

Forest Health Conditions in Ontario 2014



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Forest Health Conditions in Ontario, 2014

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- Ontario Ministry of Natural Resources and Forestry, Crown Forests and Lands Policy Branch, Forest Sustainability and Information Section
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Forest tent caterpillar 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.



Armillaria mushrooms on red pine

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.

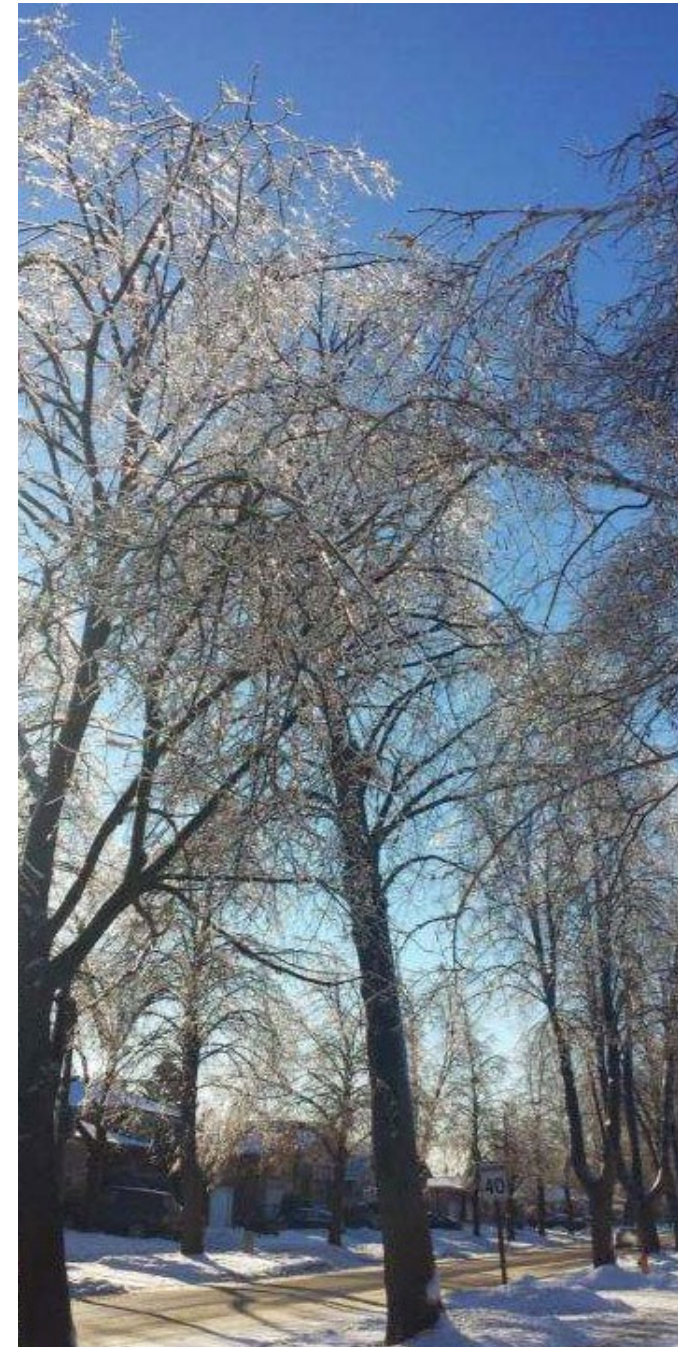
During the early winter months of 2014, colder than average temperatures and high levels of snowfall were recorded throughout much of the province. Freezing temperatures with high levels of snowfall continued into March and April, especially in Northeast Region and into Southern Region. Normal spring weather conditions were recorded in May in most of the province. This was followed by below normal temperatures in June and July, with above normal rainfall occurring in Southern and Northeast regions. The remaining summer and fall months were within average conditions, with some high and low spikes in temperature.

The 2014 weather conditions generally favoured tree growth and health, while the cooler temperatures impacted forest insects. Fungi that affect leaves and needles likely benefited from the cool wet weather, but did not result in abundant major forest disturbances.

Extreme weather and abiotic events

An ice storm, occurring December 21-23, 2013, ended the calendar year with devastating impacts. This event covered southern Ontario, affecting forest cover from north of London through Kitchener into the Golden Horseshoe, then east along the north shore of Lake Ontario, and up the St. Lawrence River valley to Cornwall. Thousands of trees in landscaped areas, riparian zones, and other wooded areas were damaged due to the shear load of ice buildup. This event caused wide spread uprooting, bending, stem breakage, and branch falling to thousands of trees. An aerial survey of damage was not carried out because of the difficulty in conducting low-level flights over inner-municipal streets and because the damage, though wide-spread, was inconsistent across the landscape. Some pockets were severely affected, while other areas showed little if any damage, which made it difficult to categorize and map the damage from the air. Ground assessments were done to assess the damage, which showed that green and white ash trees were most affected.

In June of 2014, high winds and large hail occurred over the town of South Porcupine, Timmins District. Hail broke, split, and tore away branches, and caused mechanical wounds to main stems on a variety of tree species including white birch, trembling aspen, balsam fir, black and white ash, and white and black spruce.



Ice covered trees during ice storm in Dec 2013

Tornados and high wind events caused 3,415 ha of blowdown across the province in 2014. The majority of damage was recorded in Thunder Bay District (1,867 ha), Northwest Region, with smaller areas affected in Northeast (168 ha) and Southern (136 ha) regions. Several tornados occurred in Southern Region resulting in severe damage to scattered, open grown trees and woodlot edges. A total of six tornadoes were reported from June 17 to July 30, occurring between Barrie and Orangeville, northwest of Huntsville on Bear Lake, and along the northern boundary of Pinery Provincial Park to Grand Bend. Damage was mostly to wind rows and forest edges.

Insect infestations

The current jack pine budworm (*Choristoneura pinus pinus* Freeman) outbreak has returned to a trend of declining infestation levels in Northwest Region, indicating that the outbreak will likely soon collapse. Moderate-to-severe defoliation was aerially mapped beginning in 2004, and was shown to peak 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. In 2014, defoliation was again limited to this District, declining to 22,010 ha. There is limited forest management or timber harvesting in this part of the District. 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 Annual Report on Forest Management). The jack pine budworm infestation will continue to be monitored to determine whether the outbreak continues to collapse.

The last spruce budworm (*Choristoneura fumiferana* Clemens) outbreak collapsed in 2013 in Northeast Region between Sudbury, North Bay, and Temagami, with only 253 ha of moderate-to-severe defoliation occurring. This compared to 99,797 ha in 2012. A new infestation developed in 2014 in the border area between Chapleau and Hearst Districts, totaling 30,317 ha. Trapping results from 2014 also showed an increase in male moth captures in Northeast Region. From 1997-2014, a total of 240,326 ha of mortality have been recorded in Sudbury and North Bay Districts. 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 more than doubled in size in 2014, reaching 468,866 ha of moderate-to-severe defoliation; The majority of this (459,197 ha) was recorded in Northwest Region, where all but Fort Frances District was aerially mapped with defoliation.



Jack pine budworm defoliation

Forest tent caterpillar defoliation continues to occur in Southern Region, with 8,638 ha occurring in woodlots and forested areas near the southern part of Georgian Bay. A new area of infestation was recorded in Northeast Region in 2014. In Hearst District, 1,031 ha of moderate-to-severe defoliation were aerially mapped. This outbreak, particularly in Northwest Region, has the potential to reach millions of hectares in size over the next few years. Forest tent caterpillar egg-band forecasting and aerial surveys will continue to be carried out to help predict expansion and possible declines.

Several other insects caused localized defoliation or damage in various parts of Ontario. These occurrences did not develop into provincially significant areas of defoliation, 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 has been aerially mapped for four consecutive years in Sault Ste. Marie District. It was also mapped in Sudbury District affecting semi-mature Scots pine, and detected in Peterborough District on red pine.

This year, numerous foliar diseases took advantage of the wet, cool spring in Northeast Region, including Linospora leaf blight (*Linospora tetraspora*, G.E.Thomps.) affecting balsam poplar and septoria leaf spot (*Septoria betulae* Pass.) affecting white birch. Moist conditions also attributed to anthracnose on ash (*Gnomonia fraxini* Redlin & Stack) and oak (*Apiognomonina errabunda* (Roberge) Hohn.) in Northeast and Northwest regions.

Hypoxylon canker (*Entoleuca mammata* (Wahlenb.) Rogers & Ju) was commonly found on trembling aspen in Fort Frances, Kenora, and Thunder Bay districts.

Invasive species

Emerald ash borer (*Agrilus planipennis* Fairmaire) is regulated by the Canadian Food Inspection Agency (CFIA). As of April 1, 2014, all areas that had previously been regulated to control emerald ash borer (EAB) in Ontario were consolidated into one large regulated area. The northern boundary extends to areas within the municipal boundaries of Algoma, Sudbury, and Nipissing, and the regulated area encompasses all areas south of this. CFIA and MNRF discovered several new locations of EAB in 2014, including new infestations on St. Joseph Island and within Grey, Bruce, Simcoe, and Northumberland counties.



Septoria leaf spot

Aerial surveys in 2014 showed that cumulative decline and mortality of ash species had reached 196,254 ha, an increase of 43,390 ha over that mapped in 2013.

In 2014, biocontrol agents were released by CFS for the second 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 southwestern Ontario. Follow-up assessments will be performed in future years to determine its establishment and impacts on EAB populations.

Due to the difficulties of detecting early stages of an EAB infestation, a multi-agency trap evaluation was conducted by MNRF, CFS, United States Forest Service (USFS), and Sylvar Technologies to determine which trap design is most effective at detecting low-level EAB populations. Five test sites were selected within Canada and the US to evaluate the effectiveness of the six most commonly used trapping methods for detecting EAB. Two of the five test sites were installed by MNRF Biodiversity and Monitoring staff in Ontario. The remaining sites were installed by US counterparts in Michigan, Ohio, and Pennsylvania. Final results will be analyzed by USFS and will be presented at a later date.

In 2014, MNRF also collaborated with CFIA, who coordinated an EAB detection program north of the regulated area in Ontario. The program focused on areas of high risk, such as parks and camping sites in Northwest and Northeast regions. Green prism traps baited with a pheromone lure 3Z-lactone and Z3hexenol were deployed in several locations in early June and subsequently collected in August. All results were negative for EAB.

On April 5, 2013, CFIA declared Asian long-horned beetle (*Anoplophora glabripennis* Motschulsky) eradicated from Toronto and Vaughan. The declaration resulted following a program aimed at eliminating the pest after it was initially found in the area in 2003. The program involved cutting and chipping infested trees and all potential host trees within 400 m of an infested tree, 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.

In August 2013, a new infestation of ALHB was found in Mississauga, following the discovery of a beetle on a car. Subsequent surveys by CFIA, the cities of Toronto, Mississauga, Brampton, and MNRF found approximately 25 infested Norway and Manitoba maple trees. Infested trees were in the area around Lester B. Pearson International Airport, with the exception of one tree found in an adjacent area within the city of Toronto. This infestation has undergone an aggressive eradication program led by CFIA, who continues to lead the federal detection survey.



Emerald ash borer damage

Hemlock woolly adelgid (*Adelges tsugae* Annand) was initially detected in Ontario in 2012, resulting in the destruction of five infested eastern hemlock trees in the Etobicoke area between 2012 and 2013. In 2013, the CFIA detected and destroyed another infested eastern hemlock tree in the Niagara River gorge. In 2014, follow up surveys found two additional infested trees in Etobicoke in late fall.

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.

For a third consecutive year, a pheromone trapping survey was performed to detect walnut twig beetle (*Pityophthorus juglandis* Blackman), the vector for thousand canker disease (*Geosmithia morbida* sp. nov.). To date, no walnut twig beetles have been identified in Ontario traps.



Mortality caused by beech bark disease

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.

Common Name	Latin Name	Type	Page
Armillaria root rot	<i>Armillaria</i> spp.	Disease	23
Asian long-horned beetle	<i>Anaplophora glabripennis</i> (Motschulsky)	Insect	25
Aspen twoleaf tier	<i>Enargia decolor</i> (Wlk.)	Insect	27
Beech bark disease	<i>Neonectria faginata</i> (Lohman et al.) Castl. & Rossman	Disease	30
Blowdown	n/a	Abiotic	33
Brown spot needle blight	<i>Mycosphaerella dearnessii</i> M.E. Barr	Disease	38
Cedar leafminer complex	Various species	Insect	40
Eastern larch beetle	<i>Dendroctonus simplex</i> LeConte	Insect	43
Emerald ash borer	<i>Agrilus planipennis</i> Fairmaire	Insect	45
Forest tent caterpillar	<i>Malacosoma disstria</i> Hubner	Insect	53
Gypsy moth	<i>Lymantria dispar</i> (L.)	Insect	60
Hail	n/a	Abiotic	63
Ice damage	n/a	Abiotic	65
Jack pine budworm	<i>Choristoneura pinus pinus</i> Freeman	Insect	67
Larch casebearer	<i>Coleophora laricella</i> (Hubner)	Insect	70
Satin moth	<i>Leucoma salicis</i> (L.)	Insect	73
Spruce budworm	<i>Choristoneura fumiferana</i> Clemens	Insect	76
Whitespotted sawyer beetle	<i>Monochamus s. scutellatus</i> (Say)	Insect	81



Forest tent caterpillar 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.

Common Name	Latin Name	Type	Page
Alder tubemaker	<i>Acrobasis rubrifasciella</i> Packard	Insect	83
Ambermarked birch leafminer	<i>Profenusa thomsoni</i> (Konow)	Insect	84
Ash anthracnose	<i>Gnomonia fraxini</i> Redlin & Stack	Disease	85
Balsam poplar leafblotch miner	<i>Phyllonorycter nipigion</i> (Free.)	Insect	86
Beech scale	<i>Cryptococcus fagisuga</i> Linding.	Insect	87
Birch skeletonizer	<i>Bucculatrix canadensisella</i> Chambers	Insect	88
Black headed ash sawfly	<i>Tethida cordigera</i> (Beauv.)	Insect	89
Cedar apple rust	<i>Gymnosporangium juniperi-virginianae</i> Schwein.	Disease	90
Diplodia tip blight	<i>Diplodia pinea</i> (Desm.) Kickx	Disease	91
Drought	n/a	Abiotic	92
Dutch elm disease	<i>Ophiostoma novo-ulmi</i> Brasier	Disease	93
Eastern tent caterpillar	<i>Malacosoma americanum</i> (F.)	Insect	94
European larch needlecast	<i>Mycosphaerella laricina</i> (R.Hortig) Migula	Disease	95
Fall webworm	<i>Hyphantria cunea</i> (Drury)	Insect	96
Frost	n/a	Abiotic	97
Grasshopper	Family Acrididae	Insect	98
Gray willow leaf beetle	<i>Tricholochmea decora decora</i> (Say)	Insect	99
Greenstriped mapleworm	<i>Dryocampa rubicunda</i> (F.)	Insect	100
Green hemlock needleminer	<i>Coleotechnites apicitripunctella</i> (Clem.)	Insect	101
Hypoxylon canker	<i>Entoleuca mammata</i> (Wahlenb.) Rogers & Ju	Disease	102
Imported willow leaf beetle	<i>Plagiodera versicolora</i> (Laich.)	Insect	103



Fall cankerworm larva

Common Name	Latin Name	Type	Page
Introduced pine sawfly	<i>Diprion similis</i> (Htg.)	Insect	104
Large aspen tortrix	<i>Choristoneura conflictana</i> (Walker)	Insect	105
Larger boxelder leafroller	<i>Archips negundana</i> (Dyar)	Insect	106
Lesser aspen webworm	<i>Meroptera praveilla</i> (Grt.)	Insect	107
Linospora leaf blight	<i>Linospora tetraspora</i> G.E.Thomps.	Disease	108
Maple leafroller	<i>Sparganothis acerivorana</i> Mack.	Insect	109
Maple petiole borer	<i>Caulocampus acericaulis</i> (MacG.)	Insect	110
Marssonina leaf spot	<i>Marssonina brunnea</i> (Ell & Ev) Magn.	Disease	111
Mourningcloak butterfly	<i>Nymphalis antiopa</i> (Linnaeus)	Insect	112
Needle rust of balsam fir	<i>Pucciniastrum epilobii</i> G.H Otth.	Disease	113
Northern tent caterpillar	<i>Malacosoma californicum pluviale</i> (Dyar)	Insect	114
Oak anthracnose	<i>Apiognomonina errabunda</i> (Roberge) Hohn.	Disease	115
Obliquebanded leafroller	<i>Choristoneura rosaceana</i> (Harr.)	Insect	116
Phyllosticta leaf spot	<i>Phyllosticta minima</i> (Berk. & M.A. Curtis) Underw. & Earle	Disease	117
Pine false webworm	<i>Acantholyda erythrocephala</i> (Linnaeus)	Insect	118
Pityogenes bark beetle	<i>Pityogenes hopkinsi</i> Swaine	Insect	119
Poplar twiggall fly	<i>Hexomyza schineri</i> (Gir.)	Insect	120
Ragged spruce gall adelgid	<i>Pineus similis</i> (Gill.)	Insect	121
Redheaded pine sawfly	<i>Neodiprion lecontei</i> (Fitch)	Insect	122
Septoria leaf spot -birch	<i>Septoria betulae</i> Pass.	Disease	123
Shoot blight of aspen	<i>Venturia macularis</i> (Fr.:Fr.) E. Mull. & Arx	Disease	124
Spruce needle blight	<i>Rhizophaera kalkhoffii</i> Bubak	Disease	125
Spruce needle rust	<i>Chrysomyxa ledicola</i> Lagerh.	Disease	126
Tar spot	<i>Rhytisma americanum</i> Hudler & Banik	Disease	127



Pine false webworm adult

Common Name	Latin Name	Type	Page
Tar spot needle cast	<i>Davisomycella ampla</i> (Davis) Darker	Disease	128
Western gall rust	<i>Peridermium harknessii</i> (J.P.Moore) Y. Hirats.	Disease	129
White pine blister rust	<i>Cronartium ribicola</i> J.C. Fisch.	Disease	130
White pine weevil	<i>Pissodes strobi</i> Peck	Insect	131
Willow leafminer	<i>Micrurapteryx salicifoliella</i> (Chambers)	Insect	132
Yellowheaded spruce sawfly	<i>Pikonema alaskensis</i> Rohwer	Insect	133



Tar spot on sugar maple

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.

Common Name	Latin Name	Type	Page
Ambermarked birch leafminer	<i>Profenusa thomsoni</i> (Konow)	Insect	84
Asian long-horned beetle	<i>Anaplophora glabripennis</i> (Motschulsky)	Insect	25
Beech bark disease	<i>Neonectria faginata</i> (Lohman et al.) Castl. & Rossman	Disease	30
Beech scale	<i>Cryptococcus fagisuga</i> Linding	Insect	87
Dutch elm disease	<i>Ophiostoma novo-ulmi</i> Brasier	Disease	93
Emerald ash borer	<i>Agrilus planipennis</i> Fairmaire	Insect	45
European larch needlecast	<i>Mycosphaerella laricina</i> (R.Hortig) Mig.	Disease	95
Gypsy moth	<i>Lymantria dispar</i> (L.)	Insect	60
Imported willow leaf beetle	<i>Plagiodera versicolora</i> (Laich.)	Insect	103
Introduced pine sawfly	<i>Diprion similis</i> (Htg.)	Insect	104
Larch casebearer	<i>Coleophora laricella</i> (Hubner)	Insect	70
Pine false webworm	<i>Acantholyda erythrocephala</i> (L.)	Insect	118
Satin moth	<i>Leucoma salicis</i> (L.)	Insect	73
White pine blister rust	<i>Cronartium ribicola</i> J.C. Fisch.	Disease	130



Adult female gypsy moth and egg mass

Host Index

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

Common Name	Scientific Name
American beech	<i>Fagus grandifolia</i> Ehrh.
American elm / white elm	<i>Ulmus americana</i> L.
Balsam fir	<i>Abies balsamea</i> (L.) Mill.
Balsam poplar	<i>Populus balsamifera</i> L.
Basswood	<i>Tilia americana</i> L.
Bitternut hickory	<i>Carya cordiformis</i> (Wangenh.) K Koch
Black ash	<i>Fraxinus nigra</i> Marsh.
Black cherry	<i>Prunus serotina</i> Ehrh.
Black spruce	<i>Picea mariana</i> (Mill.) BSP
Black walnut	<i>Juglans nigra</i> L.
Bur oak	<i>Quercus macrocarpa</i> Michx.
Carolina poplar	<i>Populus x canadensis</i> Moench cv. Eugenei
Choke cherry	<i>Prunus virginiana</i> L.
Colorado blue spruce	<i>Picea pungens</i> Engelm.
Eastern cottonwood	<i>Populus deltoides</i> Bartr. ex Marsh.
Eastern hemlock	<i>Tsuga canadensis</i> (L.) Carrière
Eastern red cedar	<i>Juniperus virginiana</i> L.
Eastern white cedar	<i>Thuja occidentalis</i> L.
Eastern white pine	<i>Pinus strobus</i> L.
European larch	<i>Larix decidua</i> Mill.
European white poplar	<i>Populus alba</i> L.
Green ash	<i>Fraxinus pennsylvanica</i> Marshall



Eastern white pine

Common Name	Scientific Name
Jack pine	<i>Pinus banksiana</i> Lamb.
Labrador tea	<i>Rhododendron groenlandicum</i> (Oeder) Kron & Judd
Largetooth aspen	<i>Populus grandidentata</i> Michx.
Leatherleaf	<i>Chamaedaphne calyculata</i> (L.) Moench
Lombardy poplar	<i>Populus nigra</i> L.
Manitoba maple	<i>Acer negundo</i> L.
Pin cherry	<i>Prunus pensylvanica</i> L. f.
Red maple	<i>Acer rubrum</i> L.
Red oak	<i>Quercus rubra</i> L.
Red pine	<i>Pinus resinosa</i> Ait.
Red spruce	<i>Picea rubens</i> Sarg.
Scots pine	<i>Pinus sylvestris</i> L.
Silver maple	<i>Acer saccharinum</i> L.
Speckled alder	<i>Alnus incana</i> spp. <i>rugosa</i> (Du Roi) J. Clausen
Sugar maple	<i>Acer saccharum</i> Marsh.
Tamarack / larch	<i>Larix laricina</i> (Du Roi) K. Koch
Trembling aspen	<i>Populus tremuloides</i> Michx.
White ash	<i>Fraxinus americana</i> L.
White birch	<i>Betula papyrifera</i> Marsh.
White oak	<i>Quercus alba</i> L.
White spruce	<i>Picea glauca</i> (Moench) Voss
Willow species	<i>Salix</i> spp.



Trembling aspen

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 2014.

Common Name	Light (ha)	Moderate to Severe (ha)	Tree Mortality (ha)	Area Total (ha)
(Armillaria root rot	-	-	5	5
Aspen twoleaf tier	-	749	-	749
Blowdown	-	3,415	-	3,415
Brown spot needle blight	-	327	-	327
Cedar leafminer	-	10,780	-	10,780
Eastern larch beetle	-	759	-	759
Emerald ash borer	-	43,338	-	43,338
Forest tent caterpillar	2,279	468,866	-	471,145
Gypsy moth	-	23,335	-	23,335
Hail	-	13	-	13
Jack pine budworm	-	22,010	-	22,010
Larch casebearer	15	9,643	-	9,658
Linospora leaf blight	-	14	-	14
Septoria leaf spot	-	16	-	16
Satin moth	-	180	-	180
Spruce budworm	-	30,317	15,028	45,345
White spotted sawyer beetle	-	28	-	28



Surveying for disease damage

Major Disturbances
Provincial Overview

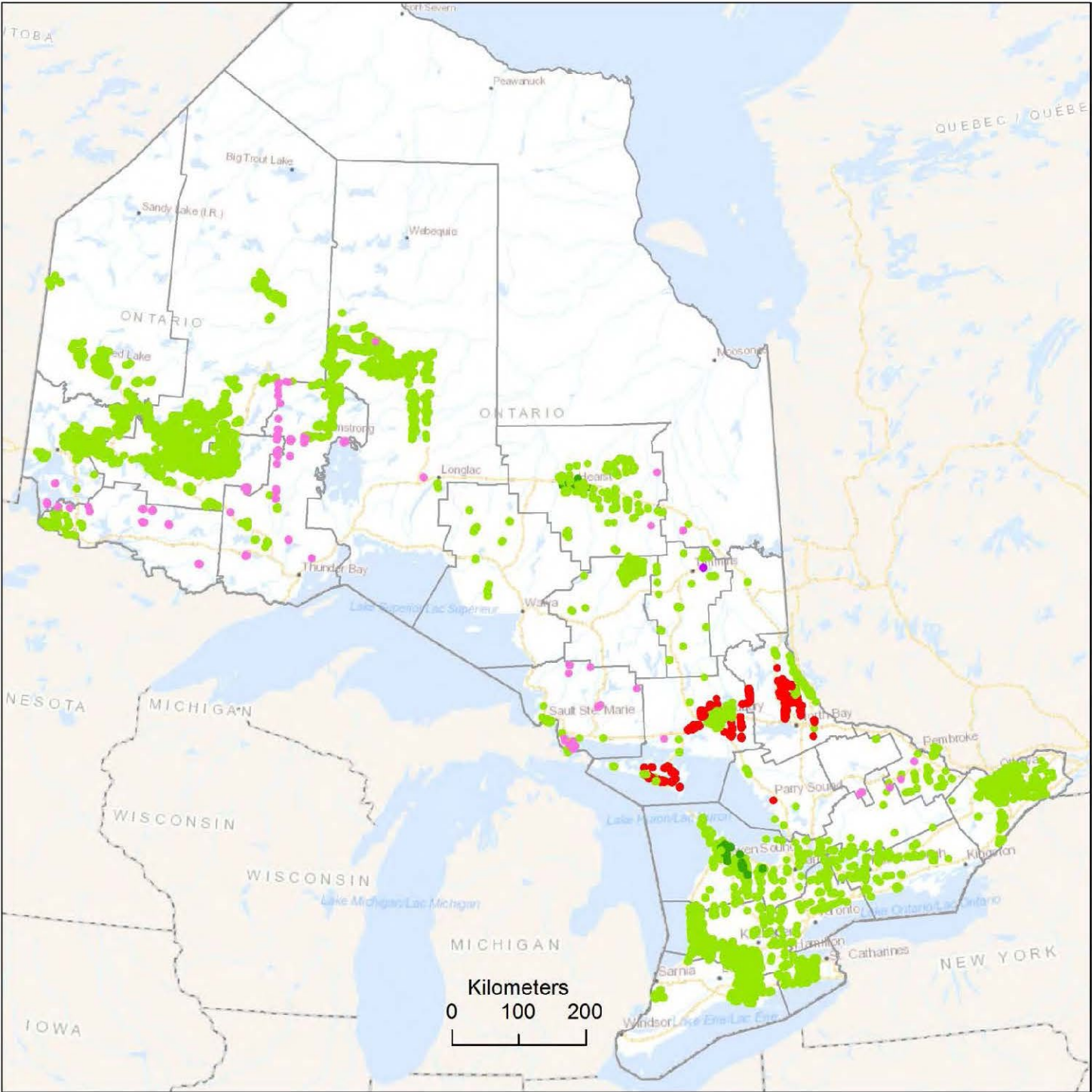
Forest Damage Ranking

Abiotic Damage
(Blowdown, Drought
Severe Weather)

- Moderate-Severe
- Severe

Biotic Damage
(Insects and Disease)

- Light
- Moderate-Severe
- Mortality



Major Disturbances
Northwest Overview

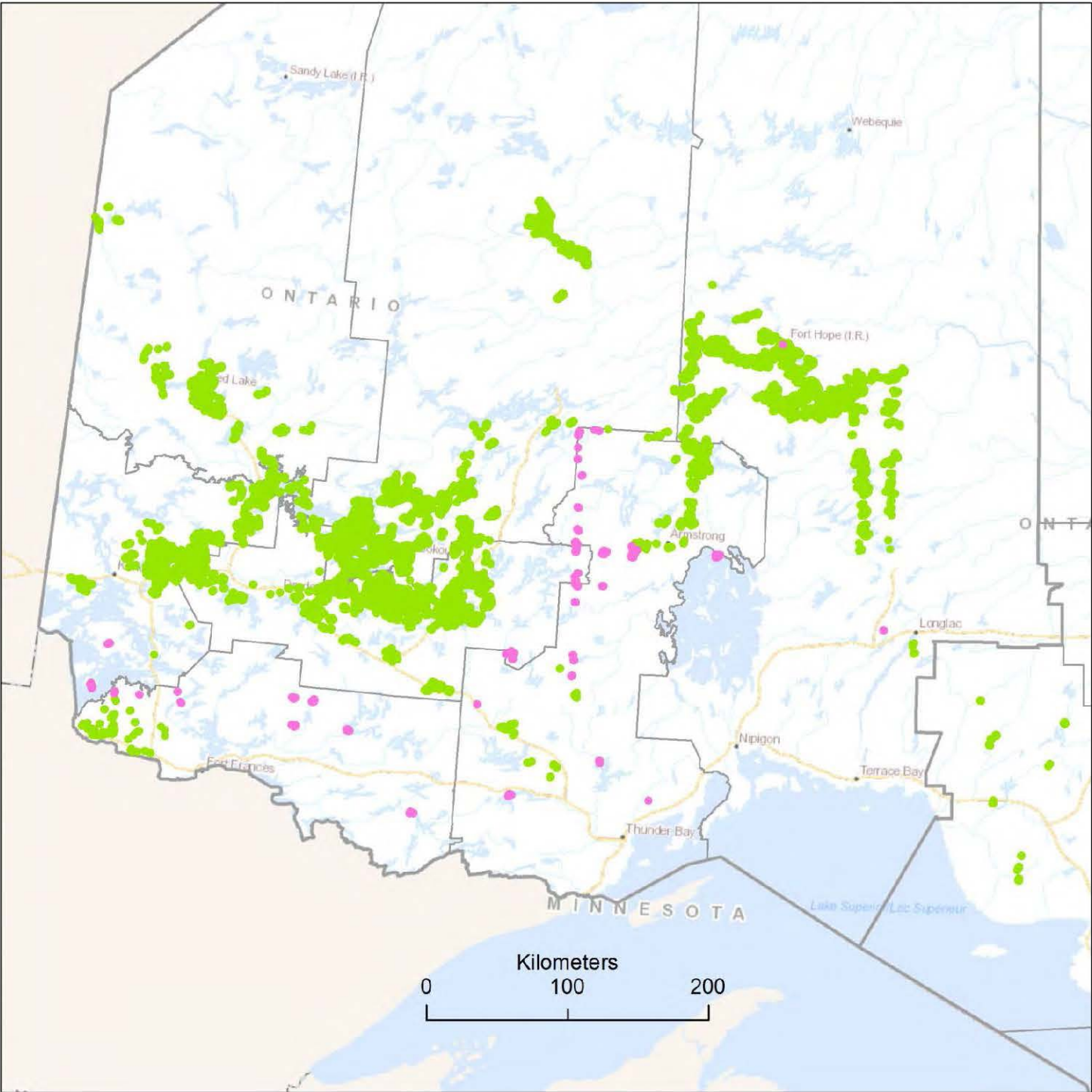
Forest Damage Ranking

Abiotic Damage
(Blowdown, Drought
Severe Weather)

- Moderate-Severe
- Severe

Biotic Damage
(Insects and Disease)

- Light
- Moderate-Severe
- Mortality



Major Disturbances
Northeast Overview

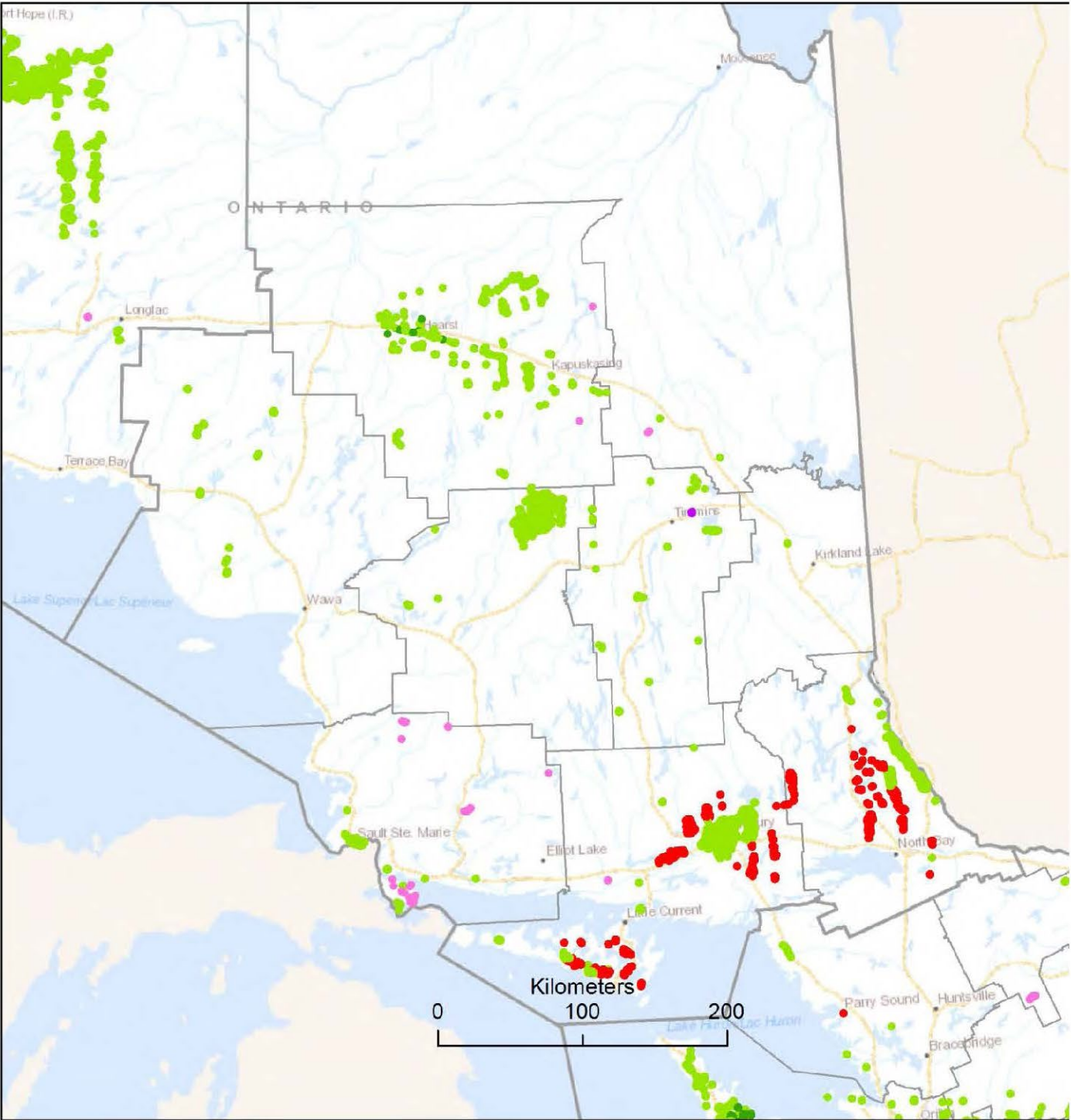
Forest Damage Ranking

Abiotic Damage
(Blowdown, Drought,
Severe Weather)

- Moderate-Severe
- Severe

Biotic Damage
(Insects and Disease)

- Light
- Moderate-Severe
- Mortality



Major Disturbances
Southern Overview

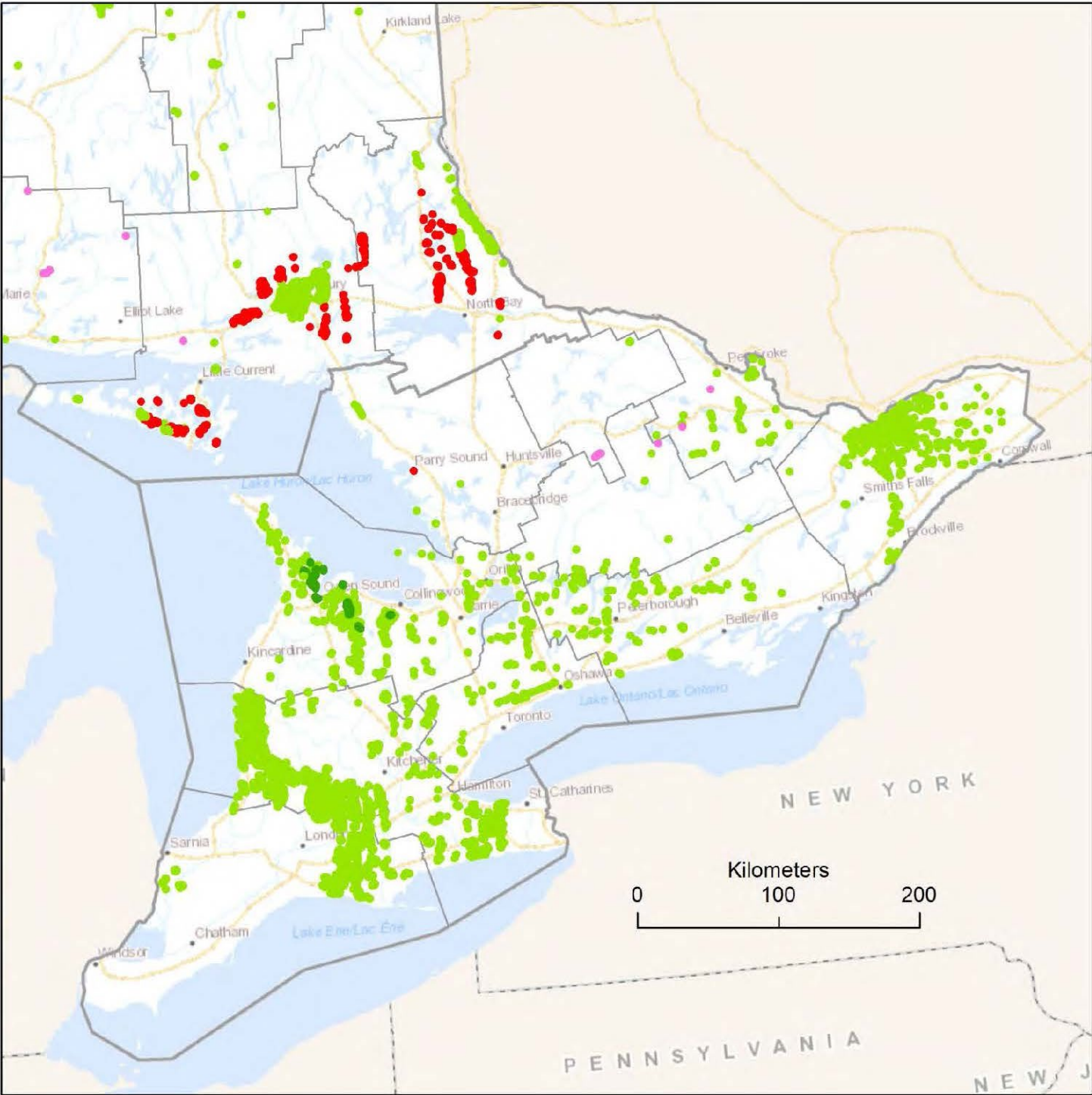
Forest Damage Ranking

Abiotic Damage
(Blowdown, Drought,
Severe Weather)

- Moderate-Severe
- Severe

Biotic Damage
(Insects and Disease)

- Light
- Moderate-Severe
- Mortality



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 2010-2014 by MNRF Region and District.

Pest or Damage Information

Key Facts

Regional Summary

Jack Pine Budworm

Pest Information

Common Name: Jack pine budworm
Latin Name: Choristoneura pinus-christianae
Pest Origin: Native to North America
Pest Type: Defoliator
Host Species: Jack pine, red pine, Scots pine, white pine
Infestation Area: 22,838 ha (2014)

Recurrent Risk Rating

- Outbreaks occur in Ontario every 6-10 years.
- Current outbreak started in 2004 and peaked in 2006, at approximately 740,000 ha.
- Total area of defoliation declined from 83,875 ha in 2012 to 22,838 ha in 2014.
- Jack pine budworm phenological cycles increased in Northeast Region in 2004.
- Large-scale control programs have been undertaken to protect high value jack pine stands during the current outbreak. The next year trees were conducted over 2009 control programs are reported in the Annual Report for Forest Management.

Regional Summary

Northwest:

- Defoliation was only mapped in Skeewauke District, in the central portion of the District, defoliation was recorded in the same general area as in 2013, although at almost 75% less total area.
- As the area of defoliation was smaller and had fewer scattered pockets, a possible collapse of the infestation could be imminent.
- The main area of defoliation occurred north of Pickle Lake, primarily along Hwy 80A, from Spruce Lake to Oulika Lake.
- Several smaller pockets were identified near Bug Lake, Minko Lakes, and Wapamak (Lake).



Jack pine budworm larvae feeding

Outlook (where applicable)

Trends (where applicable)

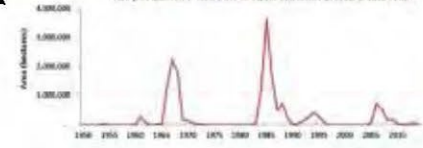
Outlook

- Most catches were up in Sudbury and South Simcoe Districts, Northeast Region, as well as Pembroke District, Southern Region, signifying possible banking of populations.
- Jack pine male flowers are critical for jack pine budworm survival in the early stages of an outbreak. Flower surveys in NE Region indicated 55% of trees (n=100) had moderate to high levels of male flowers. In NW Region, 40% of trees (n=170) surveyed had light to no flowers.



Trends

Jack pine budworm: Moderate to severe defoliation in Ontario 1950 - 2014



Area Summary

Total area within which moderate-to-severe defoliation was caused by Jack pine budworm in 2010 - 2014 by MNRF District (hectares)

Region / District	2010	2011	2012	2013	2014
Northwest					
Sudbury	12				
Pembroke	1,613				
Grand Central	3,861	4,928	13,950	66,272	12,090
Sudbury	1,800	6,904	17,895	88,370	22,000
Northeast					
Chapais	23				
North Bay	5				
Sudbury	14,687	1,799	4,708		
Timmins	663	1,648			
Sudbury	15,250	2,841	4,558		
Southern					
Algonquin	800	493			
Perry Sound	15,912	17,517	94,707		
Pembroke	136	32			
Grand Central	21,289	18,312	94,700		
Provincial total	30,000	27,770	113,116	91,670	11,090

Pest or damage image

Area Summary (where applicable)

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.

Armillaria Root Rot

Pest Information

Common Name:	Armillaria root rot
Latin Name:	<i>Armillaria</i> spp.
Pest Origins:	Native to North America
Pest Type:	Root disease
Host Species:	All species
Infestation Area:	5 ha (2014)

Provincial 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 trees.

Regional Summary

Northwest:

- Found in northern portion of Fort Frances and into Kenora district.
- Tree mortality was observed on single trees within jack pine health plots.

Southern:

- In Parry Sound District, Armillaria root rot was found in a small mature red pine stand in the town of Parry Sound, with five hectares of recently dead and dying red pine aerially mapped.
- The red pine were growing on a poor, rocky site, with drought-like conditions observed in 2012, which may have predisposed these trees to this opportunistic disease.
- Secondary pests like white spotted sawyer beetle and pine engraver were also present in this stand.



Armillaria root rot on jack pine in Northwest Region

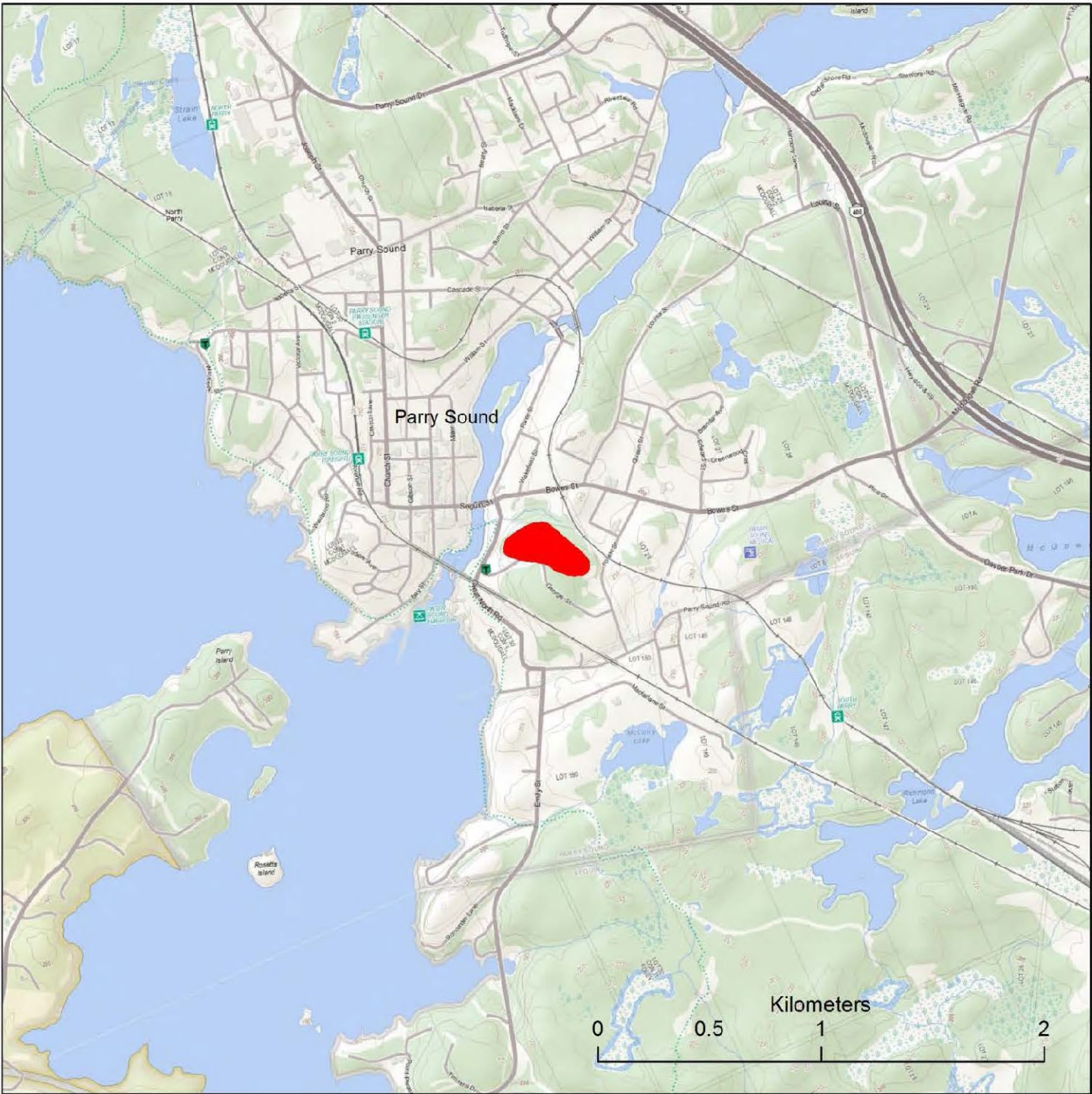


Armillaria root rot 2014

Map 1 – Southern Region

Areas-within-which Armillaria root rot caused damage.

 Area of Moderate-to-Severe Damage



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: Hardwood species including maple, poplar, willow, and birch trees
Infestation Area: 2,000 ha Regulated Area (2014)

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.

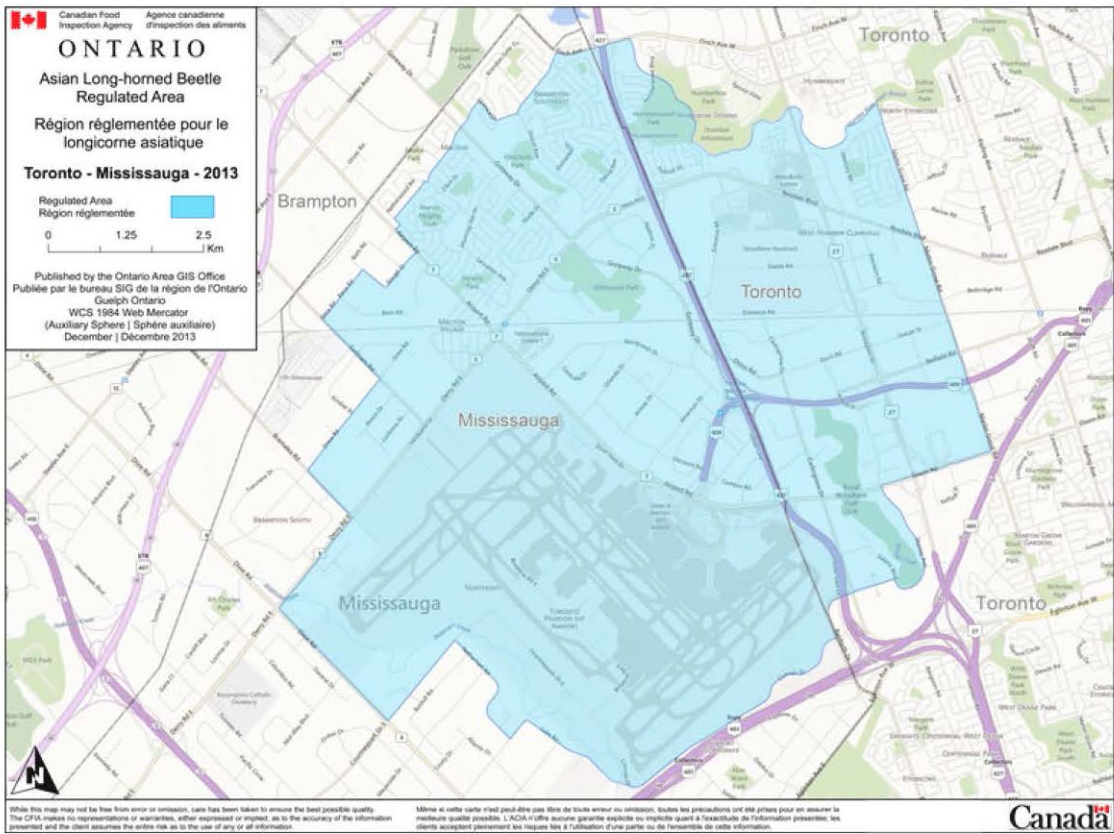
Regional Summary

- In 2013, the Toronto-Vaughan infestation was declared eradicated after several rounds of host tree removals and five consecutive years of survey results yielding no detection of ALHB.
- On September 20, 2013 CFIA confirmed the presence of Asian long-horned beetle in an industrial area near Pearson International Airport, Mississauga, Aurora District.
- The CFIA established a regulated area in Mississauga and Toronto to prevent the spread of the insect (see map on page 26). Restrictions on the movement of nursery stock, trees, logs, lumber, wood, wood chips, and bark chips from certain deciduous trees identified as hosts of ALHB are now in place.
- There were approximately 25 trees identified as infested and subsequently 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 within the regulated area. Several other infested trees were identified and destroyed during this process.
- Surveys to inspect for additional insect presence are ongoing.



Adult Asian long horned beetle

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

Aspen Twoleaf Tier

Pest Information

Common Name:	Aspen twoleaf tier
Latin Name:	<i>Enargia decolor</i> Walker
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Trembling aspen and eastern cottonwood
Infestation Area:	749 ha (2014)

Provincial Key Facts

- Periodic outbreaks have occurred frequently since the 1950s.
- Defoliation can be severe and wide-spread during outbreaks.
- Impacts on tree health are usually minimal, unless there are other stressors present.
- The last large-scale outbreak occurred in the mid-1990s, when 3,008,502 ha of moderate-to-severe defoliation was recorded.
- 2014 marked the fifth year of the current outbreak. However, a substantial decrease was recorded in 2014, with only 749 ha of moderate-to-severe defoliation.

Regional Summary

Northeast:

- Over 80% of the moderate-to-severe defoliation occurred in Hearst and Wawa districts, with the remainder occurring in Chapleau and Timmins districts.
- Wawa District had 472 ha of moderate-to-severe defoliation in small scattered pockets. The majority of this was observed near Fox Lake in Pukaskwa National Park and west of the community of Manitouwadge.
- In Hearst District, several small pockets of moderate-to-severe defoliation were aerially mapped. Defoliation was observed in four small areas west of Oba and in scattered pockets north of Kapuskasing Lake.
- In Timmins District, 67 ha of moderate-to-severe defoliation were recorded near the Groundhog River and near Peboishewi Lake.



Aspen twoleaf tier larva

Outlook

- Population outbreaks of this insect are normally short-lived due to a number of natural predators.
- A declining area of defoliation for the last two years indicates a collapse may be imminent.



Aspen twoleaf tier damage

Area Summary

Total area-within-which aspen twoleaf tier caused moderate-to-severe defoliation in 2010 – 2014 by MNRF District (area in hectares).

Region / District	2010	2011	2012	2013	2014
Northeast					
Chapleau	-	650	139,059	3,305	58
Hearst	-	-	-	-	151
Kirkland Lake	-	-	990	-	-
North Bay	-	-	290	-	-
Sault Ste. Marie	-	832	33,791	2,017	-
Sudbury	-	-	138	1,506	-
Timmins	92	-	-	-	67
Wawa	-	-	387 15,	623	472
Provincial total	92	1,482	174,655	22,451	749

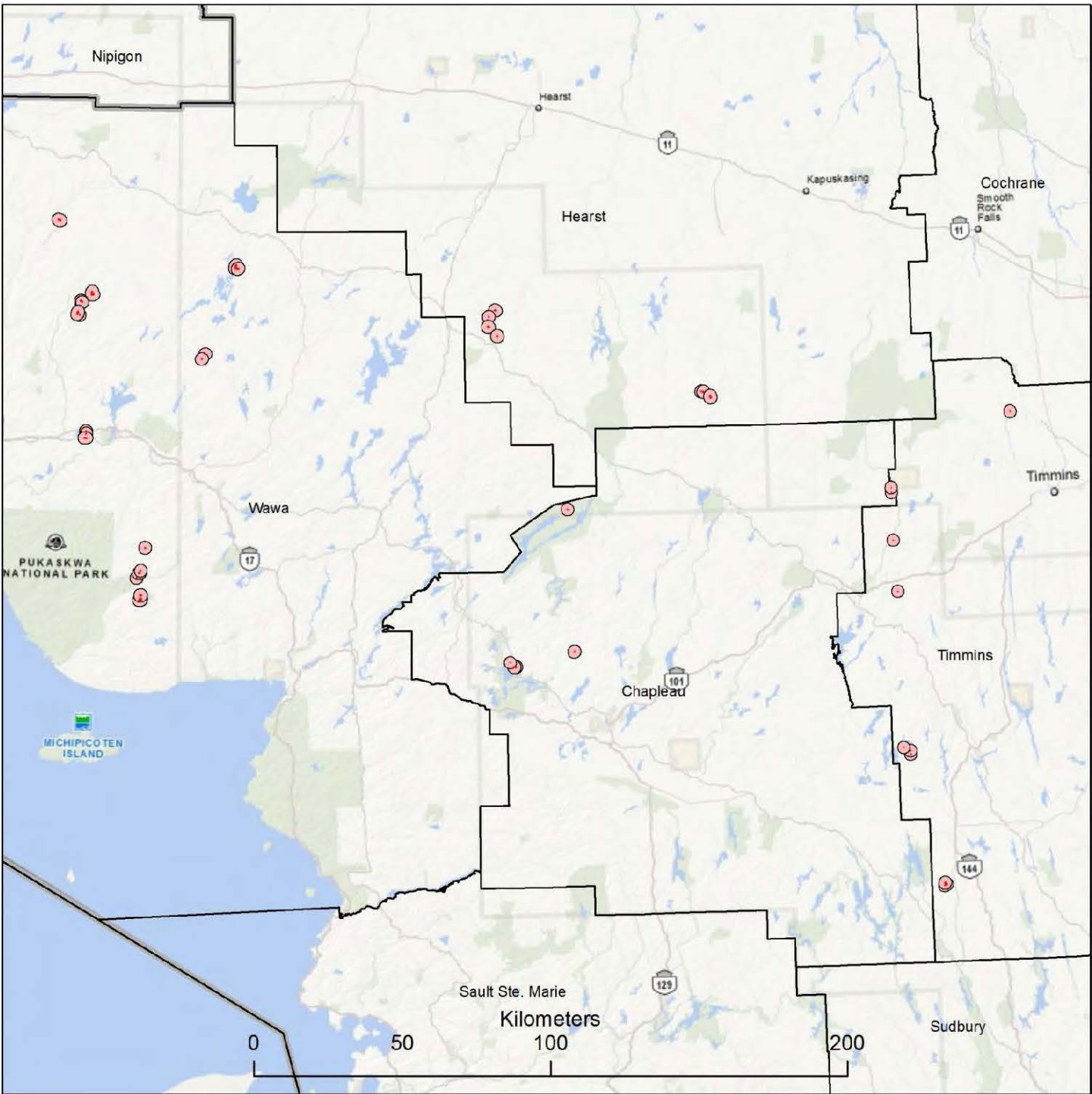


Aspen Twoleaf Tier 2014

Map 1 – Northeast Region

Areas-within-which aspen twoleaf tier caused moderate-to-severe defoliation.

 Area of Moderate-to-Severe Defoliation



Beech Bark Disease

Pest Information

Common Name:	Beech bark disease
Latin Name:	Fungus – <i>Neonectria faginata</i> (Lohman et al) Castl. Insect – <i>Cryptococcus fagisuga</i> 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 as far north as McIntock and Ridout townships west to Killbear Provincial Park, Parry Sound District and Fitzgerald Township, Algonquin Park 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:

- The disease was detected for the first time on St Joseph Island, Sault Ste. Marie District. Beech scale infestations had been recorded here on an annual basis since 2012, with a reduction in population recorded in 2014.
- In 2014, over-mature American beech were found exhibiting the heavy fruiting and elliptical cankers characteristic of the disease.



Beech bark disease fruiting bodies

Regional Summary

Southern:

- In Kemptville District, beech bark disease was found and collected at Charleston Lake Provincial Park, with moderate damage observed.
- In Algonquin District, infected scattered individual trees were observed at Lost Coin Lake in Algonquin Provincial Park, with moderate levels of infection.
- In Bancroft District, moderate-to-severe infections have been observed from Silent Lake Provincial Park to scattered locations in north Hastings and Haliburton County.
- In Parry Sound District, new moderate-to-severe levels of the disease were recorded on Wilson Island, in Lake Muskoka. Infection was noted on 50% of the American beech trees surveyed.
- In Guelph District, moderate-to-severe infection was identified in a woodlot north of Conestogo Lake and south of Moorefield in Wellington 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 been previously infested by beech scale. Therefore, several 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. Research indicates that approximately 1-4% of American beech may be resistant to the disease. Identifying, monitoring, and retaining these resistant trees will aid efforts to conserve beech on the landscape.



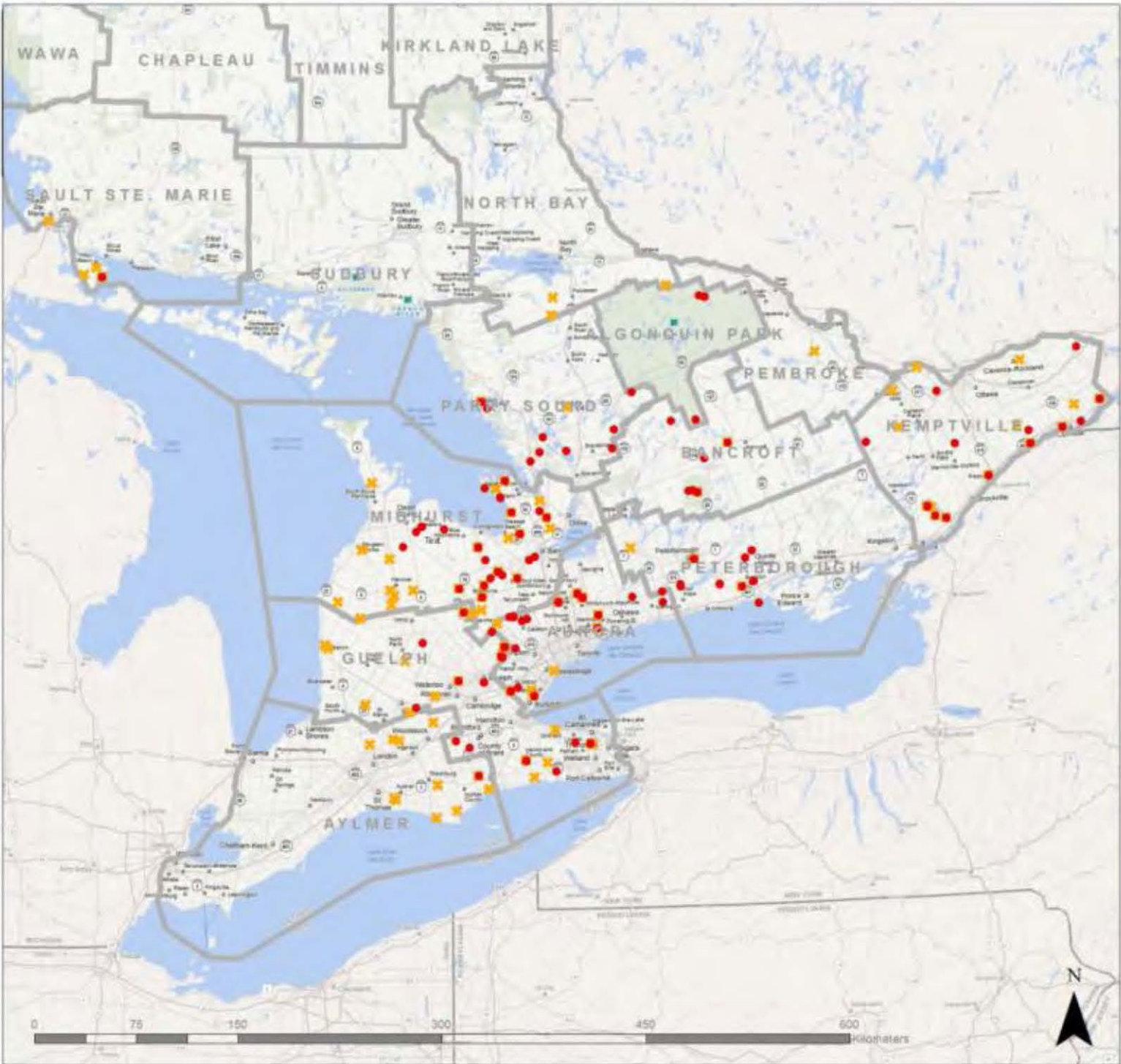
Infected tree shows bark cracks after fruiting bodies disperse



Beech Bark Disease Known Sites to Date

Map 1 – Provincial Overview
Beech bark disease and beech scale
sample locations.

- Beech Bark Disease
- ✱ Beech Scale Insect



Blowdown

Damage Information

Damage Name:	Blowdown
Damage Type:	Abiotic Damage – Weather Event
Damage Area:	3,415 ha (2014)

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 damage was recorded in 2014 (3,415 ha) when compared to that mapped in 2013 (5,276 ha) and in 2012 (5,326 ha).
- The majority of the damage was mapped in Northwest Region, with a few hundred hectares of damage reported in Northeast and Southern regions.

Regional Summary

Northwest:

- The largest area of damage (1,867 ha) was recorded in Thunder Bay District. Scattered pockets were recorded in the northwest portion of the District, and near Lake Nipigon and Dog Lake, north of Thunder Bay. West of Thunder Bay, three small areas near Shebandowan Lake were also observed.
- In Fort Frances District, 792 ha of blowdown were aerially mapped. The majority occurred in small pockets scattered through the central portion of the District, near Entwine, Eltrut, Heron and Mud lakes. Small pockets were located in Quetico Provincial Park, near Keats and Shelley lakes, and in the northwest end of the District, near Weld Lake.
- In Dryden District, 292 ha of blowdown were aerially mapped. Damage occurred between Redhead and Noname lakes, in the Lookout and Whisperice lakes area, and at the south end of Brightsand Lake Provincial Park.
- In Kenora District, 106 ha of blowdown were observed in the southern portion of the District. Three small areas of blowdown were located, just north of Arrow Lake, on Aulneau Peninsula. Six pockets of blowdown were recorded on Bigsby Island from the center to the south portion.



Blowdown in Northeast Region, Timmins District

Regional Summary

- In Nipigon District, 46 ha of blowdown were mapped in small pockets north of Lake Nipigon, south of Pikitigushi River, on a small island in Eabamet Lake, near Fort Hope, and northeast of Geraldton.
- In Sioux Lookout District, only nine hectares of blowdown were mapped. This blowdown was part of a bigger area in the northwest corner of Thunder Bay District.

Northeast:

- The majority of blowdown in Northeast Region was aerially mapped in Sault Ste. Marie District, with 152 ha of damage scattered across the District. Black spruce were completely flattened in three small, low-lying areas north of Bliss Lake at Algoma Headwaters. In the central part of the District, several pockets of blowdown, east of Hwy 129, resulted in trembling aspen and black spruce being flattened in a south westerly direction. In the northeast part of the District, a small area of aspen trees was flattened between Marty and Petrie Lakes. On St Joseph Island, a storm with gusts up to 100 km/hr snapped the tops of several aspen trees in the Milford Haven area.
- In Sudbury District, a small area of blowdown (7 ha) was mapped north of the town of Massey.
- In Cochrane District, three small pockets of blowdown were aerially mapped near the junction of Hwy 11 and Hwy 655.
- In Hearst District, two tiny pockets of blowdown were mapped; one near the Mattagami and Kapuskasing rivers and the other between Groundhog and Wakusimi rivers.

Southern:

- In Algonquin District, blowdown damage was mapped from the northern outlet of Madawaska Lake, ending near Cauliflower Creek.
- In Pembroke District, two small pockets of blowdown were recorded; one southwest of Pembroke near Crooked Kelly Lakes and the other east of Barry’s Bay near Wadsworth Lake.
- In Bancroft District, blowdown damage was observed northeast of Bark Lake.

Area Summary

Region / District	2010	2011	2012	2013	2014
Northwest					
Dryden		1,078	538	1,582	292
Fort Frances	413	1,956	-	1,379	792
Kenora		-	1,651		106
Nipigon	47	89	-	220	46
Red Lake	284	1,124	213	189	-
Sioux Lookout	-	451	622	825	9
Thunder Bay	-	363	-	42	1,867
Subtotal:	744	5,061	3,024	4,237	3,111
Northeast					
Chapleau	-	-	-	27	-
Cochrane	-	-	-	-	7
Hearst	-	1,996	-	-	1
North Bay	-	14	363	-	-
Sault Ste. Marie	-	32	-	125	152
Sudbury	-	11	47	-	7
Timmins	-	60	-	-	-
Subtotal:	-	2,113	410	152	168
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:	-	1,908	1,892	889	136
Provincial total	744	9,082	5,326	5,278	3,415

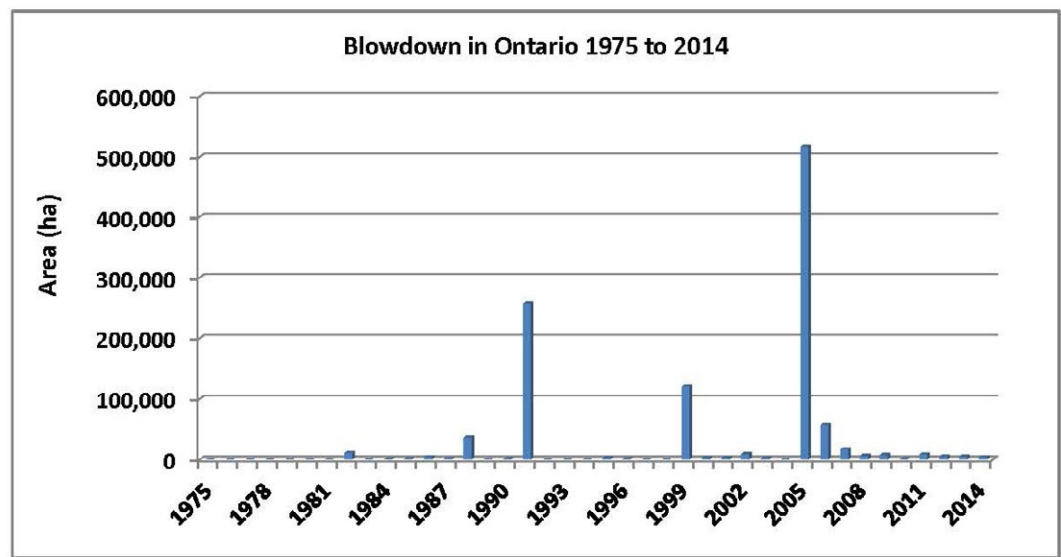
Regional Summary

- Several tornados occurred in Southern Region resulting in severe damage to scattered, open grown trees and woodlot edges. Six tornadoes were reported from June 17 to July 30, occurring west and south of the city of Barrie, northwest of the town of Orangeville, northwest of Huntsville on Bear Lake, and along the northern boundary of Pinery Provincial Park to Grand Bend. Aerial surveys of these tornados were performed; however, the majority of damage occurred outside forested areas.

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.

Trends



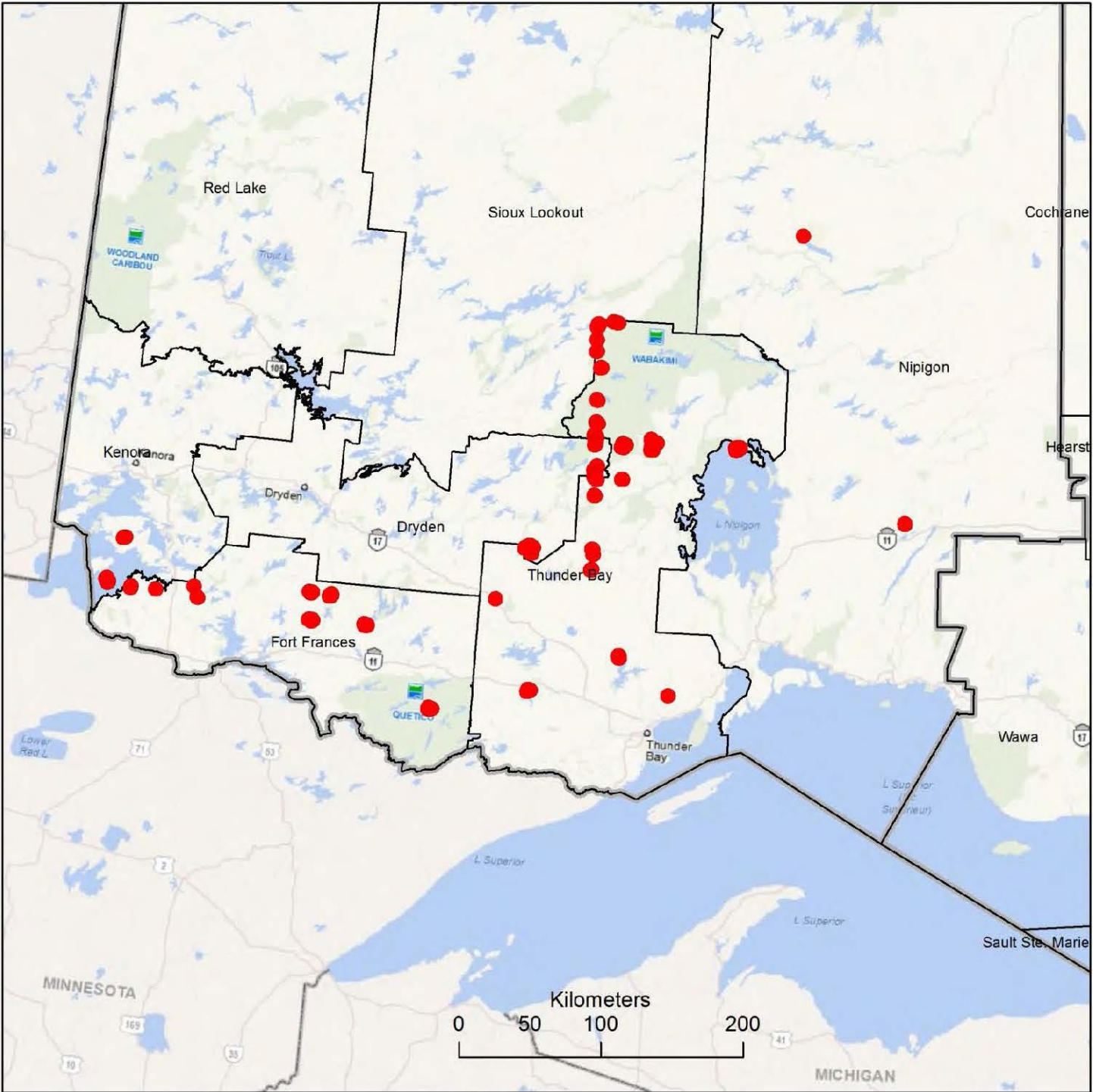
Blowdown



Blowdown Damage 2014

Map 1 – Northwest Region
Areas-within-which Blowdown caused forest damage.

 Area of Blowdown Damage

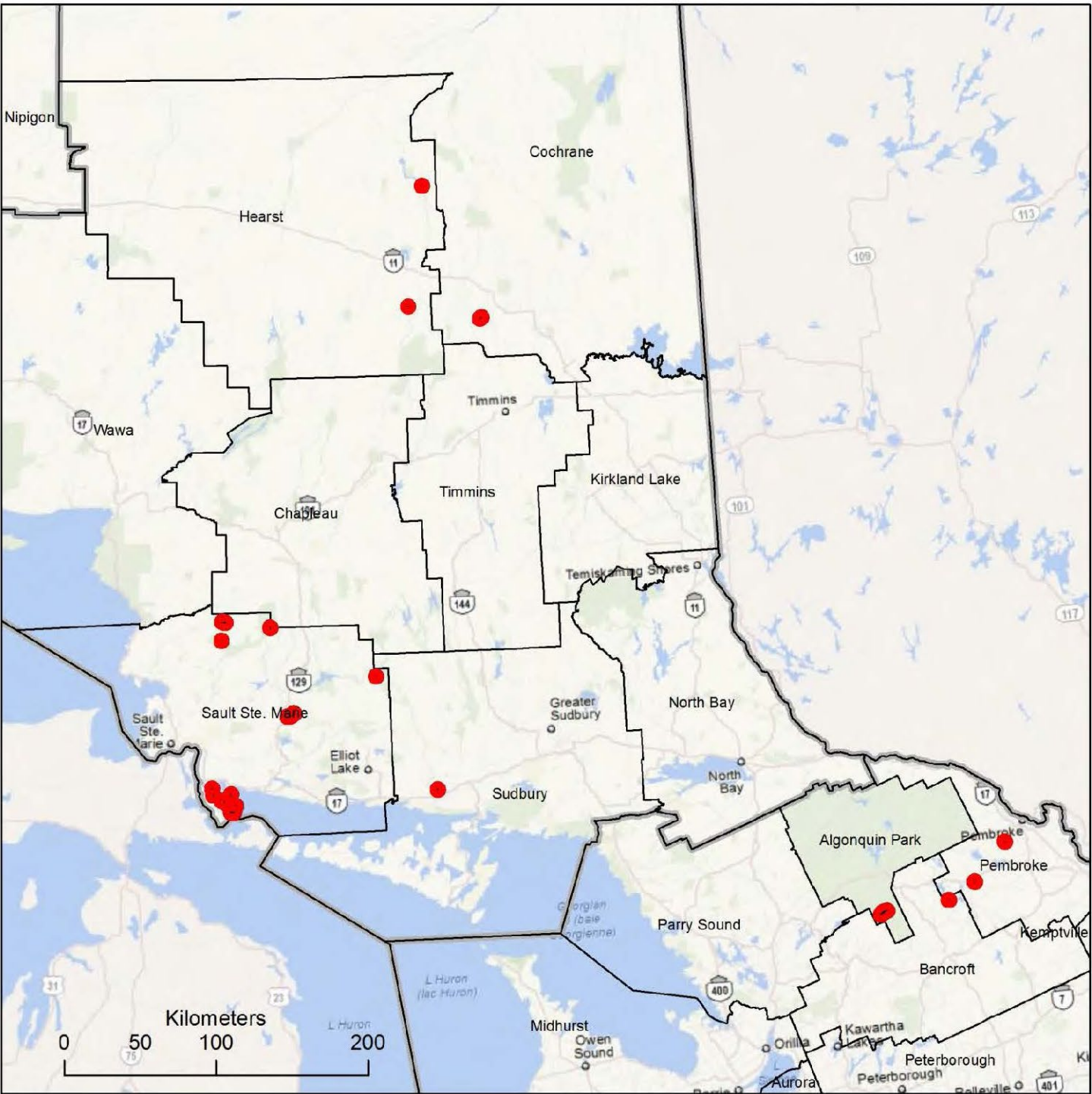




Blowdown Damage 2014

Map 2 – Northeast and Southern 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:	<i>Mycosphaerella dearnessii</i> M.E. Barr
Pest Origins:	Native to North America
Pest Type:	Needle Blight
Host Species:	Pine spp., Scots pine most affected
Infestation Area:	327 ha (2014)

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.

Regional Summary

Northeast:

- In Northeast Region, brown spot needle blight caused 327 ha of damage, just over double from that in 2013. This damage was aerially mapped.
- In Sault Ste. Marie District, the wet cool weather created ideal conditions for brown spot needle blight to infect Scots pine in several locations, totalling 176 ha of damage. Infection was observed in areas on the south portion of St Joseph Island, west of Iron Bridge, in and around Sault Ste. Marie, and along the Goulais River between Hwy 552 and Pine Shores Rd.
- In Sudbury District, brown spot needle blight caused premature needle drop of semi-mature Scots pine in a planation on Hwy 540 east of Meldrum Bay, Manitoulin Island (150 ha).

Southern:

- In Peterborough District, 12 semi-mature red pine trees in Emily Provincial Park were moderately infected (26-75%), while two others were severely (80%) infected. This area was not aerially mapped.



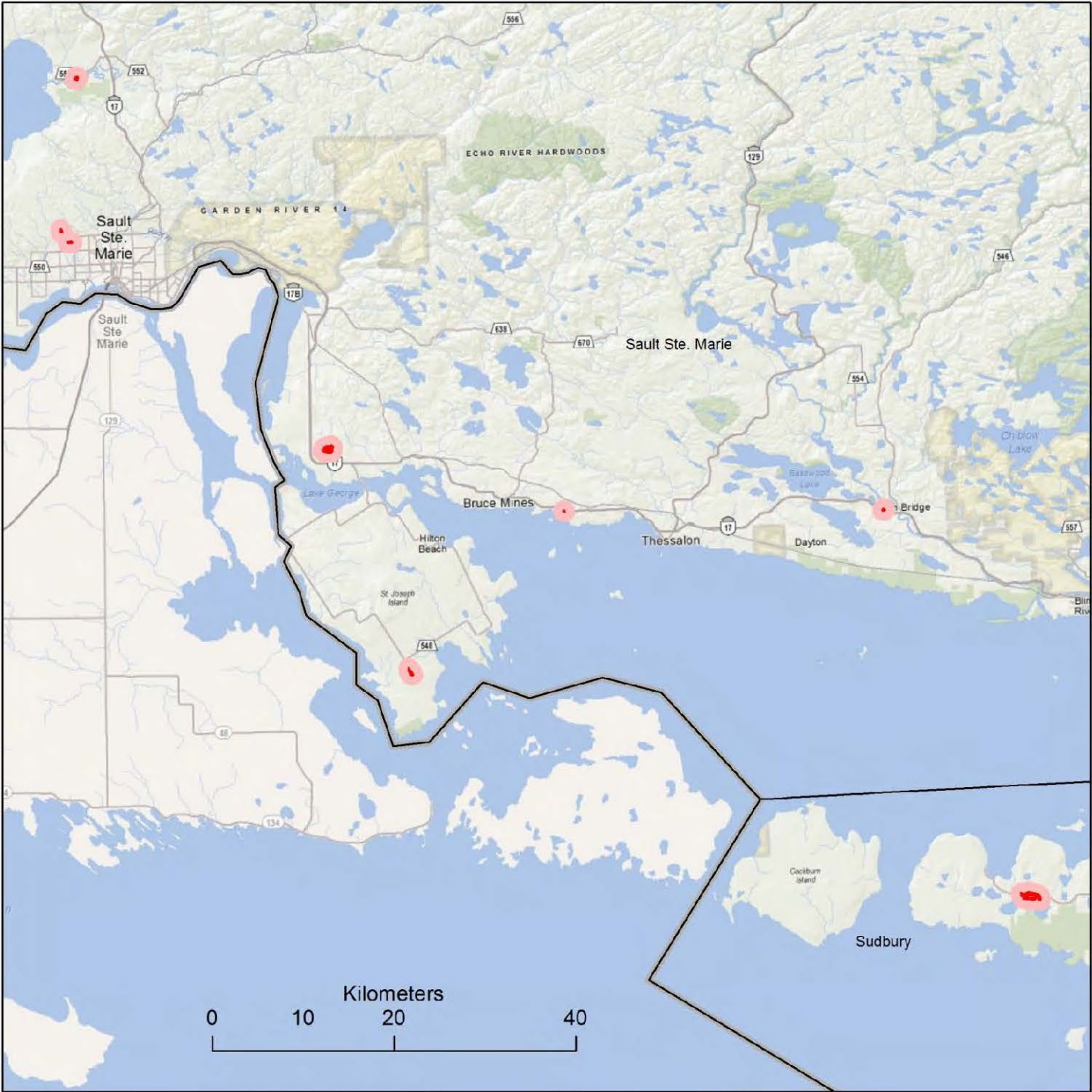
Brown spot needle blight on Scots pine in Southern Region



**Brown Spot Needle
Blight 2014**

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 species
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Eastern white cedar
Infestation Area:	10,780 ha (2014)

Provincial Key Facts

- Moderate-to-severe damage increased significantly from 2013 (6,209 ha).
- The current infestation began in 2010 in Peterborough District.
- 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 insects that mine cedar foliage, including:
 - *Argyresthia aureoargentella* Brower,
 - *Argyresthia canadensis* Freeman,
 - *Argyresthia thuiella* (Pack), and
 - *Coleotechnites thujaella* (Kft.).

Regional Summary

Southern:

- In Midhurst District, defoliation to cedars occurred from Bruce County near Port Elgin to Lions Head; throughout Grey County from Owen Sound to Flesherton and east to Simcoe, with a larger pocket from Barrie to Orillia; and through historically affected Hockley Valley.
- In Aurora District, defoliation occurred sporadically north of Uxbridge to Hwy 48 and in small pockets through York Region, from Stouffville to Lake Simcoe.



Eastern white cedar with leafmining and exit hole

Regional Summary

- In Peterborough and Bancroft Districts, damage was recorded east of Balsam Lake and north of Sturgeon Lake, south of the community of Omemee, and in the southwest part of Queen Elizabeth II Wildlands Provincial Park. Pockets of defoliation were mapped west of Rice Lake, surrounding the town of Millbrook, and along Hwy 7 east of Havelock.
- In Pembroke District, scattered pockets of defoliation occurred from the Renfrew area to Constance Lake, moving northwest up to Bark Lake.
- Kemptville District was only affected in one area of the city of Ottawa, south of Jockvale.
- Aylmer District had a pocket of defoliation south east of Ingersol, with hedgerows affected from Clear Creek to Port Burwell and roadside cedars affected along Hwy 21 between Ipperwash and Grand Bend.
- Through Guelph District, many pockets of defoliation spread from Goderich, Wingham, and Harrison to Luther March, and from Kitchener-Waterloo Cambridge area to Brantford.

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 2010 - 2014 by MNRF District.

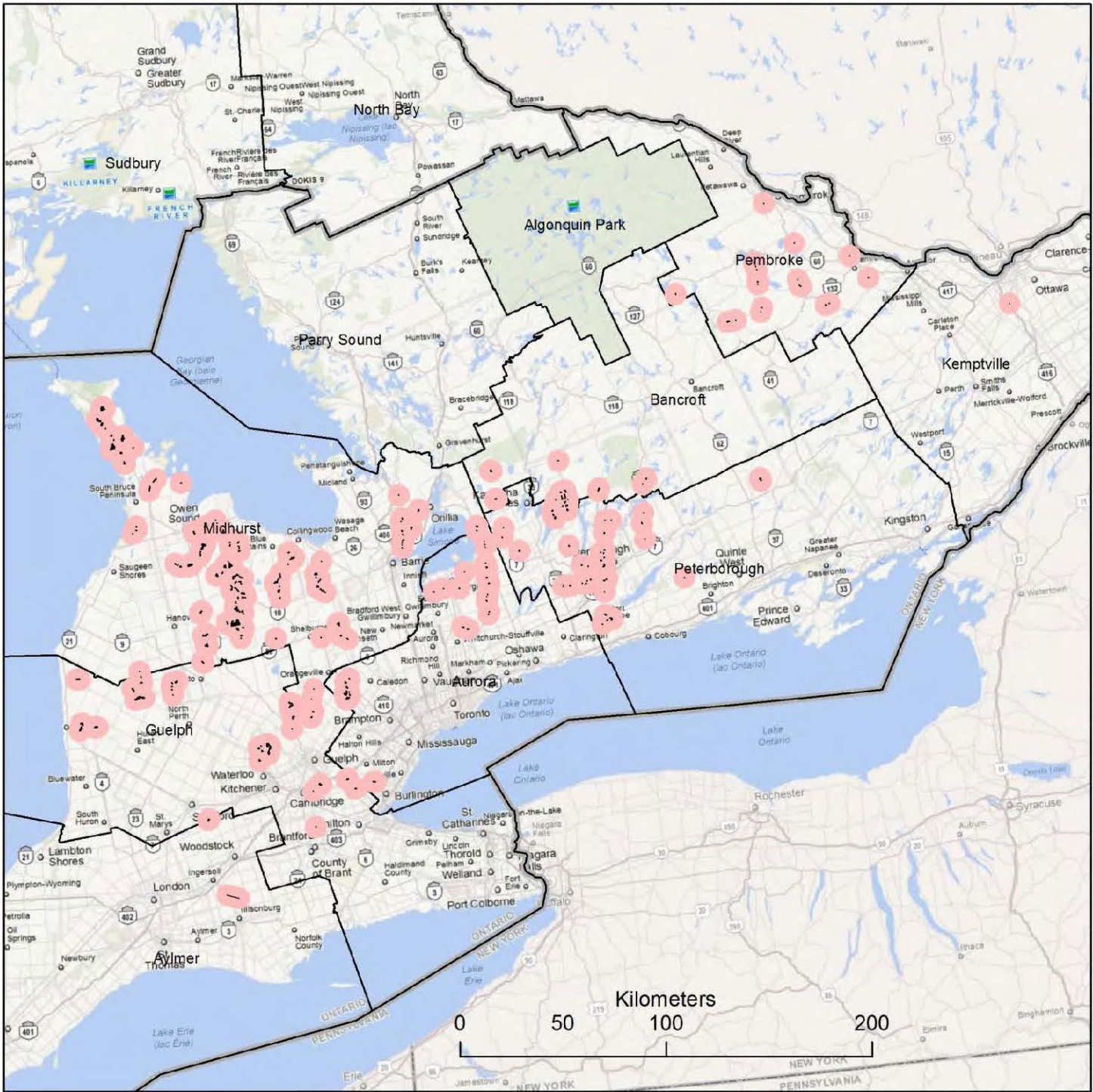
Region / District	2010	2011	2012	2013	2014
Southern					
Algonquin	157	-	-	-	-
Aurora	-	81 14,	051	695	631
Aylmer	-	-	-	386	36
Bancroft	-	261	713	31	231
Guelph	-	4	1,020	992	2,199
Kemptville	632	-	32	-	2
Midhurst	-	622	10,307	3,628	6,567
Pembroke	3,984	80	197	-	227
Peterborough	-	1,774	4,165	477	886
Provincial Total:	4,773	2,822	30,486	6,209	10,780



Cedar Leafminer Complex 2014

Map 1 – Southern Region
Areas-within-which cedar leafminer complex caused moderate-to-severe defoliation.

 Area of Moderate-to-Severe Defoliation



Eastern Larch Beetle

Pest Information

Common Name:	Eastern larch beetle
Latin Name:	<i>Dendroctonus simplex</i> LeConte
Pest Origins:	Native to North America
Pest Type:	Borer
Host Species:	Larch (Tamarack)
Infestation Area:	759 ha (2014)

Provincial Key Facts

- This beetle is found on recently dead or dying trees.
- Larger populations are found in the vicinity of other forest disturbances, such as drought or multiple years of insect defoliation.
- Similar infestation has been observed in northern Minnesota.
- Total area of infestation in 2014 (759 ha) was almost equal to that found in 2013.

Regional Summary

Northwest:

- In Fort Frances District, eastern larch beetle was aerially mapped in scattered pockets across the west end of the District for the fourth consecutive year.
- The most severely affected areas were west of the communities of Fort Frances, Emo, and Devlin, and north of Rainy River.
- High mortality of tamarack was observed in areas with high beetle populations.



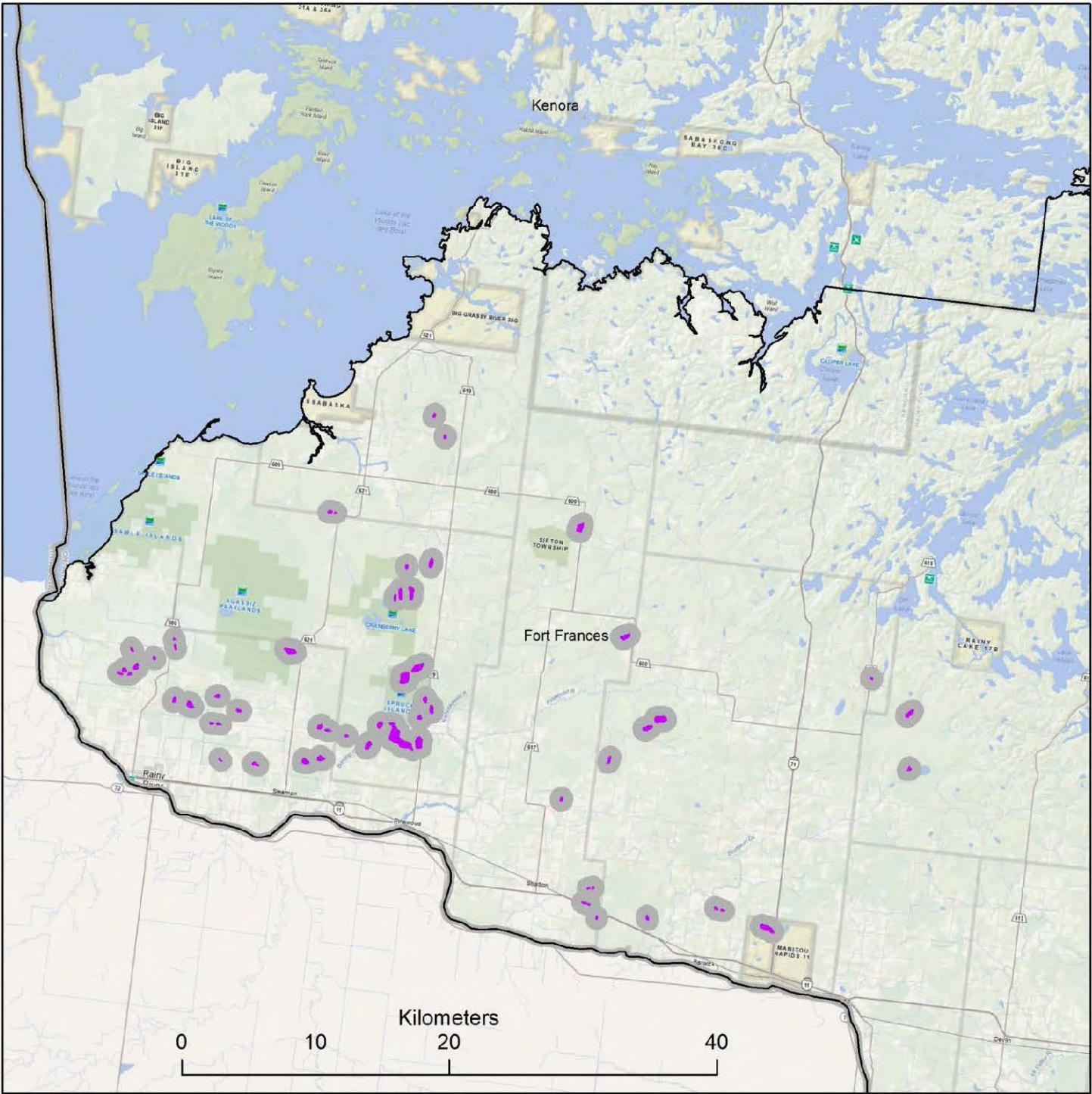
Eastern larch beetle damage in Fort Frances District



Eastern Larch Beetle 2014

Map 1 – Northwest Region
Areas-within-which eastern larch
beetle caused damage.

 Area of Damage



Emerald Ash Borer

Pest Information

Common Name:	Emerald ash borer
Latin Name:	<i>Agrilus planipennis</i> Fairmaire
Pest Origins:	Invasive – Native to Asia
Pest Type:	Wood Borer
Host Species:	Ash spp.
Infestation Area:	43,338 ha (2014)

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 the city of Sault Ste. Marie; in the City of Ottawa; and in Leeds, Grenville, Prescott, and Russell in Kemptonville 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 47).
- 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 areas of high risk, such as parks and camping sites in Northwest and Northeast regions.
- Green prism traps baited with pheromone lure 3Z-lactone and Z3 hexenol were deployed in early June and collected in August at 18 locations. All results were negative for EAB.



Thinning crown of ash tree due to emerald ash borer

Regional Summary

Southern:

- 43,338 ha of new decline and mortality due to EAB were mapped in Southern Region.
- In Aylmer District, 15,076 ha were mapped as the insect advanced east through Woodstock and Tillsonburg to include most of Oxford County, Middlesex County, and Elgin County, and merged with previously infested forests in the Niagara Region.
- In Guelph District, 23,347 ha of decline and mortality were mapped west into the Regional Municipality of Waterloo and from Stratford to Perth County. The insect had moved through the west side of Huron County, including Goderich to Bruce County. Moderate-to-severe decline was detected for the first time north of the town of St. Mary’s, Perth County.
- In Midhurst District, infested trees were identified west of Owen Sound in Georgian Bluffs, Grey County; in residential areas in south Bruce County; and in a Tobermory golf course in north Bruce County. Simcoe County discovered EAB in Oro-Medonte, Essa, Adjala-Tosorontio, New Tecumseth, Bradford West Gwillimbury, Tay, Ramara, Midland, and Barrie.
- In Aurora District, the insect continued to spread north of urban areas, resulting in 166 ha of decline and mortality to wooded areas. Infested roadside trees were located throughout York and Durham Regions. Scattered satellite infestations were found in Halton Region from Milton
- In Peterborough District, a 93 ha infestation was discovered west of Brighton and in forested areas within and near Port Hope. Infestations reported in 2013 at Balsam and Rice Lakes extended into surrounding woodlands. The city of Peterborough had no confirmed infested trees, although several beetles were captured on green prism traps in south end of the city.
- Aerial surveys in Kemptville District confirmed 4,548 ha of decline and mortality in the Ottawa area, with expansion northwest of Hwy 417, west to Kanata, south to Kemptville, and east to Maxville. The Mallorytown infestation reported in 2013 has spread along Hwy 401.

Northeast:

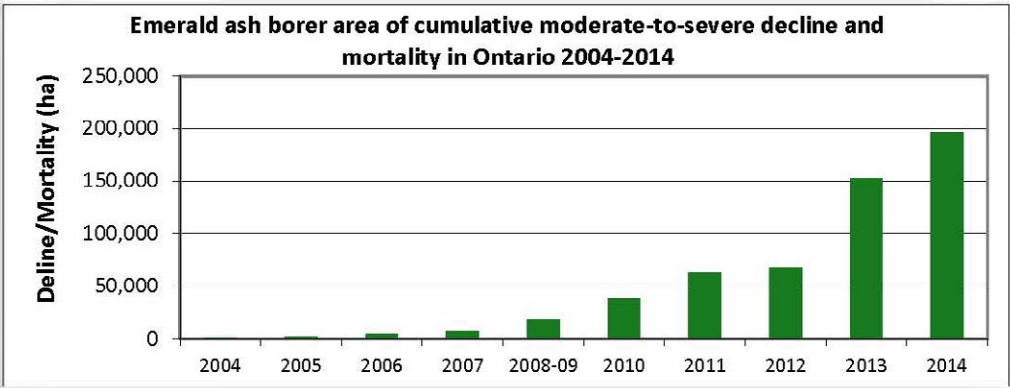
- In Sault Ste. Marie District, 108 ha of decline and mortality due to EAB were mapped within the city of Sault Ste. Marie. A new pocket of infested trees was discovered on St Joseph Island, but was not aially mapped.

Area Summary

Total area-within-which emerald ash borer caused moderate-to-severe decline and mortality in 2010 - 2014 by MNRF district (area in hectares).

Region / District	2010	2011	2012	2013	2014
Northeast					
Sault Ste. Marie	-	-	-	-	108
Subtotal:	-	-	-	-	108
Southern					
Aurora	-	-	-	-	166
Aylmer	19,436	24,147	1,410	56,908	15,076
Guelph	-	177	2,812	27,963	23,347
Kemptville	-	628	328	192	4,548
Peterborough	-	-	-	5	93
Subtotal:	19,436	24,952	4,550	85,069	43,229
Provincial total	19,436	24,952	4,550	85,069	43,338

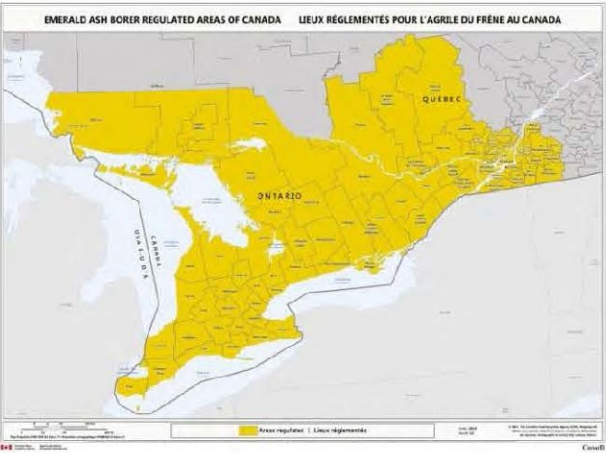
Trends



Outlook

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

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



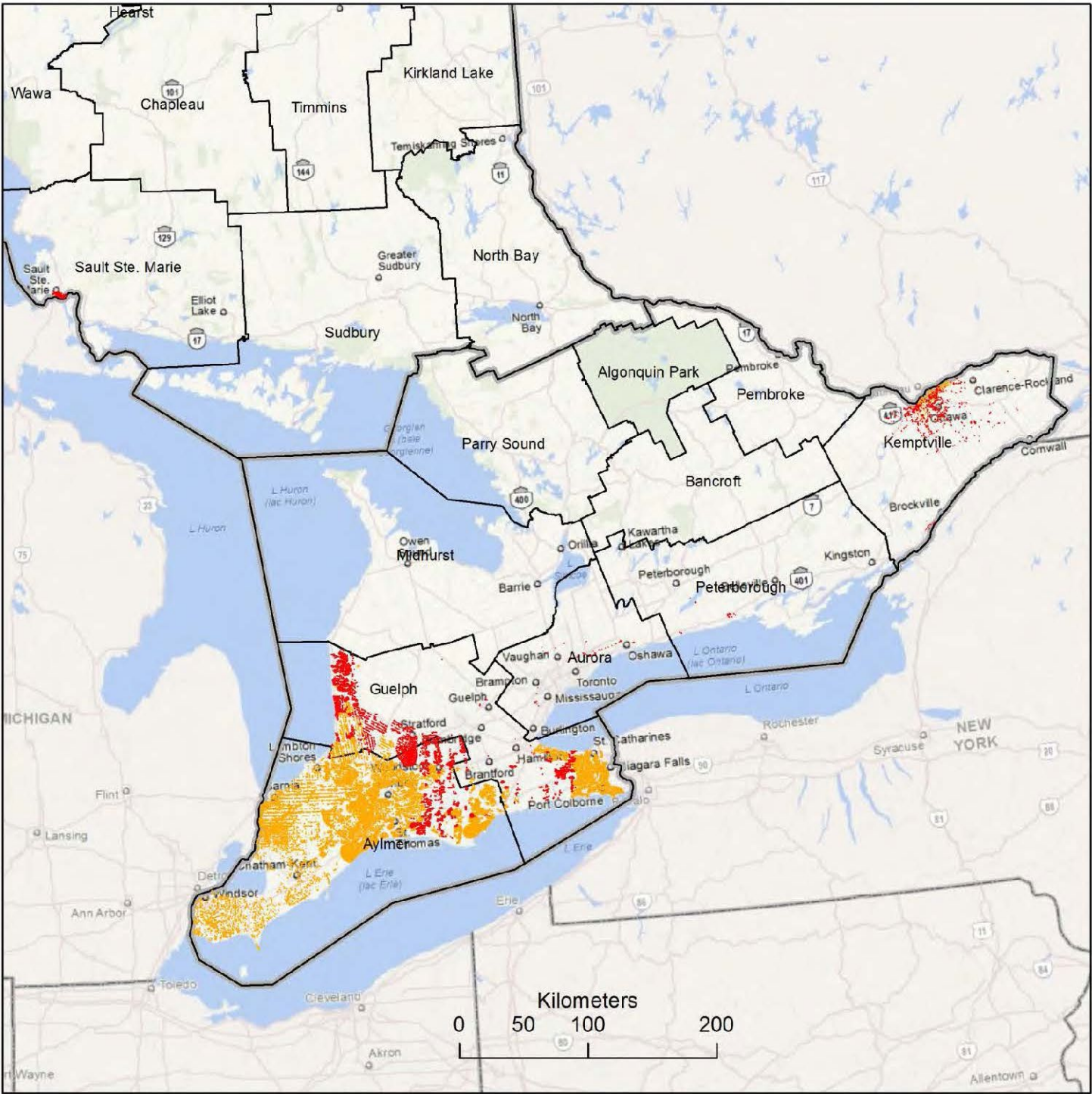
Emerald ash borer larvae under bark of ash tree



Emerald Ash Borer 2014

Map 1 – Southern Region
Overview
Areas-within-which emerald ash
borer caused moderate-to-severe
decline and mortality to ash species.

- Area of Moderate-to-Severe
Decline and Mortality
- Cumulative 2004-2013
Mortality

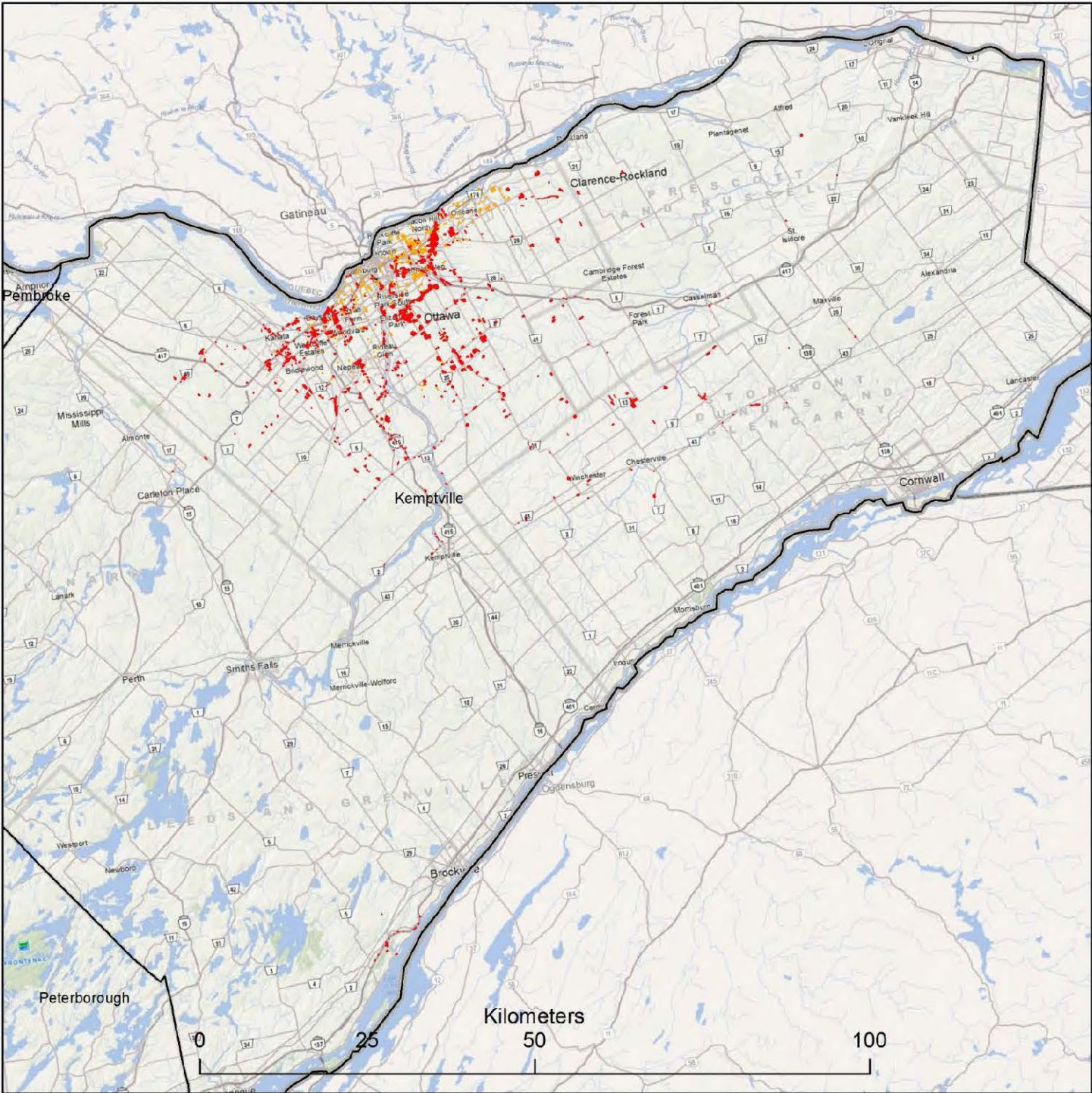




Emerald Ash Borer 2014

Map 2 – Southern Region
Areas-within-which emerald ash borer caused moderate-to-severe decline and mortality to ash species.

- Area of Moderate-to-Severe Decline and Mortality
- Cumulative 2004-2013 Mortality



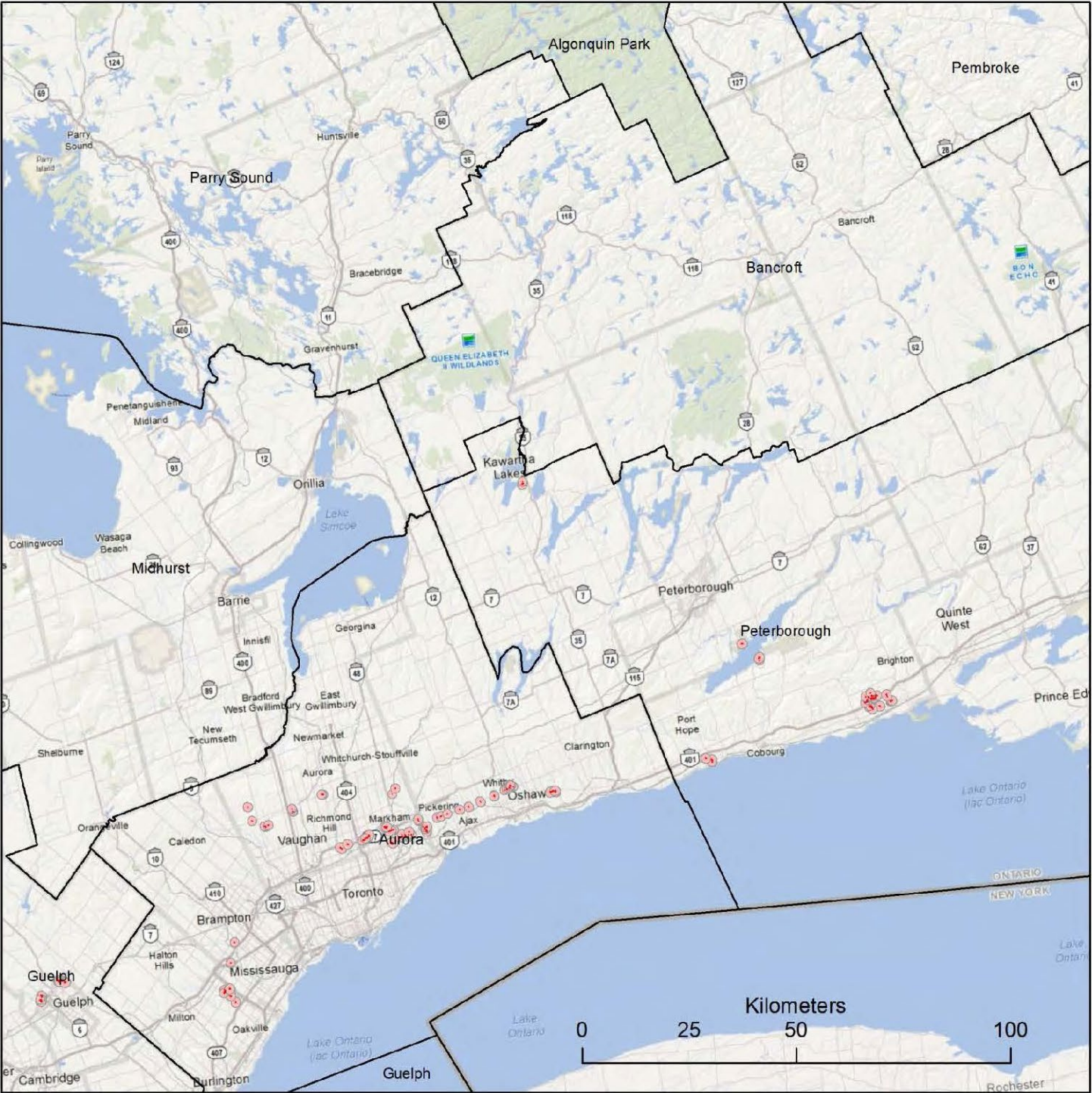


Emerald Ash Borer 2014

Map 3 – Southern Region

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

 Area of Moderate-to-Severe Decline and Mortality

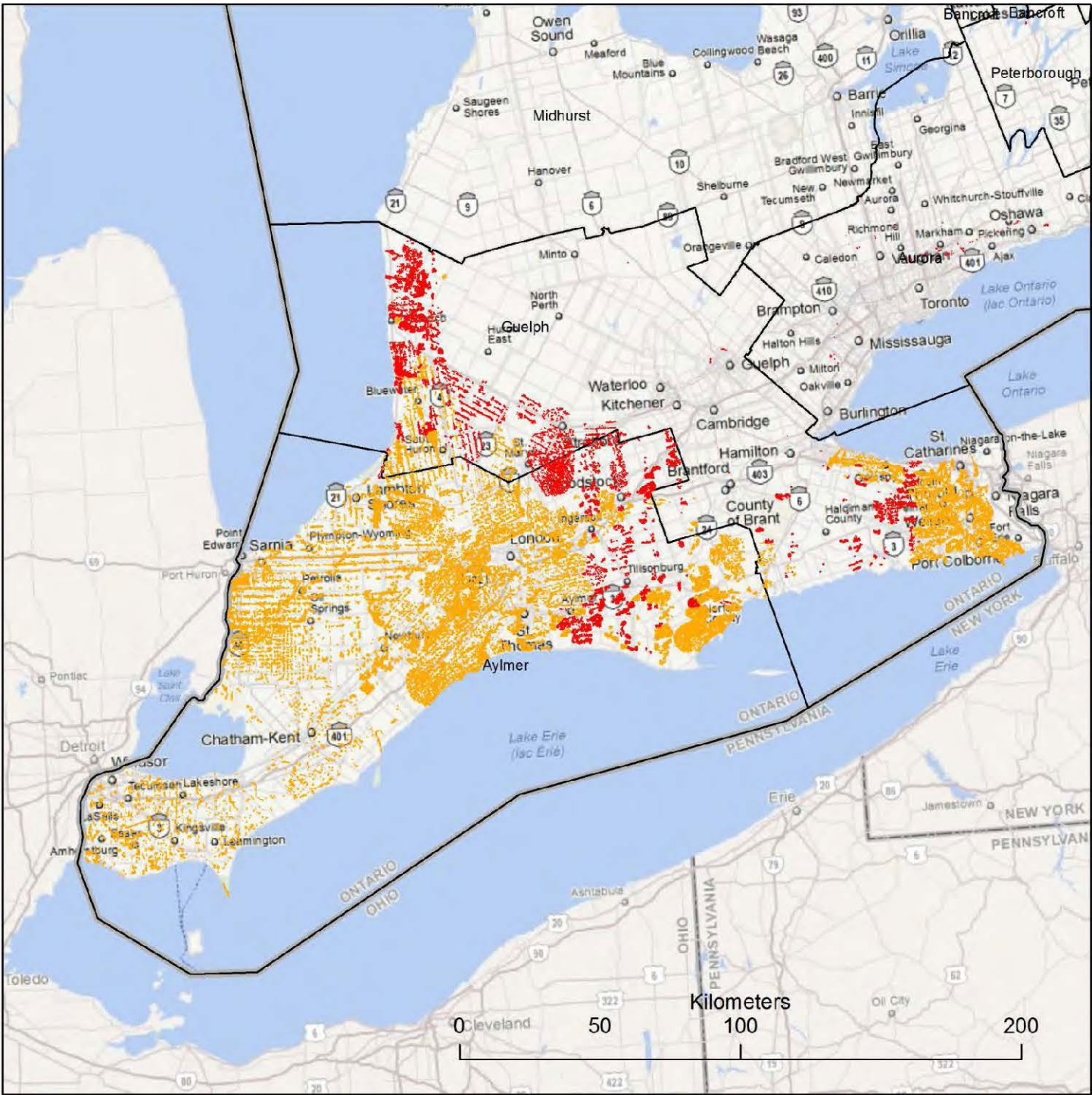




Emerald Ash Borer 2014

Map 4 – Southern Region
Areas-within-which emerald ash borer caused moderate-to-severe decline and mortality to ash species.

- Area of Moderate-to-Severe Decline and Mortality
- Cumulative 2004-2013 Mortality

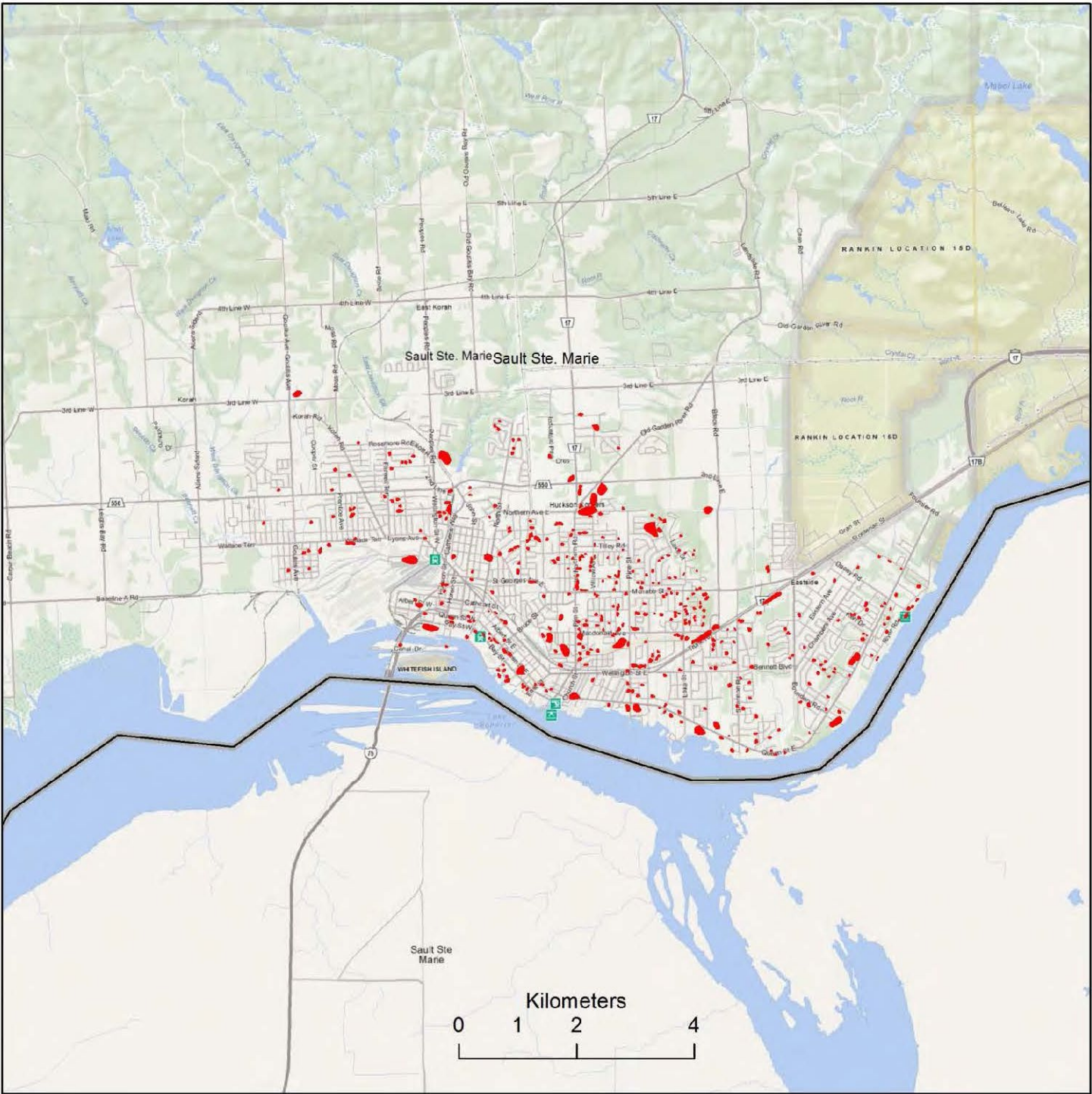




Emerald Ash Borer 2014

Map 5 – Northeast Region
Areas-within-which emerald ash borer caused moderate-to-severe decline and mortality to ash species.

 Area of Moderate-to-Severe Decline and Mortality



Forest Tent Caterpillar

Pest Information

Common Name:	Forest tent caterpillar
Latin Name:	<i>Malacosoma disstria</i> Hubner
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Hardwoods
Infestation Area:	468,866 ha (2014)

Provincial Key Facts

- Forest tent caterpillar outbreaks in Ontario occur every 10-12 years.
- In 2014, defoliation occurred in all regions, with considerable expansion in Northwest Region, new infestation in Northeast Region, and fluctuating levels in Southern Region.
- Forest tent caterpillar prefers sugar maple and oak in the southern part of the province and trembling aspen in northern areas.

Regional Summary

Northwest:

- This is the third consecutive year of infestations in Northwest Region. Defoliation more than doubled in size and was aerially mapped in all districts, except Fort Frances District.
- Largest increase occurred in Dryden District, with majority in north central and western sides.
- Sioux Lookout District had a substantial increase, with almost all defoliation occurring in the southern portion of the District, extending north to Lac Seul.
- Areas of moderate-to-severe defoliation in Kenora District almost doubled, with the majority observed on the east side. Expansion occurred in all directions with new areas of defoliation identified in Big Canyon and Clay lakes area, and near Wabaskang Lake.
- Nipigon District had an increase of almost 16,000 ha of moderate-to-severe defoliation, with majority recorded along the Albany River. New areas of defoliation included Attwood Lake area and Ogoki Lake area.



Freshly hatched forest tent caterpillar egg band

Regional Summary

- In Red Lake District, area of defoliation almost tripled, with the majority recorded between Red Lake and Ear Falls. Larger, more contiguous areas were mapped near Red and Gullrock Lakes, with smaller scattered pockets of defoliation between Red Lake and Knox Lake. Small pockets of defoliation were also mapped east of Ear Falls.
- For the first time in ten years, forest tent caterpillar was mapped in Thunder Bay District; the majority was aerially mapped north of Armstrong. Smaller pockets were also recorded near the community of Upsala.

Northeast:

- In Northeast Region, the last outbreak of forest tent caterpillar peaked in 1998, when almost three million hectares of moderate-to-severe defoliation was recorded.
- In 2014, just over 1,000 ha of forest tent caterpillar defoliation was aerially mapped in the eastern portion of Hearst District. Small, scattered pockets of defoliation were observed northeast of Hearst. Smaller areas were also mapped north and south of Kapuskasing.
- In Cochrane, Sault Ste. Marie, and Timmins Districts, forest tent caterpillar larvae were detected at very low levels with no aerially mapped defoliation.

Southern:

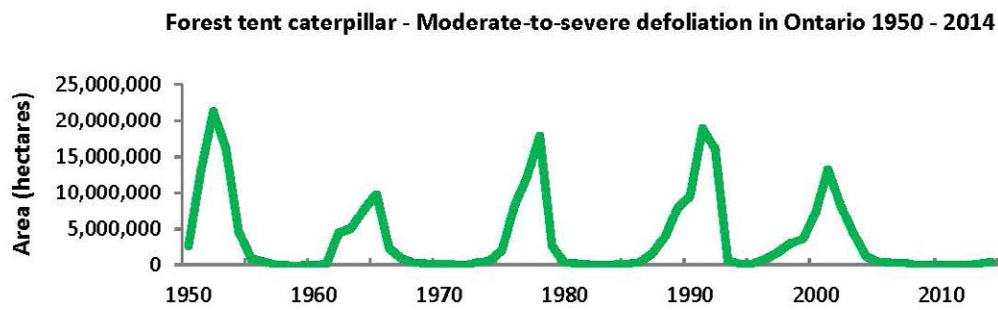
- Infestation in Southern Region continues to be in flux as it looked as though a collapse had begun in 2013, but in 2014 the area of moderate-to-severe defoliation more than doubled.
- In Midhurst District, forest tent caterpillar caused 2,279 ha of light defoliation and 8,638ha of moderate-to-severe defoliation. The majority of light defoliation was on the east side of south Bruce Peninsula and southwest of Midhurst. Smaller pockets of light defoliation were recorded southwest of Collingwood.
- The moderate-to-severe defoliation was located between Chatsworth and Markdale and southwest of Collingwood. Small pockets of moderate-to-severe defoliation were also recorded in south Bruce Peninsula, between Wiarton and Owen Sound.
- Midhurst District is in the fifth year of an infestation, which has caused widespread moderate-to-severe defoliation of sugar maple, white ash, white elm, American beech, basswood, white birch and poplar across Bruce, Grey, and Simcoe Counties.

Area Summary

Total area-within-which forest tent caterpillar caused moderate-to-severe defoliation in 2010 – 2014 by MNRF district (area in hectares).

Region / District	2010	2011	2012	2013	2014
Northwest					
Dryden	-	-	1,638	37,100	185,878
Kenora	-	-	2,381	36,738	61,857
Nipigon	-	-	25,325	48,371	64,913
Red Lake	-	-	-	9,724	24,079
Sioux Lookout	-	-	871 59,	898	114,242
Thunder Bay	-	-	-	-	8,228
Subtotal:	-	-	30,214	191,832	459,197
Northeast					
Hearst	-	-	-	-	1,031
Subtotal:	-	-	-	-	1,031
Southern					
Bancroft	30,074	12,551	-	-	-
Guelph	3,073	975	102	-	-
Midhurst	20,755	49,658	17,665	3,794	8,638
Parry Sound	141	-	-	-	-
Peterborough	6,381	3,755	-	-	-
Subtotal:	60,424	66,939	17,767	3,794	8,638
Provincial Total:	60,424	66,939	47,981	195,626	468,866

Trends



Forest Tent Caterpillar Egg Band Survey Plots

- Forest tent caterpillar egg band counts provide a basis for determining population trends and for making defoliation forecasts for the upcoming year.
- Egg bands are laid in mid to late-July and larvae emerge the following spring to feed on leaves. Egg band surveys are then done in fall by sampling three, widely-separated, co-dominant aspen trees. Trees are tallied and new egg bands on branches are counted. Forecasting is done for two size classes of trees. The average number of new egg bands per tree, results in a defoliation forecast of nil, light, moderate, or severe (see table).
- At the beginning of an infestation this scale tends to underestimate the intensity of the forecasted depletion and tends to over-estimate defoliation in declining infestations.

Average number of egg bands / tree		Defoliation Forecast
10-15cm DBH	15cm+ DBH	
0	0	Nil
1	1-5	Light
2-5	6-9	Moderate
6+	10+	Severe

Results 2014

- Populations continue to build in Northwest Region.
- A small scale egg band survey was performed in Northwest Region to forecast forest tent caterpillar defoliation in 2015 (31 locations) see Map 4 on page 59.



Forest tent caterpillar larvae

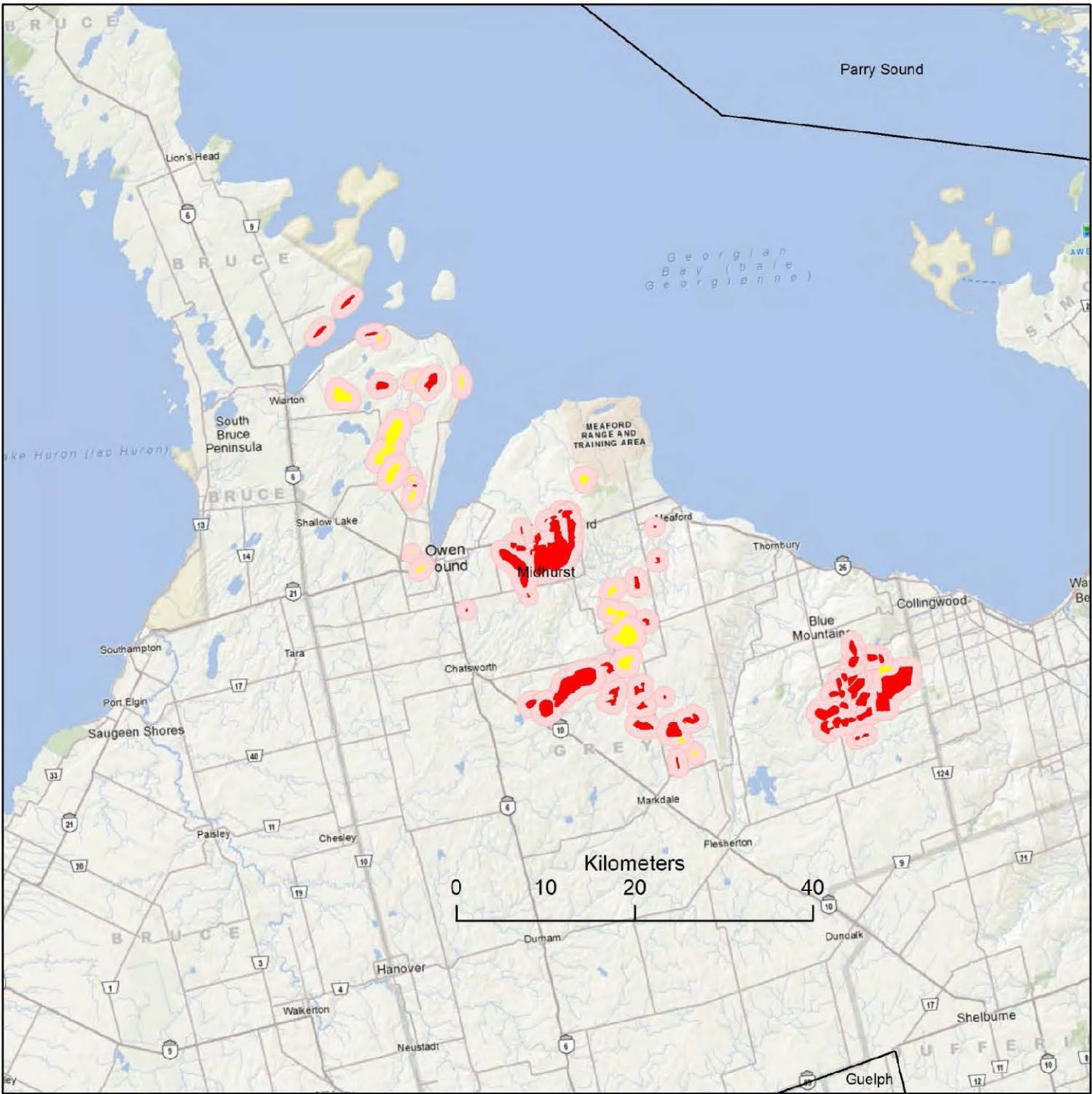


Forest Tent Caterpillar 2014

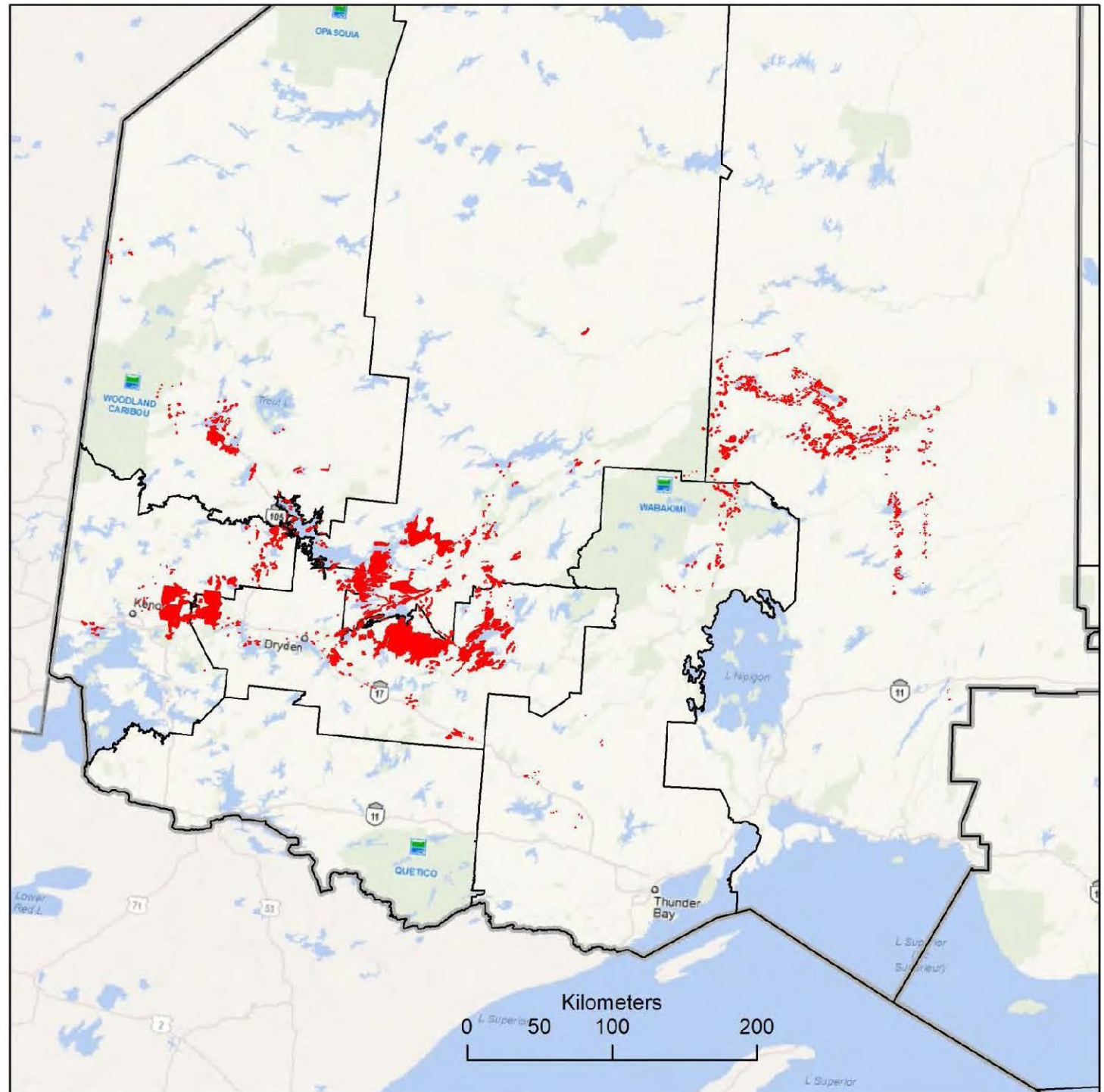
Map 1 – Southern Region

Areas-within-which forest tent caterpillar caused defoliation.

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



Map 2 – Northwest Region
Areas-within-which forest tent
caterpillar caused defoliation.

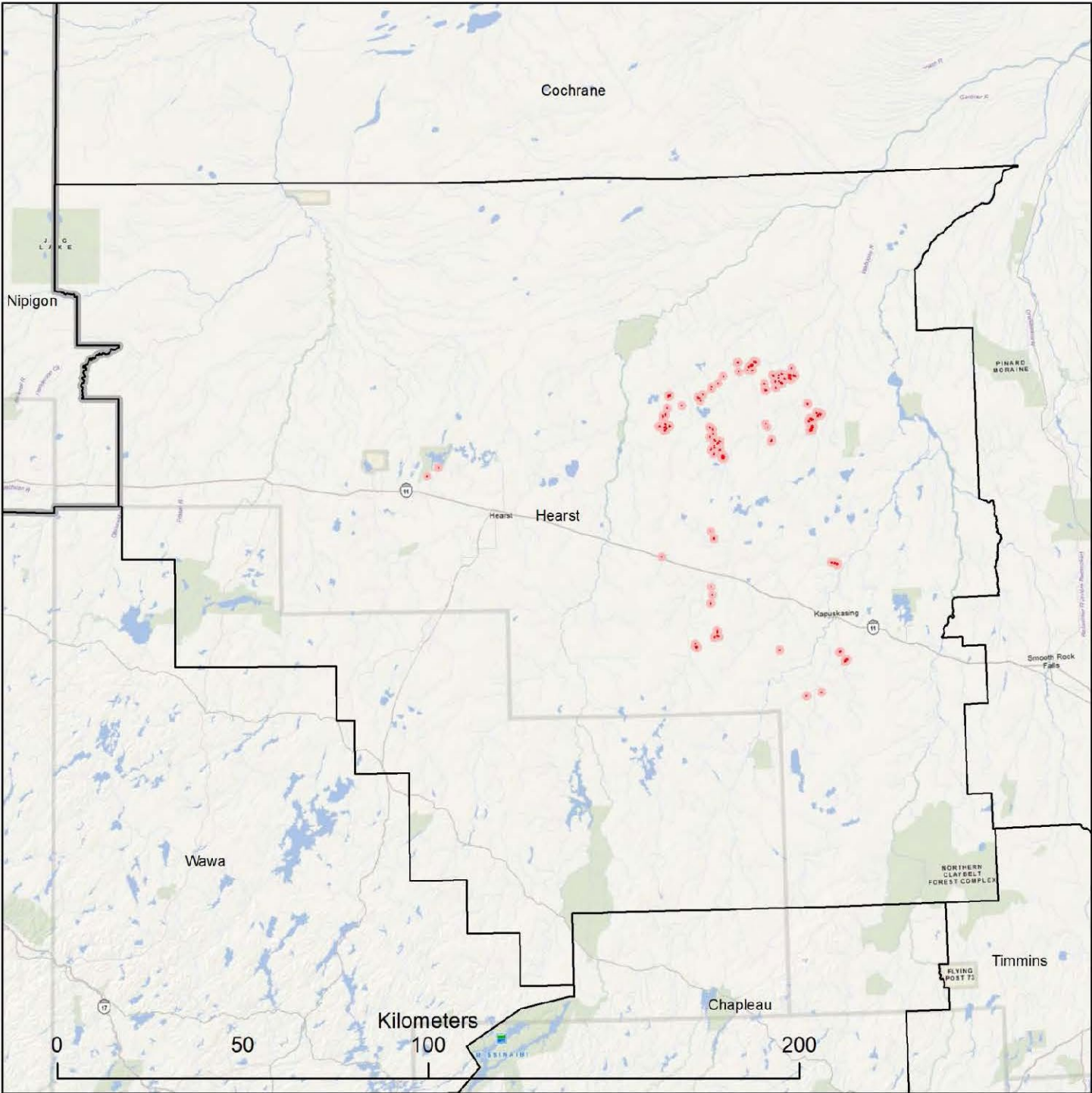




Forest Tent Caterpillar
2014

Map 3 – Northeast Region
Areas-within-which forest tent
caterpillar caused defoliation.

 Area of Moderate-to-Severe
Defoliation

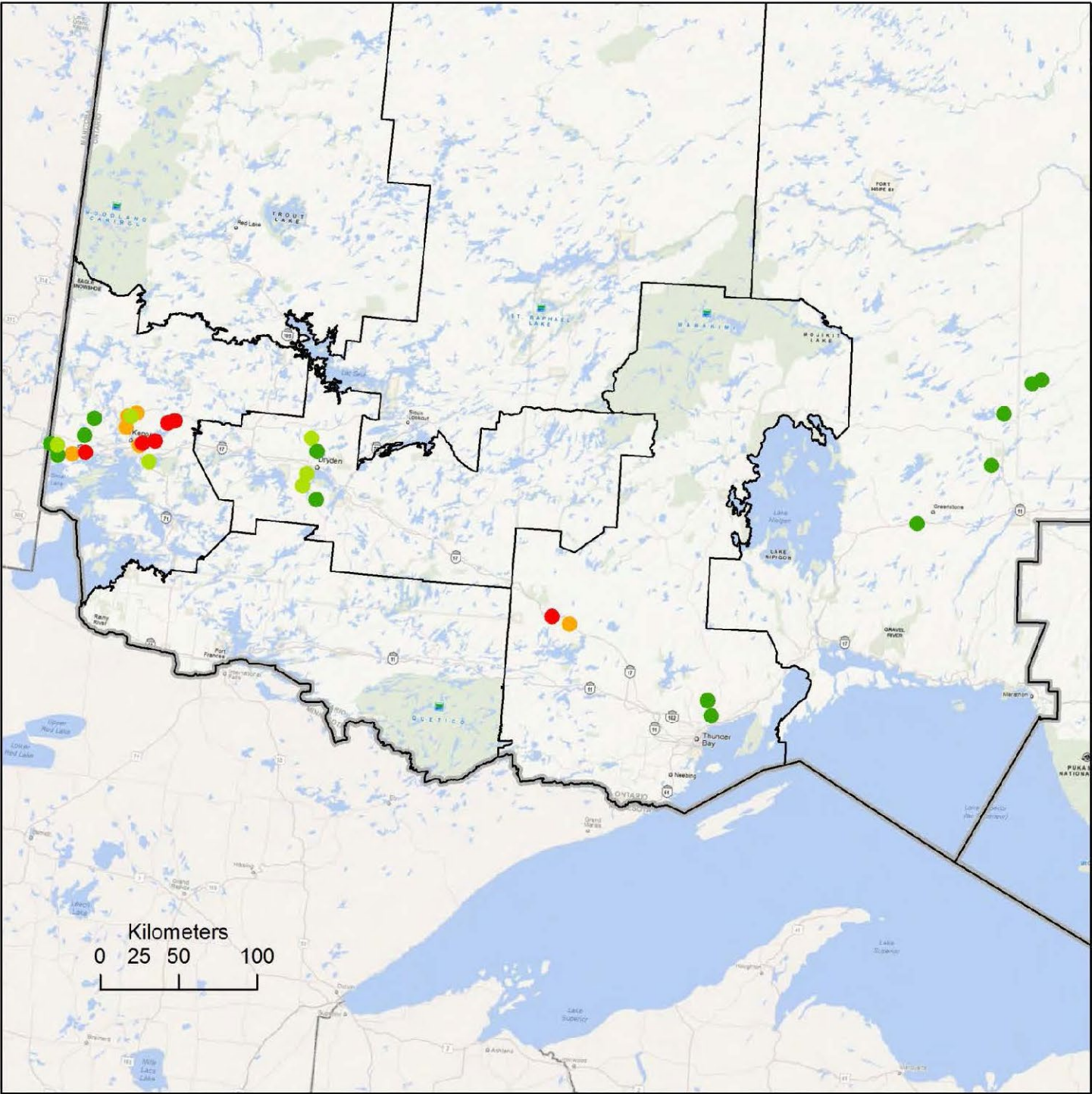




Forest Tent Caterpillar 2014

Map 4 – Northwest Region
Forest tent caterpillar defoliation
forecast 2015

- Nil
- Light
- Moderate
- Severe



Gypsy Moth

Pest Information

Common Name:	Gypsy moth
Latin Name:	<i>Lymantria dispar</i> (L.)
Pest Origins:	Invasive – Native to Europe
Pest Type:	Defoliator
Host Species:	Oak, birch, aspen, and various hardwoods
Infestation Area:	23,335 ha (2014)

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 2014, 95% of moderate-to-severe defoliation was recorded in Northeast Region (22,098 ha), with the remainder in Southern Region.

Regional Summary

Northeast:

- In Sudbury District, defoliation almost tripled from 2013. Defoliation within the city centre collapsed, but expanded northeast to Lake Wanapitei, west to the town of Lively, and south to Chief Lake. During aerial surveys, a small pocket of defoliation was also mapped in the town of Espanola. During ground surveys on Manitoulin Island, defoliation was found in stands of young red oak east of the town of Manitowaning and on Hwy 6 just south of Seguiandah, where >50% of the leaves were defoliated.
- In Sault Ste. Marie District, larvae were detected south of Elliot Lake causing light defoliation on birch (<5%), but was not aerially mapped. Gypsy moth was also found on red oak at the junction of Hwy 17 and Hwy 108. Egg masses were more numerous and larger compared to previous years, indicating a building population. A few singular larvae were found in Sault Ste. Marie, feeding on sugar maple and trembling aspen.



Gypsy moth adults laying eggs on a trembling aspen

Regional Summary

Southern:

- Defoliation increased in Southern Region, with light defoliation in 2013 and moderate-to-severe defoliation in 2014.
- In Aylmer District, 1,077 ha of moderate-to-severe defoliation were aerially mapped in the same general area that had light defoliation in 2013. Small pockets of moderate-to-severe defoliation were observed around Ladysmith and Courtright in Lambton County, where populations were feeding heavily on mature white oak.
- In Parry Sound District, 160 ha of moderate-to-severe defoliation was observed on young and semi-mature trembling aspen, red oak, cherry, alder, and white birch growing along Hwy 69, between the town of Britt and Harris Lake Rd., South of Magnetawan River. Defoliation was most severe on young trembling aspen.
- In Midhurst District, larvae were present in Georgian Bluffs, Grey County, combined with forest tent caterpillar. Defoliation was also observed in Woodford area, east of Owen Sound, causing 25% defoliation on white birch and willow.
- In Kemptville District, trace populations were found between Ottawa and the towns of Kemptville, Osgoode, Ivy Lea, and Portland, with no associated defoliation.
- In Peterborough District, trace level (<5%) defoliation on black walnut and willow was identified east and south of Keene and along Rice Lake. Gypsy moth was also identified southwest of Kendal feeding on black walnut, with no major defoliation noted.

Outlook

- Defoliation in Northeast may continue to expand outward from Sudbury if the two pathogens of gypsy moth larvae, *Entomophaga maimaiga* and Nucleopolyhedrosis Virus (NPV), remain at low levels.
- Population levels are increasing in Southern Region.

Area Summary

Total area-within-which gypsy moth caused moderate-to-severe defoliation in 2010 - 2014 by MNRF District (area in hectares).

Region / District	2010	2011	2012	2013	2014
Northeast					
Sudbury	-	-	8,123	8,451	22,098
Subtotal:	-	-	8,123	8,451	22,098
Southern Aylmer	-	-	-	-	1,077
Parry Sound	-	-	-	-	160
Subtotal:	-	-	8,123	8,451	1,237
Provincial Total:	-	-	8,123	8,451	23,335



Gypsy Moth 2014

Map 1 – Northeast and Southern Region

Areas-within-which gypsy moth caused defoliation.

 Area of Moderate-to-Severe Defoliation



Hail Damage

Damage Information

Damage Name: Hail damage
Damage Type: Abiotic Damage – Weather Event
Damage Area: 13 ha (2014)

Provincial Key Facts

- Common occurrence usually localized to a small area.
- Hail rips and shreds leaves and tears bark on young, thin-barked trees.

Regional Summary

Northeast:

- On June 30, 2014, a storm with high winds and large hail hit the town of South Porcupine, Timmins District.
- Hail damaged property and natural resources, and damage to trees was evident within one week of the event, varying from moderate to severe.
- An aerial survey, followed by a ground check, confirmed the hardest hit area was in Whitney Twp, with a total of 13 ha of hail damage.
- Red flagging (the development of red-brown foliage on the tips of individual branches where hail has damaged the shoot) and dead branches were easily seen at a distance. Hail broke, split, and tore away branches, and damaged main stems on a variety of tree species including white birch, trembling aspen, balsam fir, black and white ash, and white and black spruce.



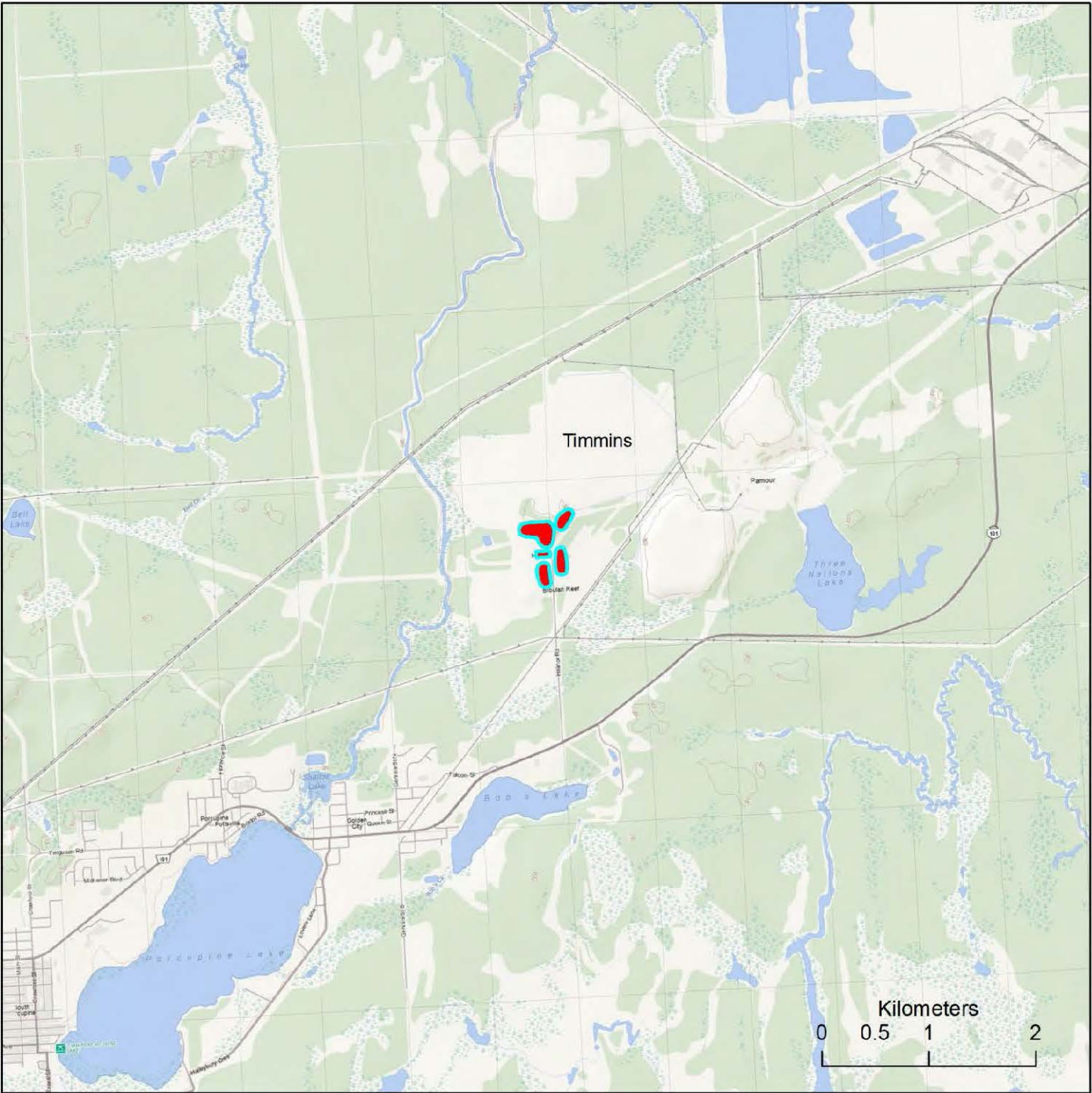
Hail damage to young tree



Hail Damage 2014

Map 1 – Northeast Region
Areas-within-which hail caused
forest damage.

 Area of Moderate-to-Severe
Damage



Ice Damage - Freezing Rain

Damage Information

Damage Name: Ice Damage – Freezing rain
Damage Type: Abiotic Damage – Weather Event
Damage Area: Greater Toronto Area

Provincial Key Facts

- Freezing rain events, causing heavy loads of ice buildup on trees, can result in uprooting, bending, stem breakage, and branch falling.
- The last major freezing rain event took place in 1998, covering much of eastern Ontario.
- An ice storm in Southern Ontario at the end of 2013 caused major damage in the GTA, extending into rural areas.
- The most severely affected trees species were white and green ash.
- An aerial inventory of damage was not conducted due to the specific locations of damage within inner-municipal streets

Regional Summary

Southern:

- The Greater Toronto Area experienced ice damage from an extreme freezing rain event, affecting Brampton, Markham, Mississauga, Pickering, Vaughan, Ajax, Aurora, Caledon, Richmond Hill, Courtice, and King. Rural areas to the north and west were also noted to have scattered pockets of damaged tree cover within riparian zones and other forested areas.
- Ground surveys were conducted in select areas, conducted by the municipalities affected.
- Damage levels observed within municipalities were widely variable. The majority of trees affected were deciduous, with ash species representing the majority of severely damaged trees.
- The most severely affected area occurred on the west end of the GTA, within Mississauga, Brampton, Caledon, and rural areas.



Damaged street trees, City of Mississauga

Regional Summary

- In Brampton and Mississauga, an average crown loss was assessed at >75% crown damage. The majority of affected trees were severely damaged, with some (<25%) moderately damaged.
- In Markham, Caledon, Ajax, and Richmond Hill, an average crown loss was assessed at 25%-75% crown damage. Half of affected trees were considered moderately damaged, with the other half severely damaged.
- The remaining municipalities contained an average crown loss of less than 25% crown, with the majority of affected trees lightly damaged, with some (<25%) moderately damaged trees.

Outlook

- The extent and frequency of freezing rain events are sporadic and result from extreme weather events.
- Freezing rain is an inherent condition amongst forest cover in Ontario.
- Following a dramatic freezing rain event, secondary pests (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 which have the potential to cause damage to forests.



Damaged street tree due to ice damage

Jack Pine Budworm

Pest Information

Common Name:	Jack pine budworm
Latin Name:	<i>Choristoneura pinus pinus</i> Freeman
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Jack pine, red pine, Scots pine, white pine
Infestation Area:	22,010 ha (2014)

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 83,075 ha in 2013 to 22,010 ha in 2014.
- Jack pine budworm pheromone catches increased in Northeast Region in 2014.
- 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 Annual Report on Forest Management).

Regional Summary

Northwest:

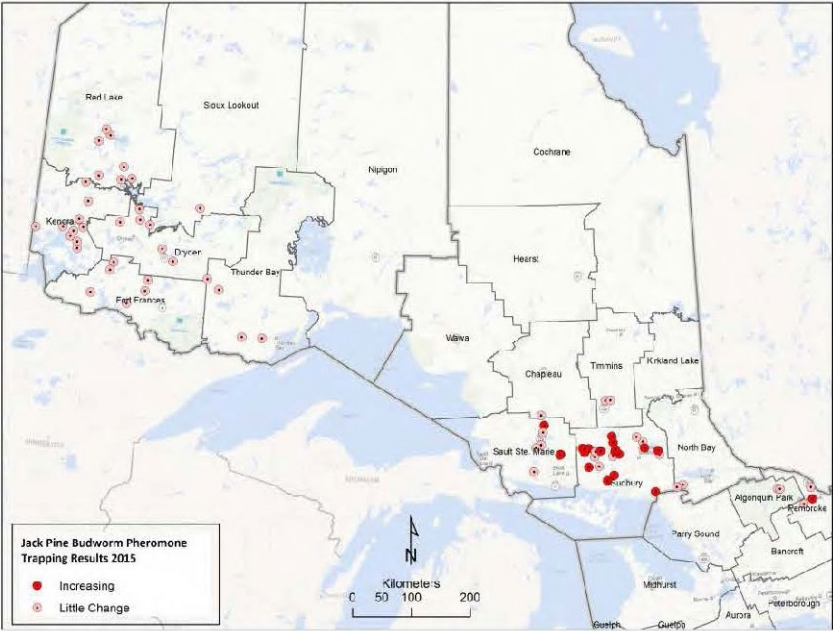
- Defoliation was only mapped in Sioux Lookout District. In the central portion of the District, defoliation was recorded in the same general area as in 2013, although at almost 75% less in total area.
- As the area of defoliation was smaller and had fewer scattered pockets, a possible collapse of the infestation could be imminent.
- The main area of defoliation occurred north of Pickle Lake, primarily along Hwy 808, from Spruce Lakes to Chilton Lake.
- Several smaller pockets were detected near Bugbee Lake, Menako Lakes, and Wapamisk Creek.



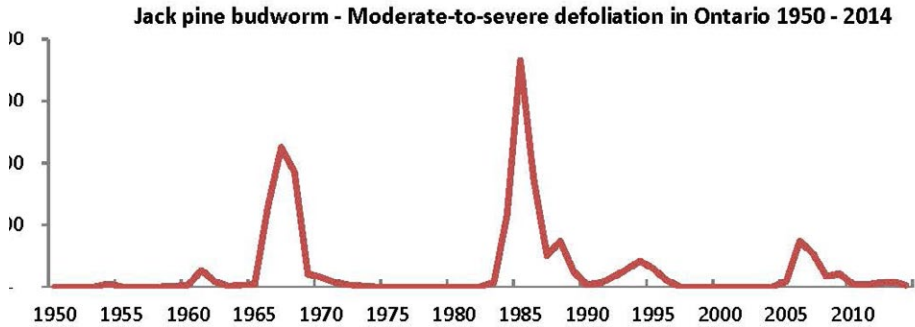
Jack pine budworm larvae feeding

Outlook

- Moth catches were up in Sudbury and Sault Ste. Marie Districts, Northeast Region, as well as Pembroke District, Southern Region, signifying a possible building of populations.
- Jack pine male flowers are critical for jack pine budworm survival in the early stages of an outbreak. Flower surveys in NE Region indicated 83% of trees (n=1633) had moderate-to-high levels of male flowers. In NW Region, 45% of trees (n=1706) surveyed had light or no flowers.



Trends



Area Summary

Total area-within-which moderate-to-severe defoliation was caused by jack pine budworm in 2010 - 2014 by MNRF District (area in hectares).

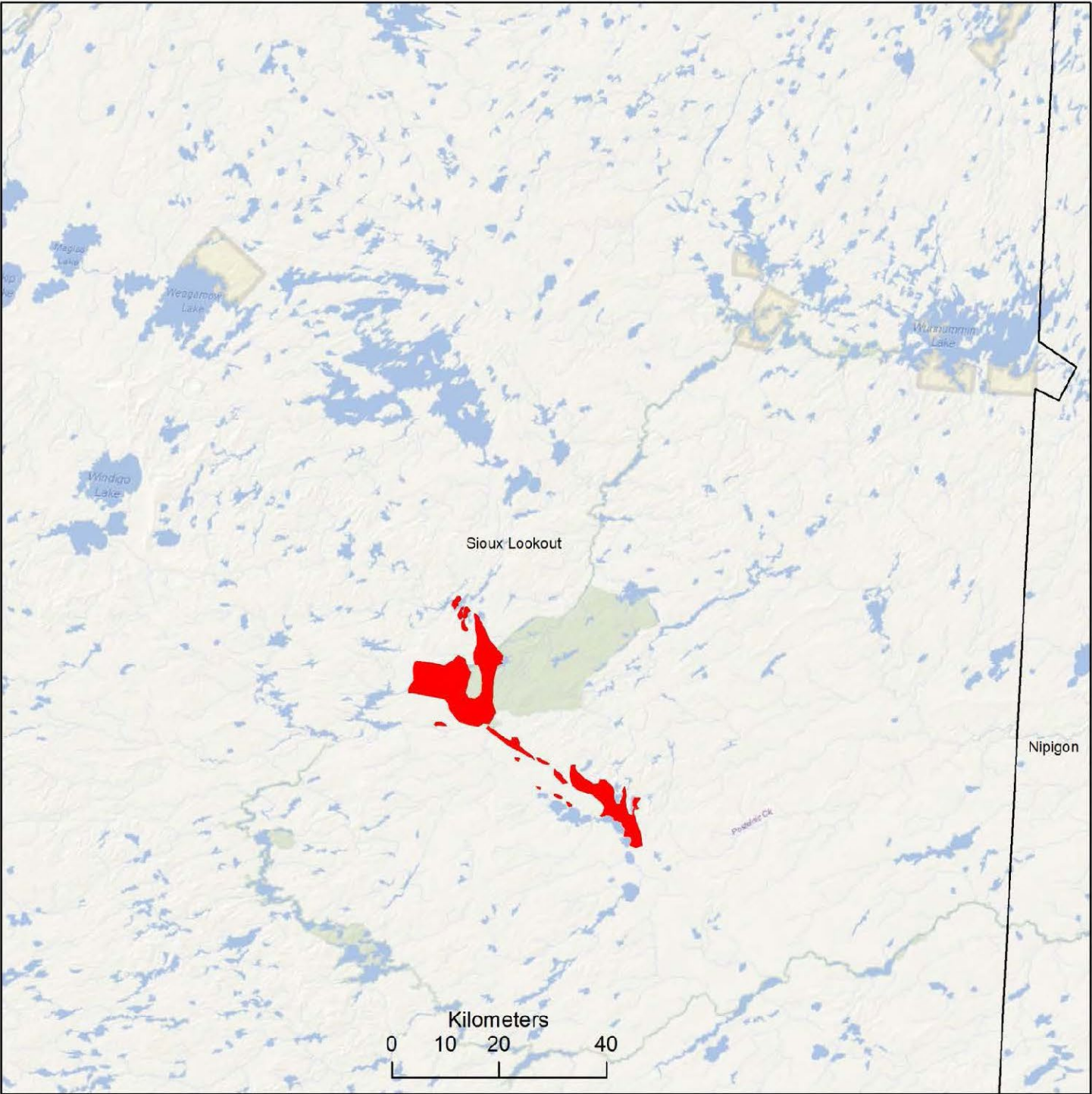
Region / District	2010	2011	2012	2013	2014
Northwest					
Dryden	41	-	-	-	-
Red Lake	1,633	-	-	-	-
Sioux Lookout	3,987	6,904	11,955	83,075	22,010
Subtotal:	5,660	6,904	11,955	83,075	22,010
Northeast					
Chapleau	23	-	-	-	-
North Bay	3	-	-	-	-
Sudbury	14,667	1,793	4,356	-	-
Timmins	365	1,048	-	-	-
Subtotal:	15,058	2,841	4,356	-	-
Southern					
Algonquin	350 451	-	-	-	-
Parry Sound	23,762	17,537	44,708	-	-
Pembroke	138 32	-	-	-	-
Subtotal:	24,249	18,021	44,708	-	-
Provincial total	44,968	27,765	61,018	83,075	22,010



Jack Pine Budworm 2014

Map 1 – Northwest Region
Areas-within-which jack pine
budworm caused defoliation.

 Area of Moderate-to-Severe
Defoliation



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: 9,657 ha (2014)

Provincial Key Facts

- Larch casebearer is a serious defoliator of tamarack in Ontario, with defoliation peaking in 2003 at 16,839 ha.
- In 2014, moderate-to-severe defoliation doubled from 5,486 ha in 2013 to reach 9,657 ha.
- Defoliation occurred in small scattered pockets, with majority occurring in Southern Region.
- Several new areas of infestation were observed in 2014, with defoliation being mapped as far north as Hearst and Cochrane Districts for the first time.

Regional Summary

Northeast:

- Moderate-to-severe defoliation was mapped in Hearst District, with the heaviest defoliation between Williamson and Owens townships.
- Larch casebearer defoliation was mapped in Newmarket and Evelyn townships, Cochrane District.
- In Timmins District, moderate-to-severe defoliation was mapped in distinct pockets within Timmins city limits, south of Night Hawk Lake, East of Frederick House Lake, and in a small pocket east of Wawaitin Falls on Kenogamissi Lake.
- In Algoma District, three small areas were mapped on St Joseph Island, two on the southeast side of the Island and the other southwest of the town of Hilton Beach.
- In Kirkland Lake District, a small stand of semi-mature tamarack was mapped with moderate-to-severe defoliation northeast of Meyers Lake.



Larch casebearer defoliation

Regional Summary

- In Sudbury District, severely defoliated semi-mature and mature tamarack were observed along Hwy 540 on Manitoulin Island.

Southern:

- Defoliation has been mapped consecutively in Southern Region since 2001.
- Moderate-to-severe defoliation increased in Kemptville District. The majority of defoliation occurred southeast of Ottawa, towards Brockville. East of this, scattered pockets of defoliation were recorded between Casselman and Ingleside.
- Defoliation increased in Pembroke District, concentrated near Westmeath.
- In Algonquin Park District, a small pocket was mapped in Edgar Twp.
- In Peterborough District, severe defoliation occurred in small pockets near Rice Lake; in small pockets in City of Kawartha Lakes; and from Central Hastings County to Frontenac County.
- Small pockets of moderate-to-severe defoliation were mapped in Bancroft District.
- In Aylmer District, over twenty tamarack trees were moderately defoliated at St. Williams Forestry Station. Small pockets of moderate defoliation were observed along Hwy 401 and Hwy 59. Moderate-to-severe defoliation was also observed on larch around Lockheart Pond.
- In Guelph District, defoliation along Hwy 403 south of Jerseyville was aerially mapped. Moderate-to-severe defoliation was also observed on larch east of Bishop’s Gate Rd., and along Hwy 403.
- In Midhurst District, defoliation increased by nearly 800 ha. In Bruce County, small pockets of moderate-to-severe defoliation were mapped to Hwy 21 at Arran Lake. Defoliation was also mapped in Grey County, in Georgian Bluffs, in Mount Forest, and in Southgate along Saugeen River wetlands to Dundalk. In Simcoe County, defoliation occurred north of Lake Simcoe. Moderate-to-severe defoliation also increased in Minesing Wetlands, which has not received major defoliation since 2010. In Dufferin County, defoliation occurred in area of Shelburne.
- In Aurora District, moderate-to-severe defoliation was mapped from Lake Simcoe to Whitby, around Sunbridge at Hwy 12. Defoliation was also aerially mapped east of Newmarket.

Area Summary

Total area-within-which larch casebearer caused moderate-to-severe defoliation in 2010 - 2014 by MNRF District (area in hectares).

Region / District	2010	2011	2012	2013	2014
Northeast					
Cochrane	-	-	-	-	3
Hearst	-	-	-	-	1,023
Kirkland Lake	-	-	-	-	15
North Bay	115	-	146	-	-
Sault Ste. Marie	-	-	-	-	34
Timmins	-	-	-	-	296
<i>Subtotal:</i>	<i>115</i>	<i>-</i>	<i>146</i>	<i>-</i>	<i>1,371</i>
Southern Algonquin	-	-	34	-	57
Aurora	-	-	449	258	445
Aylmer	-	-	-	-	47
Bancroft	-	67	526	89	105
Guelph	-	-	553	942	1,369
Kemptville	-	227	478	1,093	1,463
Midhurst	316	526	1,163	1,928	2,666
Parry Sound	1,289	-	-	5	51
Pembroke	-	232	805	143	929
Peterborough	-	562	705	1,028	1,154
<i>Subtotal:</i>	<i>1,605</i>	<i>1,614</i>	<i>4,723</i>	<i>5,486</i>	<i>8,286</i>
Provincial total	1,720	1,614	4,869	5,486	9,657



Larch Casebearer 2014

Map 1 – Northeast and Southern Region
Areas-within-which larch casebearer caused defoliation.

 Area of Moderate-to-Severe Defoliation



Satin Moth

Pest Information

Common Name:	Satin moth
Latin Name:	<i>Leucoma salicis</i> (L)
Pest Origins:	Invasive – Native to Europe
Pest Type:	Defoliator
Host Species:	Poplar spp.
Infestation Area:	180 ha (2014)

Provincial Key Facts

- 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.

Regional Summary

Northeast:

- In Sudbury District, satin moth caused moderate-to-severe defoliation in a semi-mature poplar stand on Hwy 6, just south of McGregor Bay. Defoliation left many of the crowns of European poplar, trembling aspen, and largetooth aspen bare. This is the second consecutive year defoliation was mapped in the area.
- Larvae were also found moderately defoliating a line of planted semi-mature Lombardy poplar on Hwy 6, just south of Hwy 17.
- Severe defoliation was noted on Crown Street in Nairn Centre, where 75% of the leaves of European poplar were chewed or missing. The larvae also caused light defoliation of balsam poplar in the same area.



Satin moth larvae, pupae, and defoliation

Regional Summary

Southern:

- Satin moth caused severe defoliation to European white poplar in Kemptville District. Larvae were collected at the University of Guelph, Kemptville campus, and larvae and pupae were collected southeast of Westport.
- For the second consecutive year in Peterborough District, moderate-to-severe levels of defoliation were recorded on 20 open grown, largetooth aspen at Hwy 33 and County Road 10, Picton. Moderate-to-severe levels of defoliation were also recorded on individual largetooth aspen at Hwy 7 and Hwy 35, Lindsay.



European white poplar defoliated by satin moth

Area Summary

Total area-within-which satin moth caused moderate-to-severe defoliation in 2010 - 2014 by MNRF District (area in hectares).

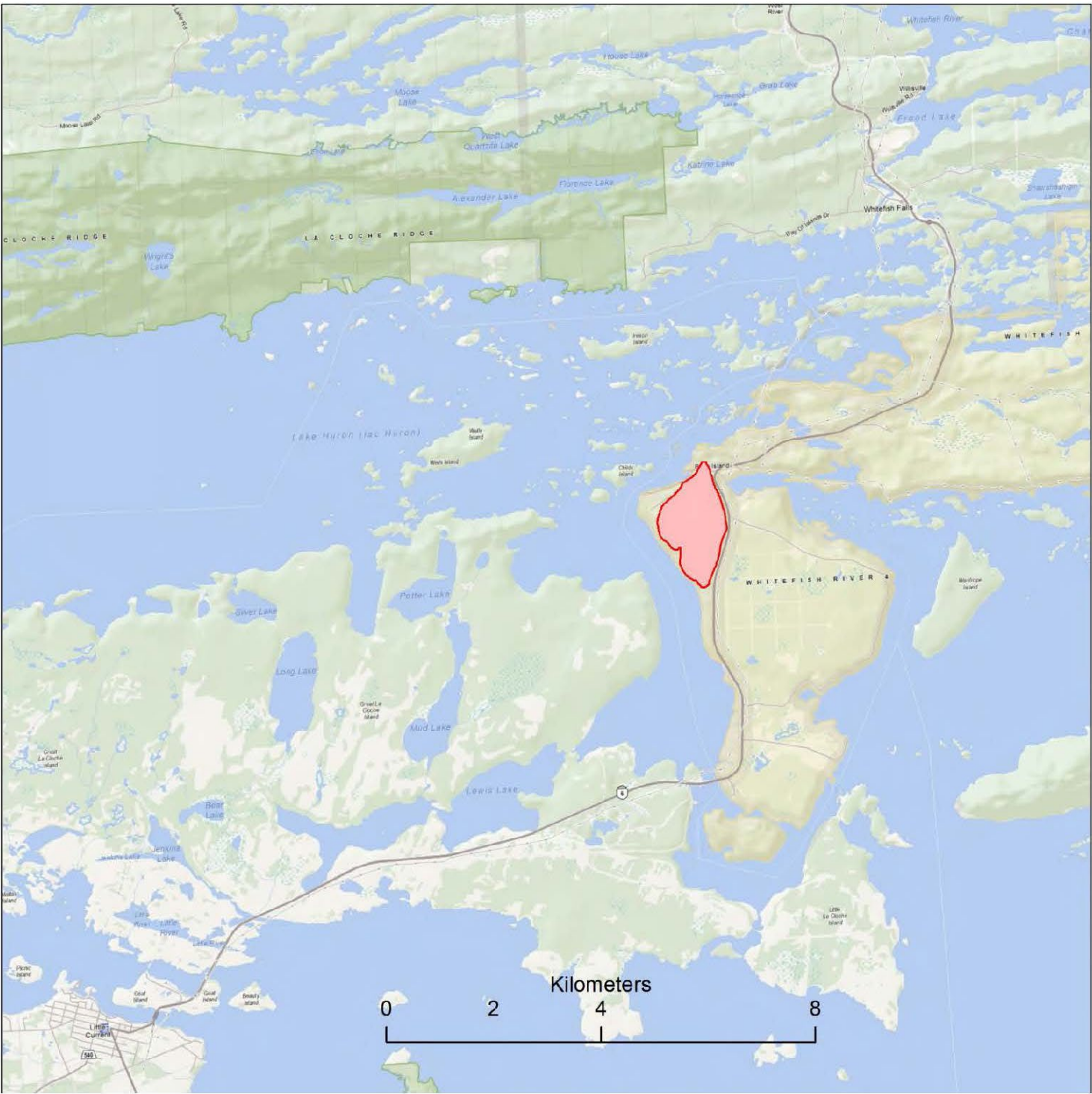
Region / District	2010	2011	2012	2013	2014
Northeast					
North Bay	-	-	-	101	180
Subtotal:	-	-	-	101	180
Provincial total	-	-	-	101	180



Satin Moth 2014

Map 1 – Northeast Region
Areas-within-which satin moth
caused defoliation.

 Area of Moderate-to-Severe
Defoliation



Spruce Budworm

Pest Information

Common Name:	Spruce budworm
Latin Name:	<i>Choristoneura fumiferana</i> Clemens
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Balsam fir, white spruce, black spruce
Infestation Area:	30,317 ha (2014)

Provincial Key Facts

- Outbreaks occur periodically when the primary host, balsam fir, reaches 40 years of age.
- There was an increase in pheromone trap catches in Northeast Region in 2014.
- Outbreaks can last decades and can result in extensive mortality to balsam fir and spruce.

Regional Summary

Northeast:

- The area of mapped defoliation increased, with a new area of infestation observed in Chapleau District.
- Moderate-to-severe defoliation was found in four Districts and white spruce and balsam fir mortality increased substantially.
- In Chapleau District, the majority of moderate-to-severe defoliation was aerially mapped east of Kapuskasing Lake. Balsam fir had the most severe defoliation.
- Hearst District had nine hectares of moderate-to-severe defoliation, next to Chapleau District.
- In North Bay District, scattered pockets of defoliation were observed along Temiskaming River and the Quebec border. A small pocket of moderate-to-severe defoliation was also noted south of Turtle Lake.
- In Sudbury District, the majority of defoliation occurred on Manitoulin Island. The remainder was recorded at the south end of Lake Wanapitei and on an island in Clear Lake, where balsam fir was severely defoliated.



Spruce budworm larva

Regional Summary

- Balsam fir mortality was high in Sudbury District, with mortality mapped along south and east shores of Manitoulin Island, north of Hwy 17 W between Sudbury and Espanola, and along Hwy 144. Dead spruce and balsam fir were also noted along Hwy 69 and east of Hwy 17 E.
- Balsam fir and white spruce mortality in North Bay District (7,342 ha) was located north and northeast of North Bay. Smaller pockets of mortality were found on either side of Hwy 11.

Area Summary

Total area-within-which spruce budworm caused moderate-to-severe (M-S) defoliation and mortality in 2010 - 2014 by MNRF District (area in hectares).

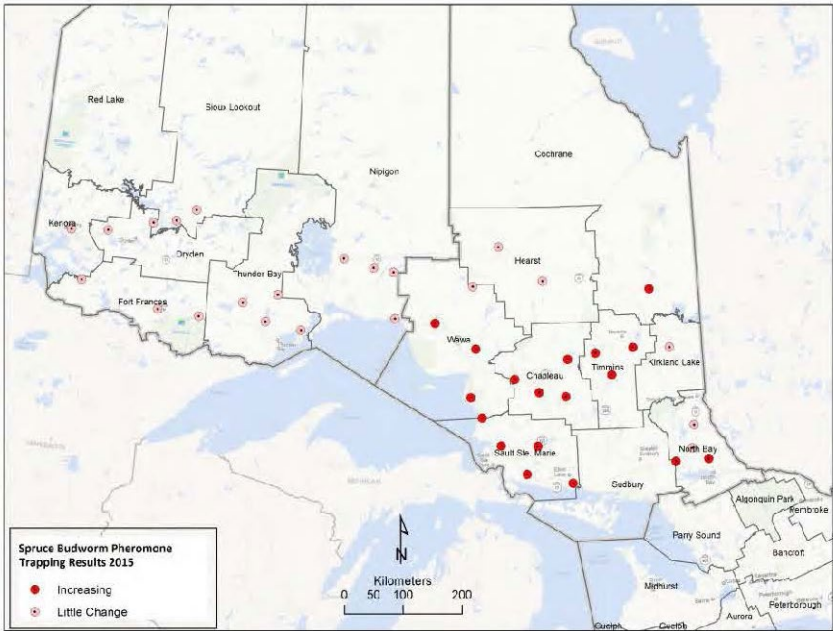
Region / District	2010	2011	2012	2013	2014	2013	2014
Severity	M-S	M-S	M-S	M-S	M-S	Mortality	Mortality
Northeast							
Chapleau	-	13,457	147	-	20,158	-	-
Hearst	-	-	-	-	9	-	-
North Bay	124,588	156,405	10,889	173	9,240 3	1	7,432
Sault Ste. Marie	5,205	64	-	-	-	-	-
Sudbury	281,254	72,849	87,819	80	911	63	7,596
Subtotal:	411,047	242,775	98,855	253	30,317	94	15,028
Southern							
Parry Sound	1,164	-	943	-	-	-	-
Peterborough	109	146	-	-	-	-	-
Subtotal:	1,273	146	943	-	-	-	-
Provincial Total:	412,320	242,921	99,797	253 3	0,317	94	15,028



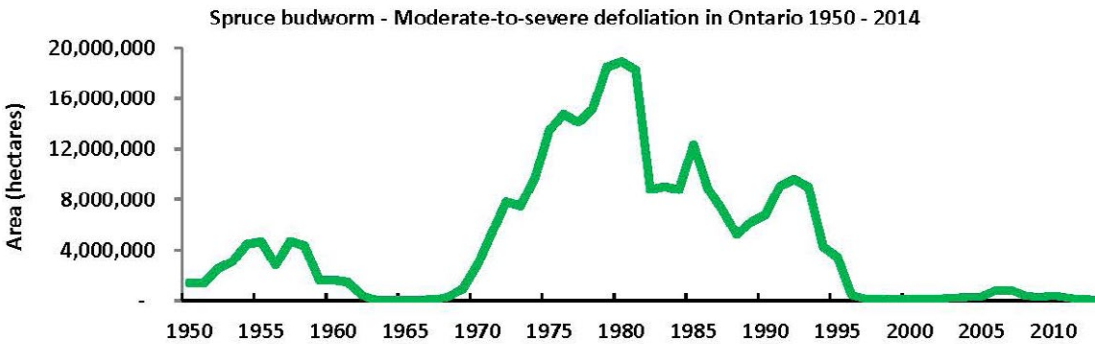
Spruce budworm damage in Chapleau District

Outlook

- Populations of spruce budworm appear to be increasing based on the larger area of mapped defoliation in 2014.
- Spruce budworm pheromone catches increased in Northeast Region, but remained static in Northwest Region. There may be a possible increase in spruce budworm populations in Northeast Region in 2015.



Trends



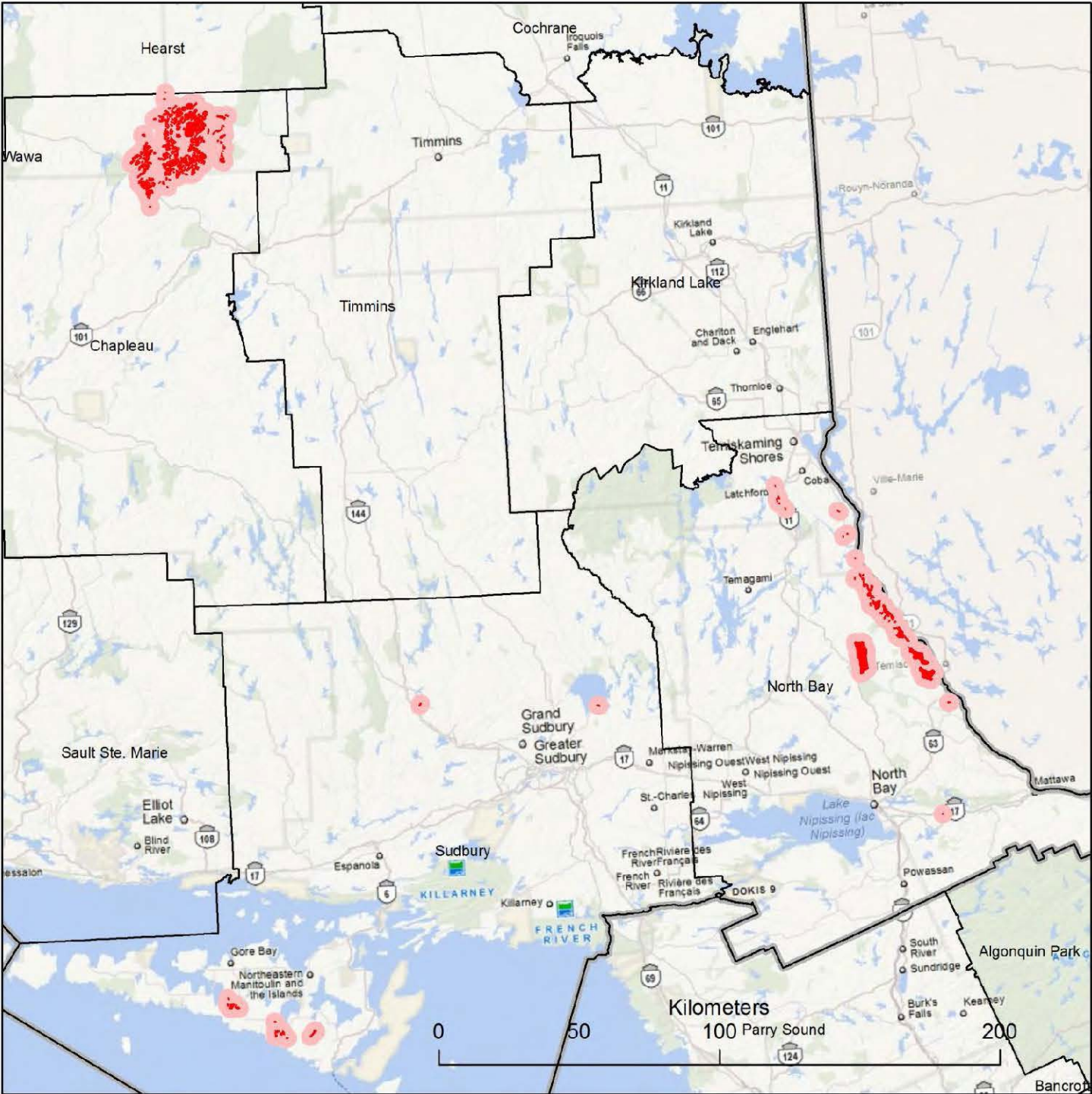
Spruce budworm moth (adult)



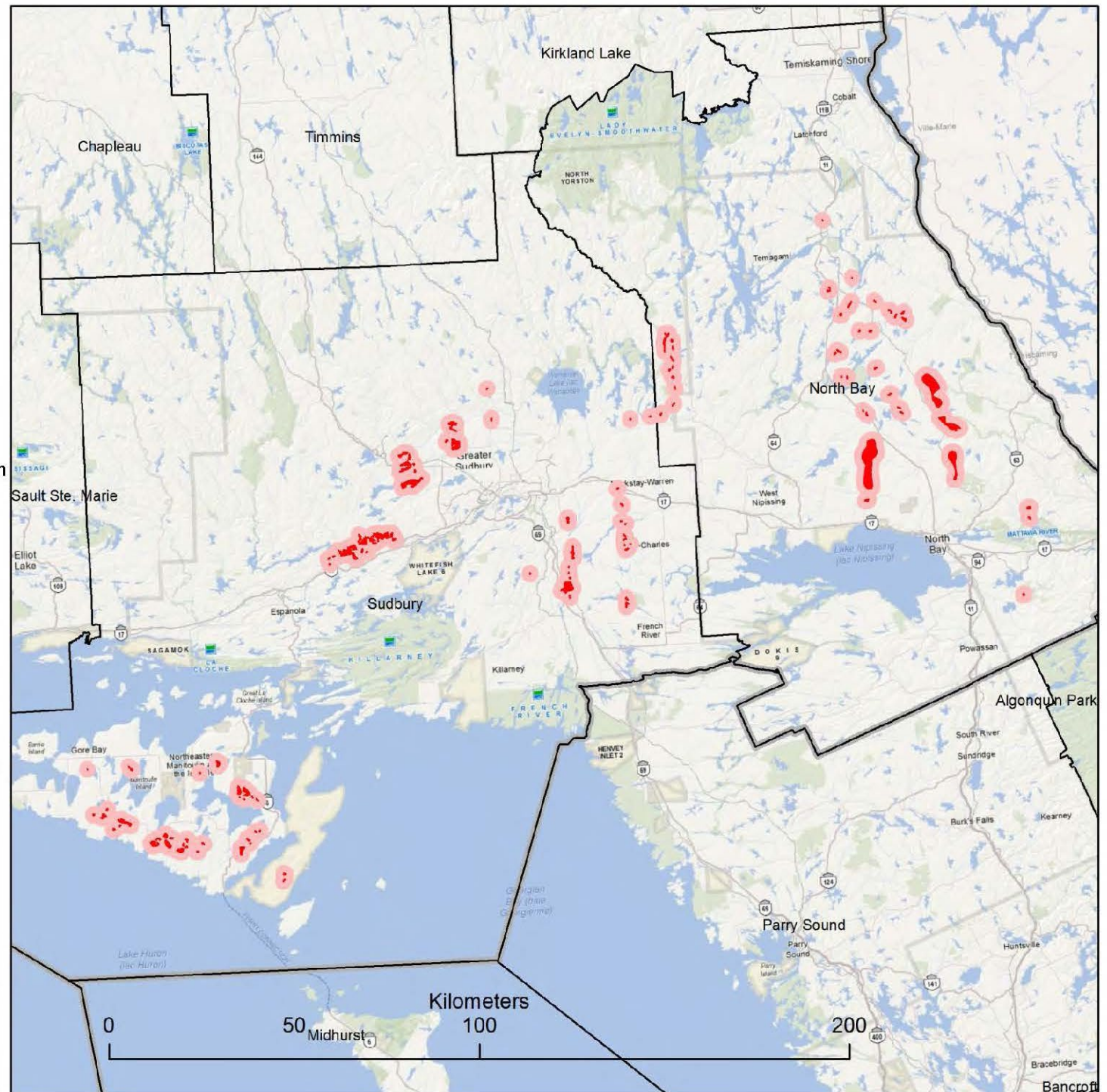
Spruce Budworm 2014

Map 1 – Northeast Region
Areas-within-which spruce budworm caused defoliation.

 Area of Moderate-to-Severe Defoliation



 Area of Mortality



Whitespotted sawyer beetle

Pest Information

Common Name:	Whitespotted sawyer beetle
Latin Name:	<i>Monochamus s. scutellatus</i> (Say)
Pest Origins:	Native to North America
Pest Type:	Wood borer
Host Species:	Jack pine
Infestation Area:	28 ha (2014)

Provincial Key Facts

- One of the most widely distributed and common wood borers in North America
- Found on recently dead or dying trees.
- Downgrades lumber due to larval tunnels.
- Larger populations found in vicinity of other forest disturbances, such as blowdown, drought, multiple years of defoliation, fire, and cutovers.
- Often confused with invasive Asian long-horned beetle.

Regional Summary

Northwest:

- In Sioux Lookout District, a small area of damage was detected in Lac Seul Forest. The damage was concentrated in a jack pine cutover north of Vermillion River Rd, west of Root Lake. This area was not aerially mapped in 2014.

Northeast:

- In central portion of Timmins District, 28 ha of damage were aerially mapped. Small pockets were mapped southeast of McBride Lake. Maturation feeding on jack pine by sawyer beetle adults was observed near Eacom Gogama Mill, where forest fires had occurred in 2012. Moderate populations of this borer were seen in MacKlem Twp and Kettle Lakes Provincial Park. These areas were not aerially mapped in 2014.
- In Sudbury District, recently dead and declining trees were observed in a stand of semi-mature jack pine trees in Scadding Twp. Maturation feeding caused needles to turn red on individual and groups of trees throughout the stand. This area was not aerially mapped.



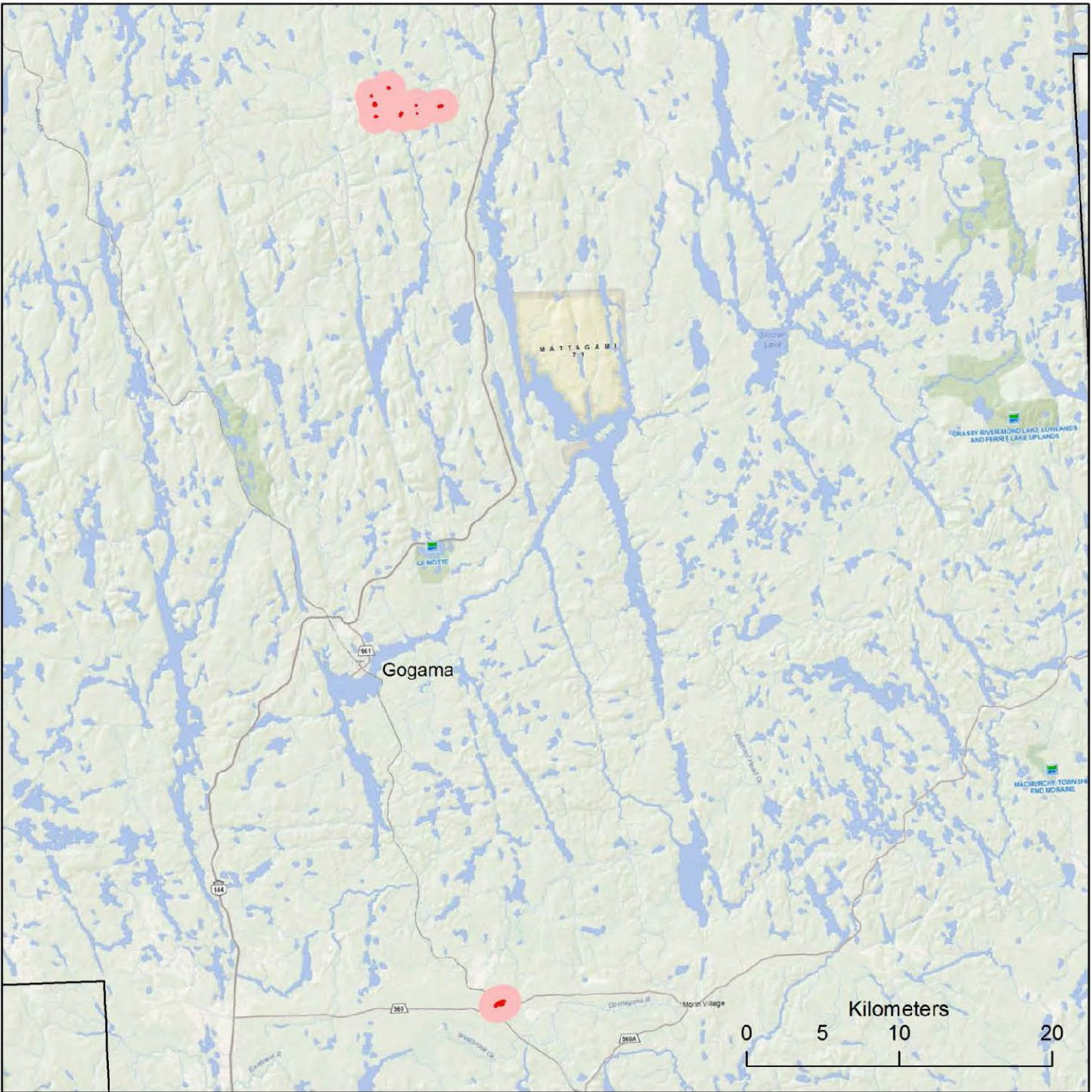
Whitespotted sawyer beetle larvae



Whitespotted Sawyer
Beetle 2014

Map 1 – Northeast Region
Areas-within-which whitespotted
sawyer beetle caused damage.

 Area of Damage



Alder tubemaker

Pest Information

Common Name:	Alder tubemaker
Latin Name:	<i>Acrobasis rubrifasciella</i> Packard
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Alder spp.

Key Facts

- Found across Canada, but mainly in Ontario and Manitoba.
- Localized infestations are short lived in Ontario.
- Defoliation is aesthetically unpleasing, but has little impact on tree health.
- Larvae feed individually and in groups within a tent of leaves from dark tube-like shelters of excrement and silk.
- This pest is highly susceptible to parasites and predators.

Regional Summary

Northeast:

- In Sudbury District, alder tubemaker larvae caused very unsightly defoliation and leaf browning to alder in the central portion of the District.
- The larvae were found causing moderate-to-severe defoliation on alder spp. in a number of townships including Denison, Hallam, Fairbanks, and Dryden.



Alder tubemaker

Ambermarked birch leafminer

Pest Information

Common Name: Ambermarked birch leafminer
Latin Name: *Profenusa thomsoni* (Konow)
Pest Origins: **Invasive** – Native to Europe
Pest Type: Defoliator
Host Species: White birch

Key Facts

- Until 1955 it was confused with birch leafminer.
- First reported in Quebec in 1959, now occurs throughout Canada.
- Not considered a serious pest as defoliation occurs late in the season.
- Prefers shaded or semi-shaded trees.
- Infestations are often short-lived.

Regional Summary

Northeast:

- In Chapleau District, this leafminer was observed near Twin Lakes. A small group of white birch trees, averaging 10 m in height, sustained from 40 to 75 per cent defoliation throughout their crowns. Total area of damage was approximately 200 m2.
- In Sudbury District, many semi-mature white birch in mixedwood stands and small birch stands on Manitoulin Island had moderate-to-severe defoliation along Hwy 542 and Hwy 6.
- Feeding was observed throughout July and August.



Ambermarked birch leafminer defoliation

Ash anthracnose

Pest Information

Common Name:	Ash anthracnose
Latin Name:	<i>Gnomonia fraxini</i> Redlin & Stack
Pest Origins:	Native to North America
Pest Type:	Foliar disease
Host Species:	Ash spp.

Key Facts

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

Regional Summary

Northwest:

- In Thunder Bay District, the disease was widely distributed in the city of Thunder Bay and the southern portion of the District. Damage was overall moderate to ash leaves.
- Found throughout Fort Frances and Kenora Districts. It was first sampled in Atikokan behind a school and later found throughout both Districts.
- A wet and cool spring in the Northwest Region created ideal conditions for this leaf fungus.



Ash anthracnose

Balsam Poplar Leafblotch Miner

Pest Information

Common Name:	Balsam poplar leafblotch miner
Latin Name:	<i>Phyllonorycter nipigion</i> (Free.)
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Balsam poplar

Key Facts

- Occurs occasionally in large numbers in Ontario.
- More common to the north and west of Lake Superior.
- Closely related to the aspen leafblotch miner.
- Infestations are often short-lived.

Regional Summary

Northeast:

- Balsam poplar leafblotch miner was observed throughout Hearst and Timmins Districts at various levels. The heaviest infestation was recorded in Hearst District at Rene Brunelle Provincial Park on mature balsam poplar. Overall defoliation was 40% at this location.
- In Kirkland Lake District, small, localized populations of the leafblotch miner were found on young and semi-mature balsam poplar along Hwy 11 and Hwy 66, causing moderate-to-severe defoliation.



Balsam poplar leafblotch miner larva

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.

Regional Summary

Northeast:

- Three beech stands in North Bay District were surveyed for Beech scale, with very low levels found in all three locations. • In Sault Ste. Marie District, seven locations were surveyed in the fall of 2014, all on St Joseph Island. Beech scale levels were moderate overall, and slightly lower than in 2013.

Southern:

- Scale insect extended in the north end of Midhurst District, at Vasey Rd and Hwy 400, Simcoe County, and was detected in the Southampton area along Lake Huron.
- Beech scale is abundant across Peterborough District and was detected in many satellite pockets in southern Bancroft District.
- In Parry Sound District, new sightings of beech scale were recorded on Wilson Island in Lake Muskoka at moderate-to-severe levels, with infestations noted on >90% of American beech.



Beech scale on American beech

Birch Skeletonizer

Pest Information

Common Name:	Birch skeletonizer
Latin Name:	<i>Buccularatrix canadensisella</i> (Chambers)
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	White birch

Key Facts

- Usually not a problem, as it is a late season defoliator.
- Areas of defoliation by birch skeletonizer were also defoliated by other pests in 2014, which may cause a decline in white birch health in 2015 in these areas.

Regional Summary

Northeast:

- The city of Greater Sudbury and municipalities of Wahnapiatae and Wanup experienced moderate-to-severe defoliation of young white birch.
- Some of these areas were also defoliated earlier in the summer by gypsy moth and were infected by septoria leaf spot in late summer.
- These areas are also located in poor sites with shallow soil on top of bedrock, causing more stress to affected trees.



Birch skeletonizer larvae

Blackheaded Ash Sawfly

Pest Information

Common Name: Blackhead ash sawfly
Latin Name: *Tethida cordigera* (Beauv.)
Pest Origins: Native to North America
Pest Type: Defoliator
Host Species: Ash spp.

Key Facts

- One of three sawflies found on ash.
- Ash can be completely defoliated when heavily infested.
- Early season defoliators, so tree will re-flush with new foliage.
- Rarely a problem, but may cause growth reduction with consecutive years of severe defoliation.

Regional Summary

- Blackheaded ash sawfly was collected and confirmed in Kemptville District, causing moderate-to-severe defoliation of green ash at Portland Conservation Area and Beveridge Locks.



Blackhead ash sawfly larvae

Cedar Apple Rust

Pest Information

Common Name:	Cedar apple rust
Latin Name:	<i>Gymnosporangium juniper-virginianae</i> Schwein.
Pest Origins:	Native to North America
Pest Type:	Foliar rust
Host Species:	Eastern red cedar, Apple

Key Facts

- The causal pathogen of this disease requires a second host, apple, to complete its two-year life cycle.
- Symptoms look completely different on each host; on apple it appears as lesions on the leaves and on cedar it forms as a gall on the foliage.
- More damaging to apple orchards.

Regional Summary

Southern:

- This disease was collected and confirmed in Kemptville District, causing severe damage to eastern red cedar at Ivy Lea Campground.
- An additional location was noted near Blue Mountain with moderate levels of infection to several roadside eastern red cedar.



Cedar apple rust fruiting bodies

Diplodia Tip Blight

Pest Information

Common Name:	Diplodia Tip Blight
Latin Name:	<i>Diplodia pinea</i> (Desm.) Kickx
Pest Origins:	Worldwide distribution
Pest Type:	Blight Disease
Host Species:	Pine spp.

Key Facts

- This disease affects two and three-needled pine species, and occasionally white pine and spruce. Stressed trees are often attacked.
- The disease kills shoots and branches, and under severe conditions can kill the whole tree.
- Diplodia can cause severe damage to nurseries and Christmas tree plantations.

Regional Summary

Southern:

- This disease was identified at two locations in Peterborough District. Infected Scots pine were recorded with <5% infection on 5% of trees in a young plantation south of Hwy. 115 on Glamorgan Road, Millbrook. Infected Scots pine were also recorded in Emily Provincial Park with 15% infection on 20% of host trees.



Diplodia tip blight on red pine

Drought

Pest Information

Common Name: Drought
Damage Type: Abiotic Damage – Weather Event
Host Species: All

Key Facts

- Forested areas within Southern Region have experienced a series of drought conditions, namely in 2001-2002, 2006-2007, and 2012.
- In 2012, a drought caused an almost immediate response from both deciduous and coniferous tree species, from Parry Sound District to Kemptville District.
- Affected areas have been monitored over the past two growing seasons revealing new satellite pockets of conifer decline, namely eastern white pine, red pine, and eastern hemlock.

Regional Summary

Southern:

- New satellite pockets of decline have occurred within Peterborough District. Mortality in a 12 ha red pine plantation reached 3%, along with 2 ha of moderate-to-severe decline (>26%).
- Small pockets of eastern white pine within Bancroft District have been assessed with severe (>76%) decline in the South Algonquin Twp and Haliburton County.
- On Wilson Island in Lake Muskoka, Parry Sound District, approximately 60 mature eastern hemlock trees were severely (>76%) affected, with high mortality rates associated with secondary insects and disease.



Drought, Pembroke District 2012

Dutch Elm Disease

Pest Information

Common Name:	Dutch elm disease
Latin Name:	<i>Ophiostoma novo-ulmi</i> (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.

Regional Summary

Southern:

- Declining white elm was prevalent across Kemptville District. Dutch elm disease was collected and confirmed on white elm at the Beveridge Locks.
- Dutch elm disease was not as prevalent in Pembroke District, but scattered occurrences were still observed.
- Infected trees were recorded mainly in the eastern portions of both Peterborough and Bancroft Districts, where individual and small groupings of trees were identified in satellite pockets.
- Trees infected with Dutch elm disease were recorded in both Aylmer and Guelph Districts, with higher occurrences in the northern portion of Guelph District, in Huron, Perth, and Wellington counties.



Dutch elm disease

Eastern Tent Caterpillar

Pest Information

Common Name:	Eastern tent caterpillar
Latin Name:	<i>Malacosoma americanum</i> (F.)
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Cherry spp. apple, alder

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, though nests can be unsightly.
- Causes little permanent damage to the host tree.

Regional Summary

Northeast:

- In Sault Ste. Marie District, tents were observed causing severe defoliation on St Joseph Island, between Blind River and Ironbridge, and north of Elliot Lake.
- Southern: • In Midhurst District, light defoliation was observed on mature cherry at McGregor Provincial Park, causing 10% defoliation. Six nests were observed in the crown.
- Severe defoliation was also recorded along roadside trees throughout Midhurst District, in Grey and Bruce Counties.
- In Peterborough District, moderate-to-severe defoliation was seen on cherry species along the northern shore of Gold Lake in Kawartha Highlands Signature Site Park, along Hwy 7 on numerous black cherry saplings from Norwood to Marmora, and along Hwy 35, north of Pontypool to Lindsay.



Eastern tent caterpillar larvae

European larch needlecast

Pest Information

Common Name:	European larch needlecast
Latin Name:	<i>Mycosphaerella laricina</i> (R.Hartig) Mig.
Pest Origins:	Invasive – Native to Europe
Pest Type:	Needlecast disease
Host Species:	European larch

Key Facts

- First noted in Ontario in 2011.
- Heavy epidemics result in a lack of the characteristic “golden” autumnal color of European larch; trees are brown from mid-summer on.

Regional Summary

Southern:

- Several open-grown trees with moderate levels of this needle cast were found within the village of Belmont in Elgin County, Aylmer District.



Typical infection of needles associated with larch needle cast

Fall Webworm

Pest Information

Common Name:	Fall webworm
Latin Name:	<i>Hyphantria cunea</i> (Drury)
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Variety of deciduous

Key Facts

- One of the few native North American insects accidentally introduced into Europe and Asia.
- Impact on tree health is usually limited because defoliation tends to occur late in the growing season. Persistent infestation can cause branch and crown dieback.

Regional Summary

Northwest:

- Fall webworm was recorded in all Districts, with the exception of Dryden District. Fall webworm nests were commonly seen along roads and around communities, causing light-to-moderate defoliation on individual or small groups of white birch, elm, cherry and alder.

Northeast:

- Recorded in all but Hearst and Cochrane Districts. Defoliation was severe in Chapleau and Wawa Districts on singular open grown and edge alder and pin cherry trees. Light-to-moderate defoliation was recorded in Timmins District right into September.
- In Sault Ste. Marie, Sudbury, North Bay, and Kirkland Lake Districts, varying levels of defoliation were noted on roadside alder, ash, pin cherry, white birch, and trembling aspen.

Southern:

- Fall webworm was observed in 8 of 10 Districts in Southern Region. In Kemptville, Pembroke, Bancroft, and Peterborough Districts, defoliation was moderate-to-severe on black walnut, white birch, white elm, bitternut hickory, and ash. In Aylmer, Guelph, Aurora, and Midhurst Districts, defoliation was light-to-severe on the above mentioned trees, as well as on poplar and sugar and Manitoba maple.



Fall webworm larvae

Frost

Pest Information

Common Name: Frost
Damage Type: Abiotic Damage – Weather Event
Host Species: Black spruce

Key Facts

- Damage from frost can be localized at times.
- Newly opened buds and leaves can be killed by frost.
- Frost damage is most common in low lying areas.

Regional Summary

Northeast:

- On June 19, temperatures dropped below 0°C in Timmins District and cooler than normal temperatures remained for a three day period. Within 15 days, frost damage was apparent at the Evelyn Black Spruce Seed Orchard. Five percent of the black spruce trees had low levels of damage from frost.
- Hearst District saw two nights with temperatures below 0°C during the month of June. On average, 10% of black spruce at the Edward Bonner Tree Improvement Center had light-to-moderate damage from frost.



Frost damage on white spruce

Grasshopper

Pest Information

Common Name:	Grasshopper
Latin Name:	Family Acrididae
Pest Origins:	Native to North America
Pest Type:	Plant eater
Host Species:	Jack pine, white and black spruce

Key Facts

- Seedlings have been damaged on occasion by grasshoppers in Ontario.
- Within minutes of being planted, grasshoppers can descend upon a seedling, quickly strip the bark from the stem, clip the seedling off just above the ground line, and then eat the needles.
- In 1991, over 8,000 jack pine seedlings were destroyed by grasshopper in Sioux Lookout District.
- Damage from grasshoppers is rare, but it does happen.

Regional Summary

Northeast:

- In Timmins District, forest industry reported a failure of newly planted jack pine and spruce seedlings southwest of Timmins.
- The site was burned in the spring of 2012, sprayed in 2013 to control vegetation, and planted in mid-June 2014.
- Not long after planting, most of the jack pine seedlings had been stripped of their tender bark or completely cut off close to the ground.
- The spruce seedlings had bark partially stripped off and the upper portion of their foliage eaten. It looks as though these seedlings will survive.
- Samples collected were sent for analysis and grasshopper damage was confirmed.



Grasshopper

Gray Willow Leaf Beetle

Pest Information

Common Name:	Gray willow leaf beetle
Latin Name:	<i>Tricholochmea decora decora</i> (Say)
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Willow spp.

Key Facts

- Adults and larvae feed on foliage.
- Epidemic levels have been seen in Newfoundland, western Ontario, and the Prairie Provinces.
- Feed in large groups.
- Leaves turn brown after larvae skeletonize foliage.

Regional Summary

Northeast:

- Extensive and widespread defoliation of willow shrubs was observed throughout Chapleau and Wawa Districts.
- Damage began to appear at low levels in widely scattered pockets in mid-July, feeding continued into late August, and damage became abundant throughout both Districts.
- Willow shrubs along roadsides, cutovers, and marshes were affected at a severe level with the majority of them sustaining 100 per cent defoliation.



Gray willow leaf beetle

Greenstriped Mapleworm

Pest Information

Common Name:	Greenstriped mapleworm
Latin Name:	<i>Dryocampa rubicunda</i> (F.)
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Red and sugar 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 North Bay District, greenstriped mapleworm defoliated approximately 20% of young and semi-mature understory red maple trees in a red spruce stand north of North Bay.
- Young red maple had up to 80% defoliation, while semi-mature trees had substantially less (<10%).
- In Timmins District, low populations and light defoliation were found on the north side of Hwy 560, south of Gogama. This was the fourth consecutive year greenstriped mapleworm was found on scattered understory young red maple in this jack pine stand.



Green striped mapleworm on red maple

Green Hemlock Needleminer

Pest Information

Common Name:	Green hemlock needleminer
Latin Name:	<i>Coleotechnites apictripunctella</i> (Clem.)
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Eastern hemlock

Key Facts

- Occurs on hemlock in Eastern Canada and local outbreaks have been reported from the northeastern United states.

Regional Summary

Southern:

- In Kemptville District, Hemlock needleminer was collected in Ivy Lea Campground, and caused moderate damage to eastern hemlock.
- Light damage was also observed at Charleston Lake Provincial Park and at the Upper Canada Village Bird Sanctuary.



Green hemlock needleminer defoliation

Hypoxylon Canker

Pest Information

Common Name:	Hypoxylon canker
Latin Name:	<i>Entoleuca mammata</i> (Wahlenb.) Rogers & Ju
Pest Origins:	Native to North America
Pest Type:	Fungal disease
Host Species:	Trembling aspen

Key Facts

- Serious problem, that often causes extensive trembling aspen mortality.
- Canker girdles the main stem of the tree, making it susceptible to snap.
- More common in poorly stocked stands.
- Spores enter the tree through bark wounds.
- Stands under moisture stress show greater susceptibility to the disease.

Regional Summary

Northwest:

- Found throughout Fort Frances and Kenora Districts. A higher incidence of cankers was found in young trembling aspen stands along Hwy 11 and Hwy 622.
- Found throughout Thunder Bay District, causing moderate levels of damage.



Hypoxylon canker

Imported Willow Leaf Beetle

Pest Information

Common Name:	Imported willow leaf beetle
Latin Name:	<i>Plagiodera versicolora</i> (Laich.)
Pest Origins:	Exotic
Pest Type:	Defoliator
Host Species:	Willow spp.

Key Facts

- Adults eat developing leaves in early spring, while the larvae skeletonize leaves.
- It is possible to observe 3 generations a year.
- Although much defoliation occurs, damage to trees is not serious unless several years of severe defoliation take place.

Regional Summary

Northeast:

- In Sudbury, North Bay, and Kirkland Lake Districts, 50 to 70% defoliation was observed on both native and ornamental willow shrubs and trees of all age classes. Southern:
- Moderate-to-severe defoliation was observed in late May and early June in both Aylmer and Guelph Districts.
- In Midhurst District, 60% defoliation was observed on 90% of willows in the area.
- In Peterborough District, this pest was first detected in early May with adult feeding on foliage within the city of Peterborough, along the northern shore of Little Lake. Defoliation was severe, causing all affected willow in the area to re-foliate.
- Severe defoliation was also observed in the Millbrook Conservation Area along Baxter Creek and along the Belleville Harbour.



Imported willow leaf beetle damage

Introduced Pine Sawfly

Pest Information

Common Name:	Introduced pine sawfly
Latin Name:	<i>Diprion similis</i> (Htg.)
Pest Origins:	Exotic
Pest Type:	Defoliator
Host Species:	Pine spp.

Key Facts

- First found in Ontario, near Oakville, in 1931.
- Causes severe defoliation that has often resulted in widespread tree mortality in affected areas, especially on white pine in Parry Sound District.
- Natural control factors help keep populations low.
- Has two generations per year, with the second generation usually more abundant in August and September.

Regional Summary

Southern:

- This insect was collected at Gratton Progeny Area near Hyndford, Pembroke District and Bolingbroke, Kemptville District, causing light-to-moderate defoliation on white and red pine.



Introduced pine sawfly larva

Large Aspen Tortrix

Pest Information

Common Name:	Large aspen tortrix
Latin Name:	<i>Choristoneura conflictana</i> (Walker)
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Trembling aspen

Key Facts

- After forest tent caterpillar, large aspen tortrix is the 2nd-most damaging aspen defoliator.
- Periodic outbreaks with sharp increases and quick decreases can be observed after 2-3 years of moderate-to-severe defoliation.

Regional Summary

Northeast:

- In Sudbury District, light-to-moderate defoliation of semi-mature and young trembling aspen was observed in a stand along Fisher Side Road in the town of Massey. There were variable levels of defoliation, with an average of 25% defoliation



Large aspen tortrix larva

Larger Boxelder Leafroller

Pest Information

Common Name:	Larger boxelder leafroller
Latin Name:	<i>Archips negundana</i> (Dyar)
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Manitoba maple

Key Facts

- Commonly found in Manitoba and Saskatchewan, it is not a serious pest of forest trees in Ontario and is more of an urban tree problem.
- During severe defoliation of Manitoba maple, larvae will feed on understory shrubs.
- Larvae are wasteful feeders, leaving uneaten foliage in a silken web.
- Tree growth can be reduced with 2-3 consecutive years of severe defoliation, but mortality rarely results.

Regional Summary

Northwest:

- In Fort Frances and Kenora Districts, defoliated Manitoba maple were observed in the towns of Fort Frances and Kenora, with defoliation ranging from 75-90%. Trees had fully re-flushed by August.

Northeast:

- In Sudbury District, young to semi-mature Manitoba maple trees within the communities of Webbwood, Espanola, and McKerrow had moderate-to-severe defoliation. Severely defoliated trees had upwards of 75% defoliation.



Larger boxelder leafroller larvae

Lesser Aspen Webworm

Pest Information

Common Name:	Lesser aspen webworm
Latin Name:	<i>Meroptera praveilla</i> (Grt.)
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Trembling aspen

Key Facts

- Found Canada wide, but more common on the Prairies.
- Not a major defoliator by itself, but is usually found in conjunction with other leafrollers.

Regional Summary

Northeast:

- In Sudbury District, light defoliation (15%) was recorded on Manitoulin Island, along Hwy 540, south of Helen Bay and Bell Road. Defoliation occurred in a mixedwood stand with young and semi-mature trembling aspen.

Linospora Leaf Blight

Pest Information

Common Name:	Linospora leaf blight
Latin Name:	<i>Linospora tetraspora</i> G.E.Thomps.
Pest Origins:	Native to North America
Pest Type:	Foliar disease
Host Species:	Balsam poplar

Key Facts

- Foliar disease that affects all ages of balsam poplar.
- Severe infection causes early leaf drop.
- Several consecutive years of severe infection can cause reduced vigour and increased susceptibility to other pathogens.

Regional Summary

Northeast:

- In Cochrane and Wawa Districts, Linospora leaf blight appeared in mid-August, affecting the majority of balsam poplar. Premature foliar browning levels were observed at 50-100% on all age classes of balsam poplar.
- In Timmins District, severe levels of premature colour change and leaf drop were recorded on mature-to-overmature balsam poplar at the end of July in Enid Twp. Ground checks confirmed Linospora leaf blight and some septoria leaf spot. Intermediate balsam poplar within this stand also sustained up to 40% defoliation by Linospora leaf blight.



Linospora leaf blight

Maple leafroller

Pest Information

Common Name:	Maple leafroller
Latin Name:	<i>Sparganothis acerivorana</i> Mack.
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Sugar maple

Key Facts

- Defoliation normally does not permanently harm tree, but when defoliation is severe dieback and mortality may occur on already weakened trees.
- Mostly seen on sugar maple in eastern North America, but can also be found on red maple.
- Severe outbreaks have occurred in Quebec and Wisconsin, and have led to some mortality in Wisconsin.
- So far, not a real problem in Ontario.

Regional Summary

Northeast:

- In Sudbury District, maple leafroller caused moderate defoliation on young and semi-mature sugar maple near Worthington. The larvae had rolled and tied leaves, affecting approximately 20% of leaves on each tree.



Maple leafroller larva

Maple Petiole Borer

Pest Information

Common Name:	Maple petiole borer
Latin Name:	<i>Caulocampus acericaulis</i> (MacG.)
Pest Origins:	Native to North America
Pest Type:	Petiole borer
Host Species:	Sugar maple

Key Facts

- A sawfly that occurs sporadically from year to year.
- Larvae feed in petioles and leaves drop prematurely.
- One generation a year occurs.
- Leaf damage is minimal and does not cause harmful damage to the tree.

Regional Summary

- Southern:**
- In Peterborough District, damage occurred on all understory sugar maples at light (5%) levels, north of Pontypool and east of the Ganaraska Forest. Damage occurred on fringe forests and on several hedgerows in Peterborough County.



Feeding hole of maple petiole borer

Marssonina Leaf Spot

Pest Information

Common Name:	Marssonina leaf spot
Latin Name:	<i>Marssonina brunnea</i> (Ell & Ev.) Magn.
Pest Origins:	Native to North America
Pest Type:	Foliar disease
Host Species:	Trembling aspen

Key Facts

- Leaf spot disease on poplar.
- A wet spring or wet late summer can promote degradation.
- A heavy infestation causes early leaf drop.

Regional Summary

- Southern:**
- In Aylmer and Guelph Districts, leaf spot was found at moderate levels on trembling aspen in woodlots and open-grown trees.



Marssonina leaf spot on trembling aspen

Mourningcloak Butterfly

Pest Information

Common Name:	Mourningcloak butterfly
Latin Name:	<i>Nymphalis antiopa</i> (L.)
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Willow, elm, and aspen spp.

Key Facts

- Distributed through North America, Europe, and Britain.
- Also known as spiny elm caterpillar.
- In previous years, it was most commonly seen on elm, but with the decline in elm trees due to Dutch elm disease, most reports are now on willow or aspen.
- Defoliation can be severe for a couple of years, but normally not serious enough to cause a threat to the host.

Regional Summary

Northwest:

- In Dryden District, high populations were found north of Vermilion Bay in late August.
- The larvae caused severe defoliation to willow shrubs in the area around Blue Lake.



Mourningcloak butterfly larvae

Needle Rust of Balsam Fir

Pest Information

Common Name:	Needle rust of balsam fir
Latin Name:	<i>Pucciniastrum epilobii</i> G.H. Otth.
Pest Origins:	Native to North America
Pest Type:	Needle rust
Host Species:	Balsam fir

Key Facts

- This rust requires two hosts to complete its lifecycle: fireweed to overwinter and balsam fir needles in the spring.
- Causes premature needle drop.
- Only the current year’s needles are affected;
- May be a problem in Christmas tree plantations.
- Removal of surrounding fireweed will reduce infection rate.
- Consecutive years of infection can reduce tree growth.

Regional Summary

Northwest:

- Found throughout Fort Frances and Kenora Districts.
- In Fort Frances District, a sample was collected in a mixed wood stand from an understory young balsam fir near Atikokan on Perch Lake Road. This tree had trace infection and some infected needles had already dropped.



Needle rust of balsam fir

Northern Tent Caterpillar

Pest Information

Common Name:	Northern tent caterpillar
Latin Name:	<i>Malacosoma californicum pluviale</i> (Dyar)
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Willow, choke cherry, pin cherry

Key Facts

- Used to be called western tent caterpillar.
- It is found from Quebec to British Columbia.
- Primarily feeds on pin cherry and willow.
- Found in June and July.
- Not a major forest pest, but is unsightly.

Regional Summary

Northwest:

- In Nipigon and Thunder Bay Districts, severe defoliation was found along roadsides, with low distribution across the districts.
- In Nipigon District, it was collected on choke cherry, northwest of Beardmore.

Northeast:

- In Timmins District, two roadside colonies were found in Sewell Twp in mid-June. Defoliation was between 15 -35% on two small willows, and general surveys in the following weeks verified that populations were low and contained to this area.



Northern tent caterpillar

Oak Anthracnose

Pest Information

Common Name:	Oak anthracnose
Latin Name:	<i>Apiognomonia errabunda</i> (Roberge) Hohn.
Pest Origins:	Native to North America
Pest Type:	Foliar disease
Host Species:	Hardwoods; bur oak

Key Facts

- Not a serious pest of forest trees, but often causes concern to homeowners.
- A single year of infection is not harmful to trees, but successive years of infection can affect tree growth and can cause branch dieback.

Regional Summary

Northwest:

- In Fort Frances District, infection was observed on mature bur oak along the Rainy River, with heaviest damage occurring in the lower crown. Trees are showing some signs of dieback, but remain relatively healthy.
- A cool, wet spring provided ideal conditions this year for this foliar disease.



Oak anthracnose

Obliquebanded Leafroller

Pest Information

Common Name:	Obliquebanded leafroller
Latin Name:	<i>Choristoneura rosaceana</i> (Harr.)
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Varied hardwoods; basswood, red maple

Key Facts

- Eggs are laid on upper surface of leaves in masses.
- May have two life cycles a year, pupating in rolled terminal leaves.
- Has caused considerable aspen defoliation in the past.

Regional Summary

Southern:

- In Bancroft District, small populations were first identified in late May. By mid-June, light (15%) defoliation was observed on red maple at the southern shore of Chandos Lake.
- In Peterborough District, light (10%) defoliation was recorded on semi-mature basswood, northeast of Keene and south of Hwy 7.
- In Aurora District, this pest was present at Cold Creek conservation area, Peel Region, where two basswood trees had 3% of leaves rolled.



Obliquebanded leafroller

Phyllosticta Leaf Spot

Pest Information

Common Name:	Phyllosticta leaf spot
Latin Name:	<i>Phyllosticta minima</i> (Berk. & M.A. Curtis) Underw. & Earle
Pest Origins:	Native to North America
Pest Type:	Foliar disease
Host Species:	Maple spp.

Key Facts

- Severely affected trees have a poor aesthetic appearance and drop their leaves prematurely.
- Tree vigor may be reduced after consecutive years of heavy infection.
- This fungus overwinters on fallen leaves, from which it can infect new leaves the following spring.

Regional Summary

Southern:

- In Aylmer District, low levels were identified on silver maple within woodlots of Archie Coulter Conservation Area, Elgin County.
- In Guelph District, low levels were identified on open-grown silver maple within the community of Selkirk, Haldimand County.
- In Kemptville and Pembroke districts, minor damage to red maple was found across the districts. It was likely a factor in premature leaf color change to many low lying red maple stands observed during aerial surveys. A ground sample was collected and confirmed off of Roger Stevens Rd. outside of North Gower.



Phyllosticta leaf spot on red maple

Pine False Webworm

Pest Information

Common Name:	Pine false webworm
Latin Name:	<i>Acantholyda erythrocephala</i> (Linnaeus)
Pest Origins:	Exotic – Native to Europe and Asia
Pest Type:	Defoliator
Host Species:	Eastern white pine, red pine, Scots pine

Key Facts

- First collected in Ontario in 1961.
- Rarely was a problem until 1993, when defoliation was recorded on semi-mature and mature pine trees.
- Infestation peaked in 1997, with almost 9,000 ha of moderate-to-severe defoliation.
- First time in over 17 years pine false webworm was not aerially mapped, as very low levels were observed in 2014.

Regional Summary

Northeast:

- In Hearst District, at Bonner Forest Genetics Centre, trace defoliation was found on one open grown Scots pine approximately 2 m tall.
- In North Bay District, light defoliation was recorded on three branches of one mature eastern white pine tree on Presquile Road in Alban. Southern:
- In Kemptville District, severe defoliation on a young, open-grown red pine was observed in Bolingbroke, north of Westport. The foliage on the 4 m tree was almost completely removed.
- In Pembroke District, in the village of Killaloe, a small red pine tree was infested with redheaded pine sawfly and had one branch with pine false webworm, which was contributing to the overall defoliation of the tree.



Pine false webworm larvae

Pityogenes Bark Beetle

Pest Information

Common Name:	Bark beetle
Latin Name:	<i>Pityogenes hopkinsi</i> Swaine
Pest Origins:	Native to North America
Pest Type:	bark beetle
Host Species:	Eastern white pine

Key Facts

- Prefers eastern white pine, and rarely found on other pines or spruce.
- Common in eastern Canada and eastern United States.
- Recently cut limbs and recently killed trees can be heavily attacked.
- Concentrates attack on smooth bark.
- Can be a problem in plantations, if slash piles are not disposed.
- Can be controlled by destruction of infested trees and slash.

Regional Summary

Northeast:

- In a young white pine plantation in North Bay District, this bark beetle had infested 4% of the trees inspected during a survey. The history of white pine blister rust and heavy pruning made this plantation attractive to the beetles, which are often secondary to a larger stressor.
- While surveying a planation with a history of white pine blister rust in Kirkland Lake District, damage from this bark beetle was noted on 2% of the trees surveyed.



Bark beetle galleries

Poplar Twiggall fly

Pest Information

Common Name:	Poplar twiggall fly
Latin Name:	<i>Hexomyza schineri</i> (Gir.)
Pest Origins:	Native to North America
Pest Type:	Non-leaf feeder
Host Species:	Trembling aspen

Key Facts

- Injury by this fly is not serious.
- Most common on young aspen.
- Female fly lays eggs on branch, larvae hatch, and swelling begins as a response to larval feeding.
- Galls continue to grow in subsequent years until they are incorporated into branches, which may appear as swollen bands.
- Disfigurement does not affect tree health.

Regional Summary

Northeast:

- In Hearst and Timmins districts, scattered populations causing light-to-moderate damage were observed, and were more noticeable in the fall with leaf off.
- In Hearst District, an infestation was recorded in the Edward Bonner Tree Improvement Center, where main stems and branches of young trembling aspen were encircled with galls. Approximately 50% of trembling aspen were affected in this small natural stand.



Galls caused by poplar twiggall fly

Ragged Spruce Gall Adelgid

Pest Information

Common Name:	Ragged spruce gall adelgid
Latin Name:	<i>Pineus similis</i> (Gill.)
Pest Origins:	Native to North America
Pest Type:	Gall insect
Host Species:	Black spruce

Key Facts

- Found throughout North America.
- Has a complex lifecycle that does not require an alternate host.
- Can cause twig or branch mortality.
- Can be a problem in Christmas tree plantations.

Regional Summary

Northeast:

- In Hearst District, a heavy infestation was observed at the Edward Bonner Tree Improvement Center. Galls were found on 30% of a black spruce plantation, varying from low-to-high number of galls on the trees.
- Low-to-moderate populations were also found throughout Timmins and Hearst Districts.



Ragged spruce gall adelgid

Redheaded Pine Sawfly

Pest Information

Common Name:	Redheaded pine sawfly
Latin Name:	<i>Neodiprion lecontei</i> (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, for the second consecutive year, this pest was found on mature red pine at a rest area west of Blind River. Branch mortality was recorded on 20% of trees.
- Semi-mature red pine at a campground on Dunlop Lake had several colonies of redheaded pine sawfly, causing severe defoliation on branches, but overall had light defoliation.
- Individual young red pine were defoliated along Hwy 129 north of Little Rapids, north of Wharnccliffe, along Hwy 108 south of Elliot Lake, and along Hwy 546 near Constance Lake. Defoliation ranged from 30-70% Southern:
- In Pembroke District, moderate-to-severe defoliation was noted in Killaloe and Wilno. Trees at both locations were defoliated at levels between 25% and 75%.



Redheaded pine sawfly larvae

Septoria Leaf Spot of Birch

Pest Information

Common Name:	Septoria leaf spot of birch
Latin Name:	<i>Septoria betulae</i> Pass.
Pest Origins:	Native to North America
Pest Type:	Foliar Disease
Host Species:	Birch spp.

Key Facts

- Common fungal disease of birch species.
- Normally prevalent in wet and humid weather conditions.
- Overall effect on tree health is expected to be 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

Northeast:

- In Sudbury District, this leaf spot was noted on individual and small groups of young and semi-mature white birch trees growing within the city of Greater Sudbury. Moderate-to-severe damage was observed, particularly along Hwy 537.
- Roadside stands north of the town of Webbwood were also affected by the leaf spot. The cool, wet weather provided a good environment for this leaf disease.



Septoria leaf spot of birch

Shoot Blight of Aspen

Pest Information

Common Name:	Shoot blight of aspen
Latin Name:	<i>Venturia macularis</i> (Fr.:Fr.) E. Mull. & Arx
Pest Origins:	Native to North America
Pest Type:	Shoot blight
Host Species:	Aspen spp.

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:

- Found throughout Fort Frances and Kenora Districts. The highest occurrence was in Fort Frances District, north of Devlin, in a cutover across from NW Bay Road off Hwy 613.



Shoot blight of aspen on terminal shoot

Spruce Needle Blight

Pest Information

Common Name:	Spruce needle blight
Latin Name:	<i>Rhizophaera kalkhoffii</i> Bubak
Pest Origins:	Native to North America
Pest Type:	Needle blight
Host Species:	Spruce spp.

Key Facts

- Damage is inconsequential to forest stands, but can be a serious problem in Christmas tree plantations.
- Spores are spread primarily by rain splash.
- Needle drop causes tree to look thin.
- Discoloured infected needles are unsightly.
- Infects from the bottom up, and can occasionally kill small trees.

Regional Summary

Northwest:

- Widely distributed throughout Thunder Bay District, causing moderate damage.
 - Found on young roadside trees along Hwy 61 and Hwy 593, and could be seen as far north as Hwy 527, Hwy 811, and north of the town of Armstrong.
- Northeast:
- In Kirkland Lake District, spruce needle blight and Stigmina needle cast had infected 28% of the trees surveyed at a young black spruce plantation at North Sun Seed Orchard Complex. Approximately 5 to 10% of foliage on the infected trees showed symptoms, which included brown foliage and chlorotic, banded needles.
 - In Kirkland Lake District, 12% of the 150 trees surveyed were infected and approximately 5% of the branches showed sign of the disease.
 - In Sudbury District, the disease was confirmed on white, red, and blue spruce in the City of Greater Sudbury, causing moderate-to-severe damage.



Spruce needle blight

Spruce Needle Rust

Pest Information

Common Name:	Spruce needle rust
Latin Name:	<i>Chrysomyxa ledicola</i> Lagerh.
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.
- Alternate hosts are Labrador tea and leather leaf.
- Most common along bogs edge, where the alternate hosts reside.
- 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:

- Found in Fort Frances and Kenora districts.
- Found throughout the town of Fort Frances and east of Atikokan.
- Found off highway 17, west of Kenora to the Manitoba border.



Spruce needle rust spores

Tar Spot

Pest Information

Common Name:	Tar Spot
Latin Name:	<i>Rhytisma americanum</i> Hudler & Banik
Pest Origins:	Native to North America
Pest Type:	Foliar disease
Host Species:	Red, silver, and sugar maple

Key Facts

- Exacerbated by wet springs.
- Only aesthetically damaging.
- Rarely a serious problem, but heavy infestations can cause premature leaf drop.

Regional Summary

Southern:

- In Aylmer District, silver maple infected with low levels of tar spot were present throughout Lambton County.
- In Guelph District, silver maple were moderately affected at Conostogo Lake.
- In Aurora District, silver maple were severely infected at Sibbald Point Provincial Park.



Tar spot affecting silver maple

Tar Spot Needle Cast

Pest Information

Common Name:	Tar spot needle cast
Latin Name:	<i>Davisomycella ampla</i> (Davis) Darker
Pest Origins:	Native to North America
Pest Type:	Needle cast
Host Species:	Jack pine

Key Facts

- Heavy infection can result in total needle loss, with the exception of current year’s needles;
- Can reduce tree growth and vigour if severe infection continues for several years.
- Spores will overwinter in dropped needles and can re-infect the following spring.

Regional Summary

Northeast:

- In Sault Ste. Marie District, a single young jack pine in a plantation in Villeneuve Twp was found to be infected, with all of the needles having some level of this needle cast. The area will be surveyed in 2015 to see if the disease has spread to other jack pine.



Tar spot needle cast

Western Gall Rust

Pest Information

Common Name:	Western Gall Rust
Latin Name:	<i>Peridermium harknessii</i> (J.P. Moore) Y. Hirats.
Pest Origins:	Native to North America
Pest Type:	Rust Disease
Host Species:	Jack and Scots 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 Fort Frances District, jack pine regeneration near Lac La Croix had high incidence of infection.

Northeast:

- In Cochrane District, heavy infection was observed in Calvert Twp. Approximately 60% of understory jack pine were infected along Hwy 11.
- In Kirkland Lake District, surveys were conducted at jack pine progeny test sites and seed orchards. At a jack pine seed orchard in Aidie Creek Twp, 71% of semi-mature trees were infected, with galls found on 10% of branches and no main stem infections. At North Sun Seed Orchard, 48% of semi-mature jack pine were infected, with the damage being limited to branch galls. At Ramore Seed Orchard Complex, galls were found on 42% of the 75 trees surveyed. Lethal (mainstem) infections were observed on 26% of the trees infected, while the other 16% were non-lethal infections.



Western gall rust fruiting body

White Pine Blister Rust

Pest Information

Common Name:	White pine blister rust
Latin Name:	<i>Cronartium ribicola</i> 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 District, at the Ewanturel test site, 5% of the trees surveyed had lethal infections, which is the highest percentage in the past 4 years. At the Ingram test site, 2% of trees had lethal infections.
- In North Bay District, at the Gurd test site, 1% of trees surveyed had lethal infections.

Southern:

- In Peterborough District, in a 1 ha eastern white pine plantation, <5% of the trees had lethal infections.



White pine blister rust on young eastern white pine

White Pine Weevil

Pest Information

Common Name:	White pine weevil
Latin Name:	<i>Pissodes strobi</i> Peck
Pest Origins:	Native to North America
Pest Type:	Shoot borer
Host Species:	Pine spp. (prefers eastern white pine) and spruce spp.

Key Facts

- Found throughout the range of pine in North America.
- Most prevalent on open-grown trees in full sunlight.
- Can seriously affect tree form.
- Repeated attacks can result in deformed and multi-stemmed trees, decreasing volumes and wood quality.

Regional Summary

Northeast:

- In Hearst District, weevil damage was detected in black spruce seed orchards at the Edward Bonner Tree Improvement Center. Young plantations (~11 years old and 2 m in height) were affected more than older plantations (~28 years old and 6 m in height). Black spruce plantations had 2% new weevil damage and 3% old weevil damage.
- In Kirkland Lake District, 9% of the 100 black spruce trees surveyed at North Sun Tree Nursery had dead, curled leaders with weevil exit holes from the previous year’s infestation;



White pine weevil damage

Willow Leafminer

Pest Information

Common Name:	Willow leafminer
Latin Name:	<i>Micrurapteryx salicifoliella</i> (Chambers)
Pest Origins:	Native to North America
Pest Type:	Leafminer
Host Species:	Willow spp.

Key Facts

- Damage is unsightly, but causes no permanent injury.
- Leaf mining causes foliage to brown.
- Can be widespread at times.

Regional Summary

Northwest:

- In Dryden, Red Lake, and Sioux Lookout districts, red foliage was observed on young willow in early July during ground surveys. Willow on roadsides, lakes shores, swamps, and in creek beds were all affected, with defoliation observed across the districts. Generally, infestations impacted 30-80% of the foliage on approximately 50% of the willow.
- Found throughout Kenora and Fort Frances districts from Quetico Park towards Rainy River, mostly along logging roads in areas with willow and usually causing minimal damage. In Kenora, it was found along Hwy 17 and north towards Grassy Narrows.



Willow leafminer damage

Yellowheaded Spruce Sawfly

Pest Information

Common Name:	Yellowheaded spruce sawfly
Latin Name:	<i>Pikonema alaskensis</i> 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.

Regional Summary

Northwest:

- In Northwest Region, defoliation occurred in the communities of Sioux Lookout, Thunder Bay, Kenora, Fort Frances, and Atikokan. Defoliation was severe on Colorado blue spruce and light on white and black spruce.

Northeast:

- In Chapleau District, defoliation was recorded in a 15 year old black spruce plantation, southwest of Chapleau. The plantation had an average defoliation of 10%, but along the southern edge of the plantation, trees had 100% defoliation.

Southern:

- In Kemptville District, severe defoliation was observed on white spruce in Bolingbroke. Light defoliation on host trees was also found at the March Road Burntlands.



Yellowheaded spruce sawfly larvae