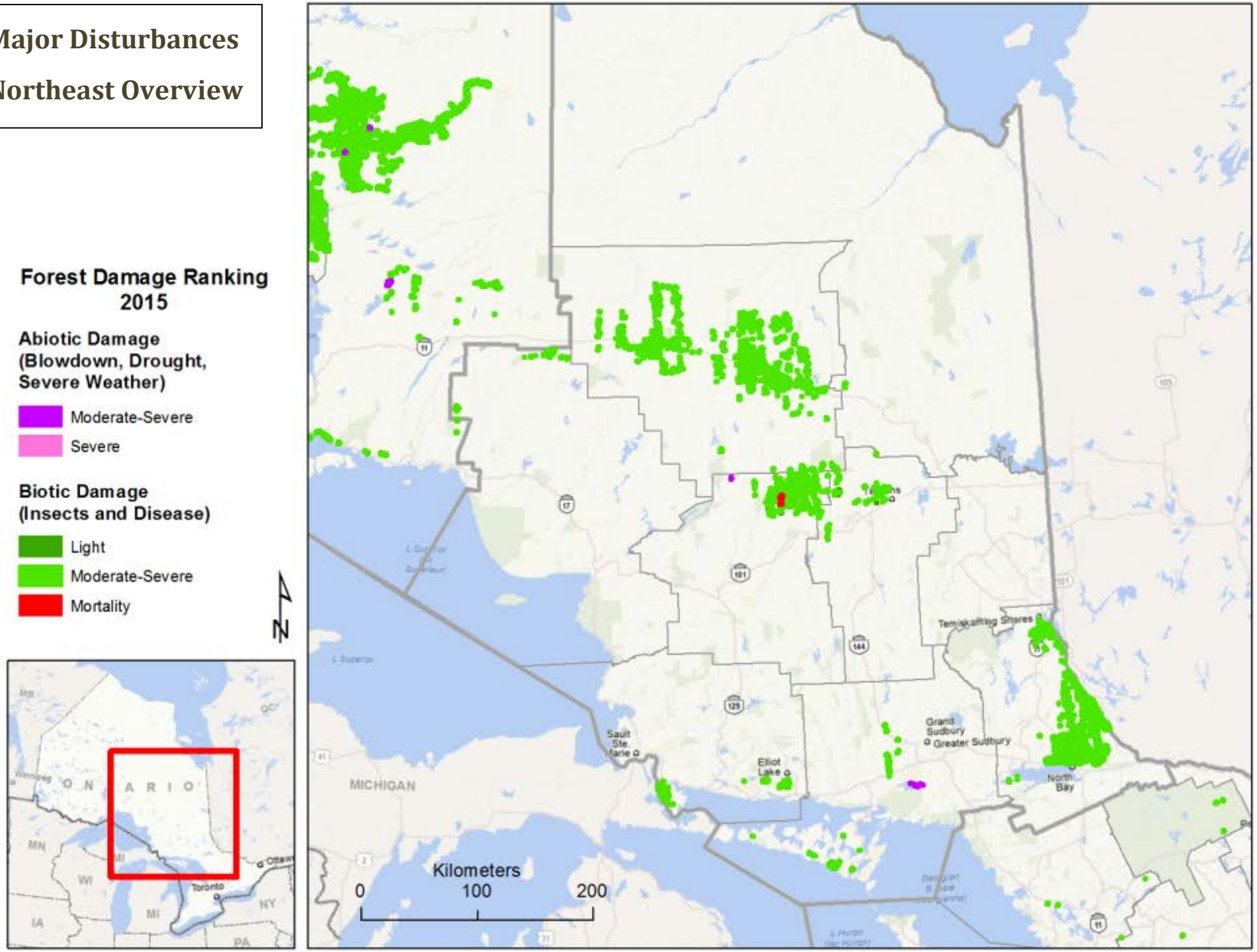
Major Disturbances

Northwest Overview



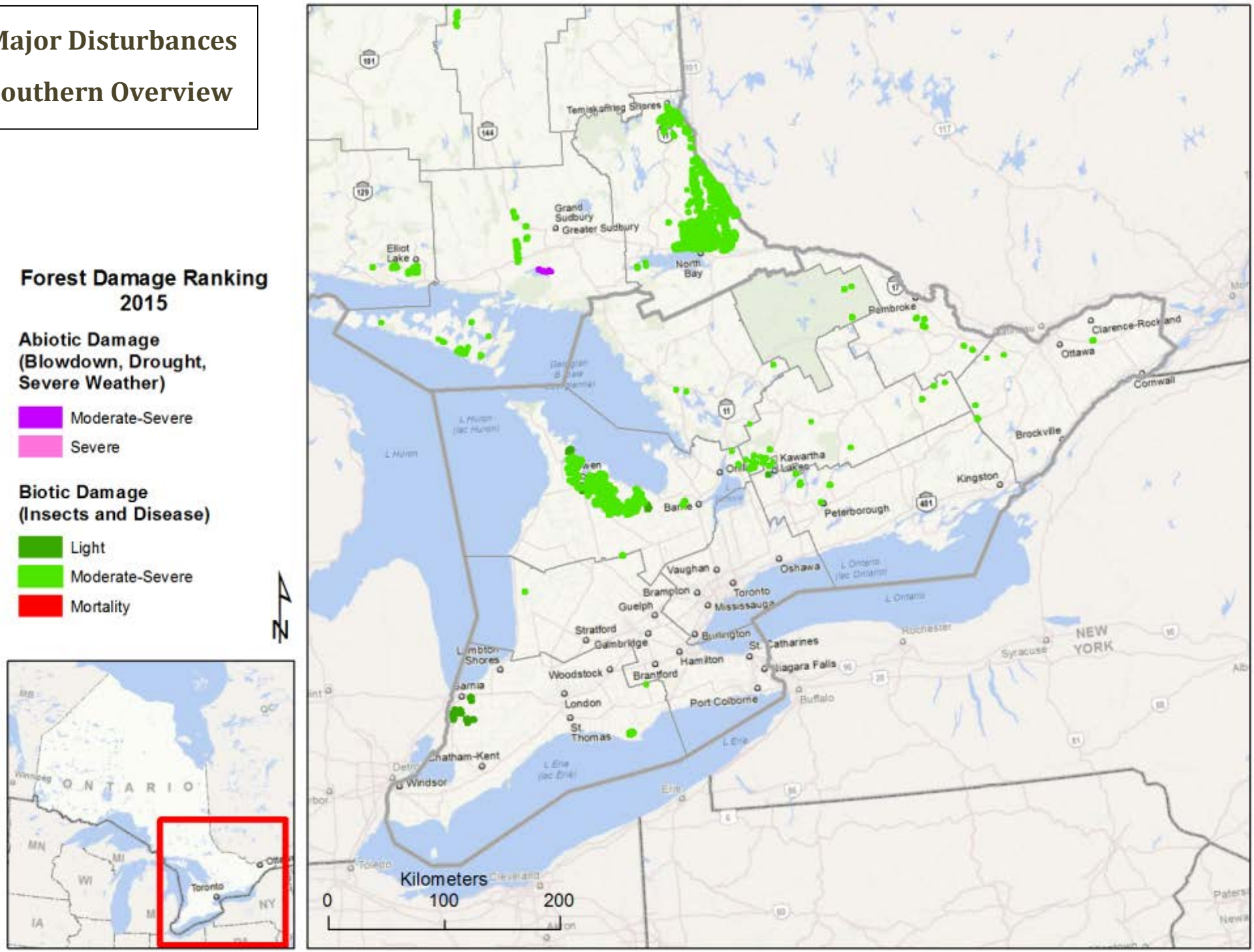
Major Disturbances

Northeast Overview



Major Disturbances

Southern Overview



Example Report – How to Read a Major Disturbance Report

Each forest health condition report summarizes information about an event or disturbance affecting the health of Ontario's forests, including:

Pest/Damage information – basic information for the disturbance, including the type of disturbance, origin, host species, and area affected that year

Key facts – overview of the disturbance, including provincial level information about the disturbance, impacts, and activity in that year

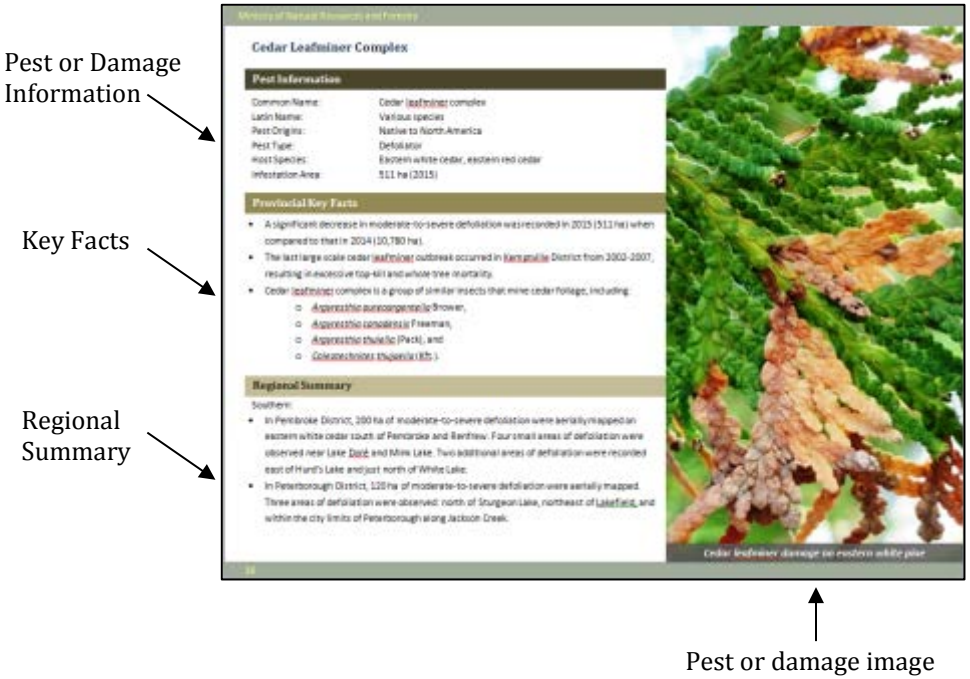
Regional summary – regional summaries, outlining more specific information by MNRF administrative regions (Northwest, Northeast, Southern)

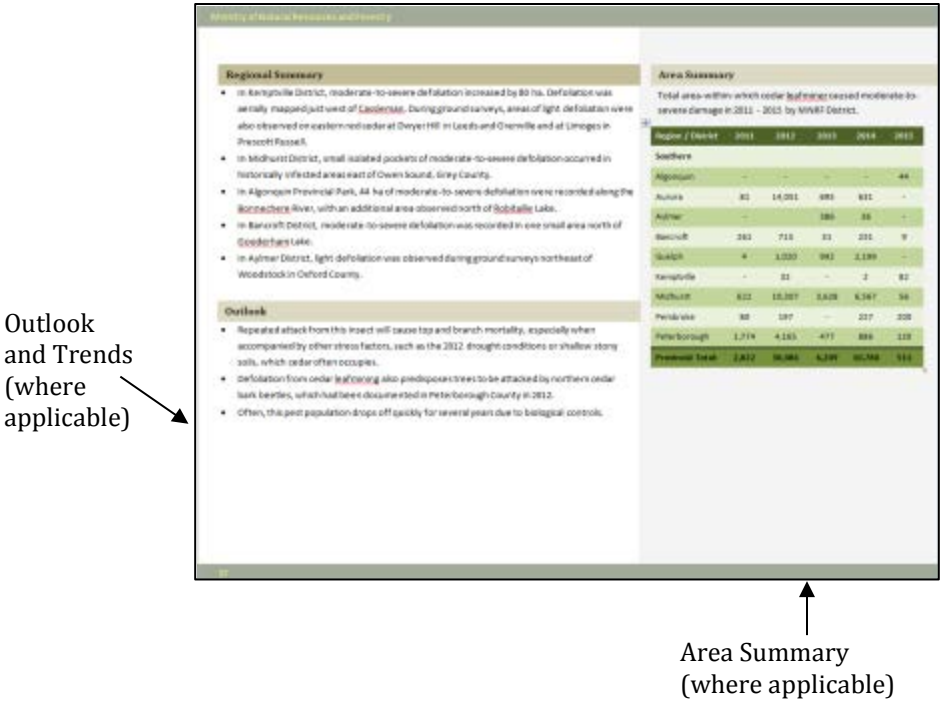
Image – a photo of the disturbance or pest

Outlook – where applicable, overview of potential future implications and developments for the disturbance

Trends – where applicable, additional information for the trend analysis of the disturbance

Area Summary – where applicable, information about the total area-within-which the disturbance caused moderate-to-severe damage in 2011-2015 by MNRF Region and District.





Example Map – How to Read a Map in this Document

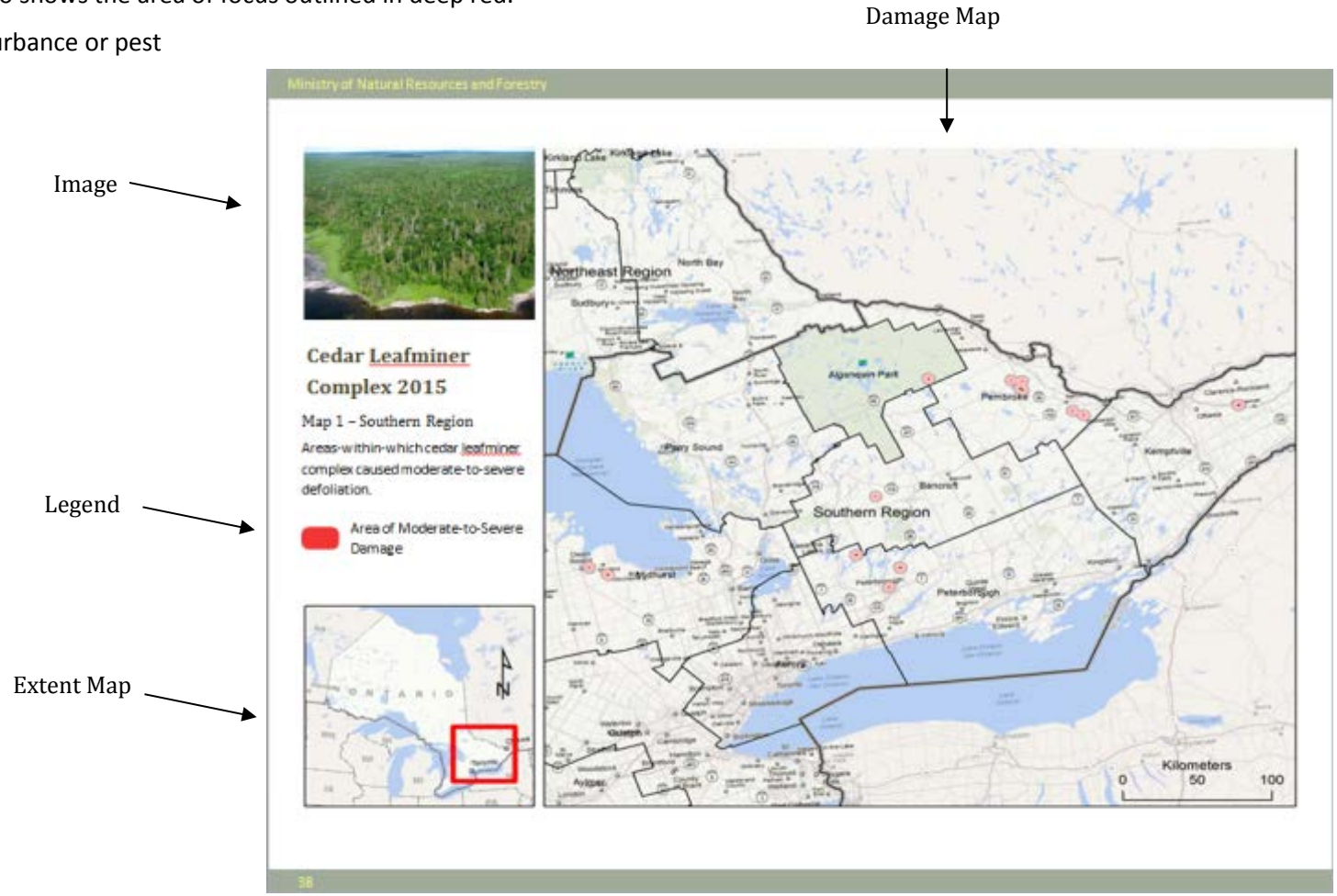
For major disturbances, the forest health condition report contains the following spatial information:

Damage Map – shows the areas of infestation or damage. Light damage is typically represented in orange, moderate-to-severe damage in red, and mortality in purple. Damage areas are also highlighted with a pink shadow or outline to help the user distinguish small damage areas.

Legend – describes the features of the map.

Extent map – map of Ontario shows the area of focus outlined in deep red.

Image – a photo of the disturbance or pest



Disclaimer: The forest health conditions report maps are not to be used for navigation or other purposes. The OMNRF makes no guarantee concerning the data's content, accuracy, completeness, or the results obtained from queries or use of the data. Each map represents areas surveyed and is subject to revision or change in subsequent reports.

Asian Long-Horned Beetle

Pest Information

Common Name:	Asian long-horned beetle
Latin Name:	*Anoplophora glabripennis* (Motschulsky)
Pest Origins:	Invasive – Native to Asia
Pest Type:	Wood Borer
Host Species:	Birch, elm, hackberry, horsechestnut, maple, mountain ash, poplar, silk tree, sycamore or London plane tree, and willow

Provincial Key Facts

- First found in 2003 in an industrial park bordering Toronto and the City of Vaughan.
- Asian long-horned beetle (ALHB) was most likely introduced to North America by infested wooden pallets, crates, or packaging materials used in shipping of imports to Canada.
- A task force, led by CFIA, was created to control ALHB and includes MNRF, CFS, City of Toronto, City of Vaughan, York Region, Toronto and Region Conservation Authority, and U.S. Department of Agriculture.
- In 2013, after several rounds of host tree removals and surveys for 10 years, it was thought that the Toronto-Vaughan infestation was eradicated.
- On September 20, 2013 CFIA confirmed the presence of Asian long-horned beetle in an industrial area near Pearson International Airport, Mississauga.
- There were approximately 25 trees identified as infested that were destroyed in 2013.
- In early 2014, disposal of host trees within 800 metres of infested trees took place in parks, ravines, industrial, and residential areas of Mississauga and west Toronto.
- Surveys to inspect for any additional insect presence were conducted in 2015.
- As part of eradication efforts, CFIA established a regulated area in Mississauga and Toronto to prevent spread of ALHB. This area is approximately 20 square kilometers (see map – page 23)
- Restrictions on movement of nursery stock, trees, logs, lumber, wood, wood chips, and bark chips from host deciduous trees are now in place within the regulated zone.
- Agencies currently working collaboratively to eradicate this insect are the CFIA, CFS, MNRF, City of Toronto, City of Mississauga, and City of Brampton.

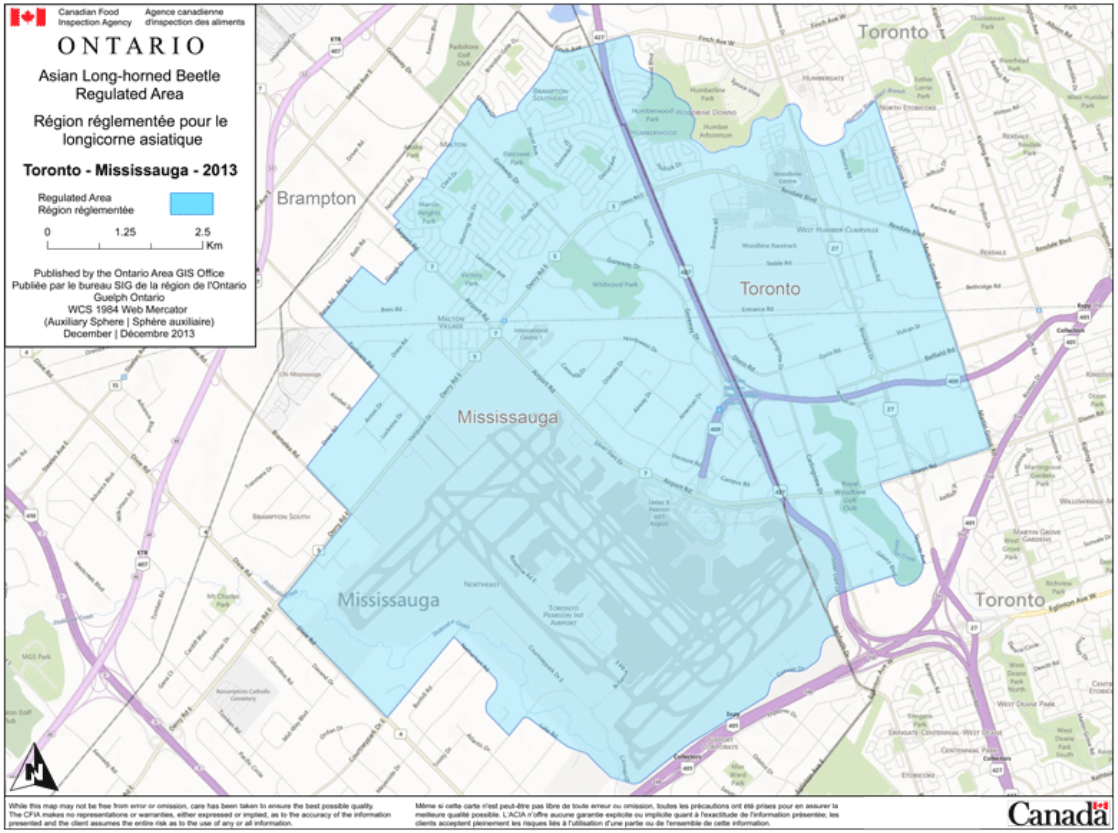
Adult Asian long-horned beetle

Regional Summary

Southern:

- No new infestations were discovered through surveys of host trees carried out in early 2015.
- Additional surveys will be carried out in 2016.

Asian long-horned beetle regulated area



More information on ALHB is available on the CFIA website at:
http://www.inspection.gc.ca/plants/plant-protection/insects/asian-longhorned-beetle/eng/1337792721926/1337792820836

Asian long-horned beetle damaged tree with exit holes

Beech Bark Disease

Pest Information

Common Name:	Beech bark disease
Latin Name:	Fungus – *Neonectria faginata* (Lohman et al) Castl.
	Insect – *Cryptococcus fagisuga* Lind.
Pest Origins:	Invasive – Native to Europe
Pest Type:	Insect-Disease Complex
Host Species:	American beech

Provincial Key Facts

- Beech bark disease is the result of an insect –fungal pathogen complex that is initiated by the infestation of beech scale on American beech.
- As the insect and fungus become established in a stand they cause growth reduction, tree deformation, declines in wood quality and mast production, as well as premature mortality.
- Beech bark disease has been identified across the range of beech in Ontario, as far north as St Joseph Island, Sault Ste. Marie District.
- Three distinct phases of beech bark disease development can be observed across Ontario:
  - Advancing front: beech scale populations have recently colonized unaffected beech trees. Scale infestations combined with other stressors can contribute to beech decline;
  - Killing front: scale populations rapidly build and the fungus colonizes trees. The killing front is characterized by heavy levels of tree mortality;
  - Aftermath forest: disease has passed through and remains endemic. Large remnant trees continue to decline and young trees become infected, disfigured, and gradually decline.

Regional Summary

Northeast:

- In Sault Ste. Marie District, a total of 7 areas were monitored for beech bark disease on St Joseph Island. Four of the areas had beech bark disease, with three of these areas representing new finds on the southern portion of the Island.
- In a hemlock/beech stand along Garside Road, Hilton Twp, one over-mature beech tree had high levels of beech bark disease and several mature trees had lighter levels of the disease.

Beech bark disease elliptical canker and fruiting

Regional Summary

- In a maple dominated stand on the south end of 5th Line, Jocelyn Twp, one mature beech tree had several small elliptical cankers with fruiting bodies on it. On the south end of A-Line, Jocelyn Twp, one over-mature beech tree had moderate levels of the disease.

Southern:

- In Pembroke District, two new locations of beech bark disease were found. At a location south of Barry's Bay and north of the village of Ireland, one beech tree in a semi mature hardwood stand was infected with the disease, while scale was present on other surrounding beech. At another location along Hwy 28 south of the village of Quadville, 30% of the beech in a mature red and silver maple stand had moderate levels of beech bark disease.
- In Kemptville District, beech bark disease was found northwest of the Town of Perth. Several scattered beech trees with fruiting in a mature mixed hardwood stand were found, but no crown dieback was evident.
- In Midhurst District, beech bark disease fruiting was collected on one large tree at Kemble Mountain tract of Grey Sauble Conservation Authority in Georgian Bluffs, north of Owen Sound. Further up the Bruce Peninsula, beech bark disease was collected at Hope Bay Provincial Nature Reserve in the Town of South Bruce Peninsula from one large tree.
- In Aylmer District, fruiting bodies were observed on one intermediate beech southwest of the Town of Aylmer in Springwater Forest, Elgin County.

Outlook

- There is no known control for beech bark disease. As the disease spreads throughout the range of beech in Ontario, beech trees will continue to decline.
- Movement of firewood may accelerate the spread of beech scale and the canker fungus.
- The canker fungus can only infect beech trees that have previously been infested by beech scale. Some trees have been identified as potentially resistant to beech bark disease since they have not been attacked by beech scale in areas that have had high scale infestation levels. Identifying, monitoring, and retaining these resistant trees will aid efforts to conserve beech on the landscape.

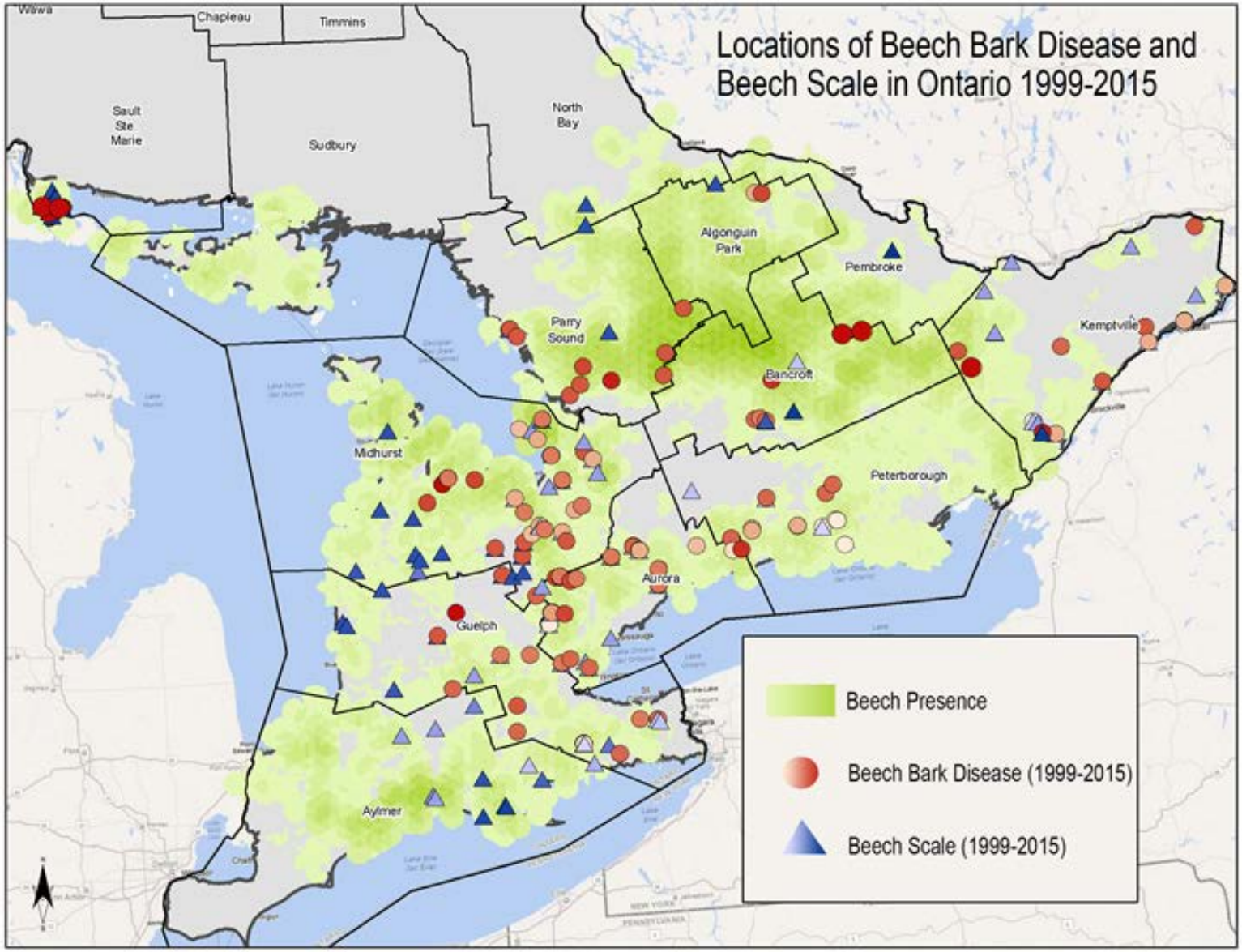
Beech bark disease on American beech

Beech Bark Disease

Known Sites to Date

Map 1 – Provincial Overview

Beech bark disease and beech scale sample locations.



Blowdown

Damage Information

Damage Name:	Blowdown
Damage Type:	Abiotic Damage – Weather Event
Damage Area:	2,047 ha (2015)

Provincial Key Facts

- Blowdown, damage to trees as a result of high winds or extreme weather events, is part of the natural processes within forests. The extent and frequency of damage is sporadic.
- Less blowdown was recorded in 2015 (2,047 ha) when compared to that mapped in 2014 (3,415 ha) and in 2013 (5,276 ha).
- The majority of the damage was aerially mapped in Northwest Region, with a small amount mapped in Northeast Region.

Regional Summary

Northwest:

- Small scattered pockets of blowdown were observed across six of the seven districts in Northwest Region, with no blowdown observed in Red Lake District in 2015.
- Almost half of the total damage was in Fort Frances District. Pockets were scattered from Quetico Provincial Park to Lake of the Woods on the western border of the district. The majority was mapped between Hwy 502 and Hwy 622 near Entwine, Jones, Tesup, and Mud Lakes. These areas totaled 991 ha.
- In Kenora District, blowdown totalled 488 ha, all of which occurred in the Lake of the Woods area. Areas mapped included six small areas near the center of Bigsby Island, one larger area on the west side of Big Island, and three medium sized pockets northwest of Arrow Lake on the Aulneau Peninsula.
- In Nipigon District, six pockets of blowdown were observed on the west central side. The majority occurred west of Nakina, on the north and south end of Jefferies Lake. The rest was seen on the north end of Weese Lake, the north end of Kellow Lake, and northeast of Abazotikichuan Lake.

Blowdown in Hearst District

Regional Summary

- In Thunder Bay District, 117 ha of blowdown were aerially mapped. Blowdown was mapped north of Thunder Bay near Dog Lake, on the west side of Lake Nipigon near Champlain Point, and north of Arril Lake in Wabakimi Provincial Park.
- In Sioux Lookout District, two small pockets of blowdown were recorded, totalling 72 ha. Both pockets were observed along the Albany River at the north end of Wabakimi Provincial Park.
- In Dryden District, two small areas of blowdown totalling 31 ha were aerially mapped near Assinkepatakiso Lake, approximately 90 km southwest of the Town of Dryden.

Northeast:

- In Sudbury District, five pockets of blowdown totalling 67 ha were observed northeast of Killarney Provincial Park. Trembling aspen and black spruce were blown over in a southeasterly direction near Lake Panache. Two of these pockets were on Whitefish First nations land, with the largest near Reef Lake and a smaller pocket near Virginia Point. The remaining three areas were observed in Caen and Bevin Townships, at the southeast end of Reef Lake, at the northeast end of Slim Lake, and at the north end of Little Gabodin Lake.
- In Chapleau District, three small areas of blowdown were aerially mapped, all in close proximity to each other. These areas totaled four ha in size and were located at the north end of Little Stefansson Lake.

Outlook

- Timely salvage operations can be effective in utilizing blowdown material.
- Following a dramatic blowdown event, secondary pest populations (such as bark beetles, wood borers, and root rots) are expected to increase.
- Climate change is predicted to result in more frequent and more severe weather events with potential to cause damage to forests. Such a pattern has not yet become evident in Ontario.

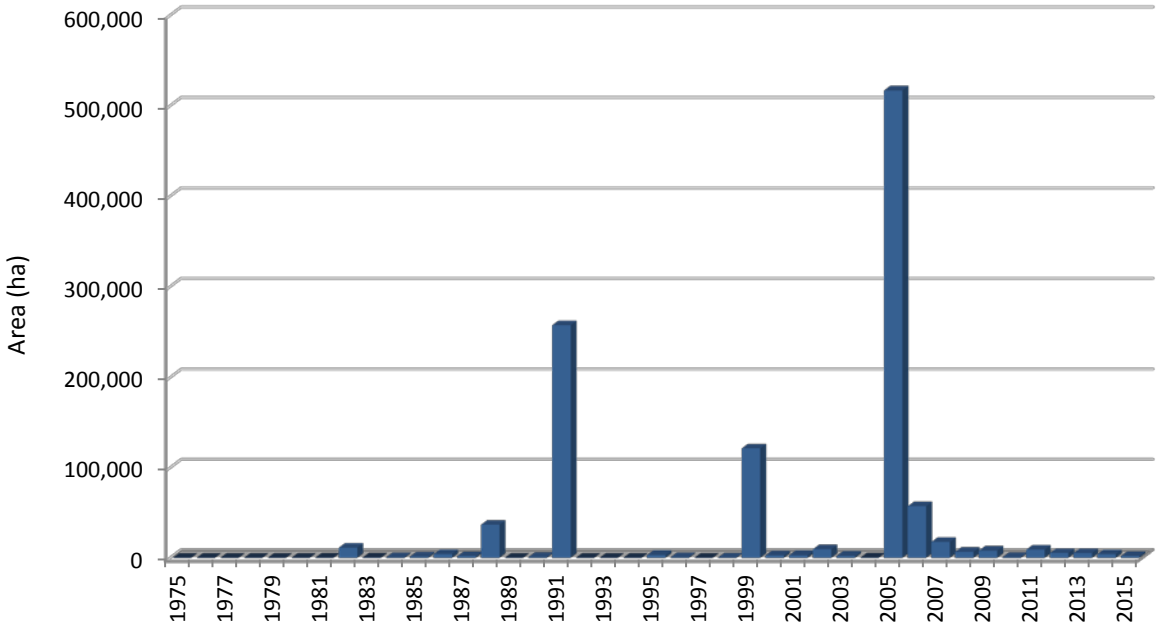
Area Summary

Total area-within-which blowdown caused moderate-to-severe damage in 2011 – 2015 by MNRF District (area in hectares)

Region / District	2011	2012	2013	2014	2015
Northwest					
Dryden	1,078	538	1,582	292	31
Fort Frances	1,956	-	1,379	792	991
Kenora	-	1,651	-	106	488
Nipigon	89	-	220	46	277
Red Lake	1,124	213	189	-	-
Sioux Lookout	451	622	825	9	72
Thunder Bay	363	-	42	1,867	117
Subtotal:	5,061	3,024	4,236	3,111	1,976
Northeast					
Chapleau	-	-	27	-	4
Cochrane	-	-	-	7	-
Hearst	1,996	-	-	1	-
North Bay	14	363	-	-	-
Sault Ste. Marie	32	-	125	152	-
Sudbury	11	47	-	7	67
Timmins	60	-	-	-	-
Subtotal:	2,113	410	152	168	71
Southern					
Algonquin	-	-	761	114	-
Bancroft	156	19	-	7	-
Guelph	1,751	-	19	-	-
Kemptville	-	37	-	-	-
Midhurst	1	71	-	-	-
Parry Sound	-	-	7	-	-
Pembroke	-	1,765	102	16	-
Subtotal:	1,909	1,892	888	136	0
Provincial total	**9,083**	**5,327**	**5,276**	**3,415**	**2,047**

Trends

Blowdown in Ontario



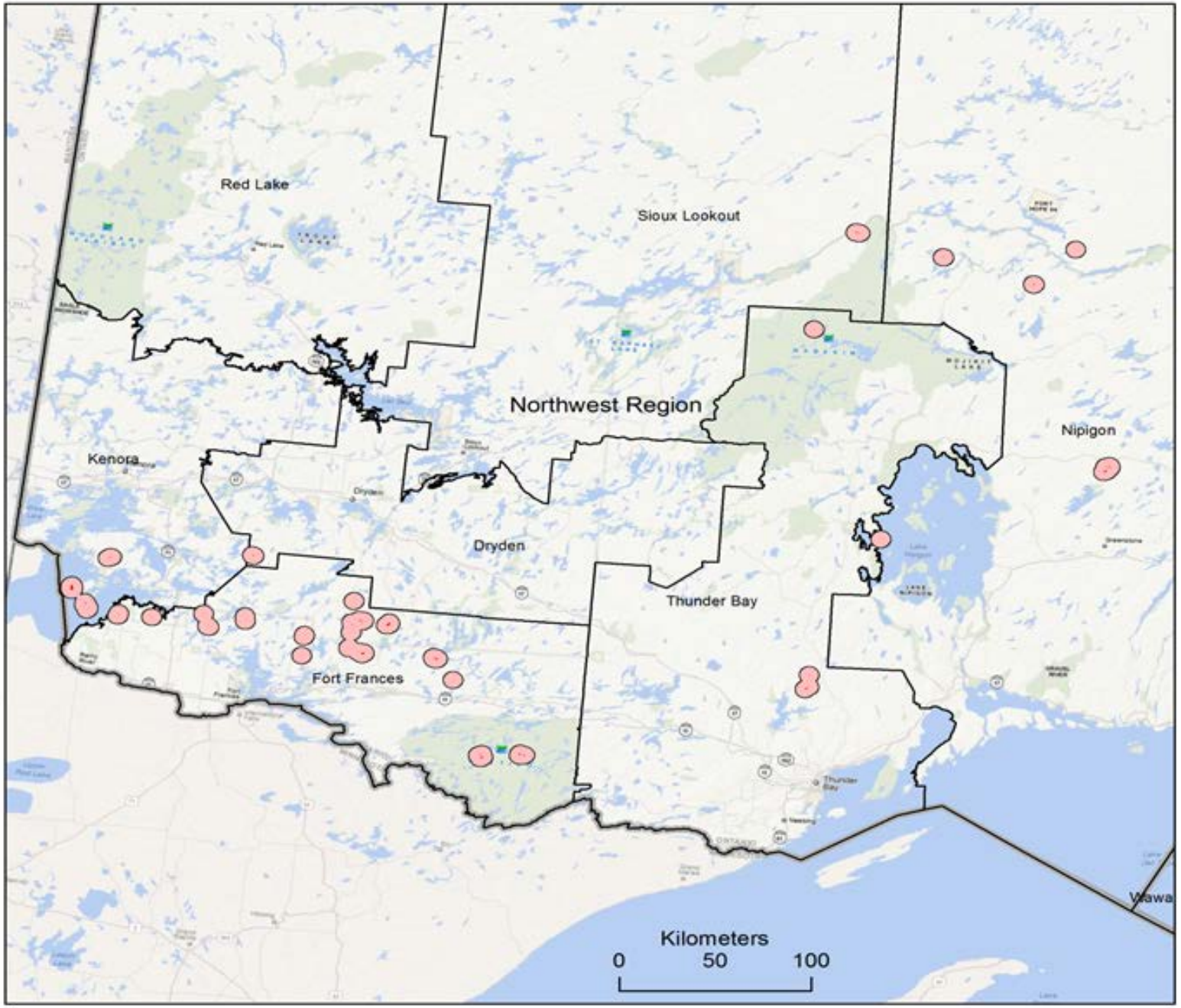
Blowdown

Blowdown Damage 2015

Map 1 – Northwest Region

Areas-within-which Blowdown caused forest damage.

Area of Blowdown Damage



Blowdown Damage 2015

Map 2 – Northeast Region

Areas-within-which Blowdown caused forest damage.

Area of Blowdown Damage

Brown Spot Needle Blight

Pest Information

Common Name:	Brown spot needle blight
Latin Name:	*Mycosphaerella dearnessii* M.E. Barr
Pest Origins:	Native to North America
Pest Type:	Needle Blight
Host Species:	Pine spp., Scots pine most affected
Infestation Area:	26 ha (2015)

Provincial Key Facts

- This disease affects trees of all ages but is most damaging to seedlings and smaller trees, such as nursery stock and Christmas tree plantations.
- Several years of infection causes reduced tree growth. Coupled with other factors, such as drought and secondary insect attack, it may result in tree mortality.
- Much less damage was recorded in 2015 (26 ha) when compared to that in 2014 (327 ha).
- The wet cool weather in early summer was perfect conditions for brown spot needle blight.

Regional Summary

Northeast:

- In Sault Ste. Marie District, a stand of semi-mature Scots pine along Chiblow Lake Road north of Iron Bridge had a total of 15 ha of severe damage, with 100% of the needles damaged.
- In Sudbury District, 11 ha of severe damage were observed in a Scots pine stand on the west side of Manitoulin Island, southeast of Meldrum Bay. This is the second consecutive year damage was recorded here at the junction of Hwy 560 and the Dump Road.

Area Summary

Total area-within-which brown spot needle blight caused moderate-to-severe damage in 2011 – 2015 by MNRF District (area in hectares)

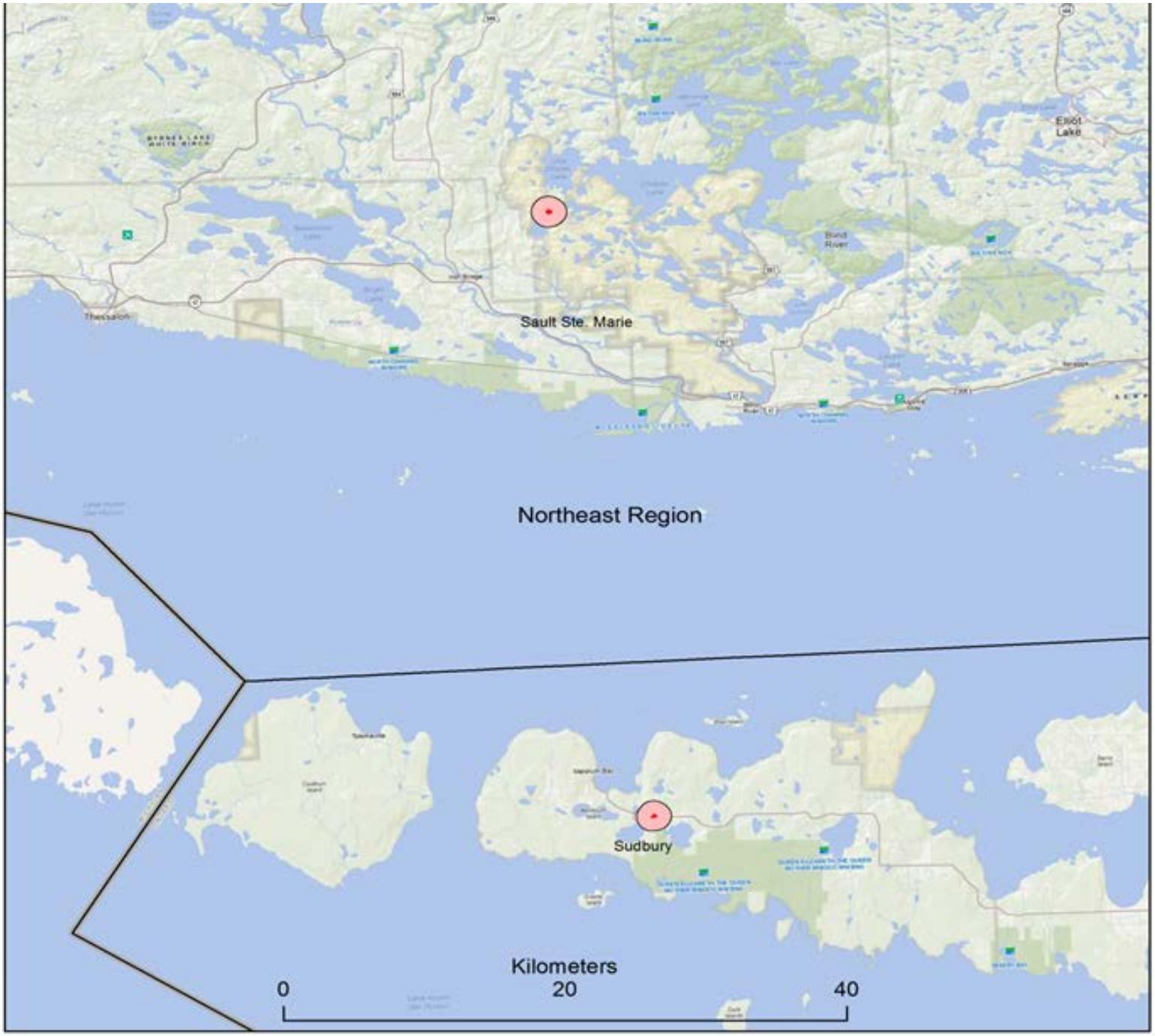
Region / District	2011	2012	2013	2014	2015
Northeast					
Sault Ste. Marie	101	26	167	176	15
Sudbury	-	-	-	150	11
Subtotal:	*101*	*26*	*167*	*327*	*26*
Southern					
Bancroft	26	-	-	-	-
Midhurst	61	-	-	-	-
Parry Sound	1,348	141	-	-	-
Subtotal:	*1,435*	*141*	-	-	-
Provincial Total:	**1,536**	**167**	**167**	**327**	**26**

Brown Spot Needle Blight 2015

Map 1 – Northeast Region

Areas-within-which brown spot needle blight caused damage.

Area of Moderate-to-Severe Damage



Cedar Leafminer Complex

Pest Information

Common Name:	Cedar leafminer complex
Latin Name:	Various insect species
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Eastern white cedar, eastern red cedar
Infestation Area:	511 ha (2015)

Provincial Key Facts

- A significant decrease in moderate-to-severe defoliation was recorded in 2015 (511 ha) when compared to that in 2014 (10,780 ha).
- The last large scale cedar leafminer outbreak occurred in Kemptville District from 2002-2007, resulting in excessive top-kill and whole tree mortality.
- Cedar leafminer complex is a group of similar insects that mine cedar foliage, including:
    - *Argyresthia aureoargentella* Brower,
    - *Argyresthia canadensis* Freeman,
    - *Argyresthia thuiella* (Pack), and
    - *Coleotechnites thujaella* (Kft.).

Regional Summary

Southern:

- In Pembroke District, 200 ha of moderate-to-severe defoliation were aerially mapped on eastern white cedar south of Pembroke and Renfrew. Four small areas of defoliation were observed near Lake Doré and Mink Lake. Two additional areas of defoliation were recorded east of Hurd's Lake and just north of White Lake.
- In Peterborough District, 120 ha of moderate-to-severe defoliation were aerially mapped. Three areas of defoliation were observed: north of Sturgeon Lake, northeast of Lakefield, and within the city limits of Peterborough along Jackson Creek.

Cedar leafminer damage on eastern white pine

Regional Summary

- In Kemptville District, moderate-to-severe defoliation was observed on 82 ha. Defoliation was aerially mapped just west of Cassleman. During ground surveys, areas of light defoliation were also observed on eastern red cedar at Dwyer Hill in Leeds and Grenville and at Limoges in Prescott Russell.
- In Midhurst District, small isolated pockets of moderate-to-severe defoliation occurred in historically infested areas east of Owen Sound, Grey County.
- In Algonquin Provincial Park, 44 ha of moderate-to-severe defoliation were recorded along the Bonnechere River, with an additional area observed north of Robitaille Lake.
- In Bancroft District, moderate-to-severe defoliation was recorded in a small 9 ha area north of Gooderham Lake.
- In Aylmer District, light defoliation was observed during ground surveys northeast of Woodstock in Oxford County.

Outlook

- Repeated attack from this insect will cause top and branch mortality, especially when accompanied by other stress factors, such as the 2012 drought conditions or shallow stony soils, which cedar often occupies.
- Defoliation from cedar leafmining also predisposes trees to be attacked by northern cedar bark beetles, which had been documented in Peterborough County in 2012.
- Often, this pest population drops off quickly for several years due to biological controls.

Area Summary

Total area-within-which cedar leafminer caused moderate-to-severe damage in 2011 - 2015 by MNRF District (area in hectares).

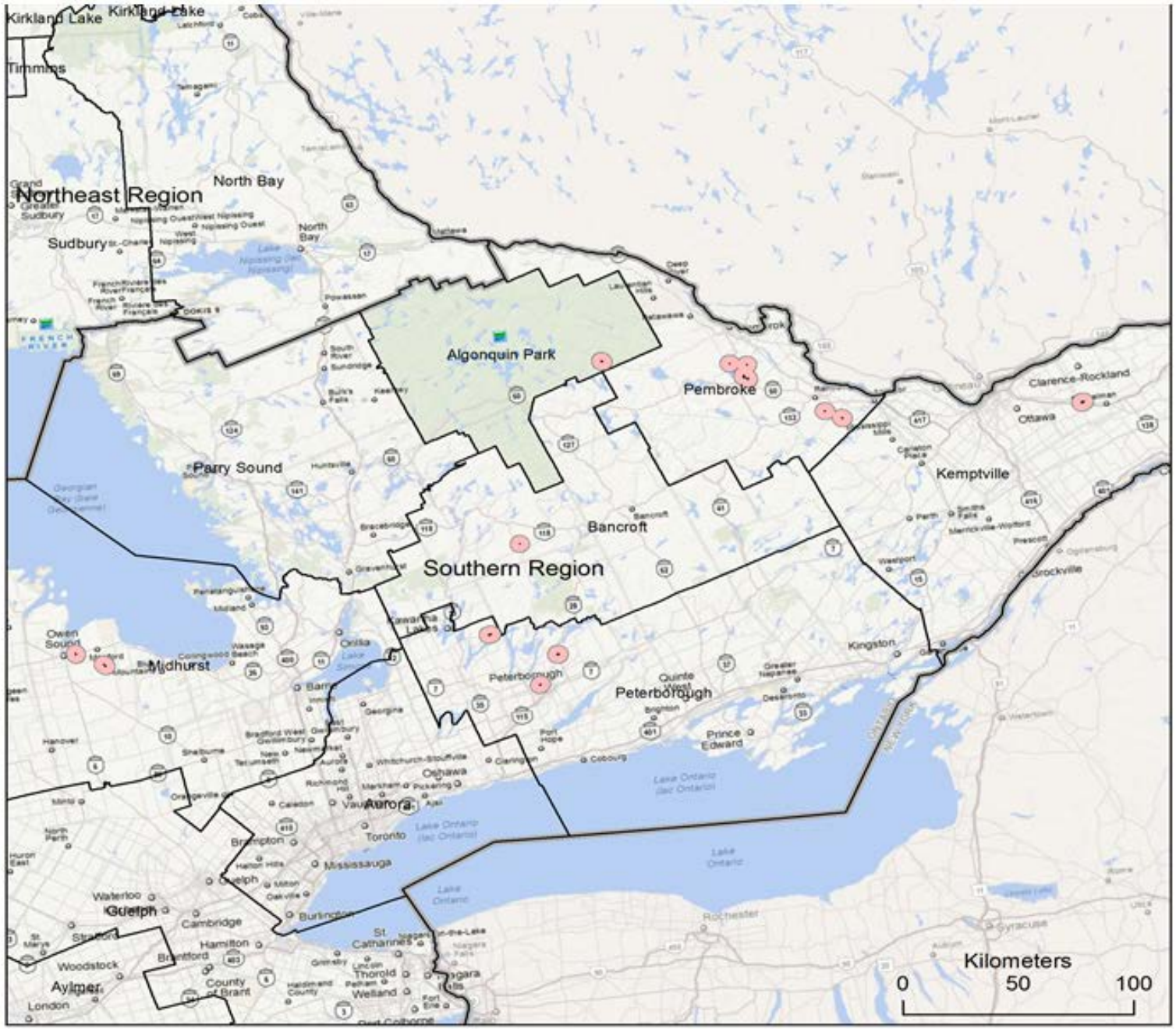
Region / District	2011	2012	2013	2014	2015
Southern					
Algonquin	-	-	-	-	44
Aurora	81	14,051	695	631	-
Aylmer	-		386	36	-
Bancroft	261	713	31	231	9
Guelph	4	1,020	992	2,199	-
Kemptville	-	32	-	2	82
Midhurst	622	10,307	3,628	6,567	56
Pembroke	80	197	-	227	200
Peterborough	1,774	4,165	477	886	120
Provincial Total:	**2,822**	**30,486**	**6,209**	**10,780**	**511**

Cedar Leafminer Complex 2015

Map 1 – Southern Region

Areas-within-which cedar leafminer complex caused moderate-to-severe defoliation.

Area of Moderate-to-Severe Damage



Emerald Ash Borer

Pest Information

Common Name:	Emerald ash borer
Latin Name:	*Agrilus planipennis* Fairmaire
Pest Origins:	Invasive – Native to Asia
Pest Type:	Wood Borer
Host Species:	Ash spp.
Infestation Area:	41,395 ha (2015)

Provincial Key Facts

- Emerald ash borer has been a significant threat to ash in Ontario since it was discovered in Windsor in 2002.
- By 2013, EAB had become well established in numerous municipalities within Aylmer and Guelph Districts; throughout the Greater Toronto Area and east to Durham Region; north to Lake Simcoe, Aurora District; in several locations in Peterborough District; in the city of Sault Ste. Marie; in the City of Ottawa; and in Leeds, Grenville, Prescott, and Russell in Kemptville District.
- Due to new discoveries in previously uninfested areas in 2013, the CFIA expanded the regulated area in 2014 to include all areas south of a line drawn from the Montreal River, Sault Ste. Marie District, across to the Quebec border (see map on page 39).
- In 2014, EAB continued to spread, moving from Windsor north to Tobermory and east to Niagara, outward from the golden horseshoe, Ottawa, and Brockville, along the northern shore of Lake Ontario following the Hwy 401 corridor, and east from Sault Ste. Marie to St Joseph Island.
- In 2014, MNRF conducted an EAB detection program outside the regulated area, coordinated with CFIA. This program focused on green prism trap deployment in areas of high risk, such as Provincial Parks and camping sites in Northwest and Northeast Regions. No insects were captured through this project.
- In 2015, infestations continued to spread in Southern Region in all directions.

Emerald ash borer adult beetle

Regional Summary

Southern:

- In Aylmer District, decline and mortality of ash has expanded throughout the entire district since the discovery of EAB in Windsor Essex thirteen years ago.
- In Guelph District, decline and mortality of ash caused by EAB expanded north along the eastern shore of Lake Huron, southeast through Wellington County across the Regional Municipality of Waterloo, and west from the City of Guelph area to Aurora District near Brampton. Dead and dying ash trees were visible in a band between Lake Ontario and Lake Erie, east of Cayuga to Port Davidson.
- In Midhurst District, no new sites were detected in Grey County but the satellite infestations east and west of Owen Sound expanded slightly. In Bruce County, new positive locations were discovered in Kincardine, Walkerton, Bruce Peninsula National Park, and Saugeen First Nations #29. Simcoe County ash decline was mapped along Hwy 400 west of Lake Simcoe and northeast along Hwy 11, with new detections in Wasaga Beach and Alliston.
- In Aurora District, ash mortality and decline moved from Orangeville across the north of the Greater Toronto Area infestation and up to Lake Simcoe through York and Durham Regions. A total of 6,092 ha of dead and dying ash were mapped in this district, up from 166 ha in 2014.
- In Peterborough District, expansion of the satellite pockets at Balsam Lake, Rice Lake, Brighton, and Port Hope has occurred totaling 93 ha. Additional sites were detected in the City of Peterborough.
- In Kemptville District, ash mortality and decline have spread from the original infestation in Ottawa to Arnprior in the northwest, Perth in the west, and Cardinal in the southeast. Dead ash trees along Hwy 417 west of Ottawa were observed. The Brockville infestation has remained stable with no new detections.
- In Pembroke District, the infested area extends from Arnprior to Renfrew along Hwy 17.

Northeast:

- In Sault Ste. Marie District, ash mortality has continued to increase in the City of Sault Ste. Marie, while damage on St Joseph Island has not increased.

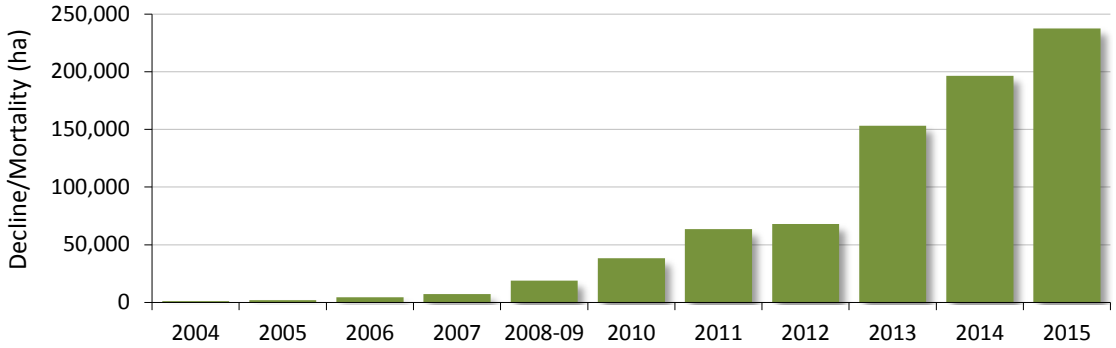
Area Summary

Total area-within-which emerald ash borer caused moderate-to-severe decline and mortality in 2011 - 2015 by MNRF district (area in hectares).

Region / District	2011	2012	2013	2014	2015
Northeast					
Sault Ste. Marie	-	-	-	108	-
Subtotal:	-	-	-	108	-
Southern					
Aurora	-	-	-	166	6,092
Aylmer	24,147	1,410	56,908	15,076	2,149
Guelph	177	2,812	27,963	23,347	29,468
Kemptville	628	328	192	4,548	1,021
Midhurst	-	-	-	-	2,336
Pembroke	-	-	-	-	80
Peterborough	-	-	5	93	190
Subtotal:	24,952	4,550	85,069	43,230	41,337
Provincial total	**24,952**	**4,550**	**85,069**	**43,338**	**41,337**

Trends

Decline of ash due to EAB in Ontario



Outlook

- EAB continues to spread in all directions within Southern Ontario and is moving from forests with a high percentage composition of ash spp. (>30%) to more diverse forests with lower compositions of ash spp. (5-10%). As a result, the perceived impact in areas with lower compositions of ash is lessened; damage remains severe, however, on a much smaller percentage of the forest composition. If not effectively controlled, EAB is expected to spread across the entire range of ash, causing widespread ash mortality in Ontario.

Map of Regulated Area 2014

Source Canadian Food Inspection Agency website: http://www.inspection.gc.ca/DAM/DAM-plants-vegetaux/STAGING/images-images/pestrava_agrpla_ministerial_image1a_1372765048219_eng.jpg

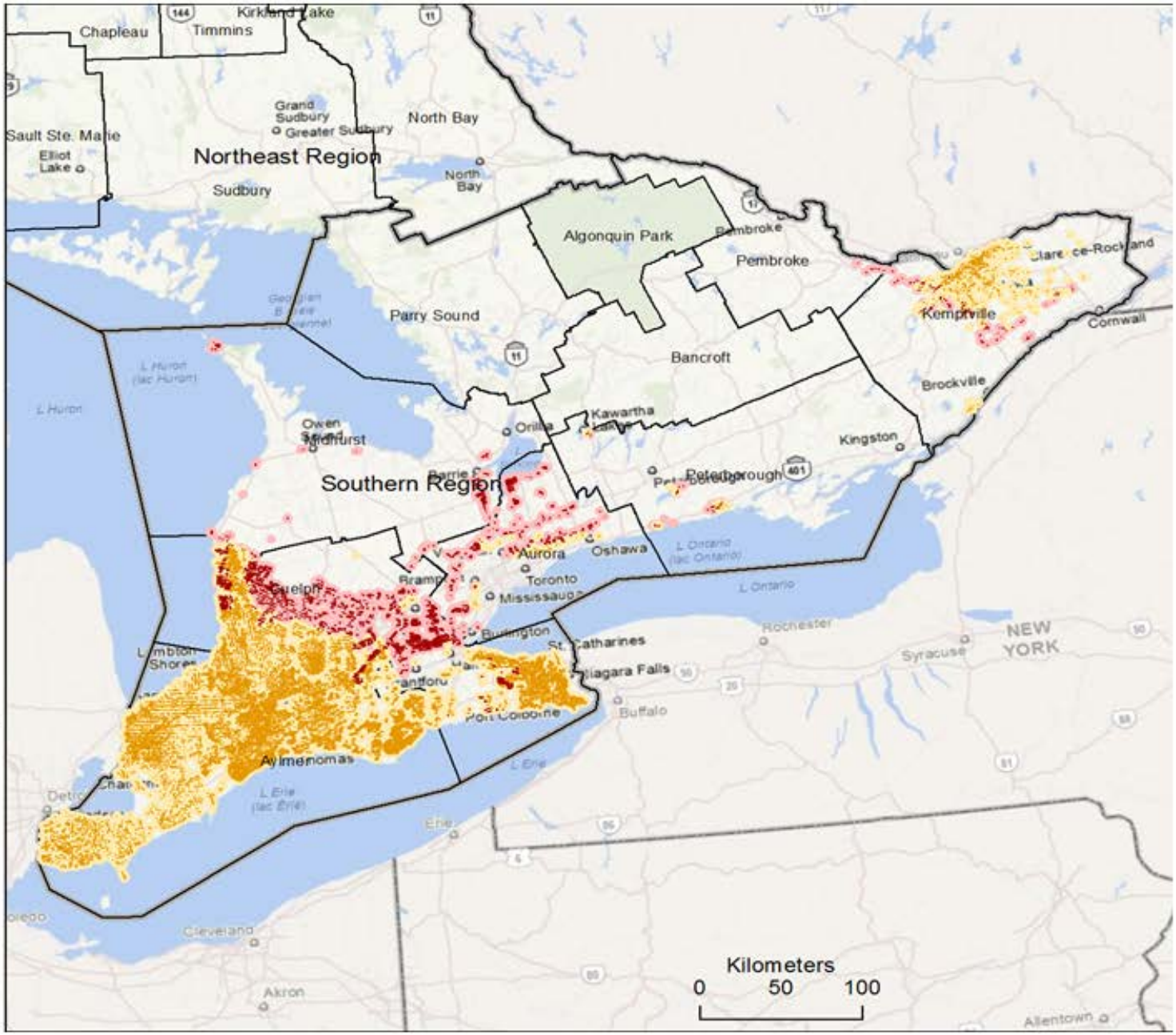
Emerald ash borer larvae under bark of ash tree

Emerald Ash Borer 2015

Map 1 – Southern Region Overview

Areas-within-which emerald ash borer caused decline and mortality to ash species.

- Area of Decline and Mortality 2015
- Area of Decline and Mortality 2002-2014

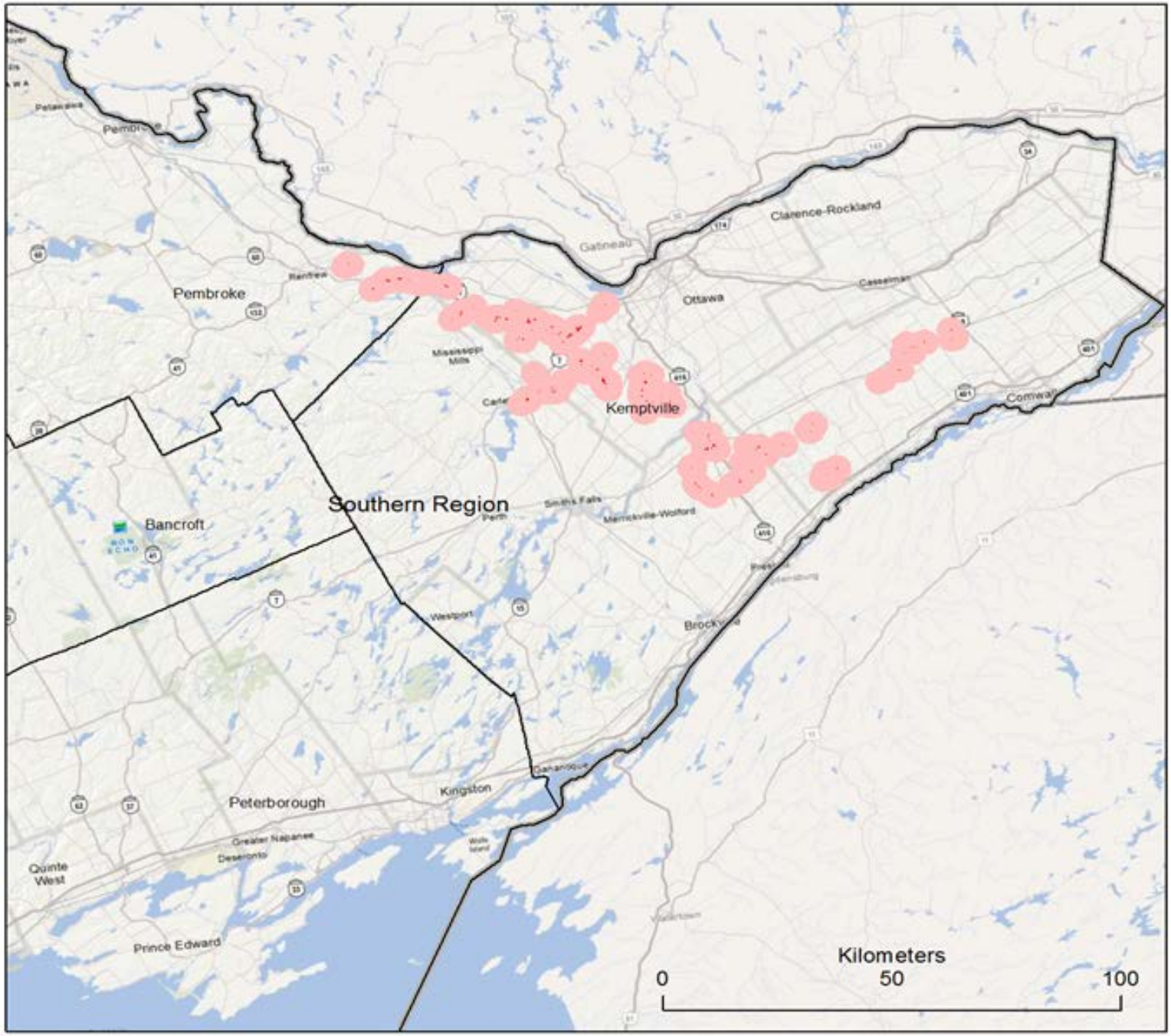


Emerald Ash Borer 2015

Map 2 – Southern Region

Areas-within-which emerald ash borer caused decline and mortality to ash species.

Area of Decline and Mortality

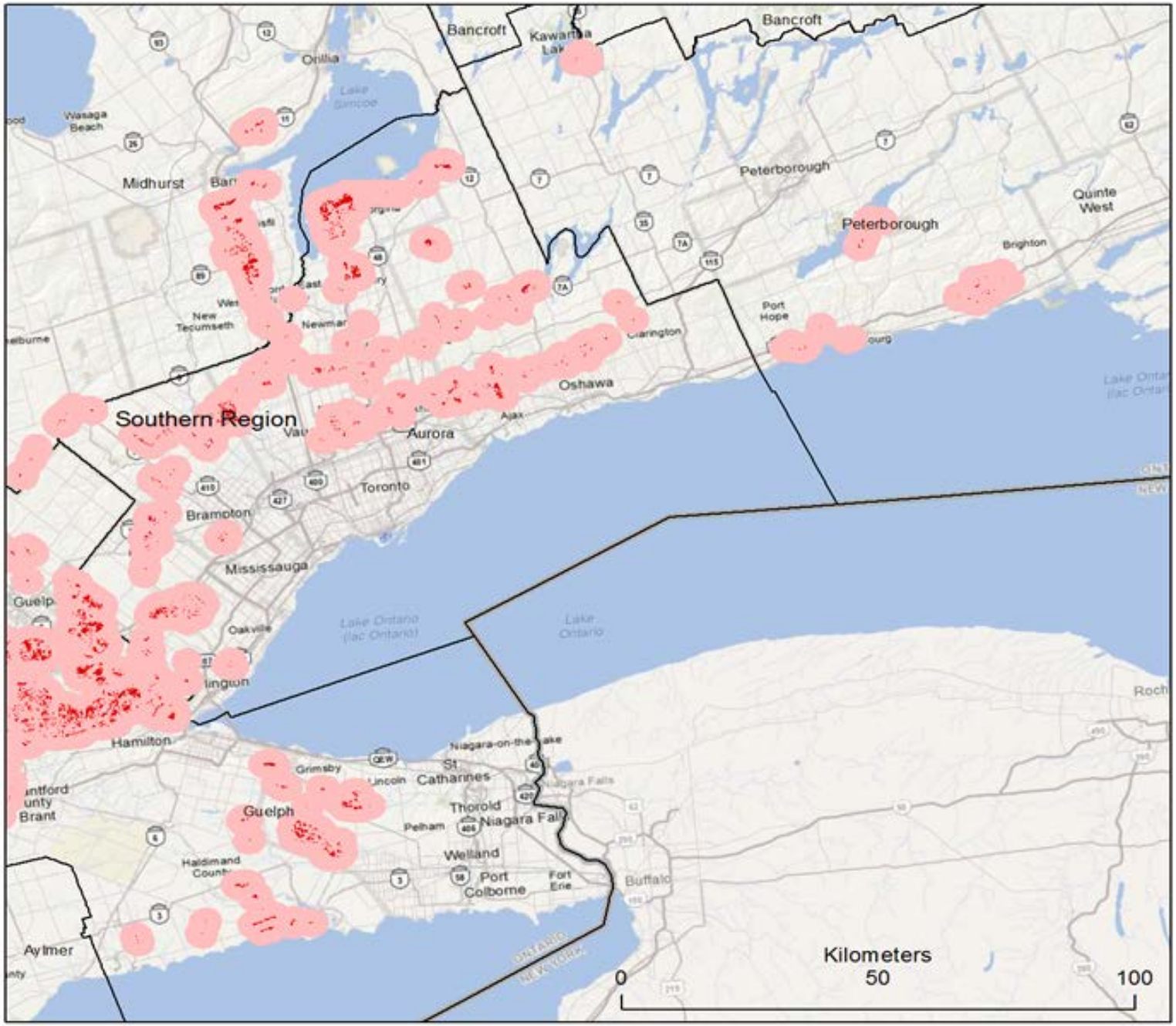


Emerald Ash Borer 2015

Map 3 – Southern Region

Areas-within-which emerald ash borer caused decline and mortality to ash species.

Area of Decline and Mortality

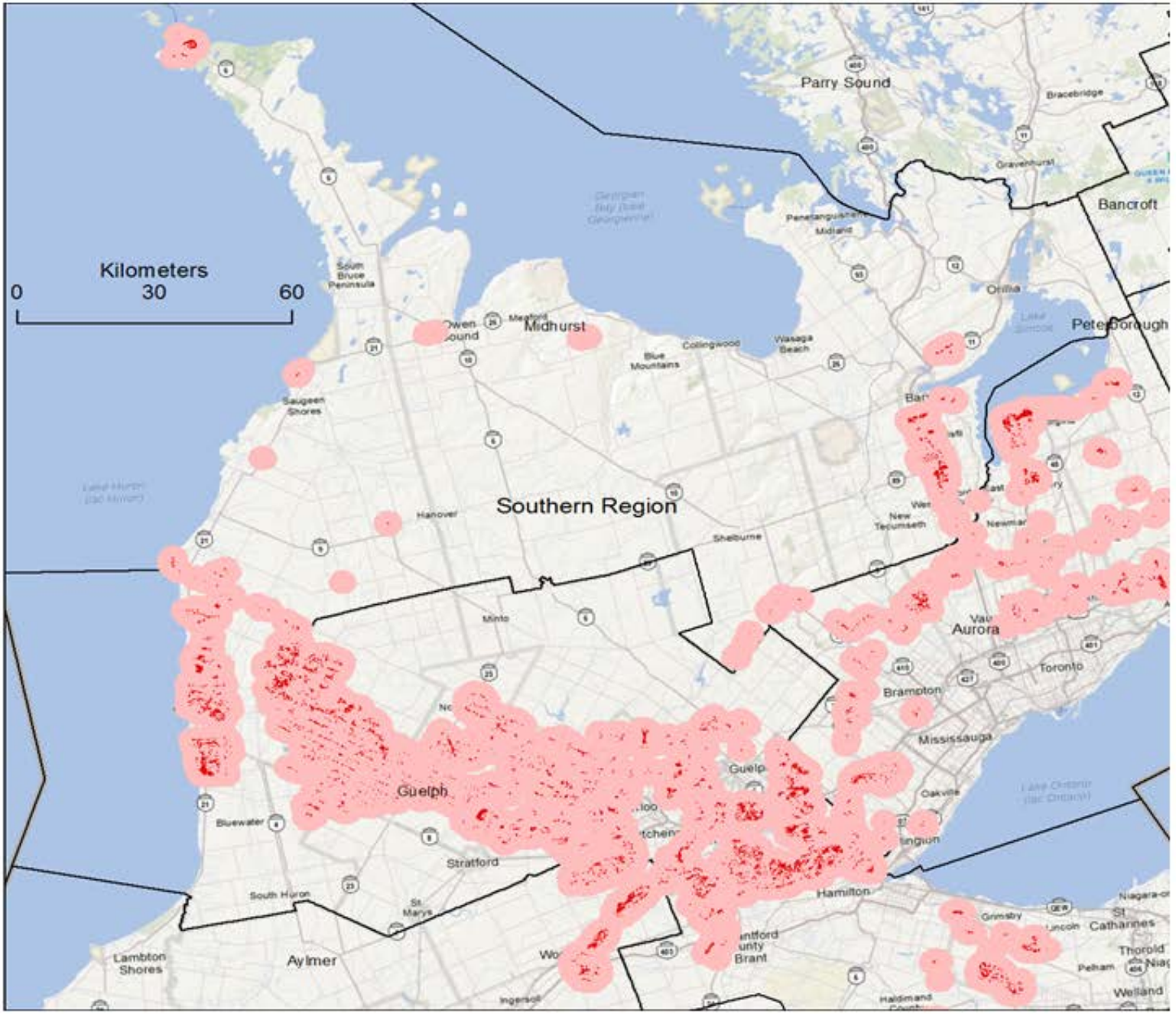


Emerald Ash Borer 2015

Map 4 – Southern Region

Areas-within-which emerald ash borer caused decline and mortality to ash species.

Area of Decline and Mortality



Forest Tent Caterpillar

Pest Information

Common Name:	Forest tent caterpillar
Latin Name:	*Malacosoma disstria* Hubner
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Hardwoods
Infestation Area:	681,645 ha (2015)

Provincial Key Facts

- Forest tent caterpillar outbreaks occur on average every 10-12 years.
- Forest tent caterpillar prefers sugar maple and oak in the southern part of the province and trembling aspen in northern areas.
- Cumulatively, a forty-five percent increase in area of moderate-to-severe defoliation occurred in the province in 2015.

Regional Summary

Northwest:

- In Dryden District, a modest decline in defoliation was observed, with a reduction of just over 16,000 ha due to fragmentation of larger contiguous areas. However, this was still the most affected district with 169,564 ha of moderate-to-severe defoliation. New areas of moderate-to-severe defoliation were mapped near Eagle, Wabigoon, and Rugby Lakes.
- In Nipigon District, moderate-to-severe defoliation increased by just over 83,000 ha. Similar to 2014, defoliation occurred across the north-central portion of the district near the Albany River. New areas of moderate-to-severe defoliation were aerially mapped along the north shore of Lake Superior, between the towns of Red Rock and Terrace Bay, near the community of Nakina, and near the towns of Geraldton and Longlac.
- In Sioux Lookout District, defoliation decreased by 26,926 ha. While defoliation continued to persist in the Lac Seul area, this area became much more fragmented. New defoliation was also mapped in St Raphael Provincial Park near Hooker and Miniss Lakes.

Forest tent caterpillar larva

Regional Summary

- In Thunder Bay District, the largest increase in defoliation (108,238 ha) was observed. The majority of new defoliation was mapped from Lake Superior to Wabakimi Provincial Park and near the north end of Lake Nipigon. Defoliation was also mapped along the International Border from Pie Island, in Lake Superior, to Northern Lights Lake. New small pockets of defoliation were observed from Hwy 11, near Greenwater Lake, north to Wawang Lake.
- In Kenora District, defoliation declined slightly, which was mostly attributed to the collapse of the infestation near Silver Lake and north of Gordon Lake. New defoliation was mapped near Dryberry and Atikwa Lakes, in Sioux Narrows, near Silver and Black Sturgeon Lakes, and near Vermillion and Lount Lakes. An expansion of the 2014 infestation was recorded around Perrault and Wabuskang Lakes.
- In Red Lake District, an increase of almost 14,000 ha of moderate-to-severe defoliation occurred. The majority of defoliation was located near Cairins and Pikangikum Lakes. Several scattered smaller pockets of defoliation stretched from Artery Lake in Woodland Caribou Provincial Park to Badrock Lake.
- In Fort Francis District, a total of 8,693 ha of moderate-to-severe defoliation were recorded near the community of Atikokan. Additional defoliation was recorded southeast of Ignace near Scotch and Pisky Lakes. Satellite pockets of defoliation were also recorded around Mine Centre, Rainy Lake, Lower Manitou Lake, and Barwick.

Northeast:

- In Hearst District, the area of moderate-to-severe defoliation made up 95% of the total defoliation in Northeast Region. Defoliation occurred in the same area as in 2014, but increased by over 35,000 ha. Two disconnected areas of defoliation were observed: west of the town of Hearst extending to the junction of Hwy 11 and Hwy 631, with a few satellite pockets near the Nipigon District boundary; and between the towns of Kapuskasing and Mattice along Hwy 11.
- In Wawa District, new areas of defoliation were detected in two small pockets. Defoliation was recorded northwest of the community of Hornepayne and near Killala Lake northwest of the community of Manitouwadge.

Severe forest tent caterpillar defoliation on aspen

Regional Summary

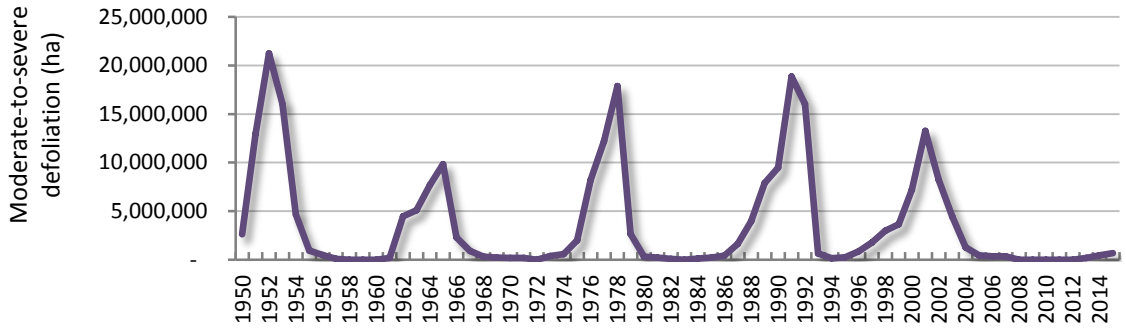
- In Timmins District, new areas of defoliation were aerially mapped, with the majority recorded northwest of Timmins in scattered pockets along the Mattagami River up to Kamiskotia Lake. Small pockets were also observed southwest of Timmins, where Hwy 101 crosses the Groundhog River.
- In Chapleau District, six new small pockets of defoliation, totalling 132 ha, were observed in Amundsen and Kapuskasing Townships.
- In Cochrane District, three new small areas of defoliation, totalling 29 ha, were observed northwest of Smoothrock Falls near Moonbeam Lake.
- In Sudbury District, two new small pockets of moderate-to-severe defoliation were observed near Windy Lake northwest of the community of Dowling. During ground surveys, a small aspen stand near Webbwood was also found to have moderate-to-severe defoliation.

Southern:

- In Midhurst District, areas where light defoliation occurred in 2014 were mapped with moderate-to-severe defoliation, increasing total area of moderate-to-severe defoliation by almost 13,000 ha. Defoliation was observed from Colpoys Bay in Bruce County through Grey County to the Collingwood area. This was the fifth year that defoliation occurred on sugar maple, white ash, white elm, American beech, basswood, white birch, and poplar.

Trends

Moderate-to-severe defoliation in Ontario



Area Summary

Total area-within-which forest tent caterpillar caused moderate-to-severe defoliation in 2011 – 2015 by MNRF District (area in hectares).

Region /	2011	2012	2013	2014	2015
Northwest					
Dryden	-	963	37,100	185,878	169,564
Fort Frances	-	-	-	-	8,693
Kenora	-	2,087	36,738	61,857	53,974
Nipigon	-	14,811	48,371	64,913	147,945
Red Lake	-	-	9,724	24,079	38,036
Sioux Lookout	-	196	59,898	114,242	87,316
Thunder Bay	-	-	-	8,228	116,466
Subtotal:	-	18,056	191,832	459,197	621,994
Northeast					
Chapleau	-	-	-	-	132
Cochrane	-	-	-	-	29
Hearst	-	-	-	1,031	36,444
Sudbury	-	-	-	-	25
Timmins	-	-	-	-	443
Wawa	-	-	-	-	1,239
Subtotal:	-	-	-	1,031	38,312
Southern					
Bancroft	3,769	-	-	-	-
Guelph	921	34	-	-	-
Midhurst	48,246	9,626	3,794	8,638	21,339
Peterborough	1,686	-	-	-	-
Subtotal:	54,623	9,660	3,794	8,638	21,339
Provincial	**54,623**	**27,716**	**195,626**	**468,866**	**681,645**

Forest Tent Caterpillar 2015

Map 1 – Southern Region

Areas-within-which forest tent caterpillar caused defoliation.

Area of Light Defoliation

Area of Moderate-to-Severe Defoliation

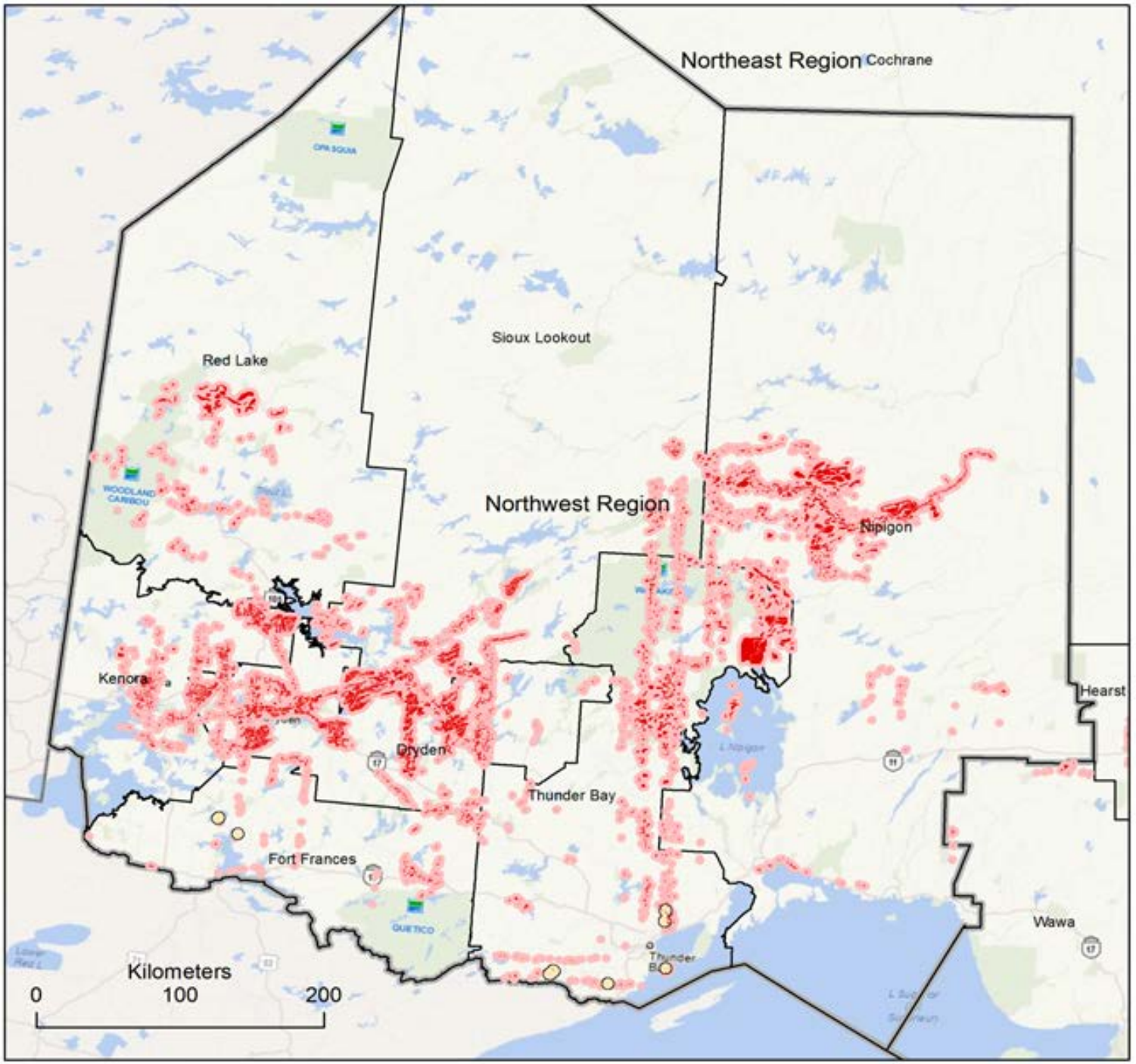
Forest Tent Caterpillar 2015

Map 2 – Northwest Region

Areas-within-which forest tent caterpillar caused defoliation.

Area of Light Defoliation

Area of Moderate-to-Severe Defoliation



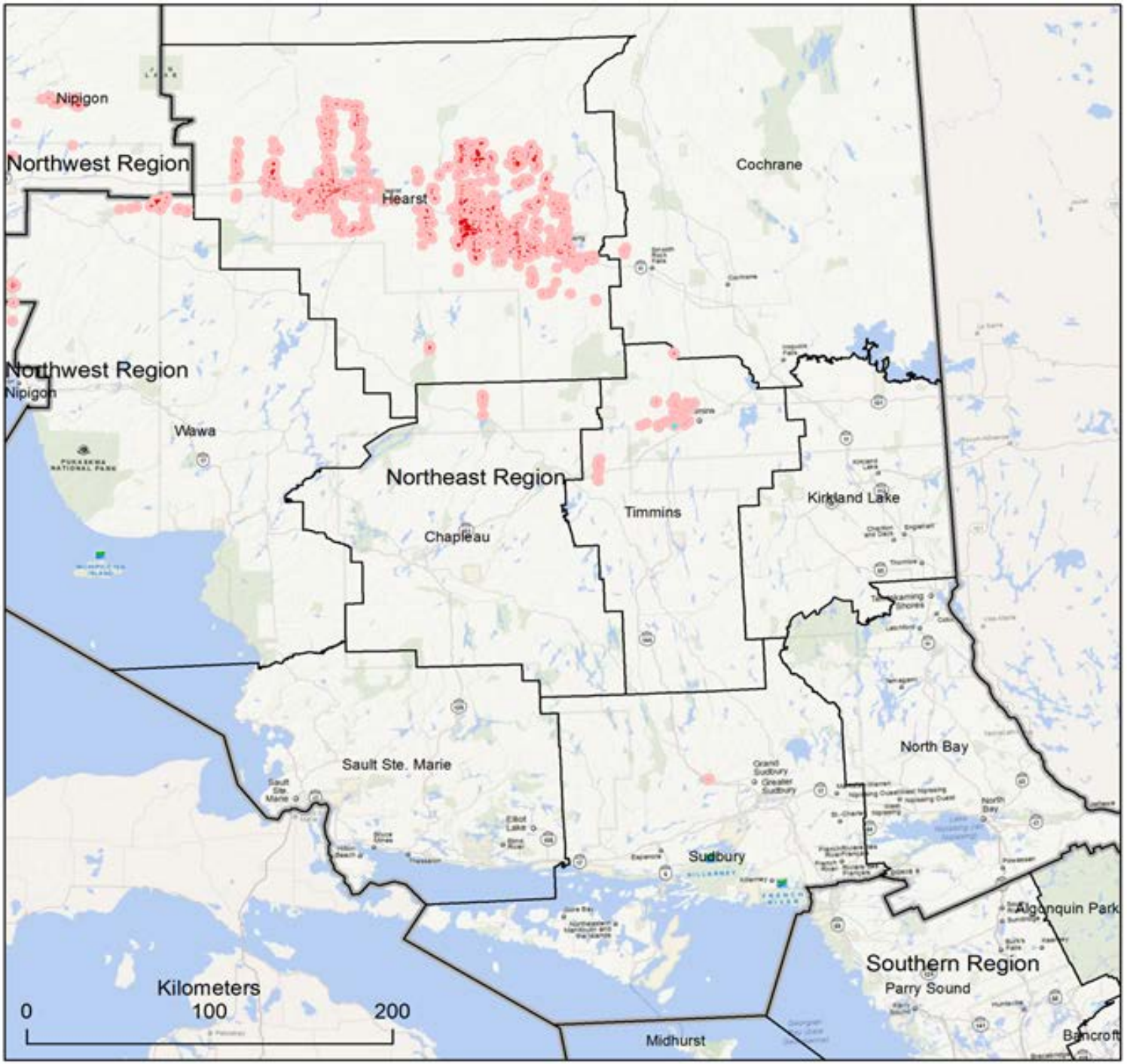
Forest Tent Caterpillar 2015

Map 3 – Northeast Region

Areas-within-which forest tent caterpillar caused defoliation.

Area of Light Defoliation

Area of Moderate-to-Severe Defoliation



Gypsy Moth

Pest Information

Common Name:	Gypsy moth
Latin Name:	*Lymantria dispar* (L.)
Pest Origins:	Invasive – Native to Europe
Pest Type:	Defoliator
Host Species:	Various hardwoods
Infestation Area:	1,772 ha – light defoliation (2015)
	757 ha – moderate-to-severe defoliation (2015)

Provincial Key Facts

- First discovered in Ontario in 1969, with the first area of severe defoliation in Kemptville District in 1981. Gypsy moth outbreaks occur periodically.
- Major outbreaks in Ontario have peaked in 1985, 1991, and 2002.
- In 2015, the infestation in Northeast Region collapsed, while in Southern Region the majority of the defoliation was light and seems to be on the verge of collapse as well.

Regional Summary

Northwest:

- A gypsy moth pheromone trap survey was carried out across the region. Moth traps were deployed at 18 locations: five in Nipigon District, six in Thunder Bay District, three in Fort Frances District, two in Dryden District, and two in Kenora District. Trap locations included Provincial Parks, rest areas, and high volume traffic areas, as well as near the Minnesota border since gypsy moth is present in northern Minnesota. Two locations in Nipigon District resulted in moth captures; one moth in Schreiber and one moth in Terrace Bay.

Northeast:

- In Sudbury District, the gypsy moth infestation collapsed. Early instar gypsy moth were collected on June 3 in Sudbury when populations were light-to-moderate. By July, larvae had disappeared and no defoliation was observed. Cool weather in mid-May caused delayed and stunted growth on certain tree species, especially elm, ash, and red oak. This may have impacted the feeding of emerging larvae and caused a good portion of the population to die.

Gypsy moth larvae

Regional Summary

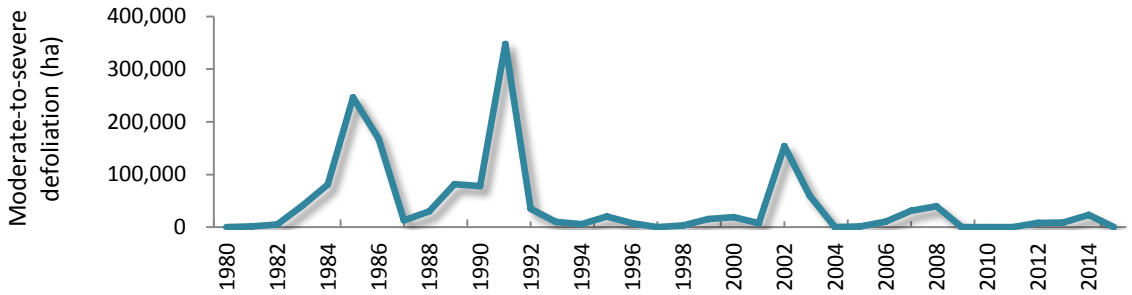
- In Sault Ste. Marie District, larvae were detected at low levels south of Elliot Lake with light defoliation on birch (<5%). Larvae were also found on red oak at the junction of Hwy 17 and Hwy 108, where six larvae were collected and trace defoliation was detected. In the city of Sault Ste. Marie, a few singular larvae were found feeding on sugar maple and trembling aspen with no detectable defoliation.

Southern:

- In Aylmer District, ground surveys found gypsy moth larvae across the district, but mostly at low levels with no or trace levels of defoliation. Defoliation was mapped in two areas; near Sarnia (light defoliation) and south of Tilsonburg near Lake Erie (moderate-to-severe defoliation). In both cases, defoliation was observed on white oak, bitternut hickory, poplar species, silver maple, and basswood totalling 2,529 ha. South of Sarnia, 1,772 ha of light defoliation were mapped, with the majority recorded in Moore Twp and Enniskillen Twp. Two pockets of light defoliation were also mapped east of Sarnia. 757 ha of moderate-to-severe defoliation were mapped southwest of the town of Walsingham. During ground surveys north of the Municipality of Chatham-Kent, two open-grown Colorado blue spruce were found to have 100% defoliation and a Norway maple was found with moderate-to-severe defoliation.
- In Midhurst District, the only encounter with gypsy moth was during an extension call in Kincardine. A blue spruce was found with over 20 gypsy moth egg masses and larvae were feeding on the new shoots. Defoliation was moderate-to-severe.

Trends

Moderate-to-severe defoliation in Ontario



Area Summary

Total area-within-which gypsy moth caused moderate-to-severe defoliation in 2011 - 2015 by MNRF District (area in hectares).

Region / District	2011	2012	2013	2014	2015
Northeast					
Sudbury	-	8,123	8,451	22,098	-
Subtotal:	-	8,123	8,451	22,098	-
Southern					
Aylmer	-	-	-	1,077	757
Parry Sound	-	-	-	160	-
Subtotal:	-	-	-	1,237	757
Provincial Total:	**-**	**8,123**	**8,451**	**23,335**	**757**

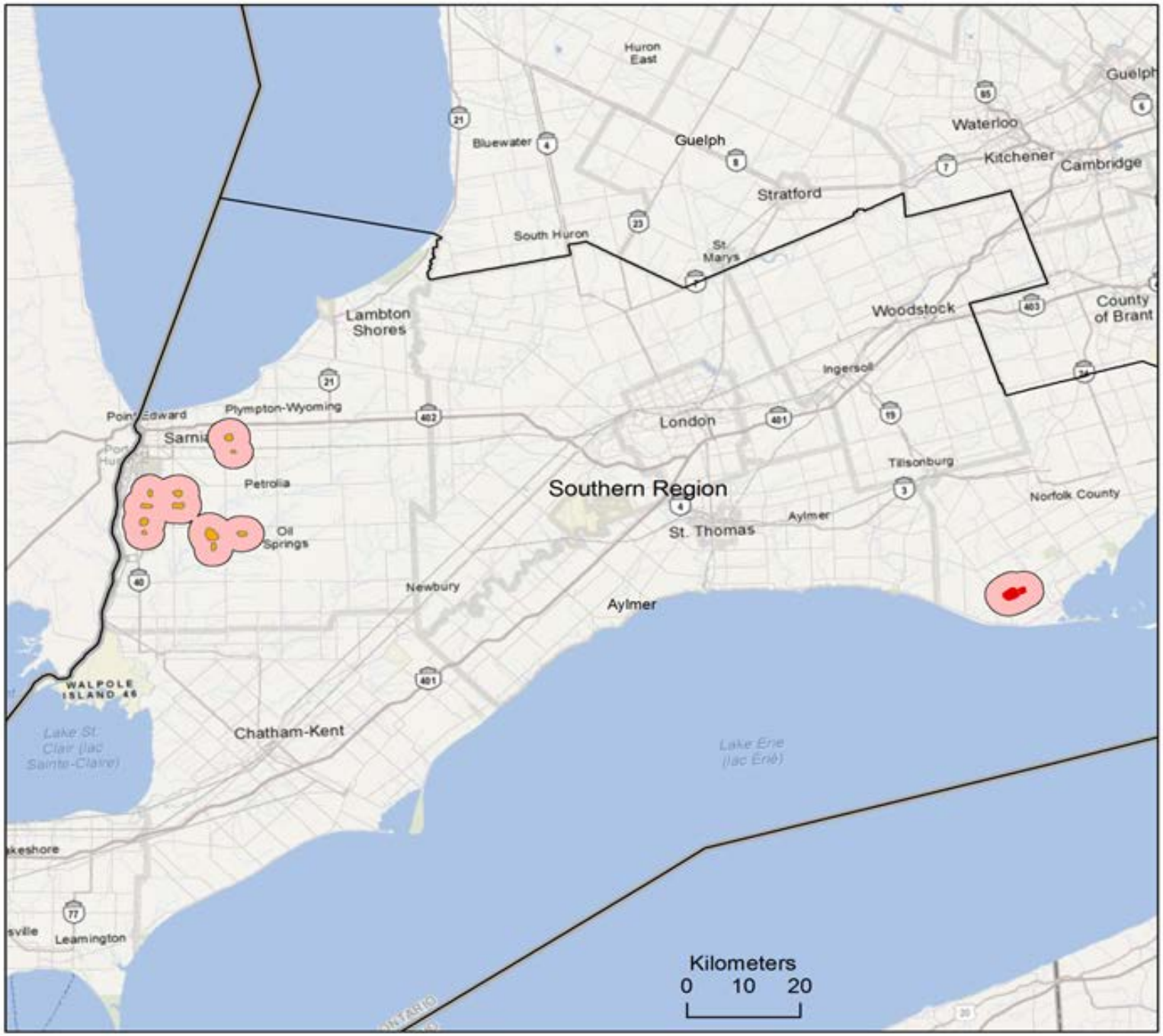
Gypsy Moth 2015

Map 1 – Southern Region

Areas-within-which gypsy moth caused defoliation.

Area of Light Defoliation

Area of Moderate-to-Severe Defoliation

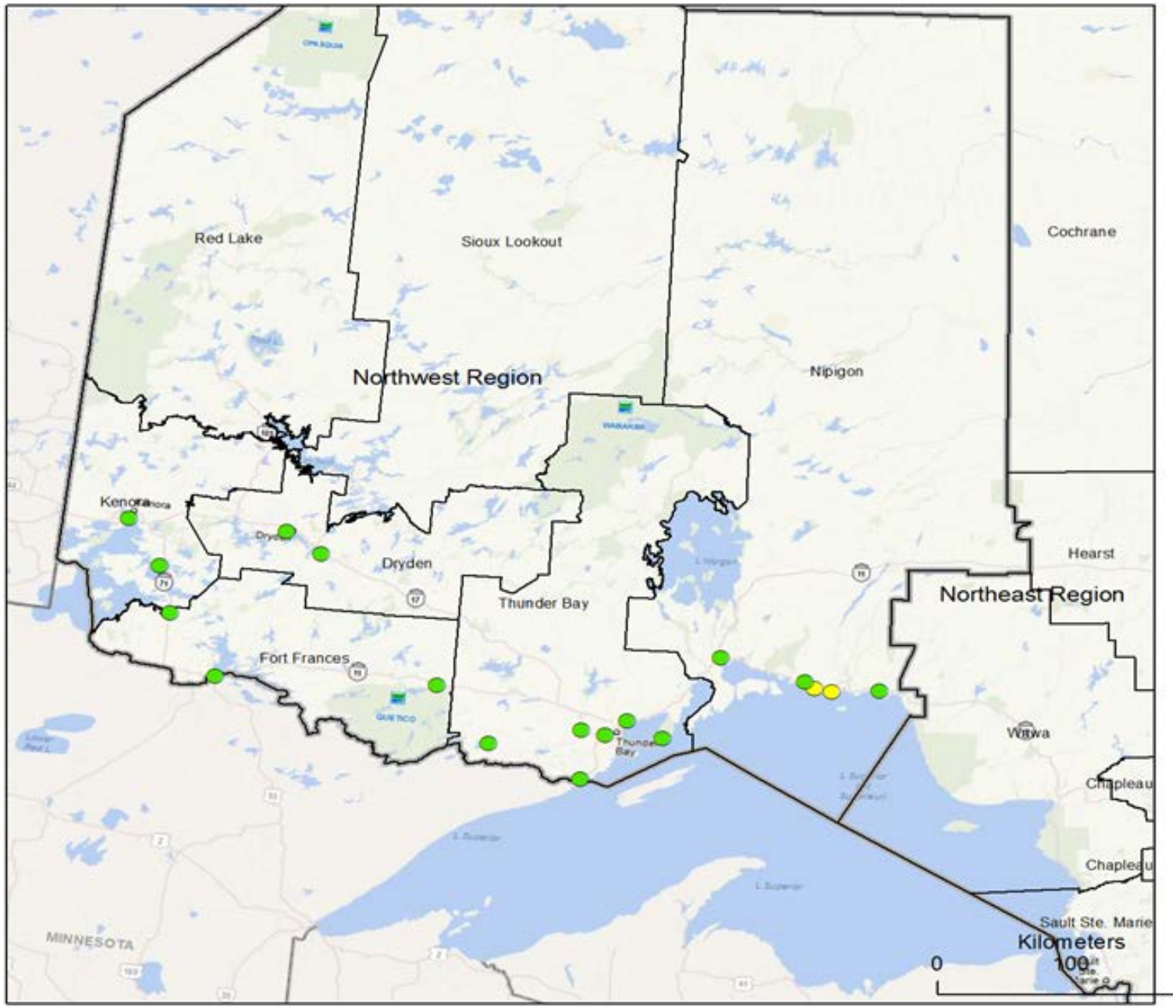


Gypsy Moth 2015

Map 2 – Pheromone Trapping Results

Trap location and number of male moths found.

- 1 moth found
- 0 moths found



Jack Pine Budworm

Pest Information

Common Name:	Jack pine budworm
Latin Name:	*Choristoneura pinus pinus* Freeman
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Jack pine and eastern white pine
Infestation Area:	21,349 ha (2015)

Provincial Key Facts

- Outbreaks occur in Ontario every 8-10 years.
- Current outbreak started in 2004 and peaked in 2006, at approximately 740,000 ha.
- Total area of defoliation declined from 22,010 ha in 2014 to 21,349 ha in 2015.
- Jack pine budworm (JPBW) pheromone catches were low, with the exception of two locations.
- Large-scale control programs have been undertaken to protect high value jack pine stands during the current outbreak. The last year these were conducted was 2009 (control programs are reported in the Provincial Report on Forest Management).

Regional Summary

Northwest:

- In Sioux Lookout District, defoliation was observed northeast of Pickle Lake, with pockets of defoliation from Badesdawa Lake to Monmonawson Lake, and to the east edge of the district.
- In Nipigon District, three small areas of defoliation were observed. Two areas were between Howells Lake and Grace Lake, with the third pocket near Patte Lake.

Northeast:

- In Sault Ste. Marie District, moderate-to-severe defoliation was mapped north of Blind River between Matinenda Lake and Emerald Lake and in four pockets south of Elliot Lake; the largest area was recorded between Marshland and McGiverin Lake and three smaller areas were observed north of Marshland Lake, north of Turtle Lake, and southwest of Blanche Lake. Semi-mature to mature jack pine had defoliation ranging from 75-100%. There was some defoliation (10-30%) on eastern white pine, with younger trees having the highest defoliation.

Jack pine budworm adult moth

Trends

Jack Pine Forest Health Plots

- In the mid-1990s, jack pine long-term monitoring plots were established across Northeast and Northwest Regions to monitor and study the impacts of jack pine budworm and the health of jack pine forests.
- A total of 117 plots (54 plots in Northeast Region, 63 plots in Northwest Region), comprising 5,850 trees were assessed in 2015. The trees were rated for the presence of any pest, disease, or abiotic factors that affect jack pine, as well as for the abundance of male flowers.

Results 2015

- In Northeast Region, 75% of the jack pine trees within the 54 long-term monitoring plots assessed had less than 25% total defoliation. A total of 43 jack pine plot trees died in 2015. Over 65% of this mortality was caused by armillaria root rot. Western gall rust, wood borers, and abiotic factors such as blowdown and snow damage contributed to the remaining mortality. Out of the plots assessed, there were four plots with JPBW defoliation, with only trace defoliation found (1% defoliation per plot). Surveys also revealed over 74% of jack pine trees showing moderate-to-high levels of male flowers.
- In Northwest Region, 63% of the jack pine trees within the 63 long-term monitoring plots assessed had less than 25% total defoliation. A total of 66 jack pine plot trees died in 2015. About 34% of this mortality was caused by armillaria root rot, while 24% was caused by bark beetles and 18% was caused by snow damage. Surveys also revealed that male flower abundance was low, with over 65% of the trees showing nil-to-moderate levels. There was no defoliation attributed to JPBW in any of the plots.
- During the assessment, a total of 998 jack pine trees were found affected by other forest health factors; these were affected by western gall rust, sweet fern blister rust, and abiotic factors such as drought, blowdown, and snow damage. The most damaging agent in both regions was western gall rust, with a total of 720 trees showing some level of gall rust. The majority (458 trees) of these trees were in Northeast Region with light severity.

Area Summary

Total area-within-which moderate-to-severe defoliation was caused by jack pine budworm in 2011 - 2015 by MNRF District (area in hectares).

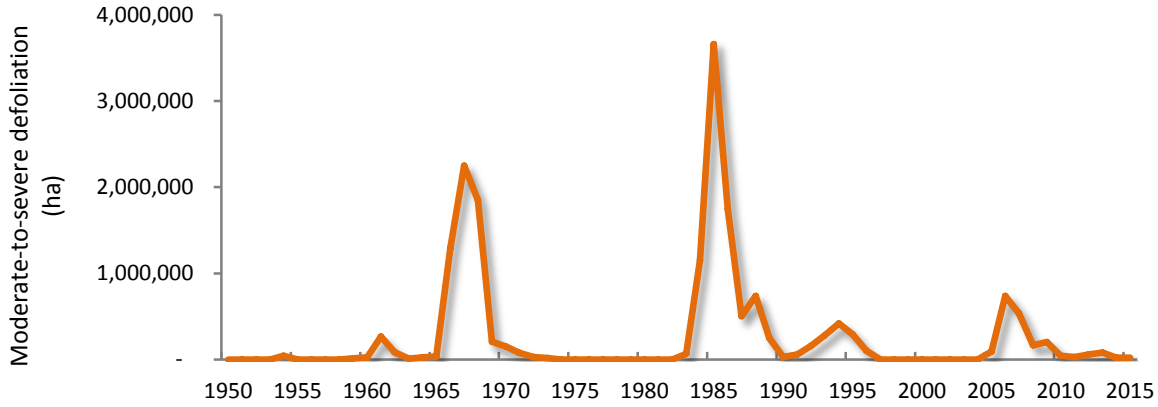
Region / District	2011	2012	2013	2014	2015
Northwest					
Nipigon	-	-	-	-	1,368
Sioux Lookout	6,904	11,955	83,075	22,010	17,461
Subtotal:	*6,904*	*11,955*	*83,075*	*22,010*	*18,829*
Northeast					
Sault Ste. Marie	-	-	-	-	2,520
Sudbury	1,793	4,356	-	-	-
Timmins	1,048	-	-	-	-
Subtotal:	*2,841*	*4,356*	-	-	*2,520*
Southern					
Algonquin	451	-	-	-	-
Parry Sound	17,537	44,708	-	-	-
Pembroke	32	-	-	-	-
Subtotal:	*18,020*	*44,708*	-	-	-
Provincial total	**27,765**	**61,018**	**83,075**	**22,010**	**21,349**

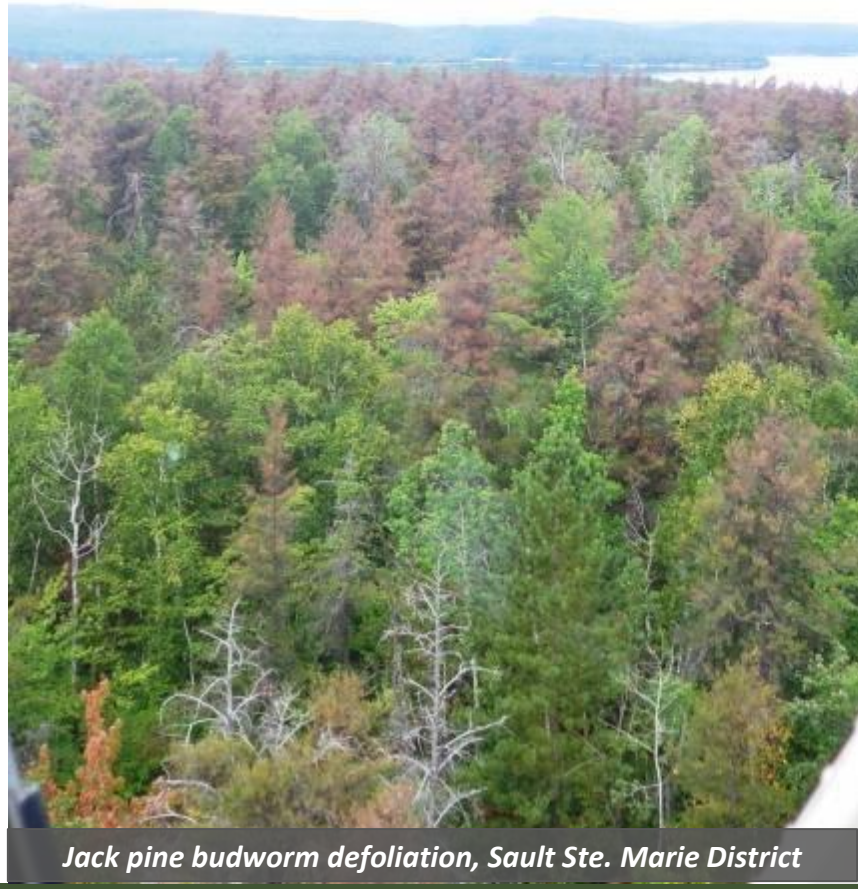
Trends

Jack Pine Budworm Pheromone Traps

- JPBW pheromone trapping was carried out across the province. Traps were deployed at 82 locations (37 in Northwest Region, 39 in Northeast Region, 6 in Southern Region).
- Trap results were very low in 2015, as 80% of traps had no moths. Only two locations had significant results: Red Lake District, in Cochenour Twp, with an average of 75.5 moths per trap; and Sioux Lookout District, at Stanzhikimi Lake, with an average of 43.5 moths per trap.

Moderate-to-severe defoliation in Ontario





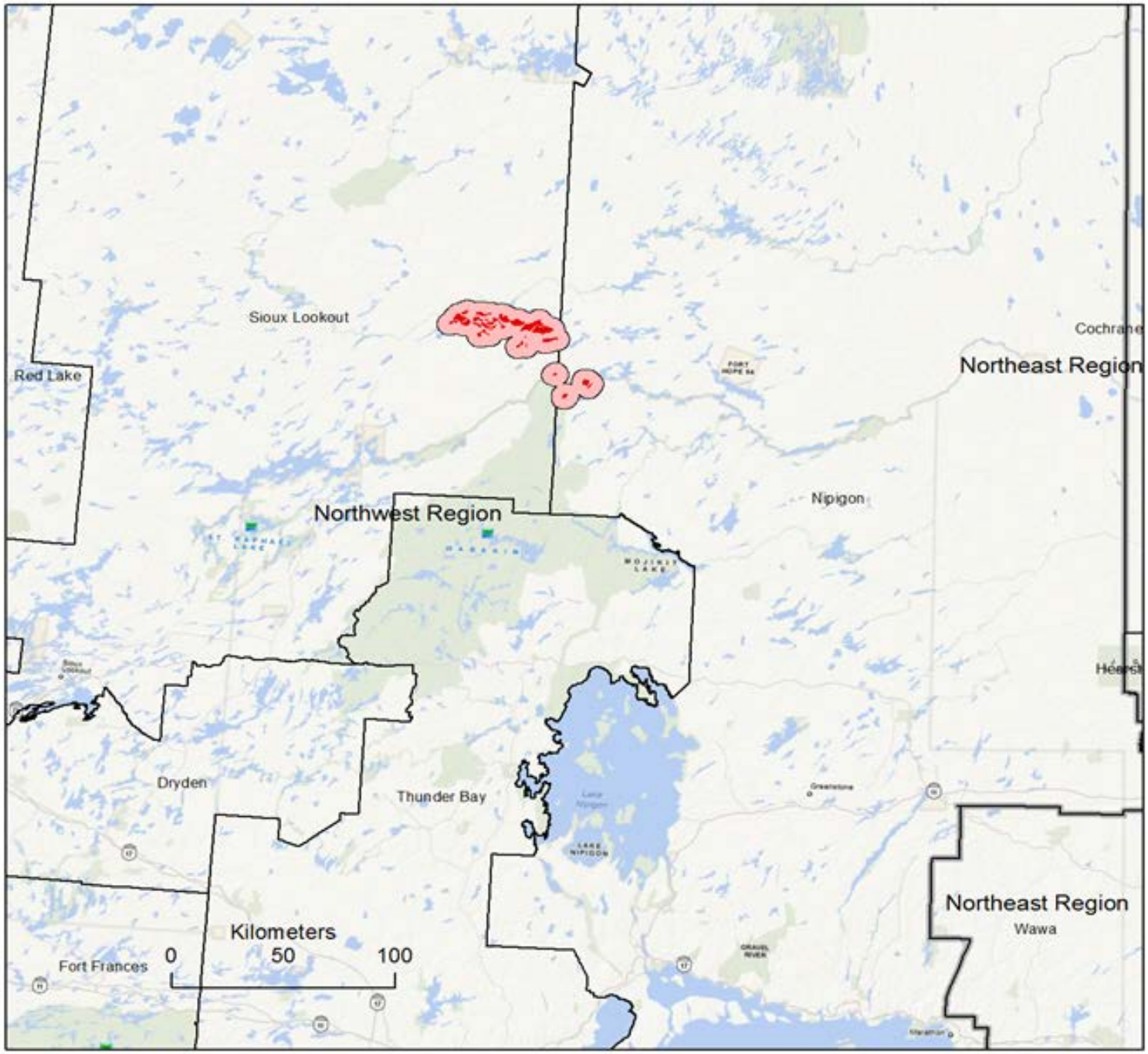
Jack pine budworm defoliation, Sault Ste. Marie District

Jack Pine Budworm 2015

Map 1 – Northwest Region

Areas-within-which jack pine budworm caused defoliation.

Area of Moderate-to-Severe Defoliation



Jack Pine Budworm 2015

Map 2 – Northeast Region

Areas-within-which jack pine budworm caused defoliation.

Area of Moderate-to-Severe Defoliation

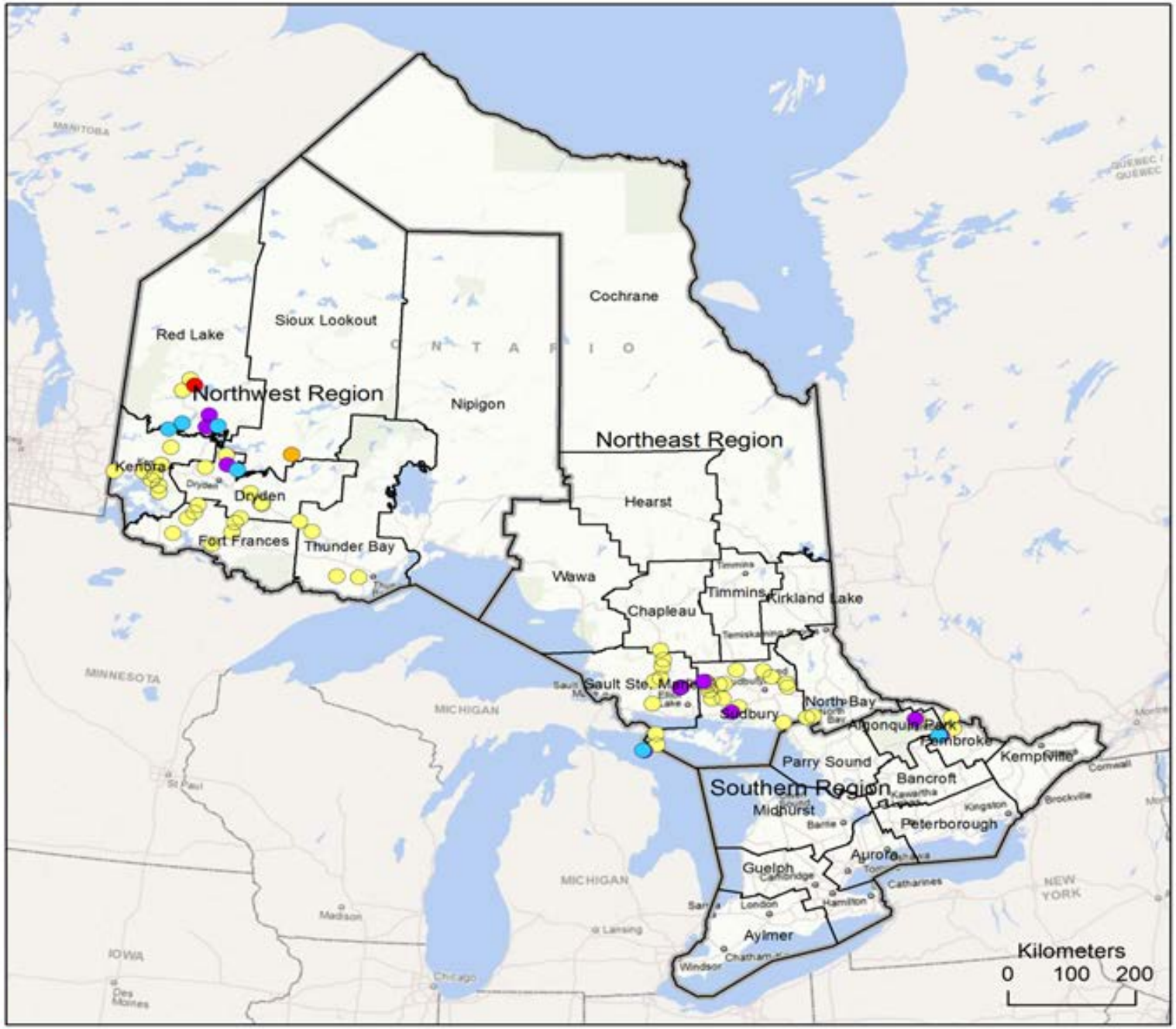
Jack Pine Budworm

2015

Map 3 – Pheromone Trapping Results

Average number of moths per trap

- 0
- 0.1-0.5
- 0.6-20
- 21-40
- 41-60
- >60



Larch Casebearer

Pest Information

Common Name:	Larch casebearer
Latin Name:	*Coleophora laricella* (Hubner)
Pest Origins:	Invasive – Native to Europe
Pest Type:	Defoliator
Host Species:	Larch (Tamarack)
Infestation Area:	1,869 ha (2015)

Provincial Key Facts

- Larch casebearer was introduced to North America in Massachusetts in 1886 and was detected in Ontario in 1905.
- Larch casebearer is a serious defoliator of tamarack in Ontario, with defoliation peaking in 2003 at 16,839 ha. Defoliation has been mapped consecutively in Southern Region since 2001.
- In 2014, defoliation was mapped as far north as Hearst and Cochrane Districts for the first time, though no defoliation was mapped in these areas in 2015.
- In 2015, moderate-to-severe defoliation decreased from 9,657 ha in 2014 to 1,869 ha.

Regional Summary

Northeast:

- Light defoliation was observed in Wawa, Chapleau, Timmins, and Kirkland Lake Districts, but was not severe enough to be aerially mapped. This is in contrast to the 1,355 ha of moderate-to-severe defoliation that was mapped in Northeast Region in 2014.

Southern:

- In Bancroft District, 811 ha of moderate-to-severe defoliation were observed, with the majority occurring northwest of the Kawartha Lakes between Dalrymple and Head Lakes. The remainder of the defoliation was recorded in small scattered pockets across the district; two small pockets were recorded south of Apsley near Jack Lake and three small areas were mapped between Upper Mazinaw and Norcan Lakes.

Larch casebearer larvae

Regional Summary

- In Midhurst District, there was a substantial decrease from 2,666 ha in 2014 to 661 ha in 2015. The largest pockets of defoliation were observed west of Barrie in the Minesing Wetlands Conservation Area. Small pockets of moderate-to-severe defoliation occurred in the Georgian Bluffs area, north of Owen Sound. Defoliation was also observed east of Mount Forest along Hwy 89 and in a small area north of Markdale. Two other small pockets were recorded east of Lake Couchiching, on the east side of Hwy 169.
- In Peterborough District, the area of moderate-to-severe defoliation decreased by almost 1,000 ha. There were only six small pockets of defoliation; five of them were recorded near Balsam Lake and one was recorded near Emily Lake, between Sturgeon and Pigeon Lakes.
- In Kemptville District, there was almost a collapse of larch casebearer, as only 86 ha of moderate-to-severe defoliation were aerially mapped. Six areas of defoliation were observed; three small areas were recorded near Silver Lake, two small pockets were recorded north of Almonte, and one pocket of defoliation was recorded south of Dalhousie Lake.
- In Algonquin Park District, two pockets of defoliation were recorded north of Grand Lake.
- In Parry Sound District, 42 ha of defoliation were aerially mapped. This defoliation was located south of Parry Sound near Joseph Lake and east of Huntsville near Troutspawn Lake. Another small area was recorded southeast of Bracebridge along Hwy 118.
- In Guelph District, 19 ha of moderate-to-severe defoliation were observed, which is a decrease of over 1,300 ha from 2014. There were only two locations with defoliation; one area was found northeast of Goderich and the other was part of an area along the Midhurst District boundary east of Mount Forest along Hwy 89.
- In Pembroke District, moderate-to-severe defoliation was minimal as only one pocket of defoliation was recorded north of Lake Doré, south of the Town of Pembroke.
- In Aylmer District, moderate-to-severe defoliation was recorded in a small area between Tillsonburg and Brantford on the east side of Hwy 24.

Area Summary

Total area-within-which larch casebearer caused moderate-to-severe defoliation in 2011 – 2015 by MNRF District (area in hectares).

Region / District	2011	2012	2013	2014	2015
Northeast					
Cochrane	-	-	-	3	-
Hearst	-	-	-	1,008	-
Kirkland Lake	-	-	-	15	-
North Bay	-	146	-	-	-
Sault Ste. Marie	-	-	-	34	-
Timmins	-	-	-	296	-
Subtotal:	-	*146*	-	*1,355*	-
Southern					
Algonquin	-	34	-	57	63
Aurora	-	449	258	445	-
Aylmer	-	-	-	47	3
Bancroft	67	526	89	105	811
Guelph	-	563	942	1,369	19
Kemptville	227	478	1,093	1,463	86
Midhurst	503	1,163	1,928	2,666	661
Parry Sound	-	-	5	51	42
Pembroke	232	805	143	929	4
Peterborough	562	705	1,028	1,154	179
Subtotal:	*1,591*	*4,723*	*5,486*	*8,287*	*1,869*
Provincial total	**1,591**	**4,869**	**5,486**	**9,643**	**1,869**

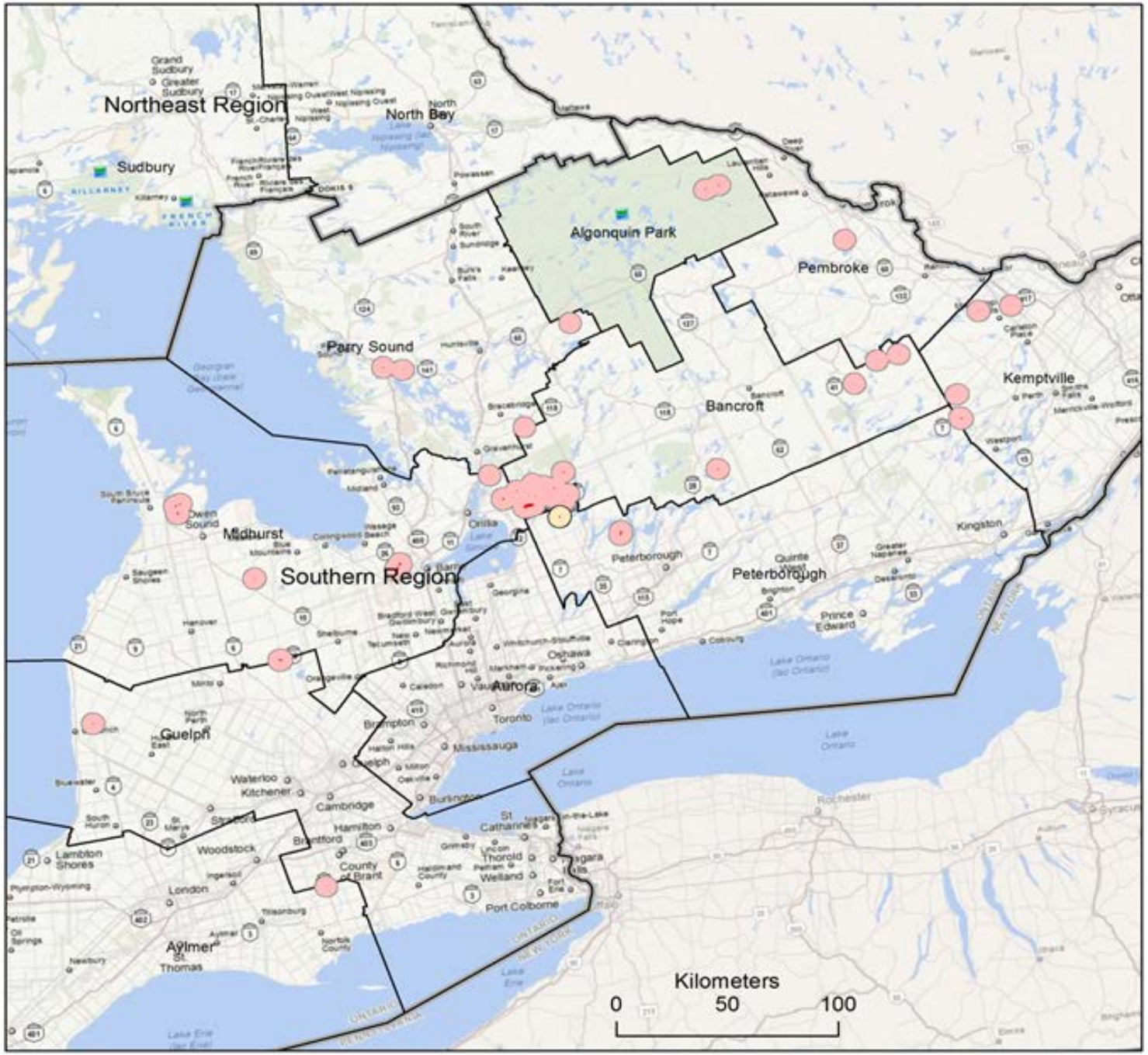
Larch Casebearer 2015

Map 1 –Southern Region

Areas-within-which larch casebearer caused defoliation.

Area of Light Defoliation

Area of Moderate-to-Severe Defoliation



Spruce Budworm

Pest Information

Common Name:	Spruce budworm
Latin Name:	*Choristoneura fumiferana* Clemens
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Balsam fir and spruce spp.
Infestation Area:	148,541 ha (2015)

Provincial Key Facts

- Spruce budworm (SBW) is one of the most damaging native insects affecting fir and spruce in Ontario since outbreaks can last decades and result in extensive mortality to host trees.
- Outbreaks occur periodically when the primary host, balsam fir, reaches 40 years of age.
- In 2015, the area of moderate-to-severe defoliation increased almost five times in size compared to 2014.

Regional Summary

Northeast:

- In North Bay District, moderate-to-severe defoliation increased by almost 110,000 ha from 2014 and accounted for almost half of all defoliation in Northeast Region. Defoliation was observed from North Bay to Temiskaming Shores. The largest areas occurred north of North Bay along Hwy 11 and along the border of Quebec. Small areas were also mapped in the Cobalt/Latchford area.
- In Chapleau District, moderate-to-severe defoliation was aerially mapped on mature balsam fir and white spruce. There was a slight increase in area of defoliation from 2014, but it was observed in the same general area. The infestation spread east and north to the Chapleau/Timmins/Hearst District boundaries. New areas were also mapped into Oates and Oswald Townships. 182 ha of balsam fir mortality was mapped near Kyushk and Ochik Lakes, following three years (2011, 2014, and 2015) of moderate-to-severe defoliation in this area.
- In Sudbury District, the area of moderate-to-severe defoliation more than doubled. This increase was seen north of Nairn Centre and on Manitoulin Island.

Spruce budworm larva

Regional Summary

- In Sault Ste. Marie District, a new infestation of SBW was recorded on St. Joseph Island. The majority of defoliation was seen between the communities of Richards Landing and Kentvale in stands of white spruce and balsam fir. Another small area of defoliation was recorded on white spruce along Hwy 17, north of the St. Joseph Island defoliation.
- In Chapleau District, small pockets of defoliation were observed in Lisgar, Watson, Poulett and Aitken Townships. This infestation also stretched into the south east corner of Hearst District.
- In Timmins District, two new infestations were recorded, which were an extension of the infestation in Chapleau District. Moderate-to-severe defoliation was mapped in relatively small pockets in Melrose, Enid, and Fortune Townships.

Trends

- Populations of SBW have increased greatly over the last three years, leading to a much larger area of mapped defoliation in 2015.

Spruce Budworm Pheromone Traps

- SBW pheromone traps were deployed in 51 locations across the province. Overall there was a slight decrease in moth catches, but in some areas in Northeast Region there were >100 moths per trap.
- In Northwest Region, there was an overall increase in moth catches.
- In Southern Region, there were moderate moth catches in seven of the 12 locations, with no more than an average of 171 moths per trap.

Spruce Budworm Egg Mass Survey

- In 2015, a SBW egg mass survey was carried out in Northeast Region to forecast expected defoliation for 2016. A total of 18 locations were sampled: six locations were in North Bay District in a high value red spruce area and the remaining locations were in and around the Chapleau District infestation.
- For 2016, the defoliation forecast on red spruce in Blyth Twp is light, but on balsam fir the forecast is severe. Six of the locations in the Chapleau infestation had a moderate-to-severe forecast for 2016, with the other six showing light forecasts.

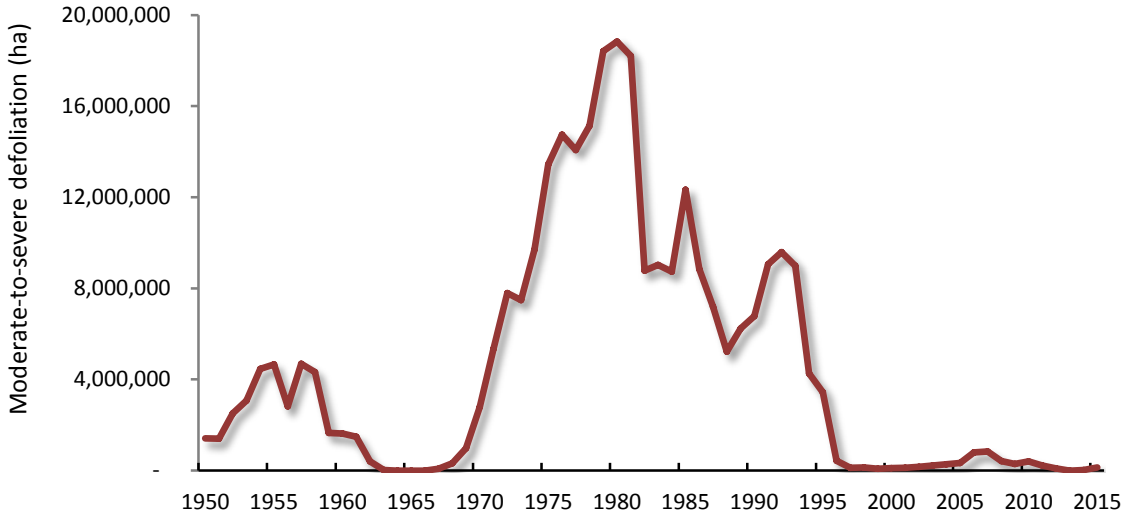
Area Summary

Total area-within-which spruce budworm caused moderate-to-severe defoliation in 2011 - 2015 by MNRF District (area in hectares).

Region / District	2011	2012	2013	2014	2015
Northeast					
Chapleau	13,457	147	-	20,158	21,167
Hearst	-	-	-	9	1,134
North Bay	156,405	10,889	173	9,240	119,184
Sault Ste. Marie	64	-	-	-	3,952
Sudbury	72,849	87,819	80	911	2,368
Timmins	-	-	-	-	736
Subtotal:	*242,775*	*98,855*	*254*	*30,317*	*148,541*
Southern					
Parry Sound	-	943	-	-	-
Peterborough	146	-	-	-	-
Subtotal:	*146*	*943*	-	-	-
Provincial total	**242,921**	**99,797**	**254**	**30,317**	**148,541**

Trends

Moderate-to-severe defoliation in Ontario



Spruce budworm adult moth

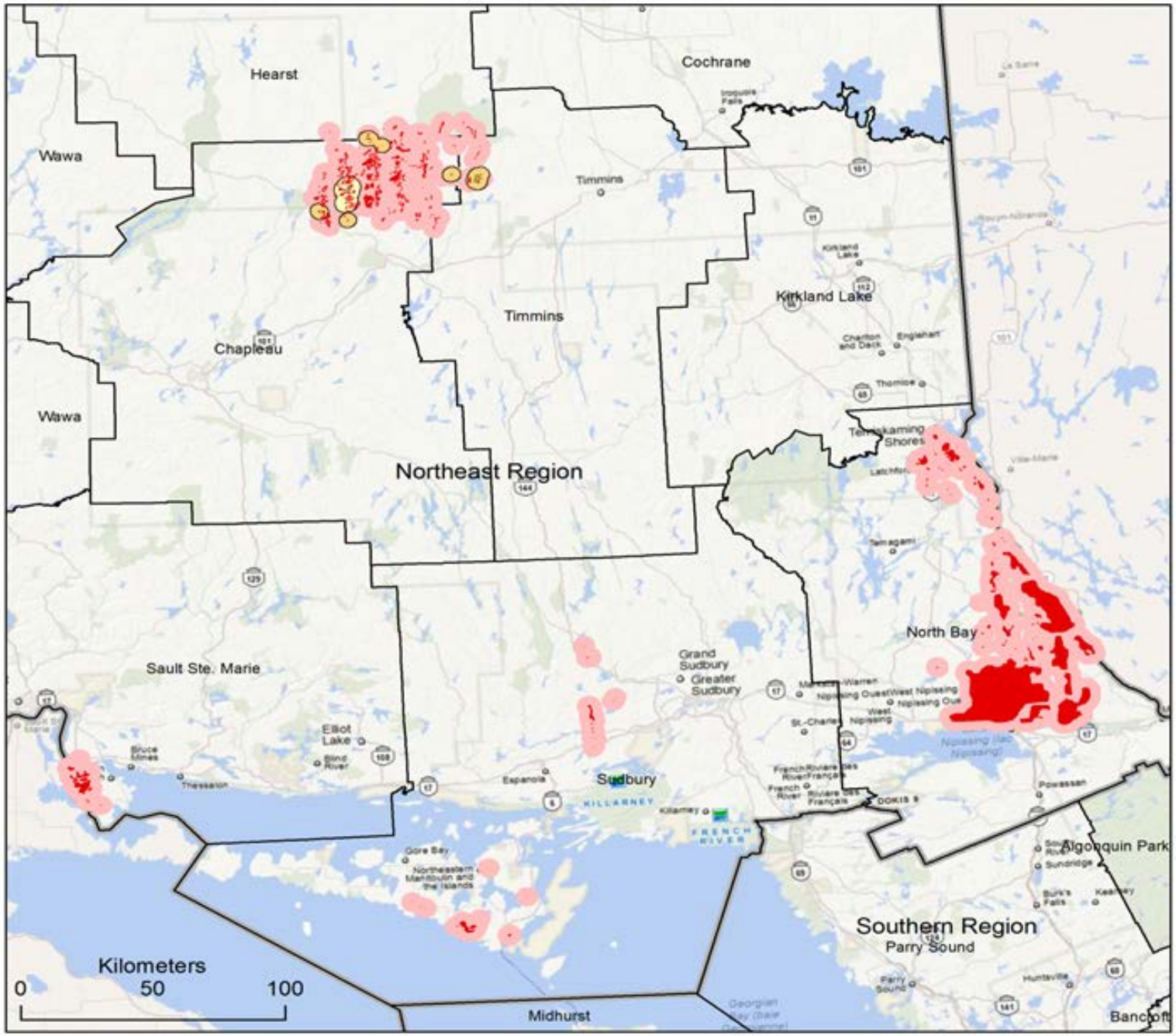
Spruce budworm damage

Spruce Budworm 2015

Map 1 – Northeast Region

Areas-within-which spruce budworm caused defoliation.

- Area of Light Defoliation
- Area of Moderate-to-Severe Defoliation
- Area of Mortality

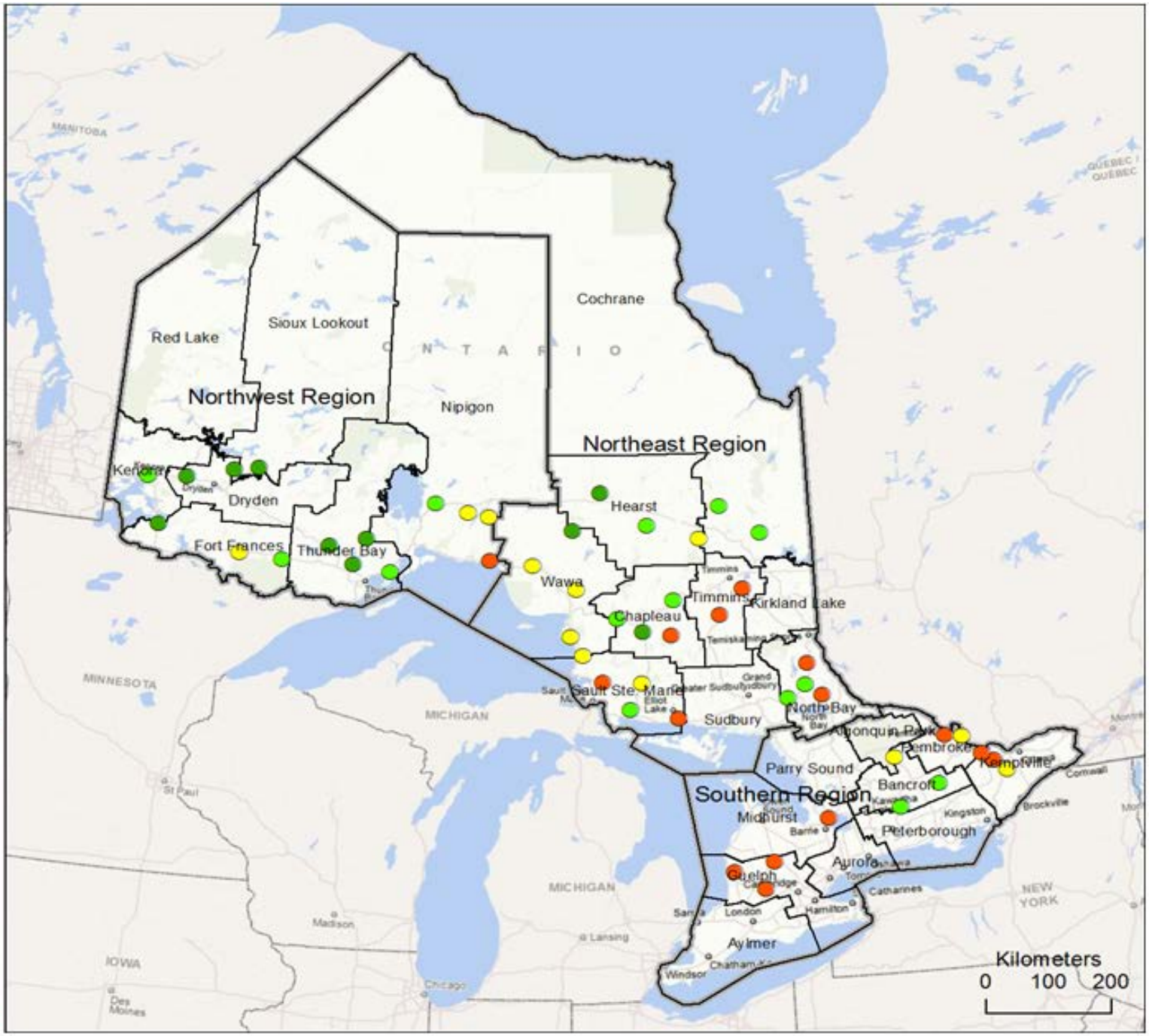


Spruce Budworm 2015

Map 2 – Pheromone Trapping Results

Average number of moths per trap

- >= 100
- 50-99
- 10-49
- <10

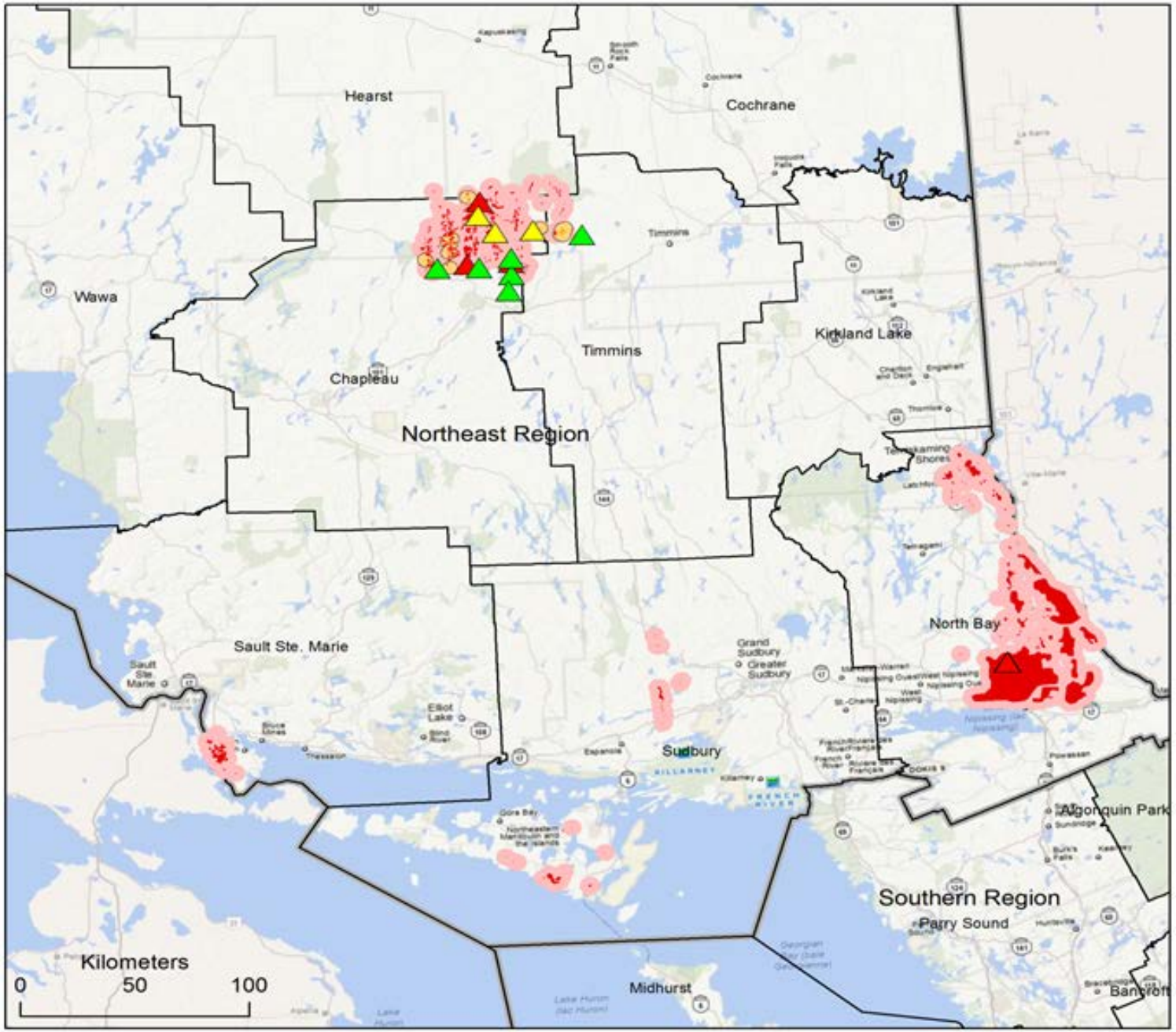


Spruce Budworm 2015

Map 3 – Egg Mass Survey Results

Defoliation forecast for 2016

- Severe
- Moderate
- Light
- Nil
- Light Defoliation
- Moderate-to-Severe Defoliation

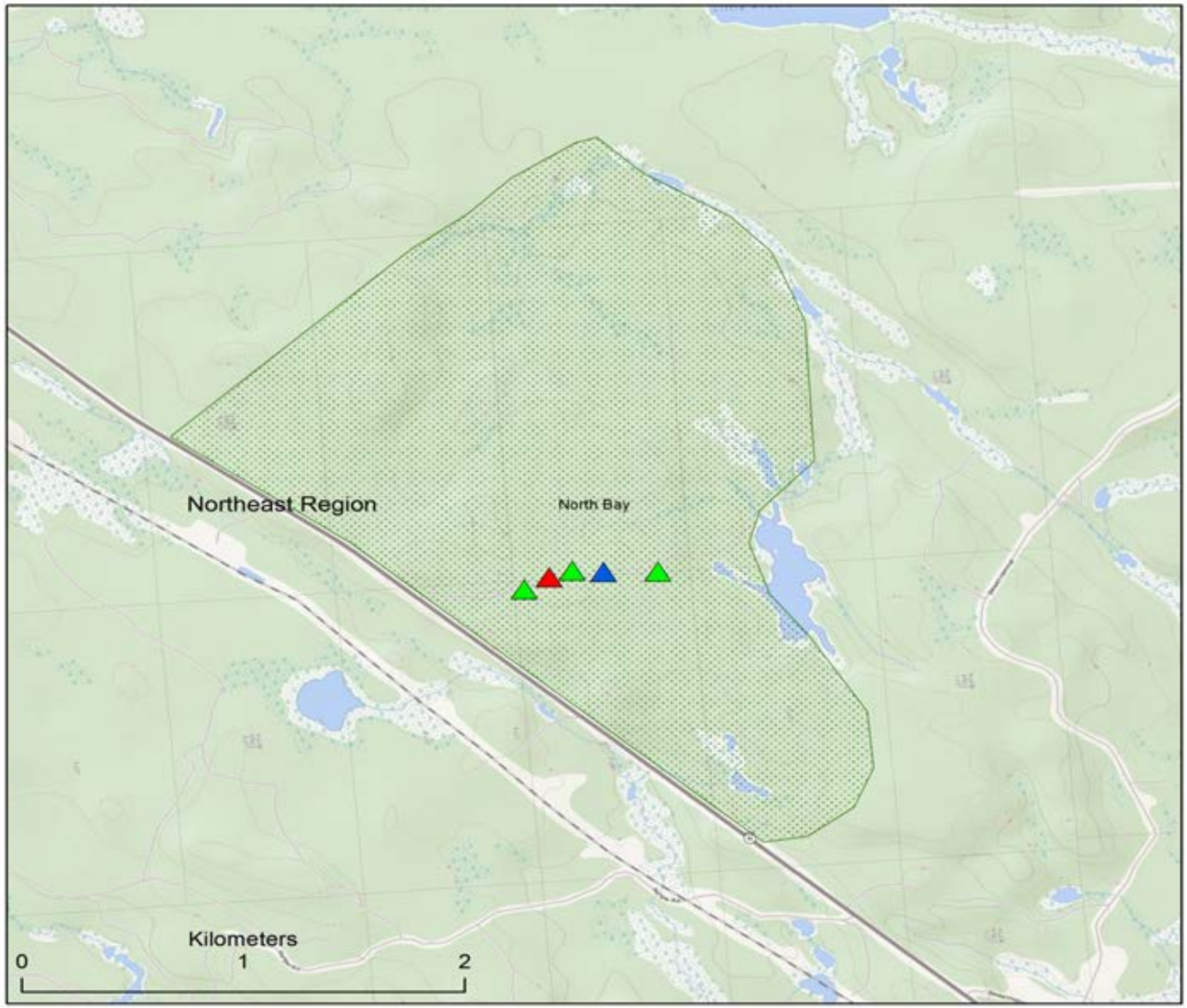


Spruce Budworm 2015

Map 4 – Egg Mass Survey Results

Defoliation forecast for 2016

- Severe
- Moderate
- Light
- Nil
- Red Spruce Area



Whitespotted Sawyer Beetle

Pest Information

Common Name:	Whitespotted sawyer beetle
Latin Name:	*Monochamus s. scutellatus* (Say)
Pest Origins:	Native to North America
Pest Type:	Wood borer
Host Species:	Pine species
Infestation Area:	925 ha (2015)

Provincial Key Facts

- One of the most widely distributed and common wood borers in North America.
- Found on recently dead or dying trees and larger populations are found near other forest disturbances, such as blowdown, drought, multiple years of defoliation, fire, and cutovers.
- Often confused with invasive Asian long-horned beetle.
- There was an increase in area of damage in 2015 (925 ha) compared to 2014 (28 ha).

Regional Summary

Northwest:

- In Red Lake District, damage was recorded in and around Woodland Caribou Provincial Park, where a severe snow event occurred in October 2012. Heavy snow had caused trees (mostly conifers) to be uprooted, snapped off, or bent over, and in 2015 whitespotted sawyer beetles caused further damage to these trees. A total of 892 ha of damage were mapped; the largest area was observed near Bigshell Lake and Burntwood Lake. Other smaller areas were mapped near Musclow, Barclay, Donald, Young, Knox, and Royd Lakes. Outside of the park, small pockets of damage were recorded north of Kirkness Lake and northwest of Graves Twp.
- In Dryden District, a total of 34 ha of damage were aerially mapped. Two small pockets were observed southeast of Wabuska Lake and near Kay Lake. This damage was the result of an isolated snow damage event separate from the one in Red Lake District.

Northeast:

- In Timmins District, low levels of the beetle were recorded. In 2014, damage was mapped near Eacom's Gogama mill, but in 2015 ground surveys revealed lower populations. Trace levels were recorded on jack pine in Westbrook, Garvey, Garibaldi, and Asquith Townships.

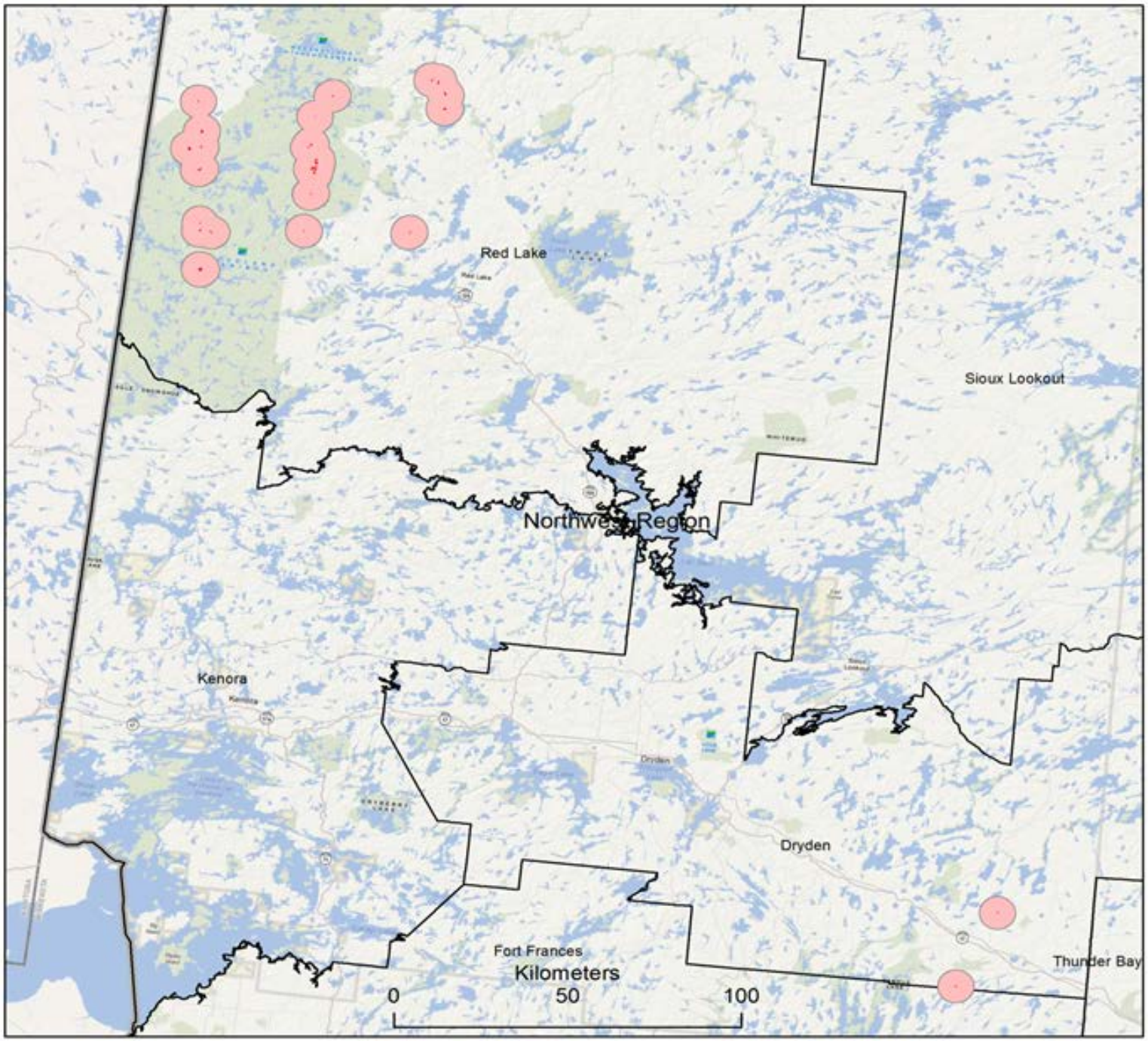
Whitespotted sawyer beetle larva

Whitespotted Sawyer Beetle 2015

Map 1 – Northwest Region

Areas-within-which whitespotted sawyer beetle caused damage.

Area of Damage



Anthracnose

Pest Information

Common Name:	Anthracnose of red oak, sugar maple, butternut, basswood, and American beech
Latin Name:	*Amphiporthe leiphaemia* (Fr.) Butin, *Aureobasidium apocryptum, Ophiognomonia leptostyla* (Fr.) Sogonov, and *Apiognomonia errabunda* (Roberge ex Desm.) Höhn.
Pest Origins:	Native to North America
Pest Type:	Foliar disease
Host Species:	Red oak, sugar maple, butternut, basswood, and beech

Key Facts

- Normally not a serious problem, but a nuisance to homeowners with early leaf drop.
- Removal and destruction of fallen leaves can limit re-infection the following spring.
- Infection may weaken tree and predispose it to other disturbance agents.

Regional Summary

Northeast:

- In Sault Ste. Marie District, early cool and damp weather in May and June created good conditions for anthracnose of oak. In the Town of Blind River, semi-mature red oak had 100% of the leaves affected, with up to 75% damage causing early leaf drop in late July. In Sault Ste. Marie, mature red oak had moderate levels of anthracnose, with 100% of the leaves affected but only 50% damage causing light leaf drop.

Southern:

- In Kemptville District, Anthracnose on sugar maple was collected in the village of Tincap causing moderate damage. Light damage was also recorded on basswood in Franktown.
- In Pembroke District, anthracnose on butternut was light in Calabogie. Low levels were also seen in butternut plots located in Kemptville and Pembroke Districts.
- In Guelph District, low levels of anthracnose were identified on mature and semi-mature red oak at Beamer Memorial Conservation Area, City of Hamilton.
- In Aylmer District, moderate levels of anthracnose on were observed on 90-100% of all understory, and some intermediate beech within Springwater Forest, Elgin County.

Anthracnose on oak

Armillaria Root Rot

Pest Information

Common Name:	Armillaria root rot
Latin Name:	*Armillaria* spp.
Pest Origins:	Native to North America
Pest Type:	Root disease
Host Species:	Red pine, jack pine, sugar maple

Key Facts

- Armillaria root rot is a serious fungal-disease found throughout North America that causes tree mortality and contributes to significant losses in both hardwood and softwood stands.
- The fungus is present in the soil and becomes more aggressive on trees that are under stress from abiotic events such as drought, forest fires, or insect infestations.
- In forest stands, mortality from this fungus can be seen in singular trees or in groups of trees in a circular pattern resulting from root grafting of closely situated infested trees.

Regional Summary

Northwest:

- Jack pine mortality by armillaria root rot was observed on several jack pine forest health plots.
- Levels of the disease were low, with most cases occurring on a singular plot tree that had died.

Northeast:

- In Sault Ste. Marie District, mortality in a red pine stand, which was infested by redheaded pine sawfly since 2012, was recorded west of Blind River. Two of the mature red pine died in 2015 and were found to have armillaria root rot. Further mortality by armillaria root rot is expected in 2016 due to root grafting and further stress by redheaded pine sawfly.

Southern:

- In Midhurst District, armillaria root rot was recorded on sugar maple and red pine. The disease was found on a recently dead mature sugar maple west of Penetanguishene. Six other sugar maple were in decline in this area, dying from the top down. Red pine decline and mortality was recorded near Beeton, Simcoe County. Two dead trees were sampled and several adjacent stems showed thinning and browning crowns. The drought of 2012 may have predisposed the trees to be infected with armillaria root rot.

Armillaria root rot on red pine

Aspen Leafblotch Miner

Pest Information

Common Name:	Aspen leafblotch miner
Latin Name:	*Phyllonorycter ontario* (Free.)
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Trembling aspen and largetooth aspen

Key Facts

- The most common leaf miner in Ontario.
- Prefers young trembling aspen and largetooth aspen.
- Adult moths are believed to overwinter in pine, spruce and fir stands.
- In heavy infestations, piles of bark flakes can be found below conifer trees during the winter as native birds find, locate, and extract these hibernating moths.

Regional Summary

Northeast:

- In Timmins District, young understory trembling aspen had light-to-moderate defoliation near Hwy 144 in Thornloe Twp.
- In Hearst District, defoliation ranged from 25-75% on young to semi-mature trembling aspen along Hwy 17, between Hearst and Kapuskasing.

Southern:

- In Pembroke District, moderate-to-severe defoliation was observed east of Barry's Bay, where 80% of the semi-mature largetooth aspen experienced defoliation. Additional surveys in the surrounding area discovered defoliation between Wilno and Deacon along Hwy 60 and in the area of Bonnechere on the west side of Round Lake.

Aspen leafblotch miner on trembling aspen

Beech Scale

Pest Information

Common Name:	Beech Scale
Latin Name:	*Cryptococcus fagisuga* (Lind.)
Pest Origins:	Invasive – Native to Europe
Pest Type:	Sucking insect
Host Species:	American beech

Key Facts

- First found in Halifax, Nova Scotia in 1890's.
- First found in Ontario in 1966, in Elgin County along the north shore of Lake Erie.
- Predisposes beech trees to beech bark disease, which significantly impacts beech trees and results in tree mortality.
- Found across the range of beech in Ontario.

Regional Summary

Northeast:

- In Sault Ste. Marie District, beech scale was observed at several sites on St Joseph Island. Scale levels were slightly lower than in 2014, but still varied between light to severe. Beech bark disease was present in several of the sites examined.

Southern:

- In Midhurst District, occurrences of this exotic scale insect have progressed through Simcoe, Dufferin, Grey, and Bruce counties. Moderate levels of scale were observed in the Bruce Peninsula. The scale has become established at Hope Bay Provincial Reserve, where beech bark disease has also been found. Levels of the insect ranged from light to severe at Blind Line near Port Elgin, but no disease was detected. Trace to light levels of scale were also recorded along Bruce County Rd 1 at Kingarf and east of Holyrood along Bruce County Rd 6. No disease was present in these woodlots.

Beech scale on American beech

Birch Leafminer

Pest Information

Common Name:	Birch leafminer
Latin Name:	*Fenusa pusilla* (Lepeletier)
Pest Origins:	Invasive - Native to Europe
Pest Type:	Defoliator
Host Species:	White birch

Key Facts

- First found in Quebec in 1929.
- First outbreak in Ontario occurred in 1939.
- Damage is more severe on open grown white birch.
- There are two to four generations per year.

Regional Summary

Northeast:

- In Sault Ste. Marie District, birch leafminer was common throughout the district, with higher levels of defoliation occurring in the southern portion of the district. Severe levels of defoliation in small stands of young white birch were observed near the village of Poplar Dale, where 100% of trees were affected with 75-100% defoliation. Severe levels of defoliation were also observed on young and semi-mature white birch between Dean Lakes and Blind River, with 100% trees affected with 75-100% defoliation.

Birch leafminer larvae

Black Knot of Cherry

Pest Information

Common Name:	Black knot of cherry
Latin Name:	*Apiosporina morbosa*, (Schw.) Arx.
Pest Origins:	Native to North America
Pest Type:	Fungal disease
Host Species:	Pin cherry

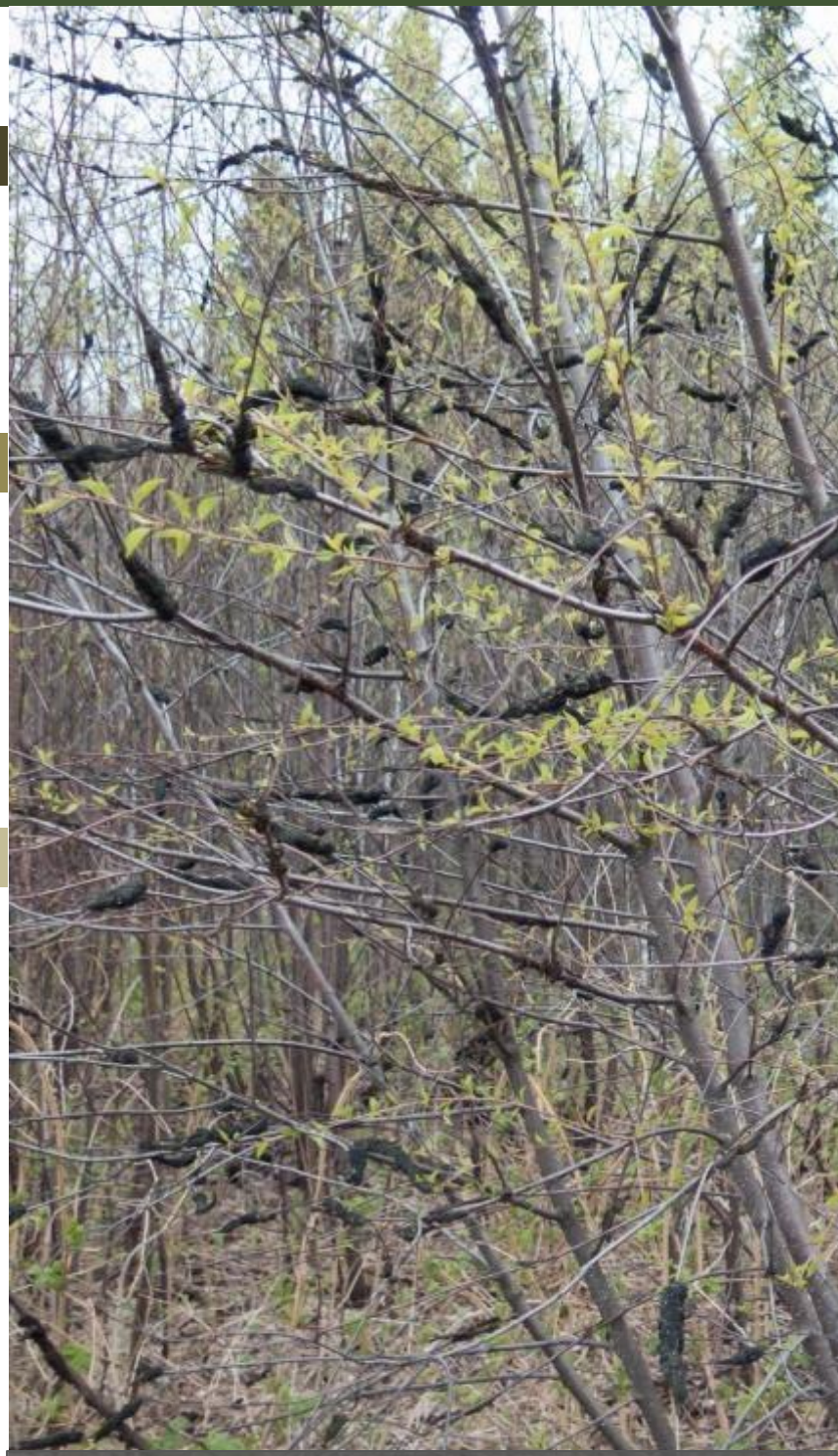
Key Facts

- A common disease of Prunus species (cherry, plums, and peaches).
- Present on the landscape annually at varying levels.
- Causes reduced growth and fruiting ability.
- Can cause branch mortality during severe infection.
- Secondary fungi can enter through cracks created by black knot of cherry.
- Pruning can help reduce spread.

Regional Summary

Northeast:

- In Chapleau District, damage was observed in Ossin Twp, along Malette Lumber Road. Damage affected small groups of roadside pin cherry trees with moderate-to-severe levels of infection.



Black knot fungus on pin cherry

erryCherry Scallopshell Moth

Pest Information

Common Name:	Cherry scallopshell moth
Latin Name:	*Hydria prunivorata* (Fgn.)
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Black cherry

Key Facts

- Feeds in nests of leaves webbed together on black cherry.
- Defoliation was aerially mapped in 2008 (224 ha).
- Last recorded in Southern Ontario in 2012.

Regional Summary

Southern:

- In Aylmer District, light defoliation was recorded on young fringe and understory black cherry south of Pinery Provincial Park in Ausable River Cut Conservation Area, Lambton County. Light defoliation was also observed on young fringe black cherry along Charlotteville Road 1 in the St. Williams Conservation Reserve, Norfolk County.

Cherry scallopshell moth larva on black cherry

Cherry Webspinning Sawfly

Pest Information

Common Name:	Cherry webspinning sawfly
Latin Name:	*Neurotoma fasciata* Norton.
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Pin cherry

Key Facts

- Cherry webspinning sawfly ranges from northeastern United States to Quebec and Ontario.
- Occasionally found in Ontario on pin cherry.
- In recreational or urban settings, the defoliation is not aesthetically pleasing and can be removed through pruning.

Regional Summary

Northwest:

- In Thunder Bay District, defoliation was collected on a pin cherry in Thunder Bay. Other occurrences were observed in homeowners' backyards within the city. The extent of the population was moderate with trace levels of host defoliation.

Darkheaded Aspen Leafroller

Pest Information

Common Name:	Darkheaded aspen leafroller
Latin Name:	*Anacampsis innocuella* (Zeller)
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Trembling aspen and largetooth aspen

Key Facts

- One of three common native leafrollers that are often referred to as an early aspen leafroller complex.
- The darkheaded aspen leafroller was last documented in 2006-2008 as part of an early aspen leafroller complex, which caused defoliation in scattered patches in Northwest Region.

Regional Summary

Southern:

- In Guelph District, moderate-to-severe defoliation was recorded on a small cluster of young, open-grown largetooth aspen and trembling aspen east of the community of McIntosh in Howick Township, Huron County.

Darkheaded aspen leafroller defoliation

Diplodia Tip Blight

Pest Information

Common Name:	Diplodia tip blight of conifers
Latin Name:	*Sphaeropsis sapinea* (Fr.) Dyko & B. Sutton
Pest Origins:	Native to North America
Pest Type:	Blight Disease
Host Species:	Pine spp.

Key Facts

- The majority of diplodia tip blight affects two and three-needled pine species, but occasionally can be found on eastern white pine and spruce.
- Stressed host trees, especially during drought conditions, are susceptible to infection.
- The disease kills shoots and branches, and under severe conditions can kill the whole tree.
- Diplodia can cause severe damage to seedlings in nurseries and Christmas tree plantations.

Regional Summary

Southern:

- In Kemptville District, a severe infection of diplodia tip blight was observed in three red pine plantations in Larose Forest south of the village of Bourget. Red pine mortality was also recorded in all three plantations.
- In Algonquin Park, low levels of diplodia damage to red pine regeneration were identified at the Achray Campground. Reinfection in 2016 and/or 2017 may cause mortality.

Diplodia tip blight on red pine

Dooks Needle Blight

Damage Information

Common Name:	Dooks needle blight
Latin Name:	*Lophophacidium dooksii* Corlett & Shoemaker
Pest Origins:	Native to North America
Pest Type:	Needle blight
Host Species:	Eastern white pine

Key Facts

- Dooks needle blight was first reported in Ontario in 1979 near McCreight's Dam, north of Thessalon, Sault Ste. Marie District.
- As with most needle blights, this disease is considered aesthetically unappealing, rather than life-threatening. Infected trees appear distinctly off-coloured and brown from a distance.
- Recurring outbreaks result in thin crowns and weakened trees due to premature needle drop and loss of efficiency.
- The last major event was in 2009 as widespread browning of eastern white pine occurred in Ontario, Quebec, New Brunswick, and through the Northeastern United States.

Regional Summary

Southern:

- In Peterborough District, moderate-to-severe damage was observed across the district, with most cases occurring on singular eastern white pine trees. The most severely affected area was in Brighton and Prince Edward Counties. Pockets of the disease were recorded in 5-10% of the eastern white pine trees, with up to 60% damage to needles.
- In Bancroft District, the disease was collected in a mixed wood stand south of Apsley on fringe eastern white pine. 40% of the trees surveyed showed moderate damage.
- In Kemptville District, this disease was observed across the district, with high levels of infection on singular trees in Baxter Conservation Area and moderate levels at Jones Creek.
- In Pembroke District, the disease was recorded north of Dacre and southeast of Deacon near Golden Lake. Moderate-to-severe damage was recorded.
- In Midhurst and Aurora Districts, sporadic trees along road sides were infected, with an average of 20% foliage affected.

Eastern white pine needles exhibiting Dooks needle blight

Dutch Elm Disease

Pest Information

Common Name:	Dutch elm disease
Latin Name:	*Ophiostoma novo-ulmi* (Brasier)
Pest Origins:	Invasive – Native to Asia
Pest Type:	Vascular wilt
Host Species:	Elm spp.

Key Facts

- First introduced to North America in the early 1930's, the disease quickly spread across eastern North America and into Ontario in the mid 1940's.
- Dutch elm disease can now be found throughout the natural range of elm in Ontario.
- The main insect vectors carrying the disease are the European elm bark beetle and the native elm bark beetle. Root grafting is another mode through which the disease can spread.

Regional Summary

Southern:

- In Midhurst District, several large elm trees south of Owen Sound showed branch flagging (leaves dying) and dieback. In one case, an elm tree leafed out in the spring and then by June the leaves had completely wilted and died.
- In Peterborough District, leaves of elm trees turned rusty brown by mid-June. The highest incidences of the disease were observed from Prince Edward County to Napanee.
- In Aylmer and Guelph Districts, trees infected with the disease were recorded, with higher incidences observed in Huron, Perth, and Wellington counties. Individual and small clusters of infected elm trees were seen in satellite pockets.

Dutch elm disease on young elm tree

Eastern Larch Beetle

Pest Information

Common Name:	Eastern larch beetle
Latin Name:	*Dendroctonus simplex* LeConte
Pest Origins:	Native to North America
Pest Type:	Bark beetle
Host Species:	Eastern larch

Provincial Key Facts

- This beetle is found on stressed, dying, or recently dead trees.
- Larger populations are found in the vicinity of other forest disturbances, such as drought or multiple years of insect defoliation.
- Damage was aerially mapped in 2013 and 2014, but declined in 2015 with small areas recorded during ground surveys.

Regional Summary

Northeast:

- In Sault Ste. Marie District, a small pocket of mortality was observed along Hwy 17, west of Iron Bridge. Twenty-two dead trees were detected in a semi-mature eastern larch stand that had moderate larch casebearer defoliation in 2014.
- In Sudbury District, whole tree mortality was recorded in a semi-mature eastern larch stand north of Massey, along Hwy 553. This area had larch casebearer defoliation in 2012 and drought like conditions in 2015. Eastern larch beetle adults were collected on three recently dead trees and galleries were observed on trees that had been dead for more than two years.

Eastern larch beetle adult

Eastern Tent Caterpillar

Pest Information

Common Name:	Eastern tent caterpillar
Latin Name:	*Malacosoma americanum* (F.)
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Cherry spp.

Key Facts

- Populations fluctuate year to year.
- Usually attacks roadside cherry and apple trees.
- Occasionally defoliates mature black cherry along roadsides.
- It is not considered a major pest in Ontario, though nests can be unsightly.
- Causes little permanent damage to the host tree.

Regional Summary

Southern:

- In Midhurst District, moderate-to-severe defoliation was observed on roadside choke cherry shrubs every few kilometers in Grey and Bruce Counties. In Dufferin County, choke cherries were severely defoliated for 750 meters along 250 Sideroad, southeast of Dundalk.

Eastern tent caterpillar larvae

Fall Webworm

Pest Information

Common Name:	Fall webworm
Latin Name:	*Hyphantria cunea* (Drury)
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	White birch, trembling aspen, black walnut, and other hardwoods

Key Facts

- One of the few native North American species introduced into Europe and Asia.
- Impact on tree health is usually limited because defoliation tends to occur late in the growing season before leaf drop. Infestations rarely persist for more than 2 to 3 years at one location.

Regional Summary

Northeast:

- In Chapleau District, light-to-moderate defoliation was found on white birch along Hwy 667.
- In Timmins and Hearst Districts, light defoliation was found on white birch and pin cherry.
- In Sault Ste. Marie District, the insect was most commonly found near Ranger Lake Road and Hwy 129, north of Seymour Lake Road.

Southern:

- In Peterborough and Bancroft Districts, light defoliation was mostly observed. Moderate-to-severe defoliation was found along Hwy 41 from Dacre to Denbigh, along Hwy 28 from Denbigh to Peterborough, and along Hwy 7 from Peterborough to Silver Lake Provincial Park.
- In Algonquin Park, light defoliation on individual trees was recorded on Achray Road.
- In Kemptville District, moderate defoliation was observed at Campbell's Corners.
- In Pembroke District, light-to-moderate defoliation was detected throughout the district, with severe defoliation along Hwy 60 between Golden Lake and Barry's Bay.
- In Midhurst District, light defoliation was observed in low lying areas. In Simcoe County, large webs were observed on ash, birch, and elm along Hwy 400 from Barrie to Coldwater.
- In Aylmer and Guelph Districts, light-to-moderate defoliation was mostly detected. Moderate-to-severe defoliation was found south of St. Thomas, within Wawanosh Valley Conservation Area, east of Straffordville, and at Yarmouth Natural Heritage Area.

Fall webworm larvae

Frost

Damage Information

Common Name:	Frost
Damage Type:	Abiotic Damage – Weather Event
Host Species:	Hardwood and conifer species

Key Facts

- Frost can adversely affect conifers and hardwoods, with new shoots and leaves being the most susceptible. Frost-killed leaves appear waterlogged and wilted, and injury is most prevalent on the outer exposed branches.

Regional Summary

Northeast:

- In Timmins, Chapleau, and Wawa Districts, five consecutive nights of below freezing temperatures were recorded in May. Frost damage was prevalent on young trembling aspen along Hwy 101, between the towns of Chapleau and Timmins. North of the community of Wawa, the leaves of young trembling aspen trees were red from frost damage, but by late June the leaves were all green again.
- In Sault Ste. Marie District, four consecutive days in May had minimum temperatures below 0°C, causing frost and stunted growth on many red oaks. Stunted and curled red oak leaves were observed north of Thessalon in early June. There were also calls from concerned homeowners in the City of Sault Ste. Marie, but the trees had recovered by early July.

Southern:

- In Peterborough and Bancroft Districts, frost damage was detected in pockets, with the most severe damage detected near Trent Lakes in Peterborough County. Damage was observed primarily on red oak; however, damage was also noted on white oak, ash, and sumac. Damaged leaves on young trees remained wilted throughout the summer months.
- In Pembroke and Algonquin Park Districts, damage was found across the districts on red oak.

Frost damage on red oak

Greenstriped Mapleworm

Pest Information

Common Name:	Greenstriped mapleworm
Latin Name:	*Dryocampa rubicunda* (F.)
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Red maple

Key Facts

- Outbreaks have occurred in previous years in Ontario.
- More commonly found on young red maple.
- Maple syrup quality can be affected after severe defoliation.
- Tree mortality can occur after three consecutive years of severe defoliation.

Regional Summary

Northeast:

- In Timmins District, moderate defoliation was recorded in Vrooman and Westbrook Townships on understorey red maple in a mature jack pine stand. Mature larvae were found feeding in mid-August and by the end of August more than 90% had gone into the ground to pupate. Larvae populations and defoliation appeared to be higher in 2015 compared to 2014. This is the fifth consecutive year defoliation has been observed in this general area.

Greenstriped mapleworm larva on red maple

Hickory Tussock Moth

Pest Information

Common Name:	Hickory tussock moth
Latin Name:	*Lophocampa caryae* Harris.
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Hickory, butternut, ash, elm, basswood, oak, Japanese heartnut

Key Facts

- Occurs mainly in southern Ontario and eastern United States.
- More localized infestations that rarely cause widespread defoliation.
- When populations are high on nut trees, larvae will also defoliate other broad-leaved trees.
- High populations do not persist.

Regional Summary

Southern:

- In Guelph District, trace defoliation was observed on 70-80% of all mature swamp white oak, at Vinemount Swamp, Niagara Region. Trace level defoliation was also reported on understory white oak, shagbark hickory, and bitternut hickory in several woodlots in Lambton County and on open-grown white oaks in Haldimand County.
- In Aylmer District, trace defoliation was observed on two mature Japanese heartnut trees in the Town of Aylmer. Trace defoliation was also recorded on red and black oak scattered throughout Rondeau Provincial Park.
- In Peterborough District, trace-to-light defoliation was observed along Northey's Bay Road by Woodview, east of Bobcaygeon at Nogies Creek, and in the Village of Consecon in Prince Edward County.
- In Kemptville District, light defoliation was recorded in Vernon northeast of Kemptville and in Baxter Conservation Area.
- In Pembroke District, trace-to-light levels of defoliation were observed in Renfrew County.

Hickory tussock moth larvae

Imported Willow Leaf Beetle

Pest Information

Common Name:	Imported willow leaf beetle
Latin Name:	*Plagiodera versicolora* (Laich.)
Pest Origins:	Invasive – Native to Europe
Pest Type:	Defoliator
Host Species:	Willow spp.

Key Facts

- Introduced to North America in 1915 and is now widely distributed across the range of willow in Ontario.
- It is possible to observe 3 generations a year.
- Although much defoliation occurs, damage to trees is not serious unless several consecutive years of severe defoliation takes place.

Regional Summary

Southern:

- In Aylmer and Guelph Districts, moderate-to-severe defoliation was found throughout the districts. Collections were made in Middlesex County and along Hwy 59 between Woodstock and Tavistock, where defoliation was moderate-to-severe on willow. Moderate-to-severe defoliation was also recorded on willow around the reservoir at Shakespeare Conservation Area, Perth County.
- In Peterborough District, light-to-moderate defoliation was detected at locations which previously had severe levels in 2014. Populations were observed on willow trees within the City of Peterborough, the Millbrook Conservation Area, and in Keene along the Indian River.

Imported willow leaf beetle larvae on willow

Introduced Pine Sawfly

Pest Information

Common Name:	Introduced pine sawfly
Latin Name:	*Diprion similis* (Htg.)
Pest Origins:	Invasive – Native to Europe
Pest Type:	Defoliator
Host Species:	Eastern white pine, jack pine, and red pine

Key Facts

- First found in Ontario, near Oakville, in 1931. Natural control factors keep populations low.
- Causes severe defoliation that has often resulted in widespread tree mortality in affected areas, especially on white pine in Parry Sound District.
- Two generations per year, with second generation more abundant in August and September.
- This insect last caused moderate-to-severe defoliation in 2000, when 8,573 ha of defoliation were recorded in the Pointe au Baril/French River area of Parry Sound District.

Regional Summary

Northeast:

- In Sault Ste. Marie District, the insect was identified near Matinenda Lake, with light defoliation observed. Jack pine budworm defoliation on eastern white pine had also been noted in this area making it difficult to distinguish defoliation between the two pests. Ground surveys on eastern white pine were carried out between Blind River and Elliot Lake, but only a few pupal cases with no defoliation were observed.

Southern:

- In Pembroke District, low levels of defoliation were observed on eastern white, red, and jack pine in Bonnechere Provincial Park. The insect was also recorded on eastern white pine with trace defoliation along Hwy 17 at Petawawa and Rolphton and along Hwy 60 in Deacon.
- In Kemptville District, low levels of defoliation were seen on eastern white pine in Kanata and at Baxter Conservation Area.
- In Algonquin Park, trace defoliation was found on eastern white pine at Achray Campground.
- In Parry Sound District, light defoliation was observed between French River and Pointe au Baril. 75% of pupal cases in this area were parasitized. This area will be monitored in 2016.

Introduced pine sawfly larva

Leaf Spot of Ash

Pest Information

Common Name:	Leaf spot of ash
Latin Name:	*Mycosphaerella fraxinicola* (Schwein.) House
Pest Origins:	Native to North America
Pest Type:	Foliar Disease
Host Species:	Ash spp.

Key Facts

- Leaf spot of ash is uncommon, yet widely distributed throughout North America.
- Symptoms appear in mid-late summer as rounded or irregular pale green blotches that turn light brown in mid-September.
- Severe outbreaks of the disease can cause the blotches to enlarge and clump together, blighting the entire leaf, and cause pre-mature leaf drop.
- Repeated, consecutive infections can cause slower tree growth.

Regional Summary

Southern:

- In Peterborough District, this leaf spot was identified on young and mature ash in late September. Moderate-to-severe damage and pre-mature leaf drop was seen along Hwy 401 from Brockville to Belleville.
- In Midhurst District, the disease was present across the district and was collected at Bruce Peninsula National Park. Infection rate and host damage was moderate.
- In Aurora District, moderate levels of damage were observed. In 2013, severe infection rates caused early ash leaf drop, but in 2015 ash leaves remained on trees until early October.
- In Kemptville District, 60% percent of ash trees were affected at an average of 50% damage.
- In Pembroke District, small brown leaf spots coalesced into larger brown areas on over 50% of ash trees, causing moderate damage.

Leaf spot of ash

Northern Tent Caterpillar

Pest Information

Common Name:	Northern tent caterpillar
Latin Name:	*Malacosoma californicum pluviale* (Dyar)
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Pin cherry, choke cherry, white birch, willow, alder, and poplar

Key Facts

- Used to be called western tent caterpillar.
- Larvae feed on a wide range of trees and shrubs in Ontario. Young larvae feed as a colony and construct silken tents in the crotch of branches. The tents protect the larvae from predators and bad weather and are enlarged as the larvae grow.
- Northern tent caterpillar has one generation per year.

Regional Summary

Northwest:

- In Thunder Bay District, light defoliation was recorded throughout the district. Roadside choke cherry north of Magone Lake Road off Hwy 527 were affected.

Northeast:

- In Timmins District, light defoliation was observed throughout the district. Light-to-moderate defoliation was observed on young roadside pin cherry along Hwy 101 near Eastman Lake.
- In Wawa District, defoliation ranged from 15-35% on young white birch north of Wawa.

Northern tent caterpillar larva

Pine False Webworm

Pest Information

Common Name:	Pine false webworm
Latin Name:	*Acantholyda erythrocephala* (Linnaeus)
Pest Origins:	Invasive – Native to Europe and Asia
Pest Type:	Defoliator
Host Species:	Eastern white pine, red pine
Infestation Area:	3 ha (2015)

Key Facts

- First collected in Ontario in 1961, it was initially a pest of young pine plantations.
- In 1993, severe defoliation was first found on semi-mature and mature pine trees. Infestation peaked in 1997, with almost 9,000 ha of moderate-to-severe defoliation. With the exception of 2014, low levels of defoliation have been mapped since 2008. In 2015, populations were localized in small pockets and are expected to continue over the next few years.

Regional Summary

Northeast:

- In North Bay District, moderate-to-severe defoliation was mapped on overmature eastern white pine, totalling 3 ha, on four small islands in West Bay of Lake Nipisssing.
- In Sault Ste. Marie District, heavy infestation was observed in a red pine plantation located east of Thessalon. A plantation survey was carried out on 450 trees; almost three-quarters (73%) of trees had defoliation averaging 20% and defoliation ranged from 5-60%.

Area Summary

Total area-within-which pine false webworm caused moderate-to-severe damage in 2011 – 2015 by MNRF District (area in hectares).

Region / District	2011	2012	2013	2014	2015
Northeast					
North Bay	55	48	7	-	3
Provincial total	**55**	**48**	**7**	**-**	**3**

Pine false webworm defoliation

Poplar Borer

Pest Information

Common Name:	Poplar borer
Latin Name:	*Saperda calcarata* Say.
Pest Origins:	Native to North America
Pest Type:	Wood Borer
Host Species:	Trembling aspen and balsam poplar

Key Facts

- Occurs throughout the range of poplar in Ontario and prefers open-grown and young aspen.
- It commonly takes four years to complete its life cycle in Ontario.
- Larvae tunnel into sapwood and heartwood.
- Larval galleries allow the introduction of disease.
- Feeding galleries make trees prone to snap during wind events.

Regional Summary

Northeast:

- In Timmins District, a moderate level of the borer was recorded on semi-mature to mature trembling aspen near Pharand Lake. The borer was also detected throughout the district on young to semi-mature trembling aspen and balsam poplar as the season progressed.

Poplar borer larva within tunnel

Redheaded Pine Sawfly

Pest Information

Common Name:	Redheaded pine sawfly
Latin Name:	*Neodiprion lecontei* (Fitch)
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Red pine

Key Facts

- Most serious pest of red pine plantations in Ontario.
- Can cause whole tree mortality on young trees.
- Can cause branch mortality and poor diameter growth.
- Prefers trees less than three metres in height.

Regional Summary

Northeast:

- In Sault Ste. Marie District, the sawfly was found on young roadside trees, in open areas, and on the edge of forest stands on red pine. For the third consecutive year, large colonies were found west of Blind River, where lower branches on mature red pine trees had severe defoliation and branch mortality and whole tree mortality through associated armillaria root rot was observed. A young red pine plantation along Hwy 17 east of Thessalon had severe defoliation on young red pine. A survey of 150 trees was carried out and 21% of trees had an average of 60% defoliation, with as much as 90% defoliation on one tree. Individual young red pine were also defoliated by 40-80% north of Little Rapids, north of Wharncliffe and Hwy 108, and south of Elliot Lake.

Southern:

- In Bancroft District, larvae and low levels of defoliation were recorded on Scots pine along Hwy 41 at the Madawaska River and along Hwy 28 east of McArthurs Mills.
- In Peterborough District, scattered larvae were found on several red pine at the Ganaraska Forest Centre, with no defoliation observed.

Redheaded pine sawfly defoliation

Satin Moth

Pest Information

Common Name:	Satin moth
Latin Name:	*Leucoma salicis* (L)
Pest Origins:	Invasive – Native to Europe
Pest Type:	Defoliator
Host Species:	European white poplar, Carolina poplar, largetooth aspen

Key Facts

- First reported in Ontario in 1972 in the eastern part of the province.
- Satin moth can be found in northeastern North America, including the majority of southern Ontario. This pest continues to expand its range in Ontario spreading from the south and reaching Sault Ste. Marie in 2011.
- Satin moth normally prefers individual or small groups of ornamental poplar trees, especially European white and Carolina poplar, but will occasionally defoliate native poplar stands.
- In 2014, 180 ha of satin moth defoliation were recorded in the Northeast and Southern Regions. In 2015, satin moth populations collapsed in Northeastern Region and decreased substantially in Southern Region.

Regional Summary

Southern:

- In Kemptville District, larvae were recorded at the University of Guelph, Kemptville campus, causing complete defoliation of three European white poplars.
- In Midhurst District, the insect was found causing severe defoliation to five hybrid poplar trees in Rama Twp.
- In Peterborough District, moderate defoliation was recorded on an individual largetooth aspen at the junction of Hwy 7 and Hwy 35 near Lindsay.

Satin moth larva and defoliation

Scorch

Pest Information

Common Name:	Scorch
Damage Type:	Abiotic – Weather Event
Host Species:	Hardwood and conifer species

Key Facts

- Scorch is a non-infectious condition caused by unfavourable environmental conditions in which water is lost from the leaf faster than it can be replaced.
- Scorch symptoms usually appear after periods of high temperatures, dry windy weather, and in soils with low moisture.
- Leaf scorch is generally restricted to the leaf margin and tips but, in severe circumstances, the entire leaf may turn brown.
- Tree symptoms can be variable with only one branch being affected, one side of the tree affected, or the whole tree exhibiting symptoms.
- Fringe trees along roads or trees exposed to reflected heat and light are most likely to be scorched.
- A late season scorch event does not pose a serious threat to healthy trees.

Regional Summary

Southern:

- In Aylmer and Guelph Districts, a scorch event caused by high temperatures with little precipitation in mid-August produced low-to-moderate damage to the leaves of woodlot, open-grown, and boulevard trees scattered throughout the districts. Species affected were sugar maple, Norway maple, and silver maple.

Scorch damage on maple

Septoria Leaf Spot

Pest Information

Common Name:	Septoria leaf spot
Latin Name:	*Sphaerulina musiva* (Peck) Quaedvlieg, Verkley & Crous
Pest Origins:	Native to North America
Pest Type:	Foliar Disease
Host Species:	Balsam poplar

Key Facts

- Common fungal disease of balsam poplar.
- Normally prevalent in wet and humid weather conditions.
- Overall effect on tree health is limited, as infection occurs late in the growing season.
- Trees may lose vigour after repeated severe infections, causing trees to be more susceptible to other pathogens.

Regional Summary

Southern:

- In Pembroke District, the disease was collected on balsam poplar in the village of Chenaux, causing light damage.
- In Kemptville District, moderate levels of damage were recorded north of Brockville near the town of Tincap, where open-grown balsam poplar averaged 60% damage on 100% of trees. Severe levels of the disease were also found on young and semi-mature balsam poplar along Aylwin Road northeast of Fitzroy Harbour, where damage was 80% on 100% of the trees.

Septoria leaf spot damage

Shoot Blight of Aspen

Pest Information

Common Name:	Shoot blight of aspen
Latin Name:	*Venturia macularis* (Fr.:Fr.) E. Mull. & Arx
Pest Origins:	Native to North America
Pest Type:	Fungal disease
Host Species:	Trembling aspen, largetooth aspen, and some hybrid species

Key Facts

- Tips of infected shoots turn black and wither, resembling “shepherd’s crook”.
- Causes death of terminal and lateral shoots, which deforms young trees and reduces growth.
- The disease can be serious in plantations, but of little economic importance in natural stands.
- Trees over 5 years of age are often not affected.

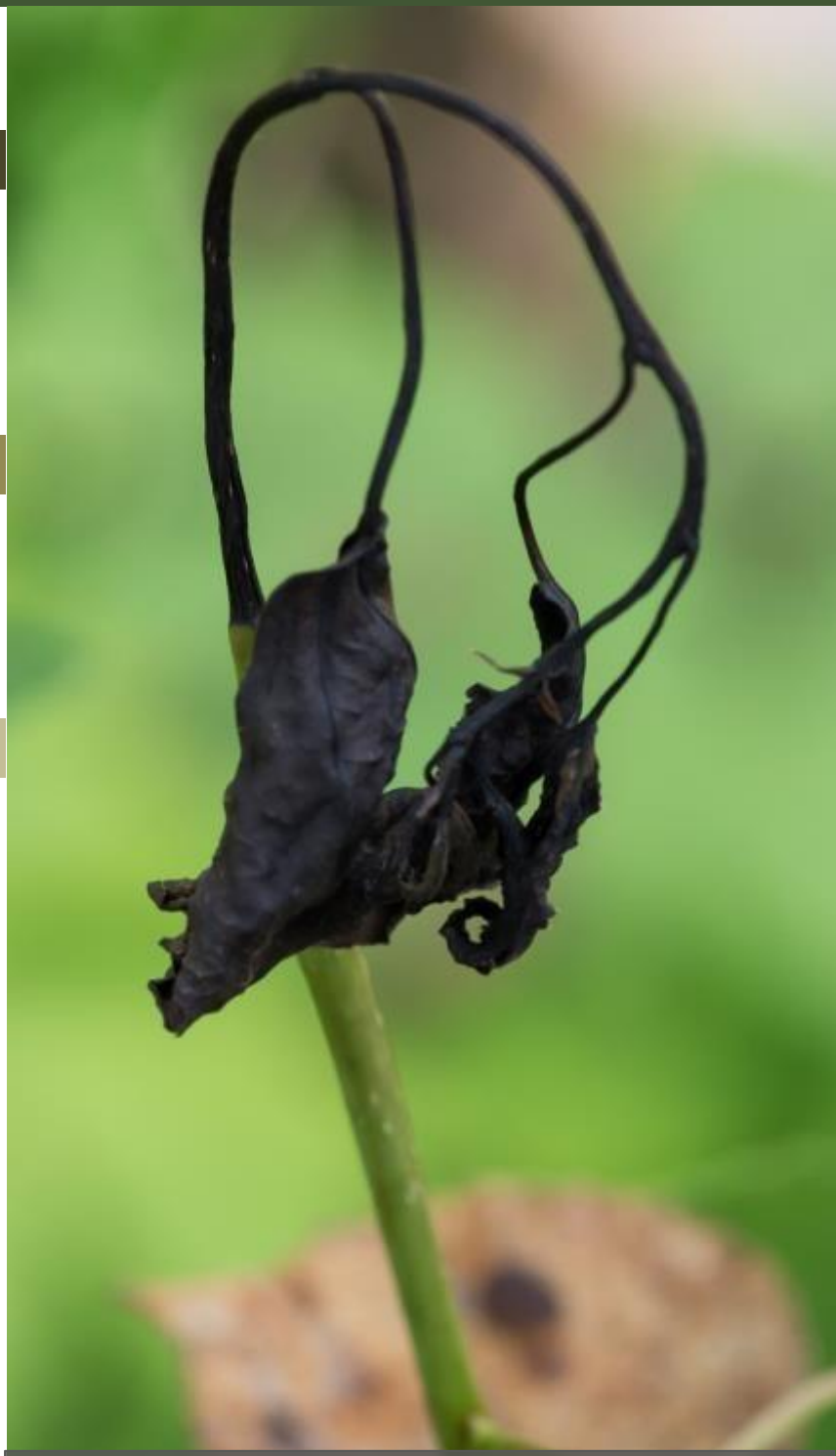
Regional Summary

Northwest:

- In Thunder Bay District, samples of the disease were collected between Whitefish and Fraleigh Lakes. Scattered young individual aspen trees, that were < 5m in height, showed the characteristic “shepherd’s crook” as a result of this fungal pathogen.

Northeast:

- In Chapleau, Wawa, Timmins, and Cochrane Districts, the disease was visible on open-grown and roadside aspen regeneration that was less than 3m tall. Light levels of the disease were collected at Edward Bonner Tree Improvement Centre, where average damage was 20%. Positive samples were also collected near Magpie River on Steephill Dam Road, where trembling aspen regeneration averaged 40% damage.



Shoot blight of aspen on terminal shoot

Spruce Needle Rust

Pest Information

Common Name:	Spruce needle rust
Latin Name:	*Chrysomyxa nagodhii,* P.E. Crane
Pest Origins:	Native to North America
Pest Type:	Needle rust
Host Species:	Spruce spp.

Key Facts

- Fungus causes current year's needles to dry out, turn red, and drop off.
- Can be identified by the presence of white blisters with bright orange spores.
- Most common along bogs edge where the alternate host, Labrador tea, resides.
- Normally not a serious problem, and rarely see more than two consecutive years of infection.
- Consecutive years of infection can cause mortality in younger trees and growth loss in larger trees.

Regional Summary

Northwest:

- In Sioux Lookout District, samples were collected northeast of the town of Sioux Lookout near Stanzhikimi Lake, where it was only seen on one open-grown black spruce tree at low levels.

Northeast:

- In Wawa District, samples were collected from a black spruce plantation southeast of Hornepayne. A plantation survey indicated that 55% of trees had 20% infection. Labrador tea was present throughout the entire plantation.
- In Chapleau and Timmins Districts, the disease was observed on scattered open-grown spruce.

Spruce needle rust on young black spruce

Tar Spot

Pest Information

Common Name:	Tar Spot
Latin Name:	*Rhytisma* spp.
Pest Origins:	Invasive – Native to Europe *Rhytisma acerinum* (Pers.) Fr. Native to North America *Rhytisma americanum* Hudler & Banik
Pest Type:	Foliar disease
Host Species:	Maple spp.

Key Facts

- Exacerbated by wet springs and aesthetically damaging.
- Rarely a serious problem, but heavy infestations can cause premature leaf drop.
- Raking and disposing of leaves can reduce reinfection in the spring.

Regional Summary

Northeast:

- In Sault Ste. Marie District, infection rates of tar spot were the highest of several consecutive years of severe outbreaks in the city of Sault Ste. Marie. The most severe cases were observed on Norway maple, with lighter infection rates on silver maple and trace levels on sugar maple. The cold damp spring created ideal conditions for this disease and early leaf drop occurred across the city in late August, causing many inquiries from the public asking about the disease.

Southern:

- In Aurora District, severe infection was observed on half the mature silver maple at Sibbald Point Provincial Park, causing moderate damage. This was reduced from 2014 when branches were found drooping and laden with tar spot.
- In Midhurst District, the disease was recorded along Hwy 86, northwest of Lochalsh, where 80% of the silver maple trees had moderate damage.

Tar spot damage on Norway maple

Western Gall Rust

Pest Information

Common Name:	Western Gall Rust
Latin Name:	*Endocronartium harknessii* (J.P. Moore) Y. Hirats.
Pest Origins:	Native to North America
Pest Type:	Rust Disease
Host Species:	Jack pine

Key Facts

- This rust disease is common across Ontario.
- Typically causes malformations, stunting, and aesthetic degradation.
- Can be a significant pest of nurseries and plantations.
- Branch galls can cause branch mortality and main stem galls on trees under 10 years of age can cause whole tree mortality.
- It can infect pine to pine and does not require an alternate host to complete its life cycle.

Regional Summary

Northwest:

- In Red Lake District, the disease was observed north of Coli Lake on understory jack pine regeneration within a natural stand of jack pine trees, with low levels of rust.
- In Fort Frances District, low levels of the disease were also recorded on scattered semi-mature jack pine in the Mine Centre area.

Northeast:

- In Cochrane District, a plantation assessment in Calvert Twp revealed low-to-moderate levels of infection. A small stand of jack pine was surveyed and 50% of the semi-mature trees had new infections, with average 20% damage.

Western gall rust on jack pine

White Pine Blister Rust

Pest Information

Common Name:	White pine blister rust
Latin Name:	*Cronartium ribicola* J.C. Fisch.
Pest Origins:	Invasive – Native to Asia
Pest Type:	Rust Disease
Host Species:	Eastern white pine

Key Facts

- This disease is relatively common throughout Ontario where Ribes spp. (the alternate hosts) are found in close proximity to pine.
- Causes branch dieback, reduction in growth, and eventual tree mortality if infection reaches the stem.

Regional Summary

Northeast:

- In Kirkland Lake and North Bay Districts, white pine blister rust surveys were carried out in early June. A plantation in Evanturel Twp had a 4% infection rate, with 2% being lethal infections. Porcupine damage was also discovered here, with 20% of trees being affected. Plantations in Ingram and Eby Townships had less than a 1% infection rate.

Southern:

- In Pembroke District, a plantation in the Gratton Progeny area, west of Renfrew and north of Dacre, was surveyed. A few lethal infections were recorded throughout the plantation, with approximately 5% of the trees being infected.

White pine blister rust fruiting

Woolly Alder Aphid

Pest Information

Common Name:	Woolly alder aphid
Latin Name:	*Prociphilius tessellatus* Fitch.
Pest Origins:	Native to North America
Pest Type:	Sucking insect
Host Species:	Alder

Key Facts

- These aphids produce a white waxy fuzz to cover and protect their bodies. They are mostly female and can reproduce both sexually and asexually.
- Very noticeable when populations are high, though high populations are usually short lived and cause no long term damage.
- Common on alder in Ontario.

Regional Summary

Northwest:

- In Thunder Bay District, low levels of the insect were observed near Walkingshaw Lake north of Thunder Bay, with light levels of damage.
- In Red Lake District, the insect was recorded on alder west of Nungesser Lake and in Bateman Twp north of Red Lake. Damage was light in both areas.

Woolly alder aphid

Yellowheaded Spruce Sawfly

Pest Information

Common Name:	Yellowheaded spruce sawfly
Latin Name:	*Pikonema alaskensis* Rohwer
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Spruce spp.

Key Facts

- Common pest in Ontario.
- Serious pest of Christmas tree plantations, open-grown trees, and plantations.
- Normally prefers to feed on young, open-grown, and roadside trees less than 10 years of age.
- Severe defoliation can cause branch and whole tree mortality and incremental growth is impeded in less severe cases.

Regional Summary

Northwest:

- In Thunder Bay District, the pest was observed in the community of Rosslyn, west of Thunder Bay, where it severely attacked ornamental spruce trees in residential yards causing mortality. A localized population was also recorded at the Current River Community Center in the City of Thunder Bay for the second consecutive year and caused mortality to three spruce trees.

Yellowheaded spruce sawfly larva