Forest Health Conditions in Ontario 2013

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Forest Health Conditions in Ontario - 2013

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Find the Ministry of Natural Resources on-line at:
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For more information on forest health in Ontario visit the Natural Resources website:
www.ontario.ca/foresthealth

You can also visit the Canadian Forest Service website:
www.glfc.cfs.nrcan.gc.ca

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Forest tent caterpillar

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Birch skeletonizer damage.

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Surveying for drought damage.

Provincial Overview

Introduction

Forest health monitoring in Ontario is conducted as a partnership with the Ontario Ministry of Natural Resources (MNR) 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 interest, particularly invasive species, or pests affectng 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 types in the province, regardless of ownership, are monitored each year. Recording and reporting forest health conditions in Ontario includes monitoring the occurrence of disturbances and events, caused by native, non-native and invasive biotic (e.g., insects, disease) and abiotic (e.g., snow and drought damage) agents.

Insect diagnostics were performed through a partnership with MNR, CFS, and the Invasive Species Centre. Samples collected by the program were identified by the Invasive Species Centre. CFS supported insect diagnostics by providing verification of the original insect identication. Results of the insect collections were entered into the national database managed by CFS.

Disease samples were identified by the Ontario Forest Research Institute.

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. Throughout the field season, forest health updates are distributed to client groups including forest industry, government, landowners and other interested stakeholders. The final results and analyses are described in this report.

Jack pine budworm sampling.

Provincial Overview

The increased number of tornadoes reported may be a result of the public submittng videos or photographs for confirmation. Most of the tornadoes of 2013 did not occur over forested areas.

Insect infestations

Jack pine budworm (*Choristoneura pinus pinus* Freeman) has been in an outbreak in Ontario since 2004, with defoliation peaking in 2006 at 740,116 ha of moderate-to-severe defoliation. The area of defoliation steadily declined afterwards reaching a low in 2011 of 27,765 ha. The trend then reversed in 2012 when defoliation increased to 61,018 ha. It increased again in 2013, reaching 83,075 ha. The increased defoliation occurred only in Sioux Lookout District in Northwest Region Populations have collapsed elsewhere in the region and in Northeast and Southern regions. Monitoring of the jack pine budworm situation will be continued in order to determine whether the Sioux Lookout population continues to increase, or returns to endemic levels. No management programs are planned, as the current infestation is still small (i.e. less than 100,000 ha) and is occurring in an area where there is limited forest management or timber harvesting.

The spruce budworm (*Choristoneura fumiferana* Clemens) outbreak collapsed in Northeast Region between Sudbury, North Bay, and Temagami. Only 253 ha of moderate-to-severe defoliation occurred in 2013, compared to 99,797 ha in 2012. Defoliation only occurred in small, scattered pockets from Sudbury to Lake Wahnapitae, North Bay and Cobalt. The population in Northeast Region is expected to remain at low levels for the next several years. Nonetheless, the 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 increasing populations which may signal the beginning of the next outbreak.

The forest tent caterpillar (*Malacosoma disstria* Hubner) outbreak in the northwest increased sixfold in 2013. Moderate-to-severe defoliation reached 191,831 ha and stretched from Red Lake to Kenora, Dryden, Sioux Lookout and Nipigon districts. There was no defoliation in Thunder Bay or Fort Frances areas, although ground surveys found caterpillars present in these areas. Based on the historical pattern of outbreaks occurring every 10-12 years, the 2012-13 defoliation likely signals an outbreak is beginning. This new outbreak has the potential to reach millions of hectares in size over the next few years.

Forest tent caterpillar continued to defoliate trees in Southern Region. In 2013 there were 12,303 ha of defoliation occurring in woodlots and forested areas near the southern part of Georgian Bay

Jack pine pheromone trap.

Provincial Overview

Weather patterns

Weather affects the growth, phenology (timing of the 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 or mortality.

Overall the 2013 growing season was cooler and wetter than normal, with some exceptions. Spring arrived late, especially in northern Ontario where cold temperatures and snow occurred in April, May, and early June. Temperatures rose towards the end of June, with heat alerts and day time highs in southern Ontario exceeding 30°C. Normal to below-normal temperatures and ample rainfall continued into July and August. Although September saw some warm weather, parts of the province saw high amounts of rainfall that led to significant flooding.

The 2013 weather generally favoured tree growth and health. Forest insects did not do well because of the cooler temperatures. Fungi likely benefited from the cool wet weather, but did not result in major forest disturbances.

Snow damage.

Extreme weather and abiotic events

Unlike 2012, there were no new drought effects mapped in 2013. An assessment of the impacts of the 2012 drought was undertaken in 2013. These assessments found 2,262 ha of mortality to red pine stands, and 464 ha of mortality to hardwood trees in south central and south eastern Ontario.

A late spring frost in 2013 resulted in damage to trembling aspen trees over a large portion of the province. Much of this could not be aerially mapped because it consisted of scattered pockets of trees affected from Ottawa to Sault Ste. Marie. Damage was severe enough in the northwest to enable aerial mapping, with 281,794 ha affected.

A heavy snowfall in October 2012 resulted in a large area of damage in the northwest. Aerial mapping in 2013 found 3,210,318 ha of damage, most of which occurred next to the Manitoba border in one large block. Damage consisted of trees uprooted, bent over, or broken.

Blowdown from high wind storms was common across Ontario.. A total of 5,278 ha of forest were affected by wind damage. There were 19 tornadoes in 2013 compared to an annual average of 13.

in Midhurst District. This is down slightly from the 17,767 ha in the same area in 2012. Defoliation in Southern Region is not expected to increase substantially in 2014. Over the next several years, the Northwest Region outbreak may move into Northeast Region then into the central part of Southern Region.

For the second year in a row, gypsy moth (*Lymantria dispar* (L.)) caused moderate-to-severe defoliation in and around the City of Greater Sudbury. Defoliation in 2013 reached 8,451 ha, which was very close to the 8,123 ha affected in 2012.

The insect was also commonly found during ground surveys across the Southern Region. Gypsy moth caused light defoliation affecting 737 ha near Sarnia in Aylmer District. An aerial spray program was conducted in the Etobicoke area of Toronto with the bacterial insecticide B.t.k. to control a significant outbreak. Gypsy moth is not expected to increase to outbreak levels in Southern Region because of very cold winter temperatures of 2013-14.

There were several other insect infestations worth noting in 2013:

- Larch casebearer (*Coleophora laricella* (Hubner)) has been defoliating tamarack trees across Southern Region since 2001. Defoliation in 2013 occurred in scattered pockets, totaling 5,486 ha. This is slightly above the 5,015 ha affected in 2012, which was a substantial increase over the 1,591 ha in 2011.
- For the third consecutive year, birch skeletonizer (*Bucculatrix canadensisella* Chambers) and the fungus septoria leaf spot (*Septoria betulae* Pass.) caused late-season browning and early leaf-drop across Northern Ontario from Kenora east to North Bay. The two species often co-occurred on the same trees and on the same leaves. The severity of this event (i.e., amount of leaves affected, and the proportion of trees affected in a stand), appeared to be much less than in 2012.
- For the second year in a row, cedar leaf miners (*Argyesthia* spp. and *Coleotechnites thujaella* (Kft.)) caused severe browning on eastern white cedar, affecting 6,209 ha in central Southern Region. This area has decreased considerably from the 30,486 ha affected in 2012.

Gypsy moth.

- Aspen two-leaf tier (*Enargia decolor* Walker) continued to cause defoliation in Northeast Region, with 22,451 ha of trembling aspen affected in Sault Ste. Marie, Wawa, and Chapleau districts.

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, leaf diseases occasionally can be mapped when the damage is exceptionally severe. Despite the relatively cool wet weather of 2013, foliar diseases were not common. There were a few exceptions, such as tar spot (*Rhytisma* spp.) on maples, especially Norway maple in much of Ontario.

Spruce needle cast (*Chrysomyxa ledi* var. *groenlandicum* Savile) was common on black spruce in Red Lake, Kenora, Dryden, and Sioux Lookout districts. The high humidity in southern Ontario resulted in anthracnose leaf diseases being common on several hardwood species including maples, oaks, basswood, ash, and black walnut. Brown spot needle blight (*Mycosphaerella dearnessii* M.E. Barr) benefited from the wet weather, causing 167 ha of damage to needles of Scots pine in Sault Ste. Marie district and white pine in Bancroft District.

In late winter 2011-12, a significant thaw-freeze event caused extensive needle browning affecting 281,116 ha in northwestern Ontario. Follow-up assessments in 2013 found good tree recovery.

Tar spot.

Invasive species

Emerald ash borer (*Agrilus planipennis* Fairmaire) is regulated by the Canadian Food Inspection Agency (CFIA). There were several new finds of this insect in Ontario in 2013 by CFIA and MNR. New areas included counties of Grey, Northumberland, Renfrew, Lanark, Simcoe, and Stormont, Dundas and Glengarry, the City of Kawartha Lakes, and Algoma District east of Sault Ste. Marie. Aerial surveys in 2013 showed cumulative decline and mortality had reached 85,069 ha, an increase of 17,150 ha over that mapped by the end of 2012.

In 2013 the first releases of a biocontrol agent were made by the Canadian Forest Service as part of a long term strategy to reduce impacts caused by emerald ash borer. The larval parasitoid *Tetrastichus planipennisi* Yang, native to China, was released at three sites in southwestern Ontario. Follow-up assessments will be done in future years to determine establishment, and impacts on emerald ash borer populations.

Provincial Overview

On April 5, 2013, CFIA declared Asian long-horned beetle (*Anoplohora glabripennis* Motschulsky) eradicated from Toronto and Vaughan. The declaration was based on a program to cut and chip infested trees and host trees within 400 m, followed by five years of surveys which found no beetles or infested trees. In August 2013, a new infestation was found in Mississauga following the discovery of a beetle on a car. Subsequent surveys by CFIA, the cities of Toronto, Mississauga, and Brampton and MNR 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 is now under an aggressive eradication program led by CFIA.

Hemlock woolly adelgid (*Adelges tsugae* Annand) was found by CFIA in 2013 infesting a single eastern hemlock tree in the Niagara River gorge. Subsequent surveys by CFIA and MNR did not find any additional infested trees. This discovery follows the detection and subsequent destruction of five infested hemlock trees in the Etobicoke area of Toronto in 2012. Follow up surveys in the vicinity of the Etobicoke site found two additional infested trees in late fall 2013.

Beech bark disease, which is a combination of an invasive insect (beech scale, *Cryptococcus fagisuga* Linding) and an invasive stem fungus (*Nectria faginata* (Lohman et al.) Castl.) continued to spread in Ontario. Damage continues to accelerate in several locations. Killbear Provincial Park conducted an aggressive beech tree removal and sanitation program where severe tree damage had been creating safety hazards near campsites and general use areas.

For the second year in a row, a pheromone trapping survey was done for walnut twig beetle (*Pityophthorus juglandis* Blackman), the vector for thousand canker disease (*Geosmithia morbida* sp. nov.). As in 2012, no walnut twig beetles were found in the Ontario traps.

Dutch elm disease continued to infect and kill vulnerable elm trees.

Hemlock wooly adelgid.

This report outlines the major and minor forest disturbances including invasive species for 2013. A variety of information is reported on individual species: pest information, key provincial facts, regional summary and where applicable, disturbance maps and area summaries.

Pest Index - Major Forest Disturbances

Major forest disturbances are insect, disease, or weather events that affect very large areas, are not specific to a region, or have affected more than one region in the past. These disturbances are events that are of provincial significance.

Blowdown.

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.

White pine blister rust.

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 or economic values.

Emerald ash borer.

Host Index

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

Common Name	Scientific Name
American beech	*Fagus grandifolia* Ehrh.
American elm / white elm	*Ulmus americana* L.
Balsam fir	*Abies balsamea* (L.) Mill.
Balsam poplar	*Populus balsamifera* L.
Basswood	*Tilia americana* L.
Black spruce	*Picea mariana* (Mill.) BSP
Black walnut	*Juglans nigra* L.
Blueberry	*Vaccinium* spp.
Bur oak	*Quercus macrocarpa* Michx.
Carolina poplar	*Populus x canadensis* Moench cv. Eugenei
Colorado blue spruce	*Picea pungens* Engelm.
Eastern cottonwood	*Populus deltoides* Bartr. ex Marsh.
Eastern white cedar	*Thuja occidentalis* L.
Eastern white pine	*Pinus strobus* L.
European beech	*Fagus sylvatica* L.
European white poplar	*Populus alba* L.
Honey-Locust	*Gleditsia triacanthos* L.
Jack pine	*Pinus banksiana* Lamb.
Labrador tea	*Rhododendron groenlandicum* (Oeder) Kron & Judd
Leatherleaf	*Chamaedaphne calyculata* (L.) Moench
Manitoba maple	*Acer negundo* L.
Norway maple	*Acer platanoides* L.
Pin cherry	*Prunus pensylvanica* L. f.
Red maple	*Acer rubrum* L.
Red oak	*Quercus rubra* L.
Red pine	*Pinus resinosa* Ait.
Scots pine	*Pinus sylvestris* L.
Silver maple	*Acer saccharinum* L.
Speckled alder	*Alnus incana spp. rugosa (*Du Roi) J. Clausen
Tamarack / larch	*Larix laricina* (Du Roi) K. Koch
Trembling aspen	*Populus tremuloides* Michx.
White birch	*Betula papyrifera* Marsh.
White oak	*Quercus alba* L.
White spruce	*Picea glauca* (Moench) Voss

Mapped Area

Major forest disturbances are mapped to quantify current status and to provide trend analysis. The major disturbance areas are categorized into severity classes: light, moderate-to-severe and mortality. An area that is classified as light has 1-25% of trees affected, as moderate-to-severe has 40-100% of trees affected and a mortality classification indicates that a disturbances event (e.g. insect defoliation) has resulted in dead trees.

The following table outlines the total area of mapped damage by severity class for major disturbances in 2013.

Common Name	Light	Moderate-to-Severe	Tree Mortality	Grand Total
Aspen twoleaf tier		22,450		22,451
Birch leafminer		111		111
Blowdown		5,278		5,278
Brown spot needle blight		167		167
Cedar leafminer complex		6,209		6,209
Deciduous decline		464		464
Eastern larch beetle			683	683
Emerald ash borer		85,068		85,068
Forest tent caterpillar	8,509	195,625		204,134
Frost		281,794		281,794
Gypsy moth	737	8,451		9,188
Jack pine budworm		83,075	8,790	91,865
Larch casebearer		5,486		5,486
Pine false webworm		7		7
Red pine decline		2,262		2,262
Satin moth		101		101
Snow damage		3,210,318		3,210,318
Spruce budworm		253	86	339

Note: Cochrane, Hearst, Timmins and Kirkland Lake districts were not surveyed in 2013.

Snow damage.

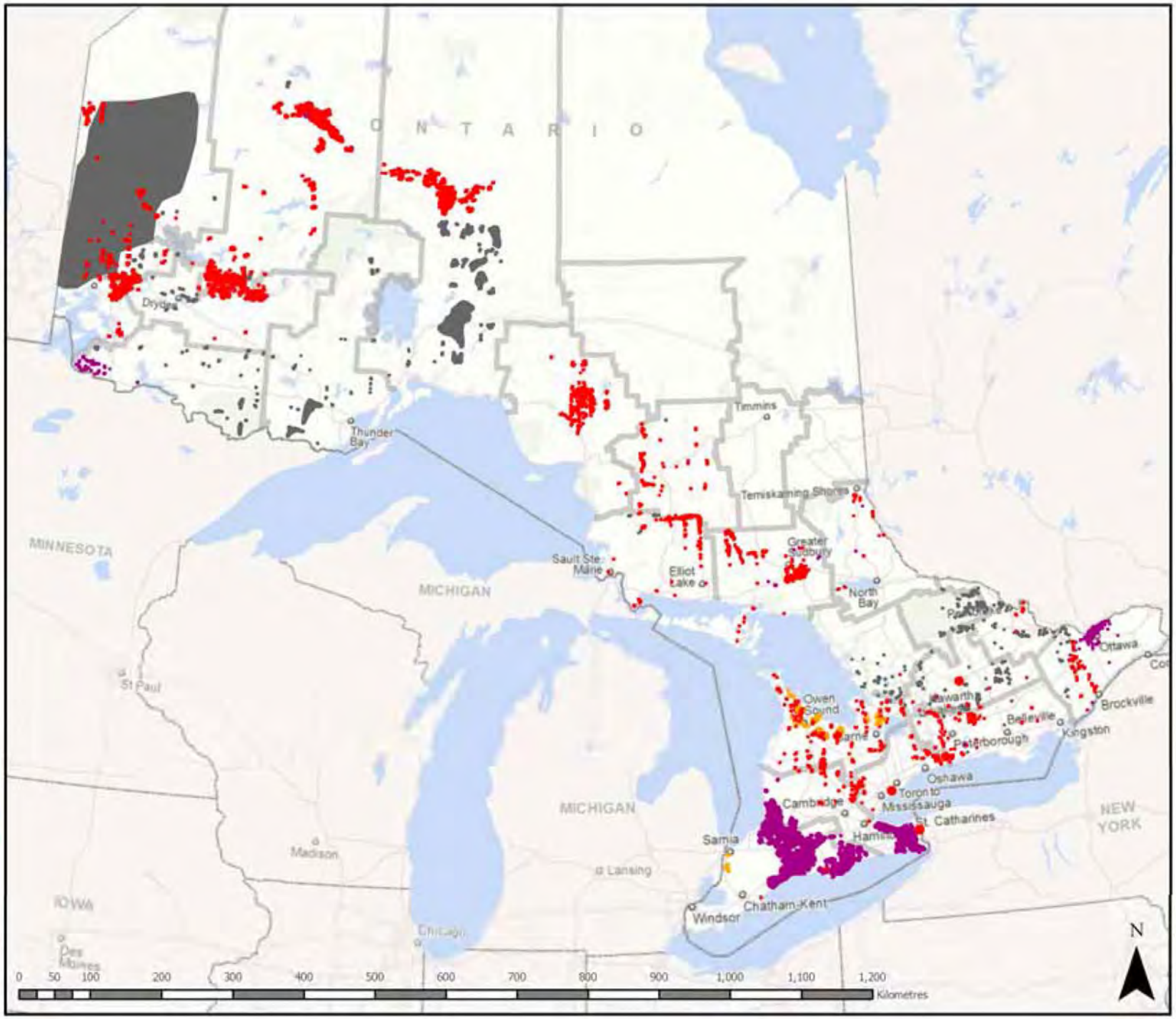
Major Disturbance Maps

Major Disturbances Provincial Overview

Map 1

Areas of biotic and abiotic disturbances at a provincial level.

- Light Biotic Damage
- Moderate-to-Severe Biotic Damage
- Biotic Mortality
- Abiotic Damage



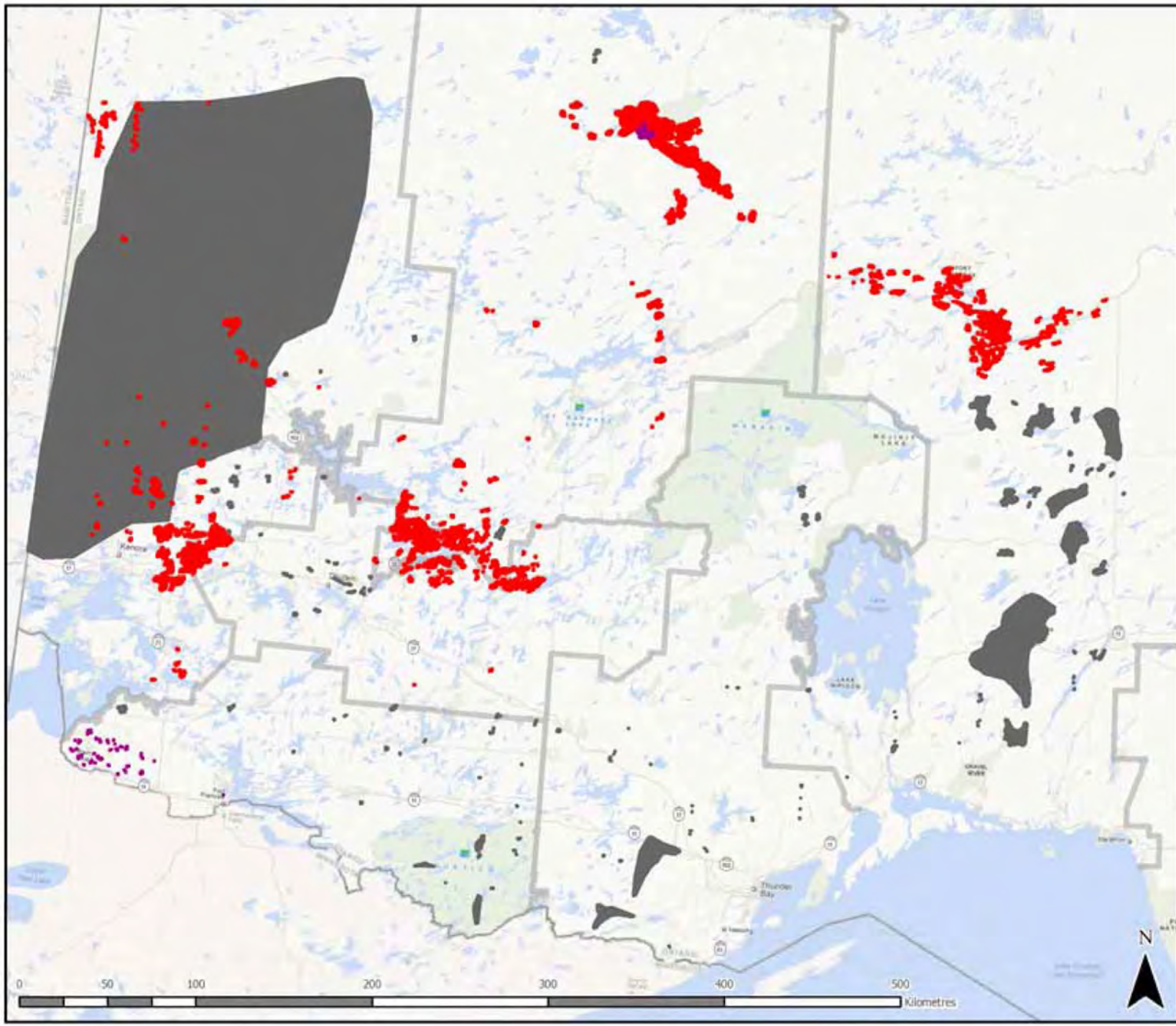
Major Disturbance Maps

Major Disturbances Northwest Overview

Map 2

Areas of biotic and abiotic disturbances at a regional level.

- Light Biotic Damage
- Moderate-to-Severe Biotic Damage
- Biotic Mortality
- Abiotic Damage



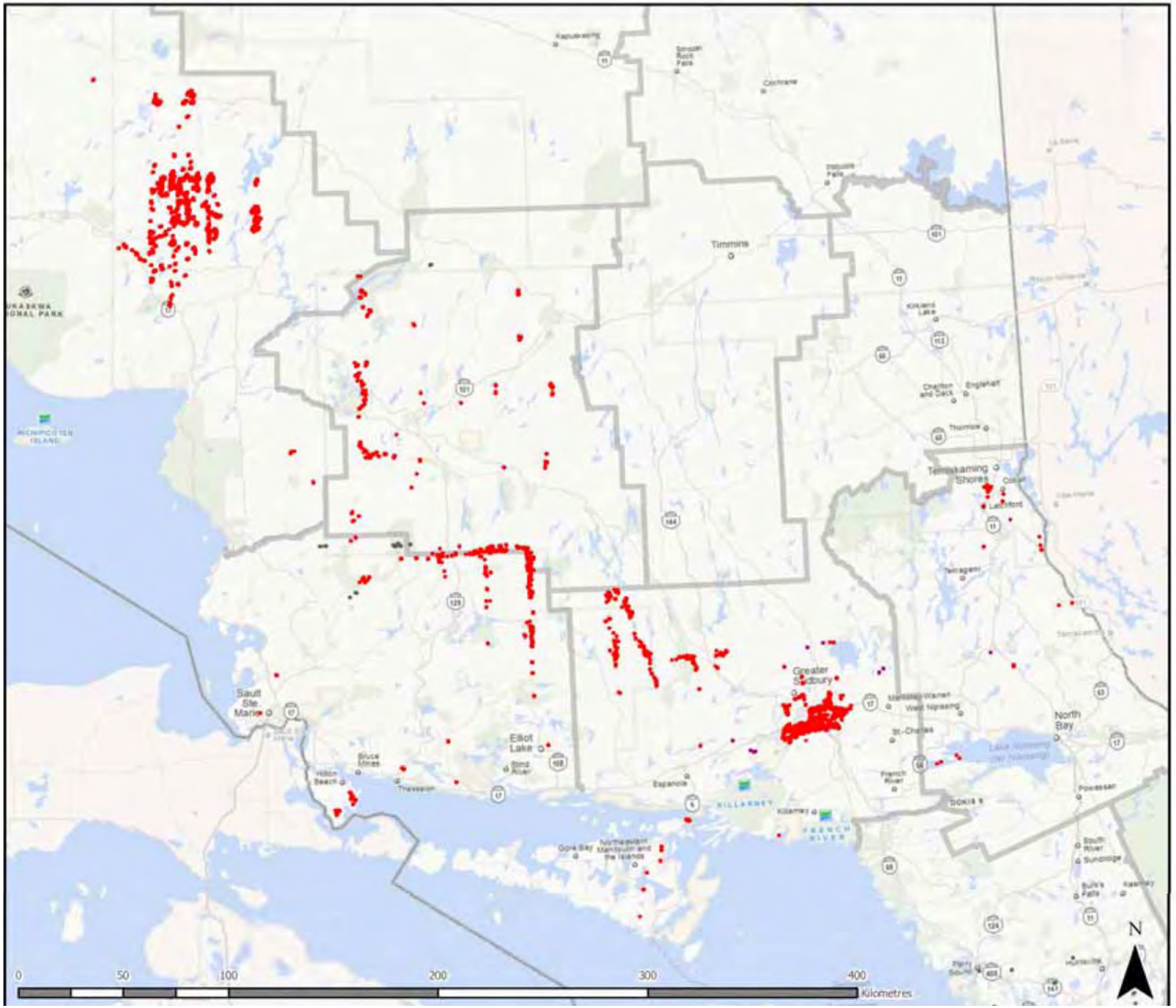
Major Disturbance Maps

Major Disturbances Northeast Overview

Map 3

Areas of biotic and abiotic disturbances at a regional level.

- Light Biotic Damage
- Moderate-to-Severe Biotic Damage
- Biotic Mortality
- Abiotic Damage



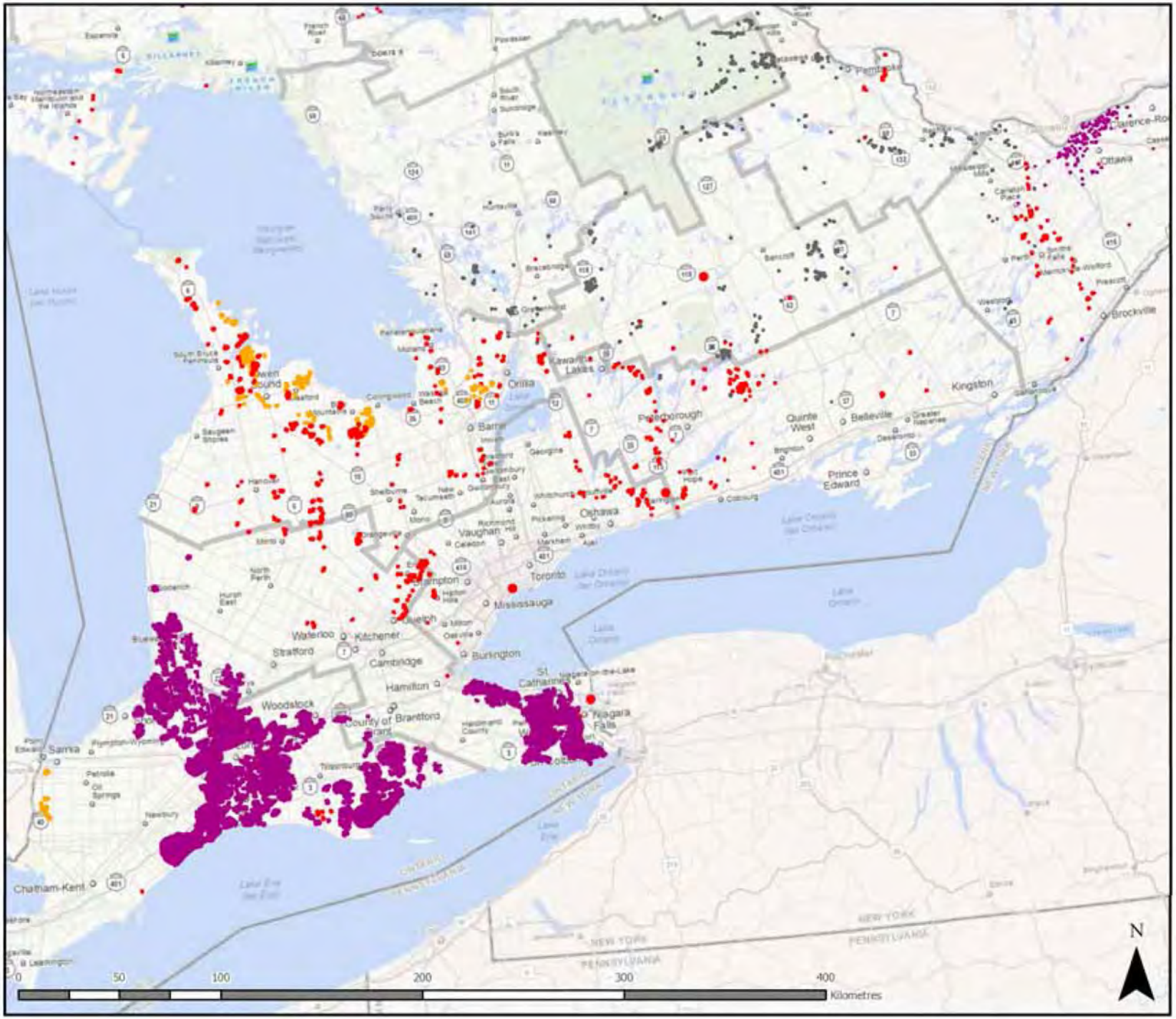
Major Disturbance Maps

Major Disturbances Southern Overview

Map 4

Areas of biotic and abiotic disturbances at a regional level.

- Light Biotic Damage
- Moderate-to-Severe Biotic Damage
- Biotic Mortality
- Abiotic Damage



Example Report - How to read a major disturbance report

Each forest health condition report summarizes information about an event or factor affecting the health of Ontario's forests.

Pest information - basic information for the disturbance, including the type of disturbance, cause and area affected that year.

Provincial key facts - overview of the disturbance including provincial level information about the disturbance.

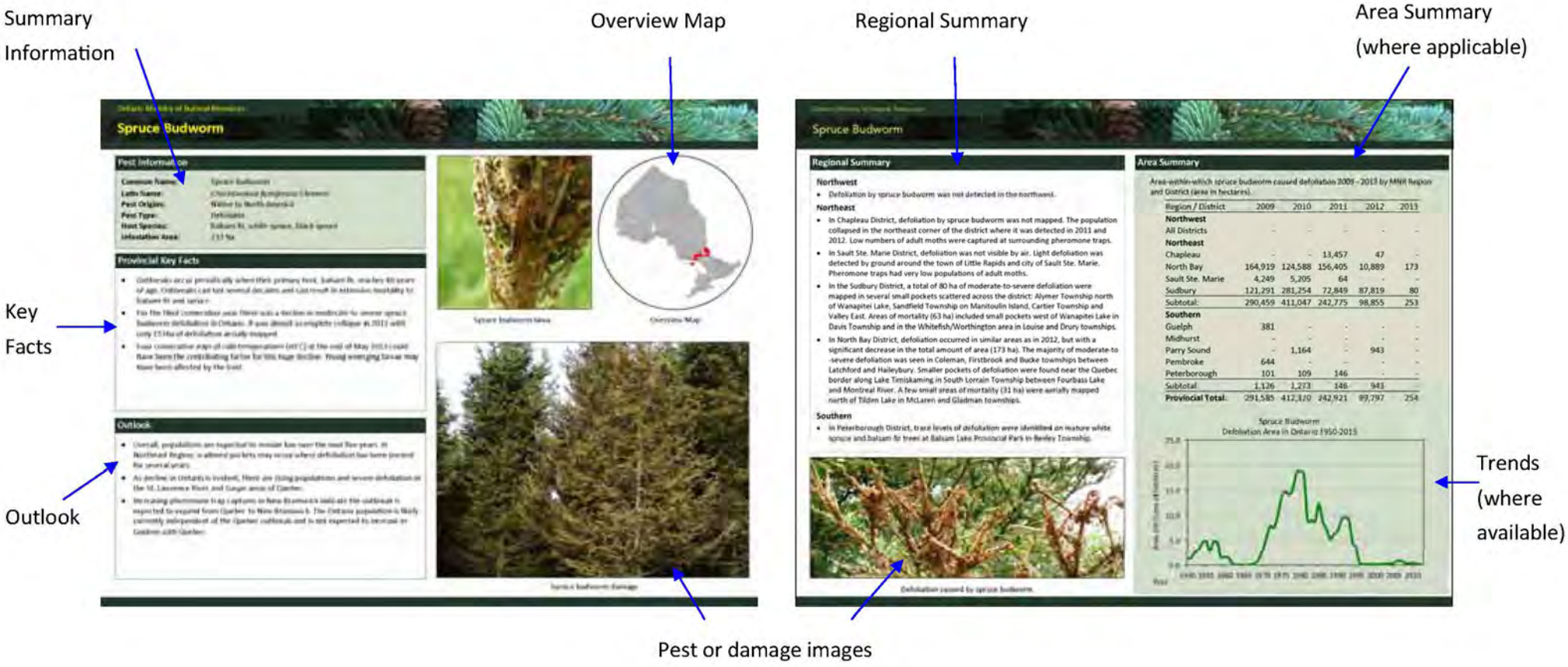
Outlook – where applicable, overview of potential future implications and developments for the disturbance

Overview map – map that indicates the extent of the disturbance at the provincial scale (clicking on the map takes you to more detailed maps for the disturbance)

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

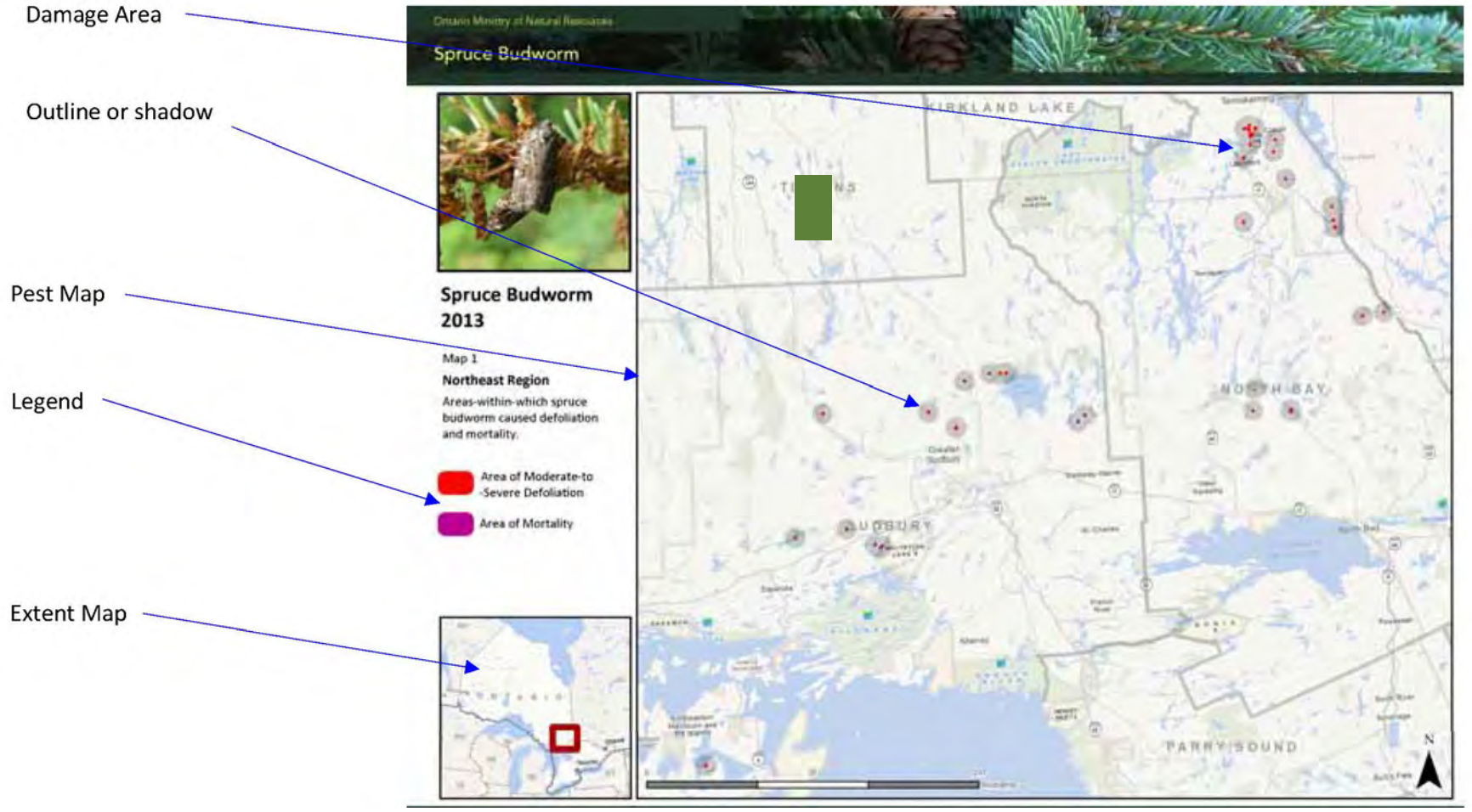
Photograph – photos of pests and associated damage

Additional Information – where applicable, additional information for a disturbance, including area summaries, trends analyses, and survey and monitoring information, often on a second page.



Example Map - How to read maps in this report

Each forest health condition report contains maps that show areas of infestation or damage. Light damage is typically represented in orange, moderate-to-severe damage is red and mortality as purple. The borders of each disturbance area are enhanced for ease of view making the area appear more visible, but larger than it actually is. Also, each damage area is highlighted with a gray shadow or outline to help the user distinguish small damage areas. A legend on the upper left describes the map and an extent map of Ontario shows the maps area of focus outlined in deep red (bottom left).



Disclaimer: The forest health conditions report maps are not to be used for navigation or other purposes. The OMNR 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.

Ontario Ministry of Natural Resources and Forestry

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:	Borer
Host Species:	Hardwood species, including maple trees
Infestation Area:	25 trees within an area of 2000 ha (2013)

Provincial Key Facts

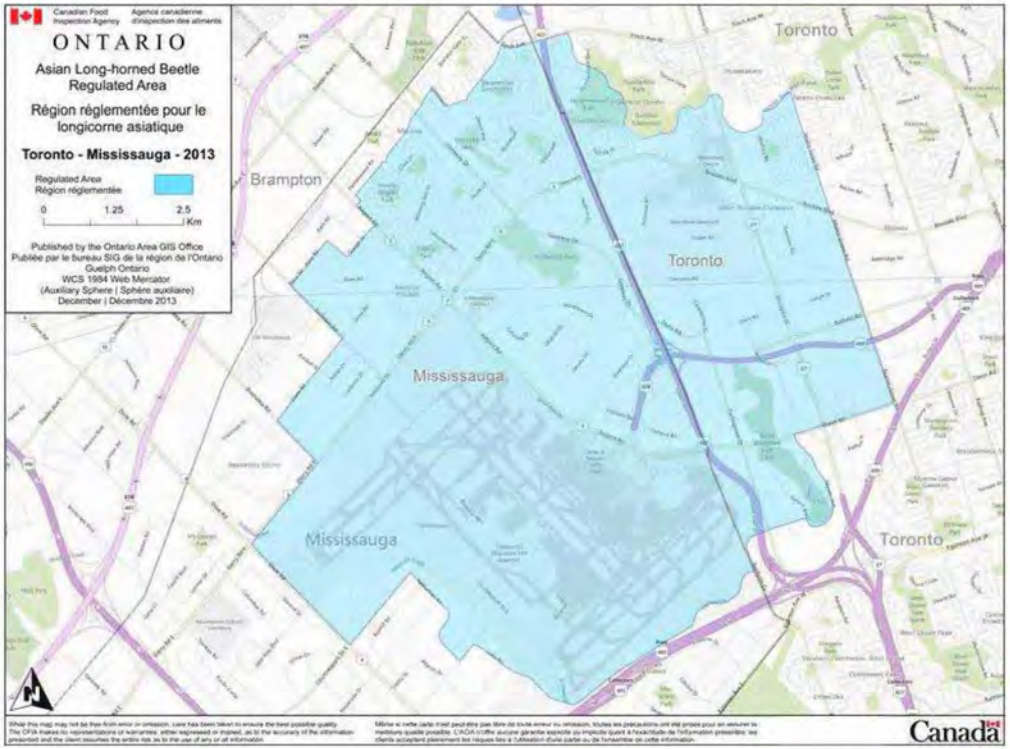
- First found in Canada in September 2003 in the border area of Toronto and Vaughan.
- An eradication program was undertaken under the direction of the Canadian Food Inspection Agency. Surveys were done to delineate the infested area. A Federal Ministerial Order declared a regulated zone around the infestation to restrict the movement of infested material to non-infested areas. All infested trees were cut down and chipped. Nearby host trees up to 400 metres from infested trees were also cut down and chipped. Annual surveys found the last known infested tree in 2007. After five years of no beetles or infested trees being found, the insect was declared eradicated in April 2013.

Summary

- In August 2013 an infestation was found in Mississauga. Delimitation surveys found 25 infested trees, one of which was in Toronto. The 2013 infestation is in a mostly industrial area near Pearson International Airport.
- In February 2014, CFIA led an eradication program of cuttng and chipping infested trees. Host trees within 800 metres of infested trees were also cut.
- Restrictions with regards to movement of nursery stock, trees, logs, lumber, wood, wood chips and bark chips from certain deciduous trees identified as hosts of the ALHB are now in place within the regulated zone.

Asian long-horned beetle.

Overview Map



Asian long-horned beetle regulated area in Toronto—Mississauga—2013.

Ontario Ministry of Natural Resources and Forestry

Aspen Twoleaf Tier

Pest Information

Common Name:	Aspen twoleaf tier
Latin Name:	*Enargia decolor* Walker
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Trembling aspen and eastern cottonwood
Infestation Area:	22,451 ha

Provincial Key Facts

- Periodic outbreaks have occurred frequently since the 1950s.
- Defoliation can be severe during outbreaks.
- Impacts on tree health are usually minimal, unless there are other stressors present.
- Outbreaks often co-occur with other defoliators such as large aspen tortrix.
- The last large-scale outbreak occurred in the 1990s, peaking at 3,008,502 ha of moderate-to-severe defoliation across Northeast Region in 1990.
- 2013 marked the fourth year of the current outbreak. A substantial decrease in area of defoliation occurred in 2013, compared to the 174,655 ha in 2012. Nonetheless, some of the stands affected in 2013 had not been previously defoliated during the current outbreak.

Outlook

• Population outbreaks of this insect are normally short-lived due to natural (but unknown) factors.

• Although little is known about the population dynamics of this insect, widespread severe defoliation is not expected in 2014. Pockets of defoliation may persist in some areas defoliated in 2013.

Aspen twoleaf tier larva.

Overview Map

Aspen twoleaf tier damage.

Aspen Twoleaf Tier

Regional Summary

Northwest

- Aspen twoleaf tier was not reported through aerial or ground surveys.

Northeast

- Aspen twoleaf tier was mapped in Wawa, Chapleau, Sault Ste. Marie and Sudbury districts. During 2013, a total of 22,450 ha of moderate-to-severe defoliation were mapped.
- Wawa District saw a significant increase in defoliation from 387 ha of defoliation mapped in 2012 to 15,623 ha in 2013. Defoliation was concentrated in the central area of the district northeast of White River in the area of Gourlay, Strickland and Nameigos lakes.
- In Chapleau District, area of defoliation drastically decreased with small scattered pockets of defoliation in the south end of the district along the Sault Ste. Marie District border as well as in the northwest end of the district near Missinaibi Lake in Baltic, Missinaibi, Abbey and Buckland townships
- In Sault Ste. Marie District there was a considerable decrease in defoliation. The majority of defoliation was recorded in the northeast portion of the district bordering Chapleau District. Isolated pockets were also mapped on the southeast side of St. Joseph Island.
- The 1,506 ha of defoliation in Sudbury District occurred in the northwest corner of the district. Patches of defoliation were aerially mapped in a swath between Munster Township by Geneva Lake running west to Rush Brook Provincial Park, Northwest Jasper and Alton townships.

Southern

- Aspen twoleaf tier was not reported through aerial or ground surveys.

Area Summary

Total area-within-which aspen twoleaf tier caused moderate-to-severe defoliation 2009 - 2013 by MNR Region and District (area in hectares).

Region/District	2009	2010	2011	2012	2013
Northwest					
All Districts	-	-	-	-	-
Northeast					
Chapleau	-	-	650	139,059	3,305
Kirkland Lake	-	-	-	990	-
North Bay	-	-	-	290	-
Sault Ste. Marie	-	-	832	33,791	2,017
Sudbury	-	-		- 138	1,506
Timmins	-	92	-	-	-
Wawa	-	-	-	387	15,623
Subtotal:	-	92	1,482	174,655	22,451
Southern					
All Districts	-	-	-	-	-
Provincial Total:	-	92	1,482	174,655	22,451

Aspen twoleaf tier adults.

Aspen Twoleaf Tier

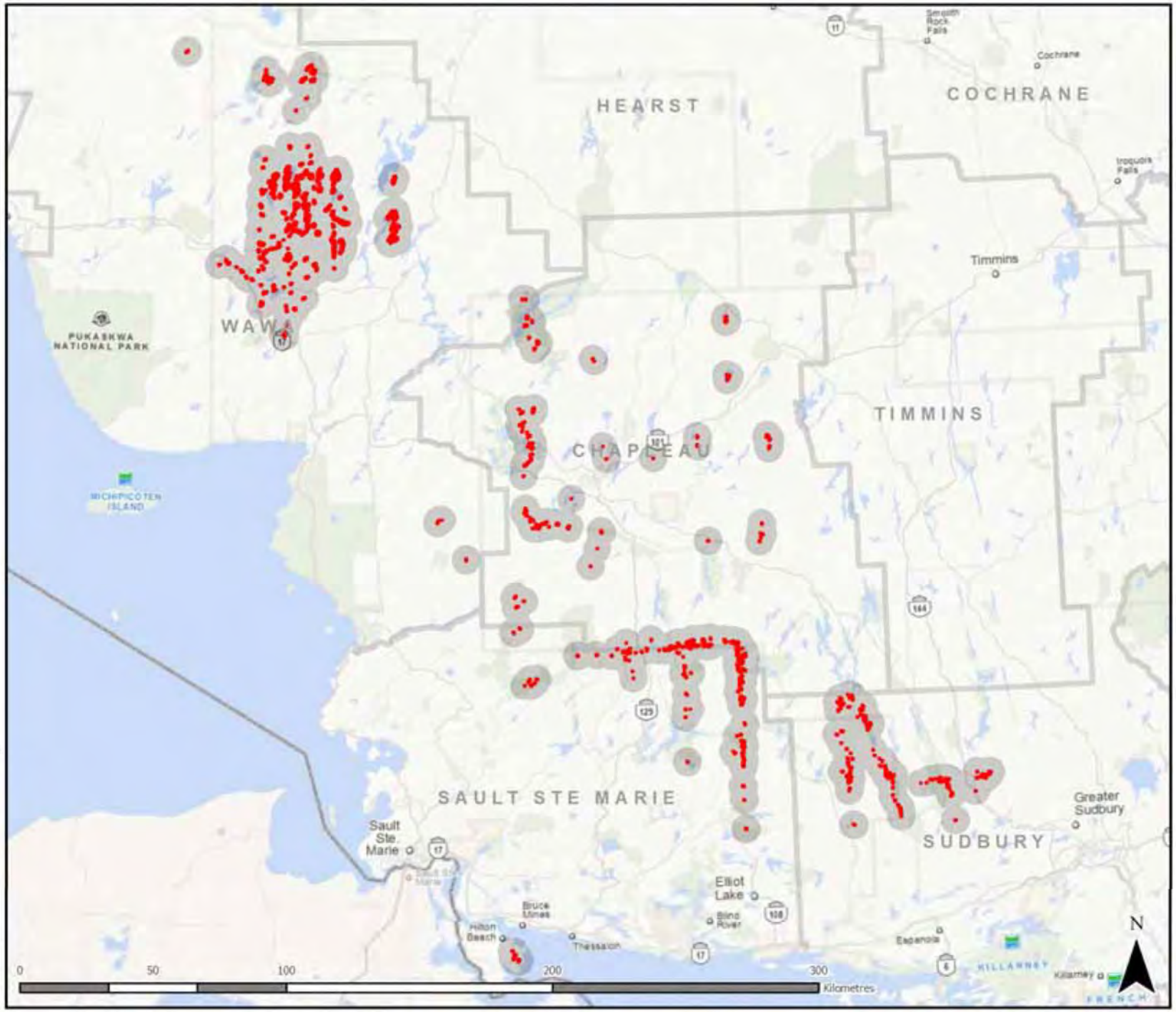
Aspen Twoleaf Tier 2013

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- *Neonectria faginata* (Lohman *et al*.) Castl. Insect (beech scale) - *Cryptococcus fagisuga* Lind.
Pest Origins:	**Invasive** - native to Europe
Pest Type:	Insect-disease complex
Host Species:	American and European beech
Infestation Area:	Refer to map for full range

Provincial Key Facts

- Three distinct phases of beech bark disease development can be observed across Ontario:
- The advancing front, in which beech scale populations have recently colonized unaffected beech trees. Scale infestations combined with other stressors can contribute to beech decline;
- The killing front, in which scale populations rapidly build and the fungus colonizes trees. The killing front is characterized by heavy levels of tree mortality;
- The aftermath forest, where the disease has passed through and remains endemic. Large remnant trees will continue to decline and younger regenerating trees become infected, disfigured and gradually decline.
- Beech bark disease has been identified as far north as Parry Sound, Parry Sound District and Fitzgerald Township, Algonquin Park District.

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.
- In Ontario, a few trees have been identified as potentially disease resistant as they have not been attacked by the scale insect in areas which have had high scale infestation levels. These trees may be disease resistant because the canker fungus can only infect scale-infested trees. Research indicates that approximately 1-4% of American beech may be resistant to beech bark disease. The identification, monitoring and retaining of these resistant trees will be of value in the retention of beech on the landscape.

Fruiting bodies of beech bark disease.

Size comparison of beech bark disease fruiting bodies.

Mortality caused by beech bark disease.

Beech Bark Disease

Regional Summary

Northeast

- In Sault Ste. Marie District beech stands on St. Joseph Island were surveyed in mid-September for beech scale and beech bark disease. Trees were surveyed in Hilton and Jocelyn townships and 66% of the trees had moderate-to-high levels of beech scale, but no sign of beech bark disease (advancing front).
- In Sudbury District several stands were surveyed in November 2013. Mature trees were surveyed in the Fort Lacloche area and beech scale and beech bark disease were not found.
- In North Bay District stands were surveyed. Light-to-moderate levels of scale (advancing front) were observed in a small stand of beech west of Trout Lake on Hwy 524 just north of Farleys Corners. Beech bark disease was not present. Further surveys are planned for 2014.

Southern

- The disease occurs in Bancroft, Parry Sound and Pembroke Districts.
- In Bancroft District the disease occurs from the Haliburton Village area south to Haliburton Highlands Signature Site Park and east to the town of Bancroft extending into Pembroke District.
- The killing front has reached Killbear Provincial Park in Parry Sound District causing mortality and decline

Northwest

- Outside host range.

Fruiting bodies of beech bark disease.

Above: beech tree infested with the beech scale (which are covered in white waxy wool). Below: a beech tree trunk covered with older beech bark disease fruiting bodies.

Beech Bark Disease

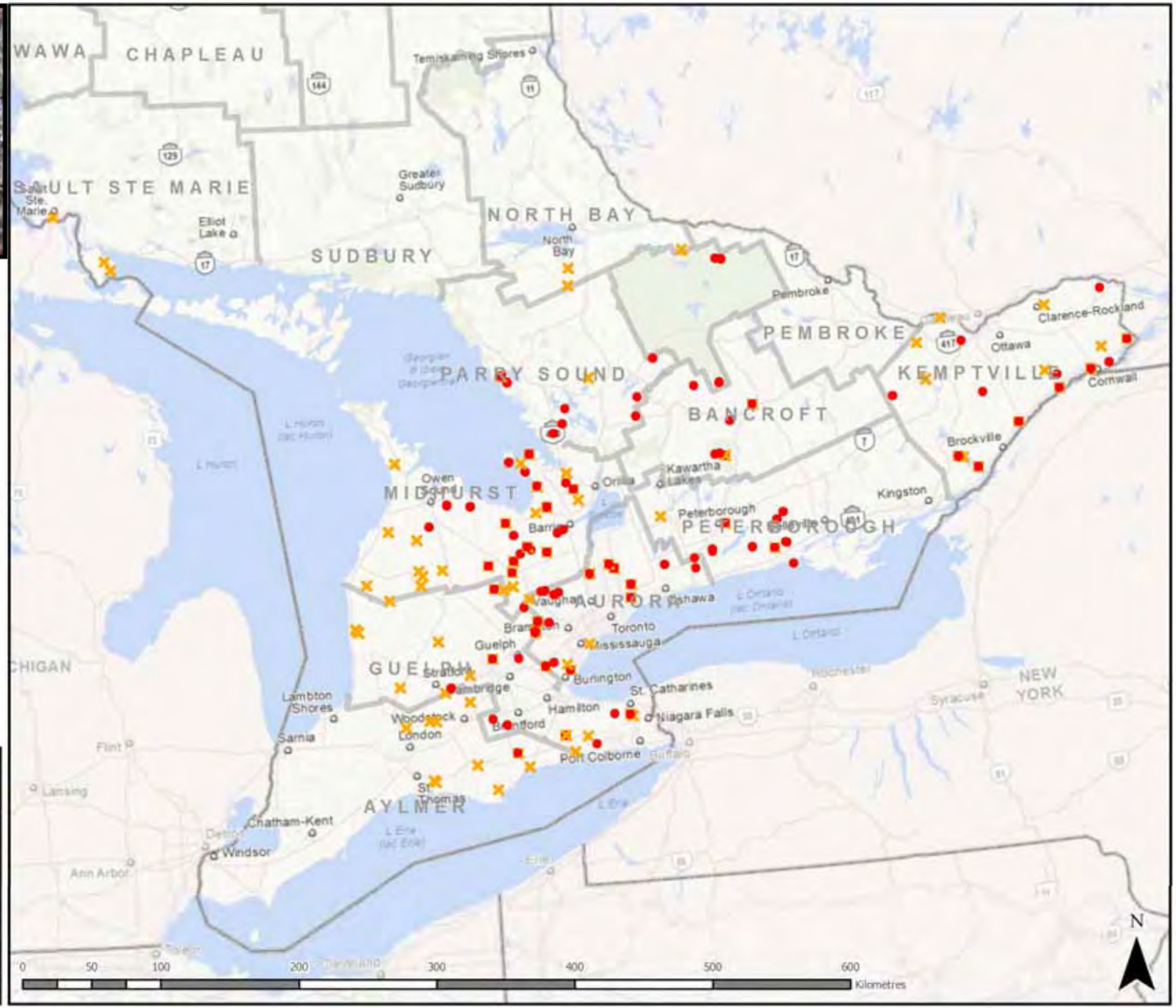
Beech Bark Disease Known Sites to Date

Map 1

Provincial Overview

Beech bark disease and beech scale sample locations.

- Beech bark disease
- Beech scale insect



Birch Leafminer

Pest Information

Common Name:	Birch Leafminer
Latin Name:	*Fenusa pusilla* (Lepeletier)
Pest Origins:	**Invasive** - native to Europe
Pest Type:	Defoliator
Host Species:	Birch and occasionally alder (a shrub species)
Infestation Area:	111 ha

Provincial Key Facts

- First found in Canada in Quebec in 1929.
- First outbreak in Ontario occurred in 1939.
- Damage is often most severe on open grown or ornamental trees. Tree mortality is rare, although heavily infested trees lose aesthetic value.

Regional Summary

Northwest

- Birch leafminer was not reported through aerial or ground surveys.

Northeast

- A total of 111 ha of moderate-to-severe defoliation was mapped in Sault Ste. Marie (34 ha) and Sudbury (76 ha) districts.
- In Sault Ste. Marie District, three pockets of defoliation were mapped in the southeast portion of the district. One pocket occurred north of Iron Bridge near Constance Lake, a second between Iron Bridge and Blind River and the third northeast of the town of Elliot Lake. Ground surveys found severe defoliation along Hwy 17 between Iron Bridge and Blind River, Hwy 546 north of Iron Bridge, and in the Elliot Lake area.
- In Sudbury District, birch leafminer defoliation was observed on semi-mature white birch trees around the City of Greater Sudbury in early July. The defoliation was later aerially mapped in small patches in Waters Township south of Lively, specifically near Mud Lake and Little Fly Lake. A small patch of defoliation was also mapped south of Bass Lake on Manitoulin Island.

Southern

- Birch leafminer was not reported through aerial or ground surveys.

Birch leafminer larvae and the damage it caused to a birch leaf.

Overview Map

Birch leafminer damage in Sault Ste. Marie District

Birch Leafminer

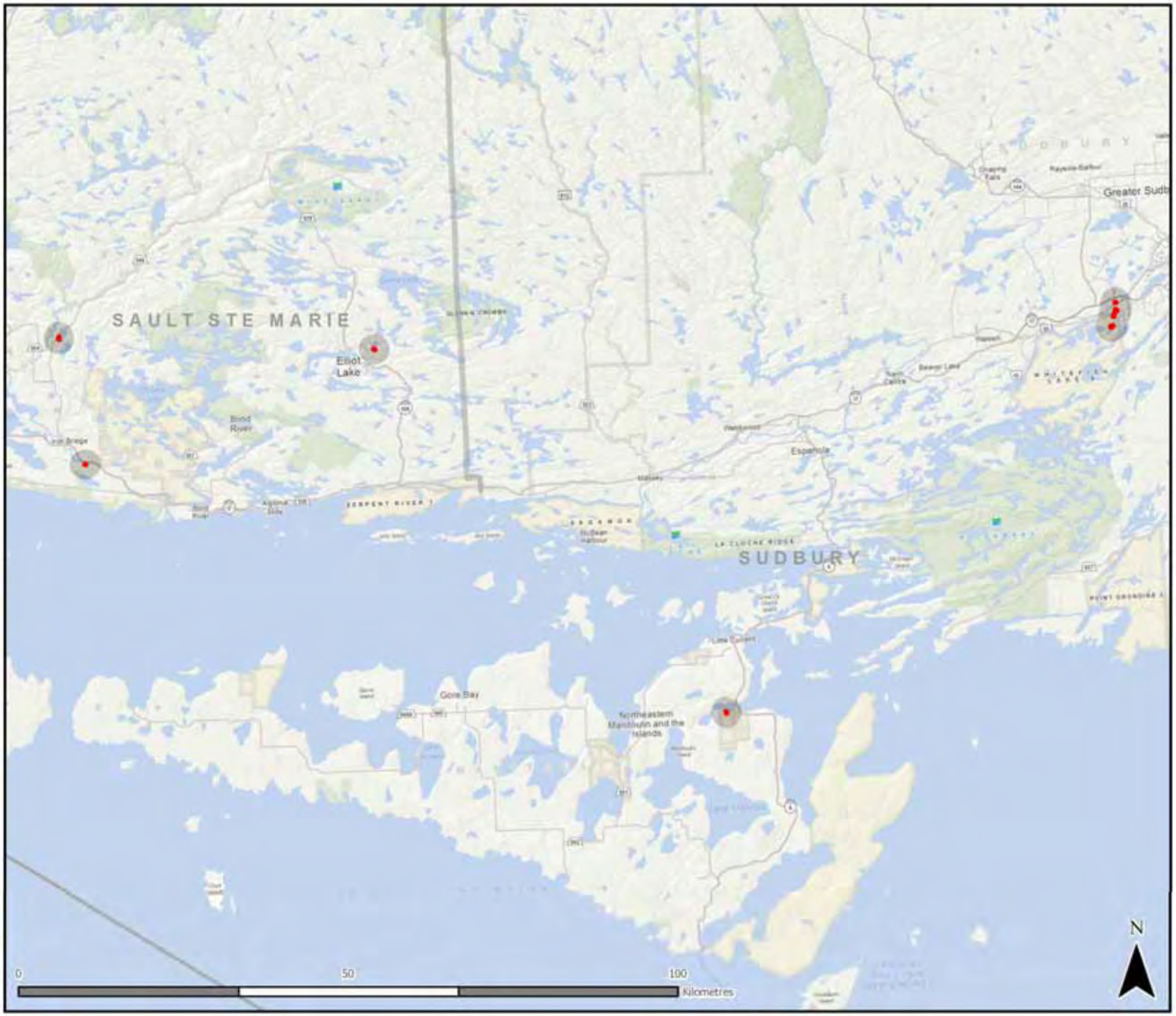
Birch Leafminer 2013

Map 1

Northeast Region

Areas-within-which birch leafminer caused defoliation.

Area of Moderate-to -Severe Defoliation



Birch Skeletonizer

Pest Information

Common Name:	Birch skeletonizer
Latin Name:	*Bucculatrix canadensisella* Chambers
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Birch spp.

Provincial Key Facts

- Current outbreak started in 2010.
- Outbreaks last 2-4 years.
- Increased area in 2013, but some areas had less severe defoliation.
- Birch skeletonizer is often found with the leaf disease septoria leaf spot of birch.
- White birch in and around Sudbury were also defoliated in early summer by gypsy moth and in later summer were infected with septoria leaf spot and defoliated by birch skeletonizer. These stressors combined may cause white birch decline in this area.

Birch leaf damage caused by birch skeletonizer.

Birch skeletonizer larvae and damage they caused to a birch leaf.

Northwest

- Birch skeletonizer was observed throughout northwestern Ontario from the ground.
- In Red Lake, Sioux Lookout and Dryden districts, approximately 50% of white birch stands located south of the town of Red Lake to Vermilion Bay, east to Dryden, Ignace and Sioux Lookout experienced up to 75% defoliation.
- In Thunder Bay and Nipigon districts, population levels of birch skeletonizer were low -to-moderate causing low levels of defoliation. Small populations were scattered throughout the districts. Detectable defoliation occurred in the forested areas of the city of Thunder Bay and in the Silver Falls area east of the Kaministiquia River.

Northeast

- In Chapleau and Wawa districts this insect infested a similar area in 2013 as in 2012, but at a lower intensity than 2012. Defoliation was concentrated along the Hwy 101 corridor between Wawa and Timmins and along Hwy 129 from Flame Lake area in Deans Township to the junction of Hwy 129 and Hwy 101. The highest level of defoliation was observed south of Hwy 101 in Miskokomon Township where defoliation reached 40% on affected host species.
- In Sault Ste. Marie District, levels of defoliation in the north end of the district were low compared to 2012, but increased to severe in the southeast along the north shore of Lake Huron from Blind River to Serpent River First Nation.
- In Sudbury District, the City of Greater Sudbury and surrounding municipalities of Wahnapitae and Wanup experienced moderate-to-severe defoliation of young white birch stands.
- In North Bay District, areas of infestation were wide spread including Barr and Firstbrook townships, west of Haileybury and along Hwy 17 from the town of Marten River to Temagami.

Southern

- Birch skeletonizer was not reported through aerial or ground surveys.

Blowdown

Damage Information

Damage Name:	Blowdown
Damage Type:	Abiotic damage - weather event
Damage Area:	5,278 ha

Provincial Key Facts

- Blowdown damage mapped in 2013 (5,278 ha) was comparable to 2012 (5,326 ha) and was half as extensive as in 2011 (9,082 ha).
- The extent and frequency of blowdown events are sporadic and result from extreme weather events.

Outlook

- Blowdown is part of natural processes in Ontario's forests.
- Following a blowdown event, secondary pest populations (such as bark beetles, wood borers and armillaria root rot) are expected to increase.
- Timely salvage operations can be effective in utilizing blowdown material.
- Climate change predictions indicate extreme weather events will increase in frequency and severity. Such a pattern has not yet become evident in Ontario.

Blowdown south of Grimsby along the Niagara Escarpment, Guelph District

Overview Map

Blowdown in southeastern Ontario

Blowdown in Northeast Region, Sault Ste. Marie District.

Blowdown

Regional Summary

Northwest

- Blowdown damage was mapped in Red Lake, Sioux Lookout, Dryden, Fort Frances, Thunder Bay and Nipigon districts totalling 4,237 ha of severe damage.
- In Red Lake District, 189 ha of trees were uprooted around the northwest shores of Wakeman Lake.
- In Sioux Lookout District, 825 ha of trees were uprooted south of Marchington Lake and west of Kinniwap Lake.
- In Dryden District, 1,582 ha of trees were uprooted or snapped off. A mid-summer storm caused damage to areas west of Dryden along Hwy 17 near Minnitaki Road North, near Kellar Road, around the Dryden ski hill, Gullwing Lake, Dryden airport, Thunder Lake, Hartman Lake and Troutfly Lake. Trees along the Turtle River, north of Pekagoning Lake, extending into Fort Frances District were also uprooted.
- Fort Frances District had 1,379 ha of blowdown mapped with the majority of damage caused by a wind storm in late August. Big Grassy River area east of Minahico was most significantly affected. Other events occurred around Gulliver Lake, Pekagoning Lake and Kaiashkons Lake. Quetico Provincial Park had 11 small events mapped.
- Thunder Bay District experienced a late summer blowdown event, which will be mapped in 2014. Prior to that event, two small areas of blowdown were mapped. One was north of Hoof Lake Rd in the southeast corner of Begin Township and the other was northwest of Pigeon River on the south side of Hwy 593 in Devon Township.
- Nipigon District had 220 ha of trees damaged north of Nakina at Painter Lake and southeast of Aroland around Kawashakagama Lake.

Northeast

- Sault Ste. Marie District had a total of 125 ha of blowdown mapped. The majority of the blowdown was off the north end of Megisan Lake in Algoma Headwaters Provincial Park (Natural Environment Park). There were 3 smaller pockets south of the park: south of Ragged Lake, along the Goulais River and east of Cowie Lake. Black spruce and trembling aspen were damaged. A small wind event, not aerially mapped, occurred in the Thessalon area causing mainly white spruce and balsam fir to snap.
- Chapleau District had 27 ha of blowdown mapped in Algoma Headwaters Provincial Park.

Southern

- In Guelph District, 19 ha of severe damage occurred south of Grimsby, along the Mountainview Conservation Area section of the Bruce Trail. High winds caused sugar maple, basswood, ironwood and red oak to blowdown, uproot and snap off.
- A corridor of blowdown totalling 863 ha was aerially mapped from Algonquin Provincial Park southeast to Petawawa, Pembroke District. On the afternoon of July 19, 2013 micro-bursts of powerful wind flattened several scattered forested areas and caused broken tops and leaning stems. Blowdown pockets were also observed during roadside surveys through Greater Madawaska Township, Renfrew County, and eastward to Russell Township, Prescott and Russell counties, Kemptville District.

Area Summary

Total area-within-which blowdown caused moderate-to-severe damage 2009 - 2013 by MNR Region and District (area in hectares).

Region / District	2009	2010	2011	2012	2013
Northwest					
Dryden	898	-	1,078	538	1,582
Fort Frances	-	413	1,956	-	1,379
Kenora	339	-	-	1,651	-
Nipigon	10	47	89	-	220
Red Lake	3,553	284	1,124	213	189
Sioux Lookout	2,470	-	451	622	825
Thunder Bay	-	-	363	-	42
Subtotal:	7,270	744	5,061	3,024	4,237
Northeast					
Chapleau	-	-	-	-	27
Hearst	-	-	1,996	-	-
North Bay	329	-	14	363	-
Sault Ste. Marie	-	-	32	-	125
Sudbury	-	-	11	47	-
Timmins	-	-	60	-	-
Subtotal:	329	-	2,113	410	152
Southern					
Algonquin	-	-	-	-	761
Bancroft	-	-	156	19	-
Guelph	-	-	1,751	-	
19					
Kemptville	-	-	-	37	-
Midhurst	348	-	1	71	-
Parry Sound	-	-	-	-	7
Pembroke	-	-	-	1,765	102
Subtotal:	348	-	1,908	1,892	889
Provincial Total	7,947	744	9,082	5,326	5,278

Blowdown

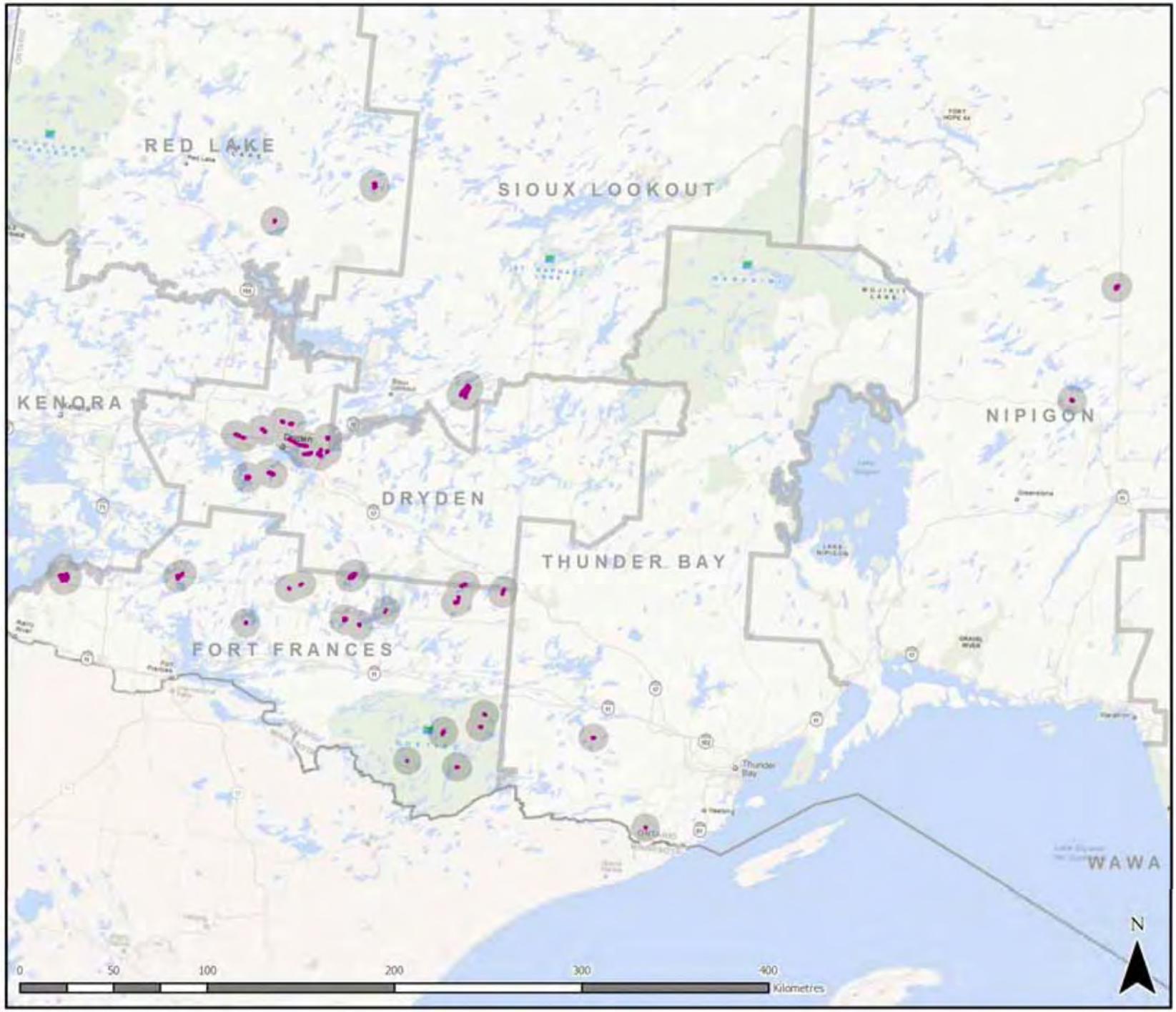
Blowdown Damage 2013

Map 1

Northwest Region

Areas-within-which blowdown caused forest damage.

Area of Blowdown Damage



Blowdown

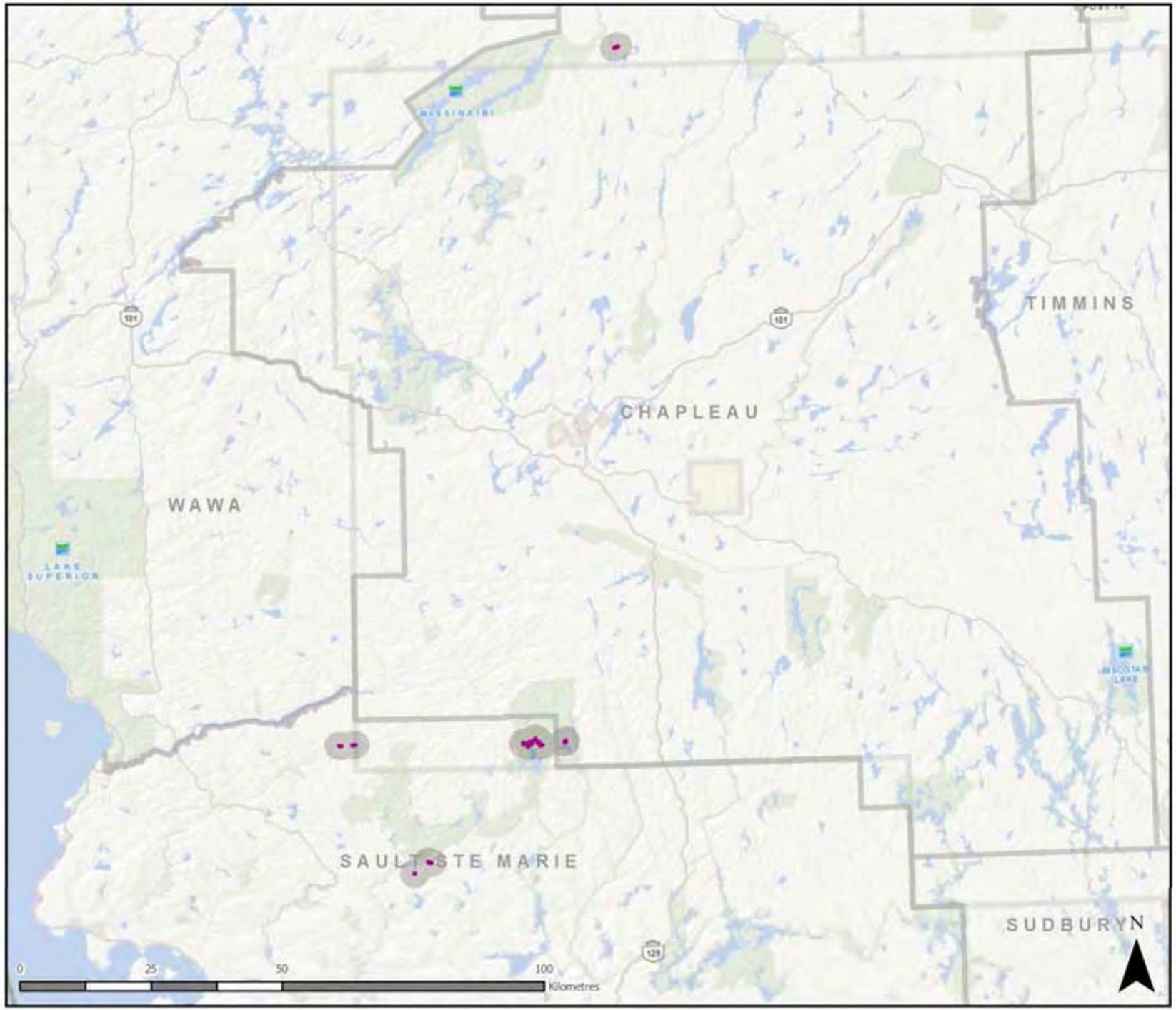
Blowdown Damage 2013

Map 2

Northeast Region

Areas-within-which Blowdown caused forest damage.

Area of Blowdown Damage



Blowdown

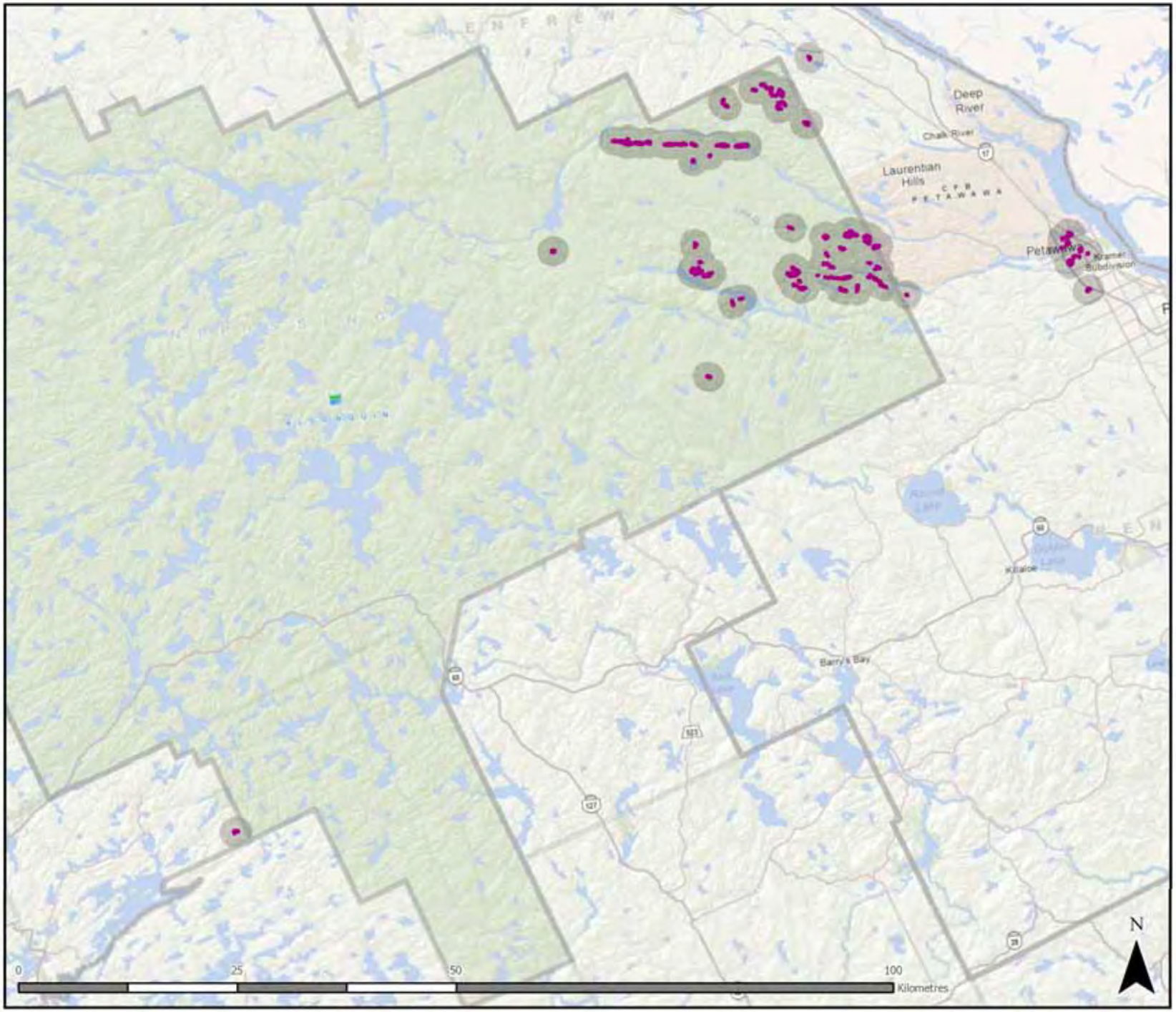
Blowdown Damage 2013

Map 3

Southern Region

Areas-within-which Blowdown caused forest damage.

Area of Blowdown Damage



Blowdown

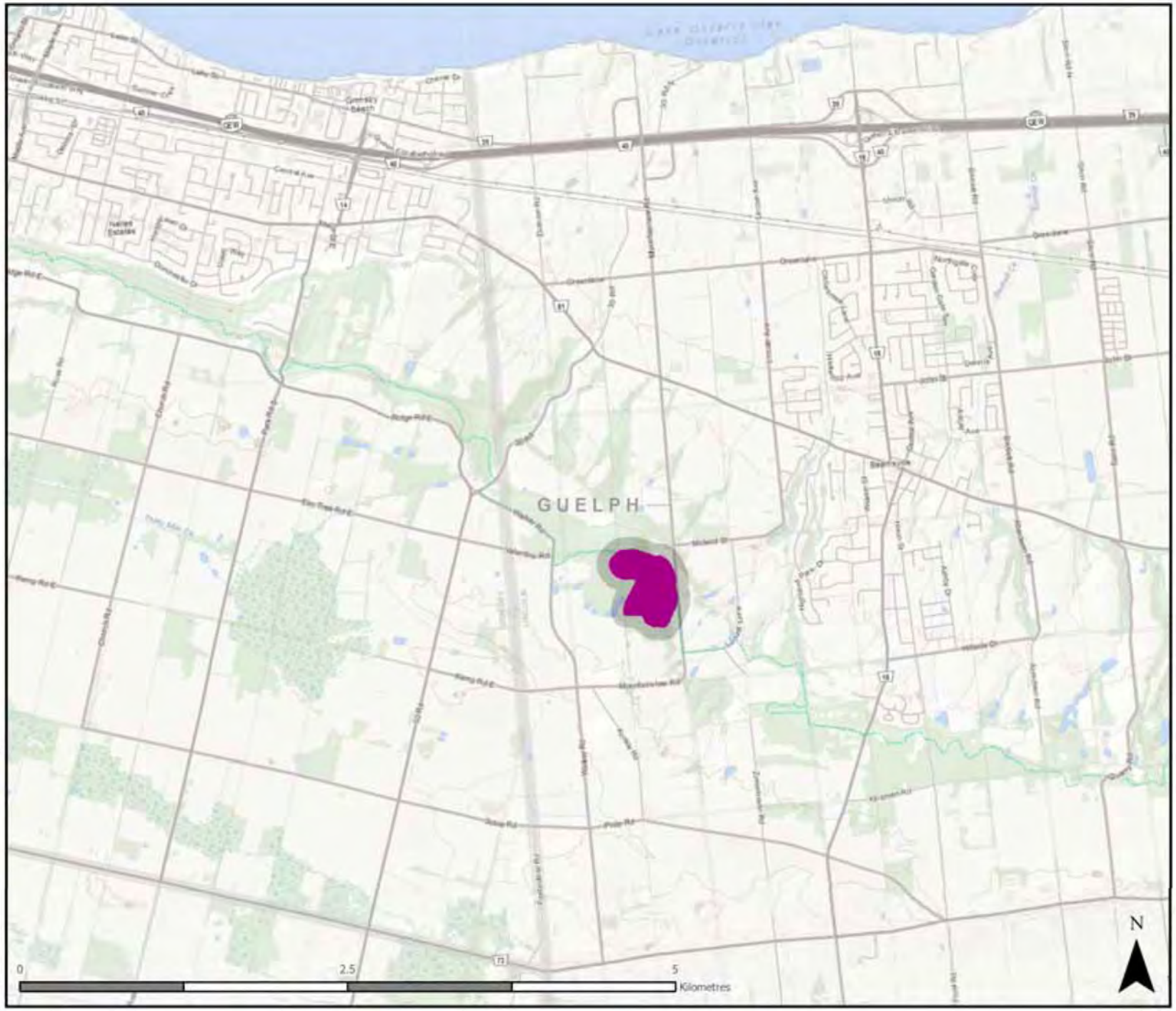
Blowdown Damage 2013

Map 4

Southern Region

Areas-within-which Blowdown caused forest damage.

Area of Blowdown Damage



Ontario Ministry of Natural Resources and Forestry

Brown Spot Needle Blight

Pest Information

Common Name:	Brown Spot Needle Blight
Latin Name:	*Mycosphaerella dearnessii* M.E. Barr
Pest Origins:	Native to North America
Pest Type:	Needle blight
Host Species:	Pine species
Infestation	Area: 167 ha

Provincial Key Facts

- This disease affects pine trees of all ages but is most damaging on seedlings and smaller trees such as nursery stock and Christmas tree plantations.
- Several years of infection causes reduced growth and coupled with other factors such as drought and secondary insect attack, may result in tree mortality.

Regional Summary

Northwest

- Brown spot needle blight was not reported through aerial or ground surveys.

Northeast

- Moderate-to-severe defoliation on Scots pine was mapped in the southwestern portion of Sault Ste. Marie District.
- The majority of defoliation was found on St. Joseph Island in Jocelyn and Hilton townships.
- Two small areas were mapped in the southern end of Kirkwood Township north of Thessalon. Here, defoliation occurred on younger stands of Scots pine.
- Another small, damaged stand of Scots pine was mapped near Goulais River, along Hwy 552 in Vankoughnet Township.

Southern

- In Bancroft District, through ground surveys, light levels (18%) of infection were identified affecting 19% of eastern white pine at the Crow River Seed Orchard north of Silent Lake Provincial Park. Aerial mapping of brown spot needle blight did not occur.

Brown spot needle blight on red pine.

Overview Map

Damage to pine trees by brown spot needle blight in the Northeast Region.

Brown Spot Needle Blight

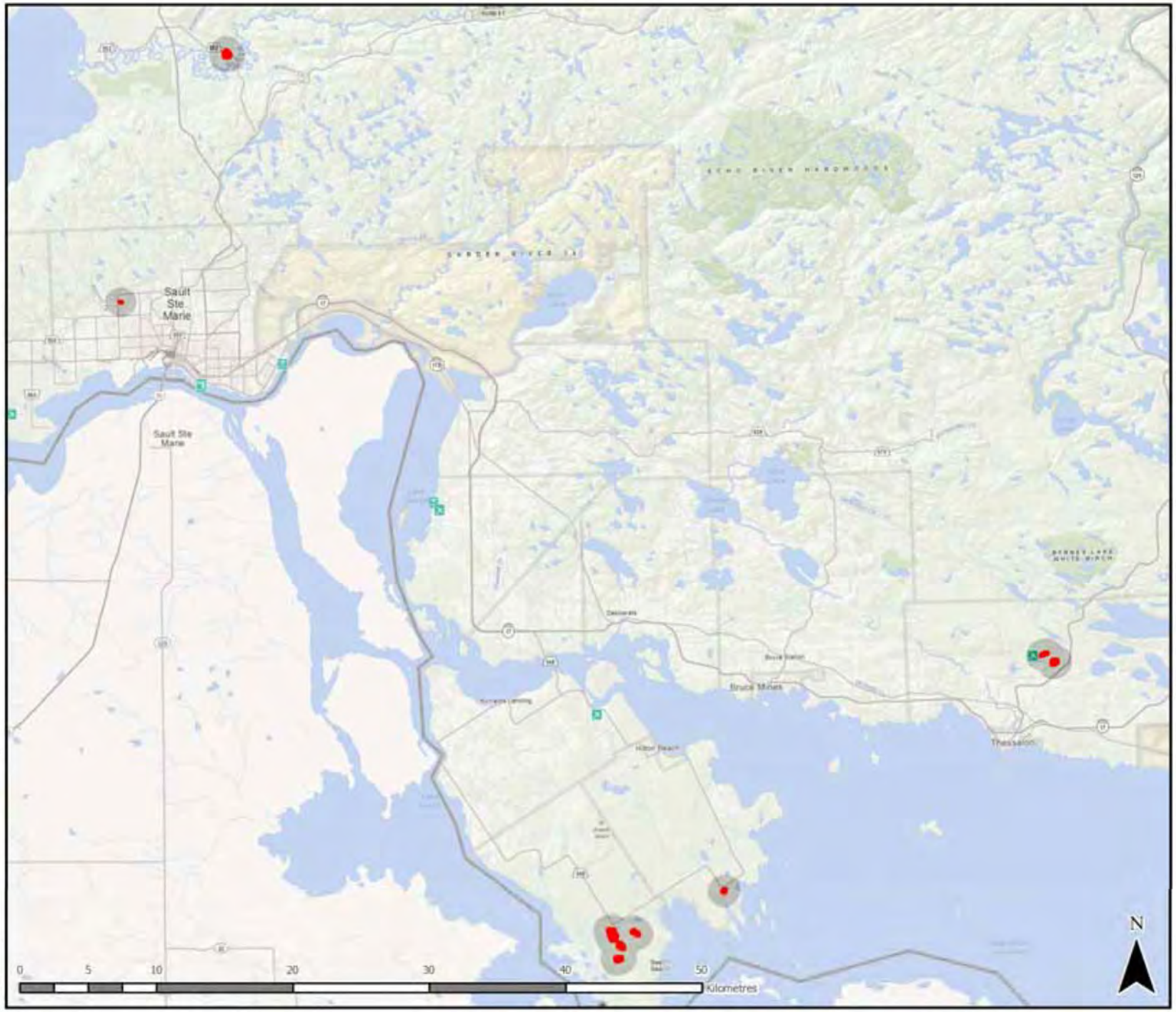
Brown Spot Needle Blight 2013

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:	*Argyresthia thuiella* (Pack.) and other sp.
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Eastern white cedar
Infestation	Area: 6,209 ha

Provincial Key Facts

- The last large scale cedar leafminer outbreak occurred in Kemptville District from 2002-2007 resulting in top-kill and often whole tree mortality.
- The latest infestation began in 2010 in Peterborough District.
- Moderate-to-severe damage decreased significantly from 2012 (30,486 ha) to 2013 (6,209 ha).
- Cedar leafminer complex is a group of insects that mine the cedar foliage, including:
  - *Argyresthia aureoargentella* Brower
  - *Argyresthia canadensis* Freeman
  - *Argyresthia thuiella* (Pack.)
  - *Coleotechnites thujaella* (Kft.)
- Tree mortality can occur when damage is severe and repeated over two or more years.

New growth of cedar foliage following damage caused by cedar leafminer.

Overview Map

Cedar leafminer larva.

Damage caused by cedar leafminer in southern Ontario

Cedar Leafminer Complex

Regional Summary

Northwest

- Cedar leafminer was not reported through aerial or ground surveys.

Northeast

- Cedar leafminer was not reported through aerial or ground surveys.

Southern

- Aylmer, Guelph, Midhurst, Aurora, Bancroft and Peterborough districts had a total of 6,209 ha of moderate-to-severe defoliation mapped.
- Defoliation recorded in Guelph District decreased slightly from 2012 (1,020 ha) to 2013 (992 ha). Newly infested areas were recorded in Aylmer District in 2013 with 386 ha of moderate-to-severe defoliation.
- In Midhurst District there was a 35% redution in defoliated area mapped. Defoliation was mapped in Bruce, Grey, Dufferin and Simcoe counties.
- Aurora District saw the greatest reduction in mapped defoliation from 14,051 ha in 2012 to 695 ha in 2013. Defolition was distributed in small pockets along the western and eastern borders of the district.
- In 2013 a major collapse in cedar leafminer population occurred in Bancroft and Peterborough districts.
- In Peterborough District, satellite pockets of defoliation occurred east of Balsam Lake and north of Sturgeon Lake, south of Pigeon River Headwaters Conservation Area and south of the community of Omemee and within Peterborough Northumberland counties.
- In Bancroft District defoliation occurred in Lutterworth Township just north of Cameron Lake affecting approximately 10 ha of pure cedar stands.
- Upper canopy decline and thin crowns were recorded in Northumberland County, Peterborough County and City of Kawartha Lakes where greater than 70% defoliation occurred in the past three consecutive years.

Trend Analysis

- Cedar leafminer outbreaks vary considerably in length and severity. The current outbreak is expected to continue to decline in 2014.

Area Summary

Total area-within-which cedar leafminer caused moderate-to-severe defoliation 2009-2013 by MNR Region and District (area in hectares).

Region / District 2009		2010	2011	2012	2013
Southern					
Algonquin	-	157	-	-	-
Aurora	-	-	81	14,051	695
Aylmer	-	-	-	-	386
Bancroft	-	-	261	713	31
Guelph	-	-	4	1,020	992
Kemptville	-	632	-	32	-
Midhurst	-	-	622	10,307	3,628
Parry Sound	-	-	-	-	-
Pembroke	-	3,984	80	197	-
Peterborough	-	-	1,774	4,165	477
Subtotal:	-	4,773	2,822	30,486	6,209
Provincial Total:	-	4,773	2,822	30,486	6,209

Cedar leafminer cocoon

Cedar Leafminer Complex

Cedar Leafminer Complex 2013

Map 1

Southern Region

Areas-within-which cedar leaf miner complex caused defoliation.

Area of Moderate-to-Severe Defoliation

Drought-Induced Deciduous Decline

Pest Information

Damage Name:	Decline due to 2012 Drought
Damage Type:	Abiotic damage - weather event
Damage Area:	464 ha

Provincial Key Facts

- In 2012, Southern Region experienced widespread drought resulting in leaf browning and premature leaf drop to 174,607 ha of forested land. Effects of the 2012 drought were evident in 2013 with deciduous trees showing decline or mortality. The main affected species were red maple, silver maple, sugar maple and red oak.
- Site conditions in affected areas consisted of rocky out-crops, ridges and thin soils. In some cases trees growing in wetlands also incurred damage due to a drop in water tables.

Southern Region aerial view of 2012 drought induced deciduous decline in 2013

Overview Map

Regional Summary

Northwest

- Drought-induced deciduous decline was not reported through aerial or ground surveys.

Northeast

- Drought-induced deciduous decline was not reported through aerial or ground surveys.

Southern

- Drought-induced deciduous decline was mapped in Parry Sound, Peterborough, Bancroft, Pembroke and Kemptville districts totalling 464 ha of moderate-to-severe die-back.
- In Parry Sound District, 141 ha of moderate-to-severe decline were recorded during aerial surveys. Sites affected included the northern shores of Muskoka Lake, northeast of Lake Rosseau and just west of Lake of Bays.
- Peterborough District had 25 ha of decline while Bancroft District had 52 ha. In both districts, high seed production was recorded on red maple and silver maple. Other visible symptoms included chlorotic foliage, smaller foliage, twig die back and in some cases crown dieback.
- Pembroke District had the greatest amount of decline with 211 ha mapped. Areas affected were primarily in Horton and McNab townships, with centrally scattered pockets. Affected hardwood species were characterized by thinning crowns and heavy seed crops.
- Kemptville District had the least amount of decline, 34 ha, mapped in Fitzroy Township.

Drought induced deciduous decline on shallow soils and rocky outcrops.

Ontario Ministry of Natural Resources and Forestry

Drought-Induced Deciduous Decline

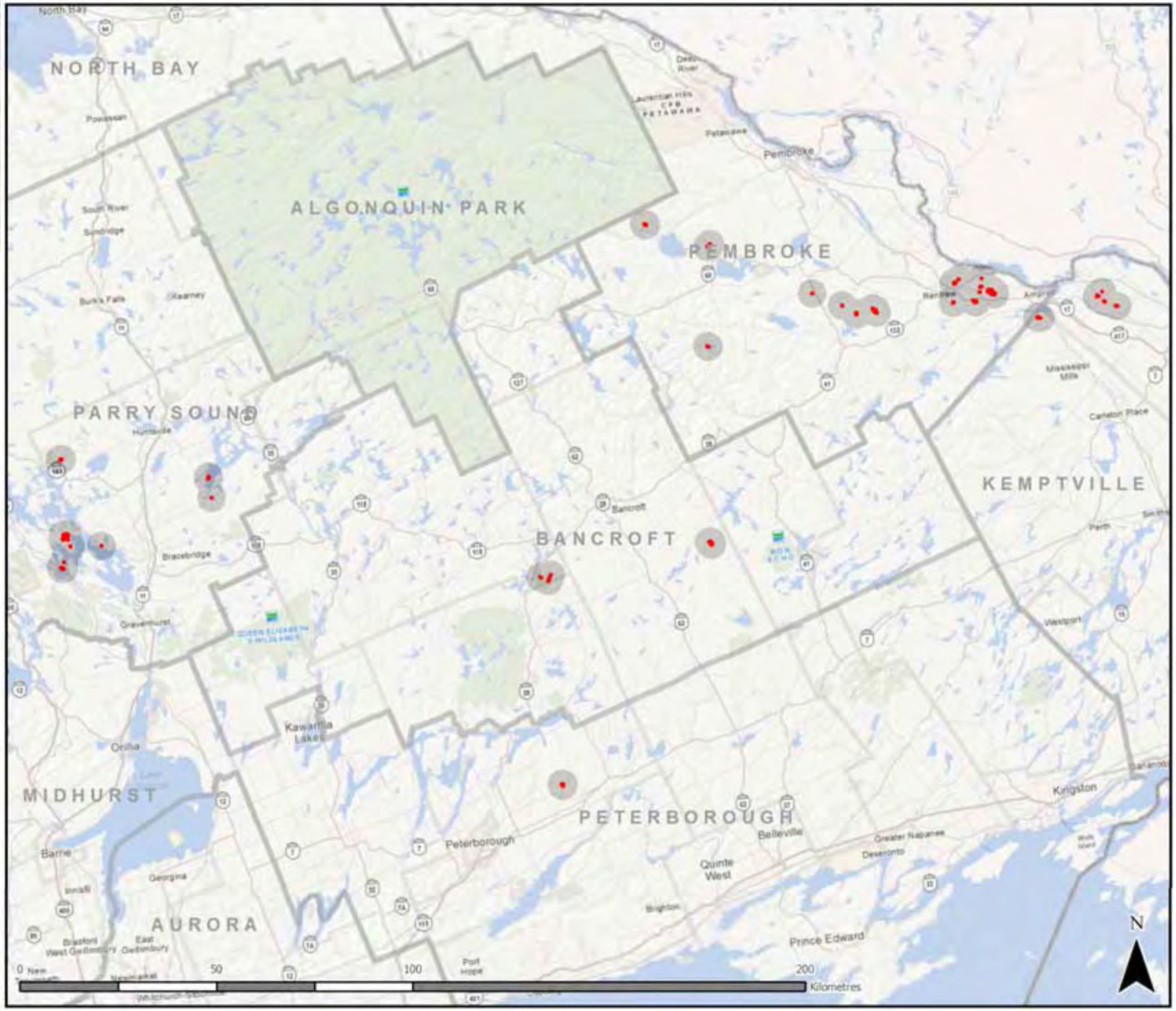
2013 Deciduous Decline Caused by 2012 Drought

Map 1

Southern Region

Areas-within-which drought induced red pine decline caused moderate-to-severe defoliation.

Area of Moderate-to -Severe Defoliation



Ontario Ministry of Natural Resources and Forestry

Drought-Induced Red Pine Decline

Pest Information

Damage Name:	Decline due to 2012 Drought
Damage Type:	Abiotic damage - weather event
Damage Area:	2,262 ha

Red pine decline in Southern Region

Overview Map

Provincial Key Facts

- In 2012, Southern Region experienced widespread drought causing damage to 174,607 ha of forested land. Districts affected were Algonquin, Bancroft, Kemptville, Midhurst, Parry Sound, Pembroke and Peterborough. The effects of the 2012 drought on red pine were evident in 2013.
- Drought conditions can reduce tree growth, brown and kill foliage, cause tree mortality and induce stress responses such as increased seed production. Drought stressed trees are more susceptible to insects and pathogens.

Regional Summary

Northwest

- Drought-induced red pine decline was not reported through aerial or ground surveys.

Northeast

- Drought induced red pine decline was not reported through aerial or ground surveys.

Southern

- Drought-induced red pine decline was mapped in Midhurst, Parry Sound, Algonquin Park Peterborough, Bancroft, Pembroke and Kemptville districts totalling 2,262 ha.
- In Midhurst District, four small pockets of declining red pine (18 ha) were aerially mapped. Two were located west of Grass Lake and north along Peninsula Point Road while the others were southeast of Long Lake and south of Severn Falls.
- In Parry Sound District, a total of 232 ha experienced decline. A large area east of Muldrew Lake was severely affected.
- In Algonquin Park, Pembroke and Kemptville districts decline was found on multiple pine species characterized by discoloured needles and heavy cone crops.
- A total of 341 ha of pine decline was mapped in Algonquin Park along the south and eastern boundaries.
- In Pembroke District, 124 ha were identified in Bonnechere Valley and Admaston/ Bromley townships.
- In Kemptville District, 68 ha were mapped near Torbolton Township. In Bancroft and Peterborough districts, red pine decline and mortality occurred in association withsecondary pests including pine needle scale, pine pitch borer, pine gall weevil, diplodia tip blight, armillaria root disease, pine engraver beetle and red band needle blight. There was also some decline noted in white pine and jack pine trees, but this accounted for less than 1% of the drought-affected trees.
- Bancroft District contained the most area of decline, 1,448 ha. Severely affected locations occurred in satellite pockets north and west of Bon Echo Provincial Park.

Drought-induced red pine decline and tree mortality.

Ontario Ministry of Natural Resources and Forestry

Drought-Induced Red Pine Decline

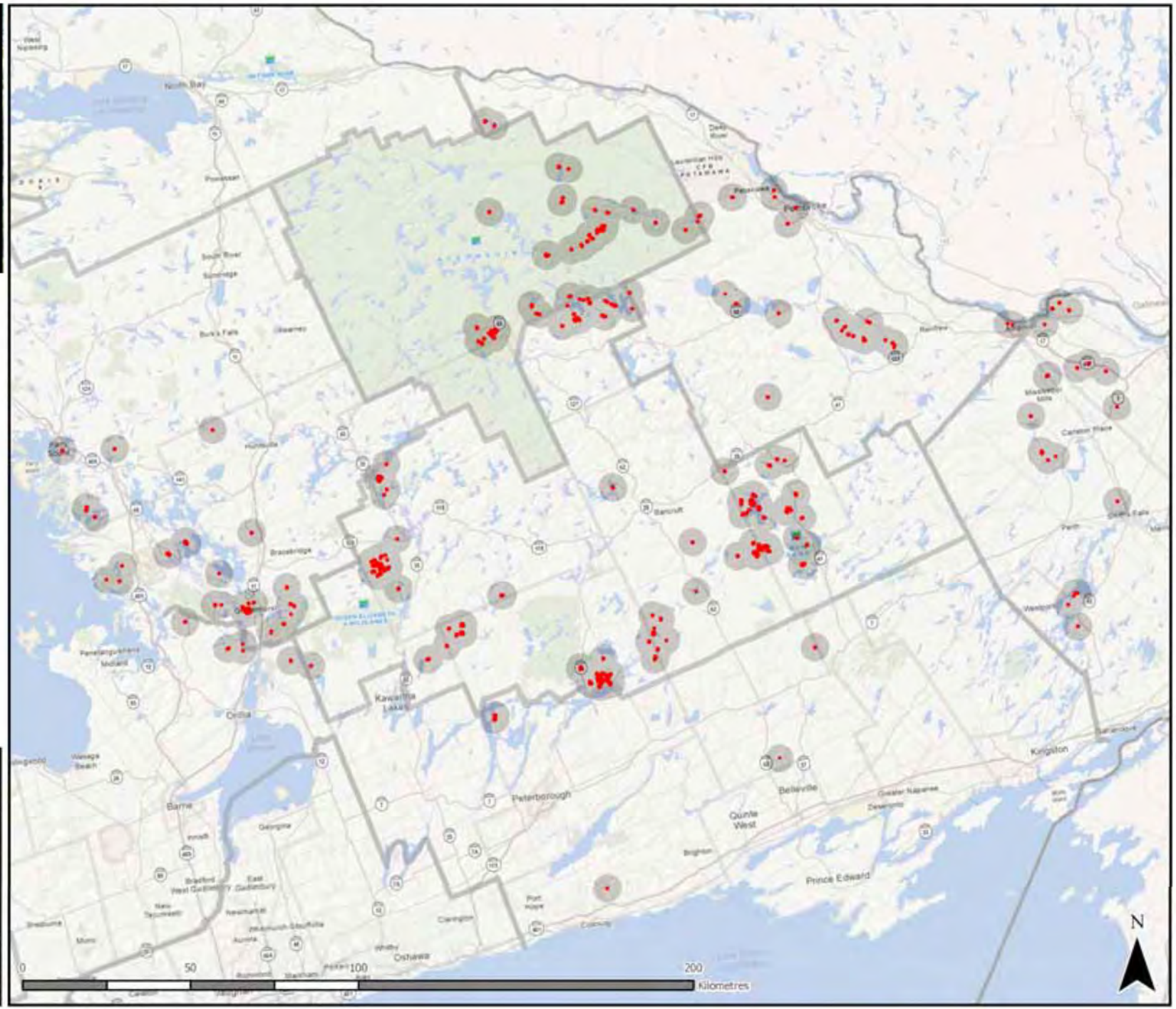
2012 Drought-Induced Red Pine Decline in 2013

Map 1

Southern Region

Areas-within-which drought induced red pine decline caused moderate-to-severe defoliation.

Area of Moderate-to-Severe Defoliation



Eastern Larch Beetle

Pest Information

Common Name:	Eastern Larch Beetle
Latin Name:	*Dendroctonus simplex* LeConte
Pest Origins:	Native to North America
Pest Type:	Borer
Host Species:	Tamarack
Mortality Area:	683 ha

Provincial Key Facts

- Eastern larch beetle has been recorded causing tree mortality in the Fort Frances District since 2009. In 2013 the mapped area of mortality decreased significantly compared to 2012 (2,997 ha).
- The Ontario infestation is an extension of one occurring in northern Minnesota.

Regional Summary

Northwest

- In Fort Frances District, 683 ha of mortality were mapped. The mapped area of mortality was scattered throughout the western portion of the district within the area 50 km west of Fort Frances, 5 km north of Rainy River and 5 km south of Harris Hill.

Northeast

- Eastern larch beetle was not reported through aerial or ground surveys.

Southern

- Eastern larch beetle was not reported through aerial or ground surveys.

Eastern larch beetle larvae.

Overview Map

Eastern larch beetle damage in Fort Frances District.

Eastern Larch Beetle

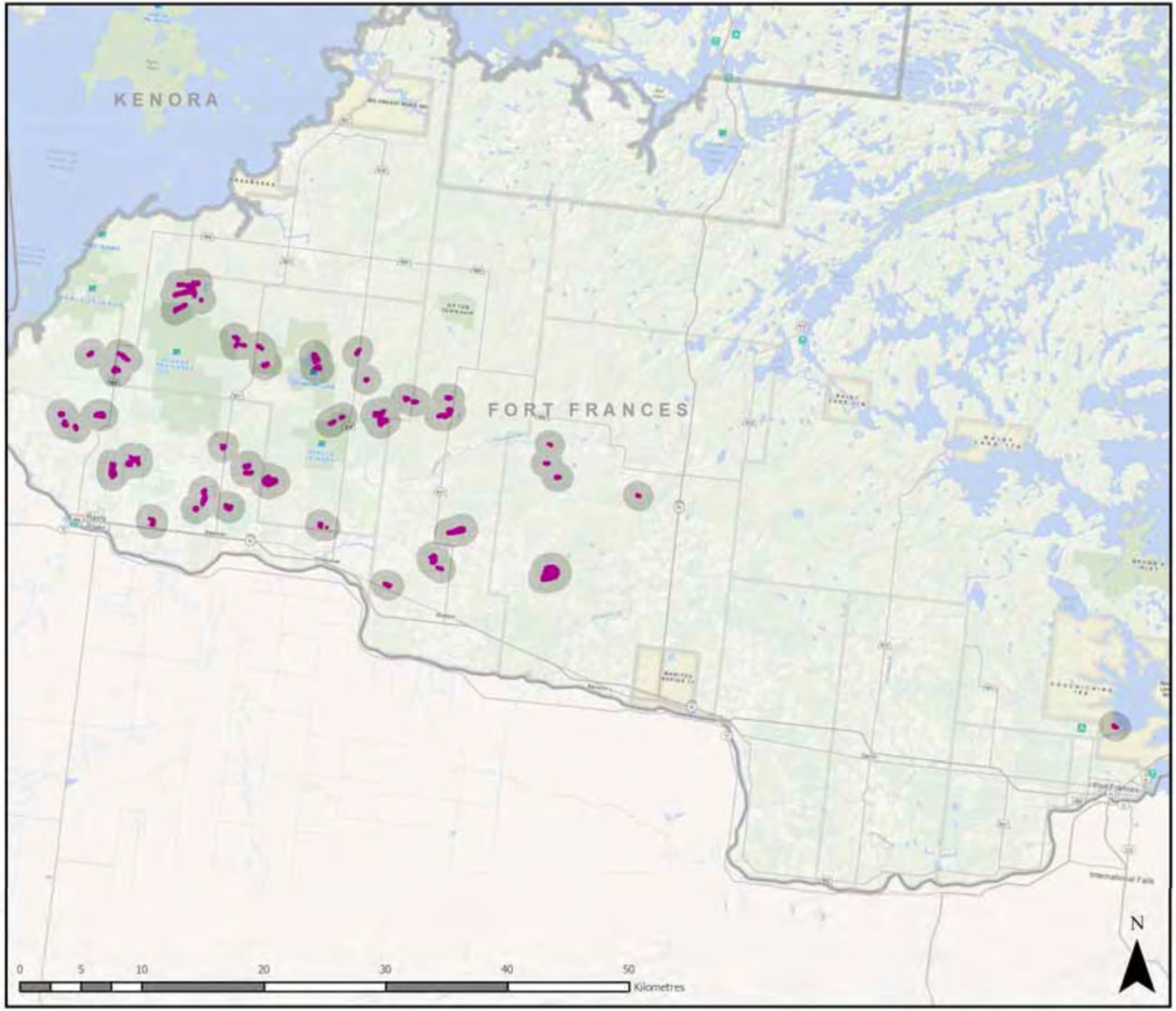
Eastern Larch Beetle 2013

Map 1

Northwest Region

Areas-within-which eastern larch beetle caused mortality.

Area of Mortality



Ontario Ministry of Natural Resources and Forestry

Emerald Ash Borer

Pest Information

Common Name:	Emerald ash borer	Host Species:	Ash spp.
Latin Name:	*Agrilus planipennis* Fairmaire	Infestation	Area: 85,068 ha
Pest Origins:	**Invasive** - native to Asia		
Pest Type:	Wood borer		

Adult emerald ash borer.

Overview Map

Provincial Key Facts

- Emerald ash borer is a significant threat to ash in Ontario. It was first discovered in Ontario in 2002 in Windsor and continues to expand especially in southern Ontario.
- By the end of 2012 emerald ash borer occurred from Windsor north to the southern border of Bruce County, and east to Niagara and Durham counties. A separate infestation occurred in eastern Ontario from Frontenac County east to Ottawa, and Prescott and Russell County. Infestations also existed on Manitoulin Island and in the city of Sault Ste. Marie.
- The infested area expanded considerably in 2013, likely helped by the 2012 drought that favoured insect survival while stressing the trees. New infestations were found in Grey, Northumberland, Renfrew, Lanark, Simcoe, and Stormont, Dundas and Glengarry counties, the City of Kawartha Lakes, Laird Township and Algoma District.
- Tree mortality becomes severe about six years after an area becomes infested. It then increases rapidly, reaching greater or equal to 99% by the end of year 10.
- Consult the Canadian Food Inspection Agency (CFIA) www.inspection.gc.ca for updates on the areas regulated for emerald ash borer.

Outlook

- Tree mortality is expected to continue to increase as the insect spreads and existing infestations reach levels high enough to kill trees.
- Undetected infestations are likely to exist outside the known infested counties.
- Continual discoveries of new infestations indicate people continue to spread the insect despite federal regulations restricting the movement of infested material.
- CFIA has proposed expanding the regulated area in 2014 to include all or part of the judicial districts of Parry Sound, Muskoka, Algoma, Sudbury, and Nipissing, as well as Algonquin Park. Movement of infested ash material into this zone from infested parts of southern Ontario will no longer be restricted. This may increase the rate of spread of the insect into and within the enlarged regulated area.
- The prevalence of ash decreases in the forests north of the current known range of the borer. Total impact on the forest will likely be less than in the south where ash is a major component of forests, woodlots and urban areas.

Mortality of ash trees in Southern Region.

Emerald Ash Borer

Regional Summary

Northwest

- There is no known population of emerald ash borer in Northwest Region.

Northeast

- In Sault Ste. Marie District emerald ash borer continued to spread within the city of Sault Ste. Marie with increased ash mortality particularly in the central and eastern areas of the city. A ground survey was done in the spring between Sault Ste. Marie and St. Joseph Island for emerald ash borer with no infestation found, but later in the summer a prism trap located along Rydall Mill Road, Laird Township had one adult beetle.
- Emerald ash borer pheromone traps deployed In the communities of Timmins, Cochrane, Fauquier, Kapuskasing and Hearst by the Ministry of Natural Resources did not catch the insect.

Southern

- Emerald ash borer continued to kill trees in Aurora, Aylmer, Guelph, Peterborough, Pembroke and Kemptville districts. Mapped moderate-to-severe decline and mortality totalled 85,068 ha. This was an increase of 7,616 ha over the 77,422 ha of 2012.
- Aylmer District had a significant amount of damage mapped, 56,908 ha, followed by Guelph with 27,963 ha.
- In Midhurst District newly discovered infestations included roadside trees near Meaford, Grey County and Erindale Park in Orangeville, Dufferin County. In Bruce County, which is within the regulated area, infested trees were found in Southampton 60 km north of the previously known site in Lucknow. The insect continued to expand throughout Aurora District, which is completely within the emerald ash borer regulated area.
- In Peterborough District, a 5 ha area of moderate-to-severe decline and mortality was mapped. Infestations were detected within Northumberland County and the City of Kawartha Lakes. Both infestations are located within private camp grounds west of Alderville on the shore of Rice Lake and in the Rosedale area on the shore of Balsam Lake. Although these sites were discovered in 2013, the decline and mortality at these sites is severe enough to suggest the infestations are at least five years old.
- In Pembroke District, the insect was found in a single tree in Arnprior, Renfrew County.
- In Kemptville District, 129 ha of new damage were mapped, which is a decrease from 2012. New finds were discovered in Winchester, Cornwall and South Mountain in the United Counties of Stormont, Dundas and Glengarry as well as in Pakenham and Carleton Place, Lanark County.
- Although the borer is causing widespread tree mortality in the Greater Toronto Area, this has not been quantified by aerial surveys because of the difficulties of doing low level flights over urban areas.

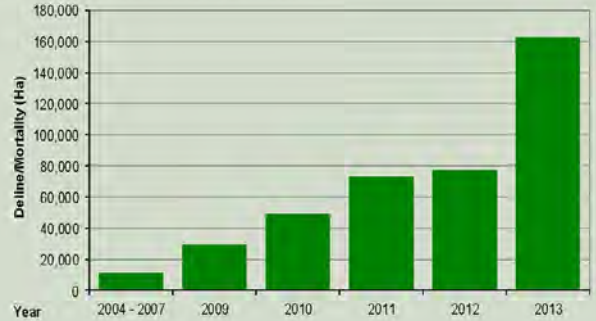
Area Summary

Total area-within-which emerald ash borer caused mortality 2009 - 2013 by MNR

Region/District	2004-2007	2009	2010	2011	2012	2013
Southern						
Aylmer	10,964	18,217	19,447	23,302	1,418	56,908
Guelph	-	-	-	177	2,826	27,963
Kemptville	-	-	-	754	317	192
Peterborough	-	-	-	-	-	5
Annual Total:	10,964	18,217	19,447	24,233	4,561	85,068
Cumulative Total:	10,964	29,181	48,628	72,861	77,422	162,490

* Area calculations for 2009 include damage that occurred in 2008, numbers have been updated from 2012. Region and District areas are in hectares.

Cumulative area-within-which emerald ash borer caused mortality 2004-2013.



Emerald ash borer larva and gallery in the cambial layer of an ash tree.

Dead ash trees in the Municipality of Lambton Shores, Aylmer District.

Emerald Ash Borer

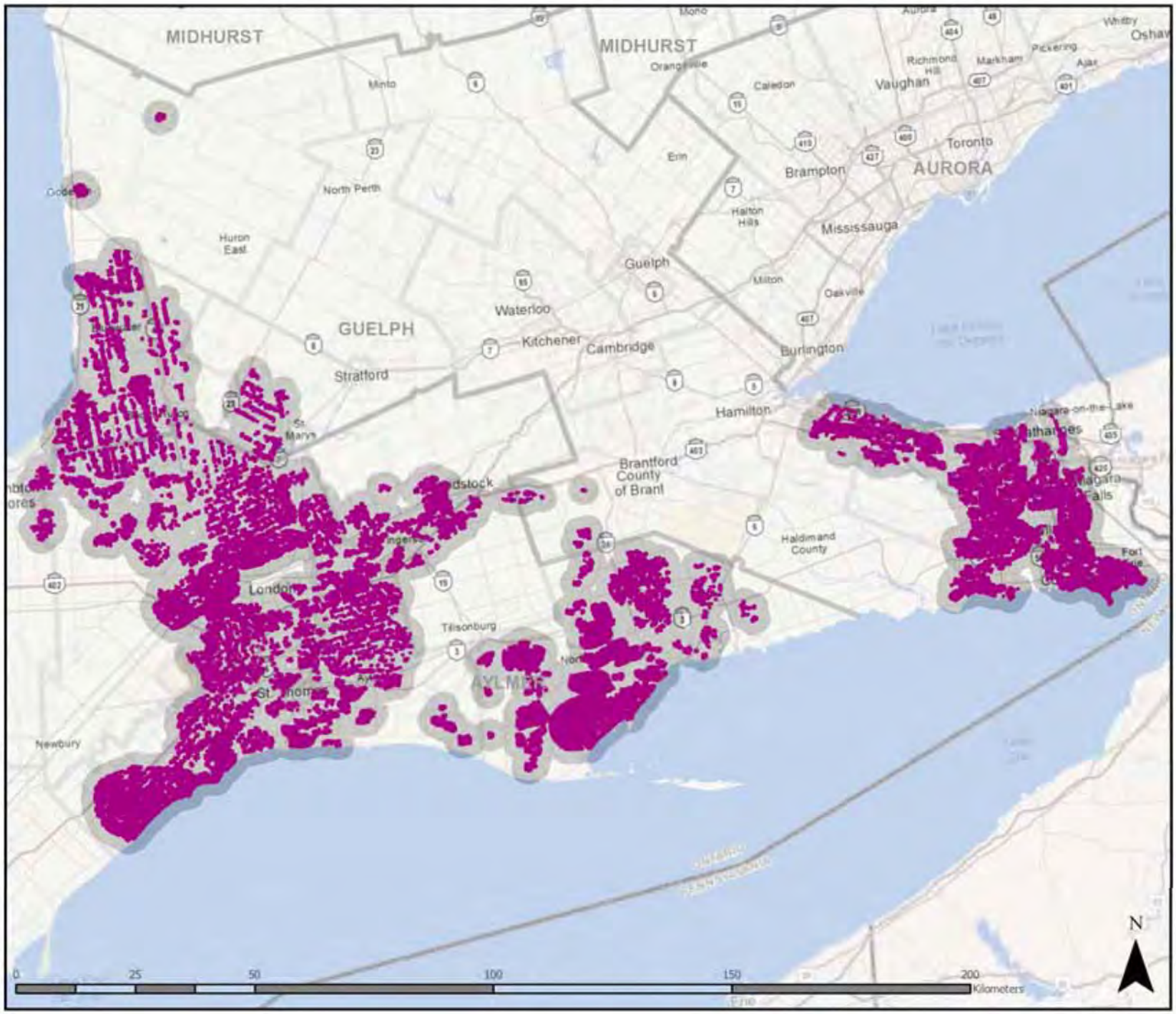
Emerald Ash Borer 2013

Map 1

Southern Region

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

Area of Mortality



Emerald Ash Borer

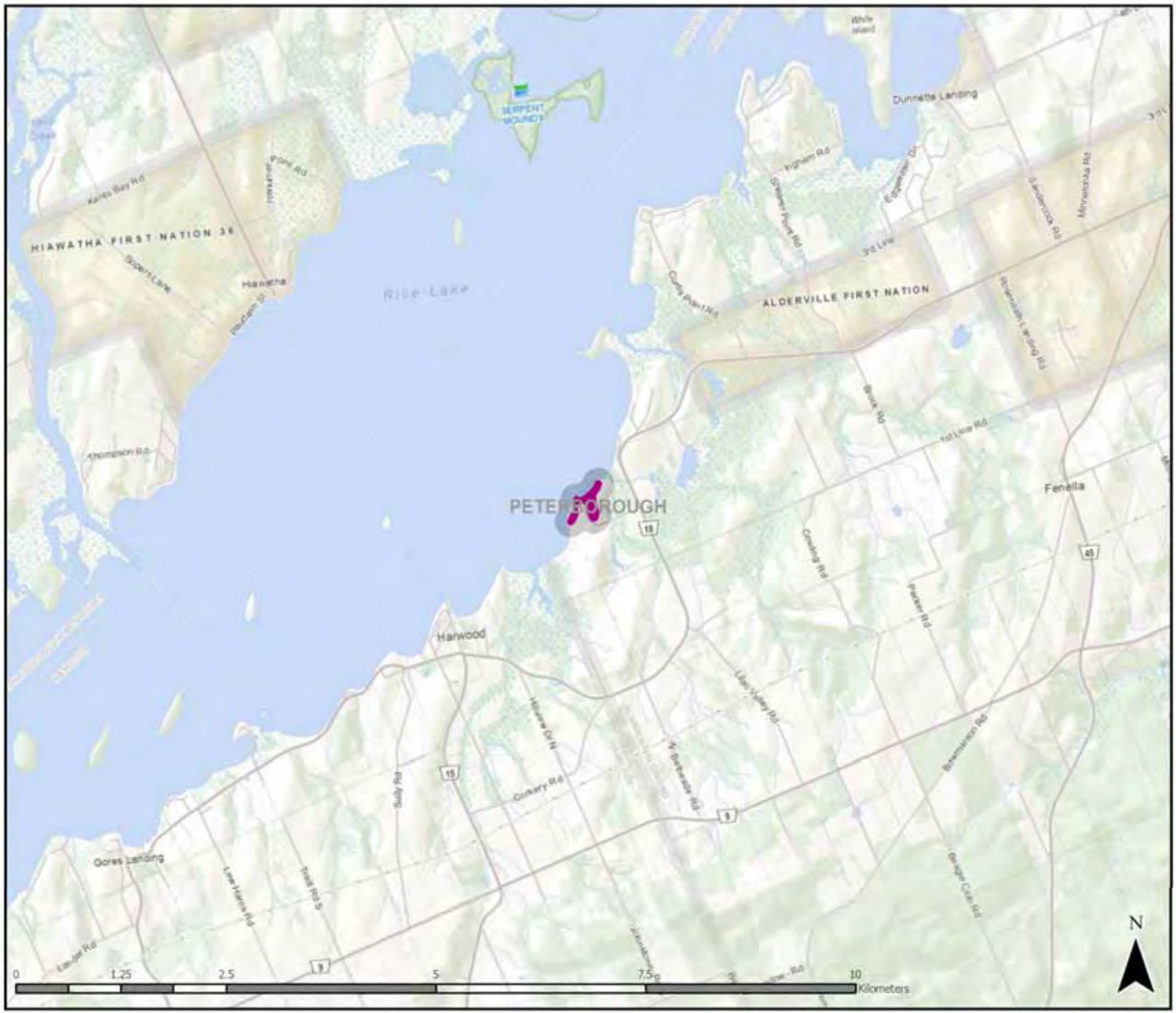
Emerald Ash Borer 2013

Map 2

Southern Region

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

Area of Mortality



Emerald Ash Borer

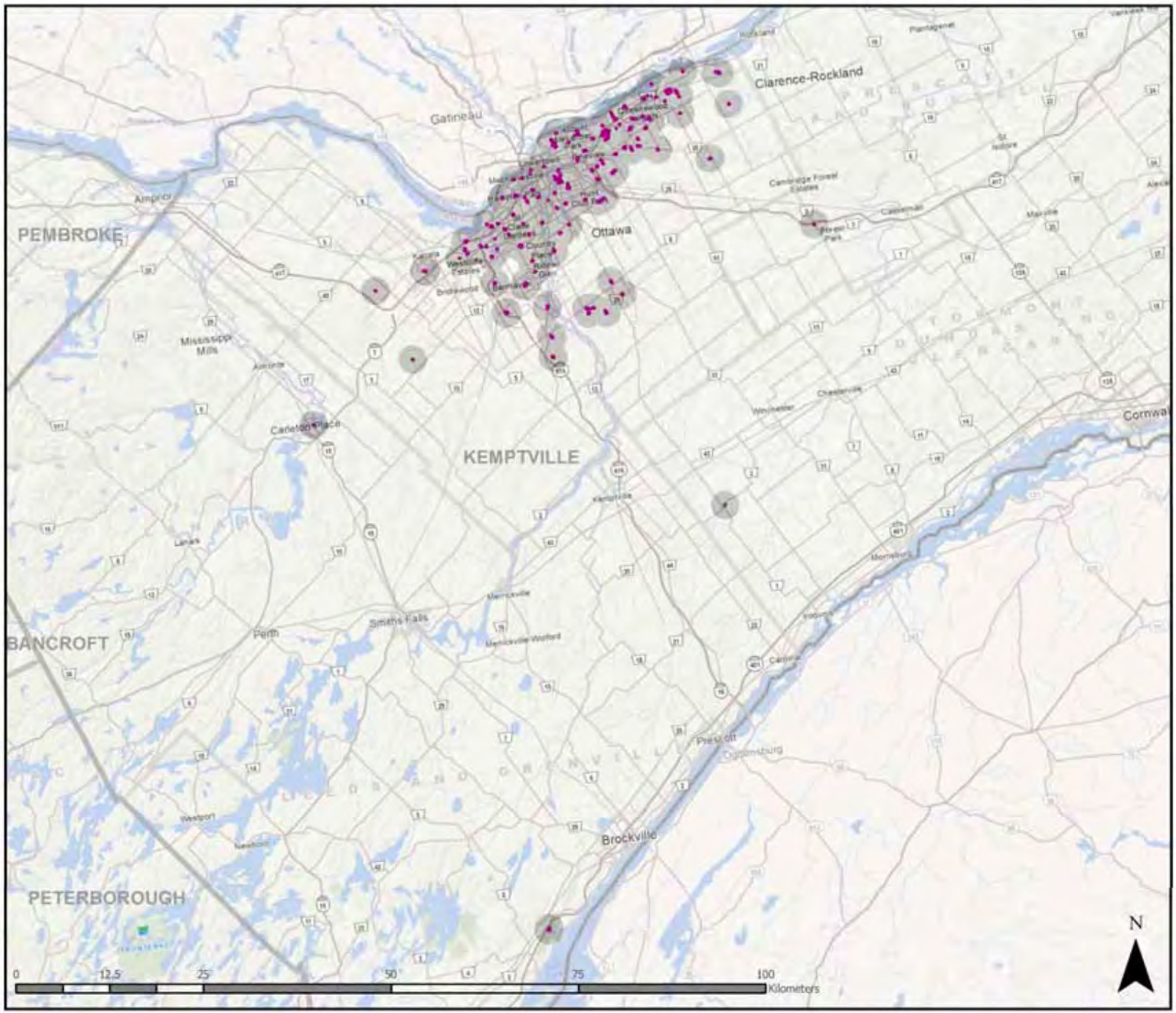
Emerald Ash Borer 2013

Map 3

Southern Region

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

Area of Mortality



Emerald Ash Borer

Emerald Ash Borer 2004-2013

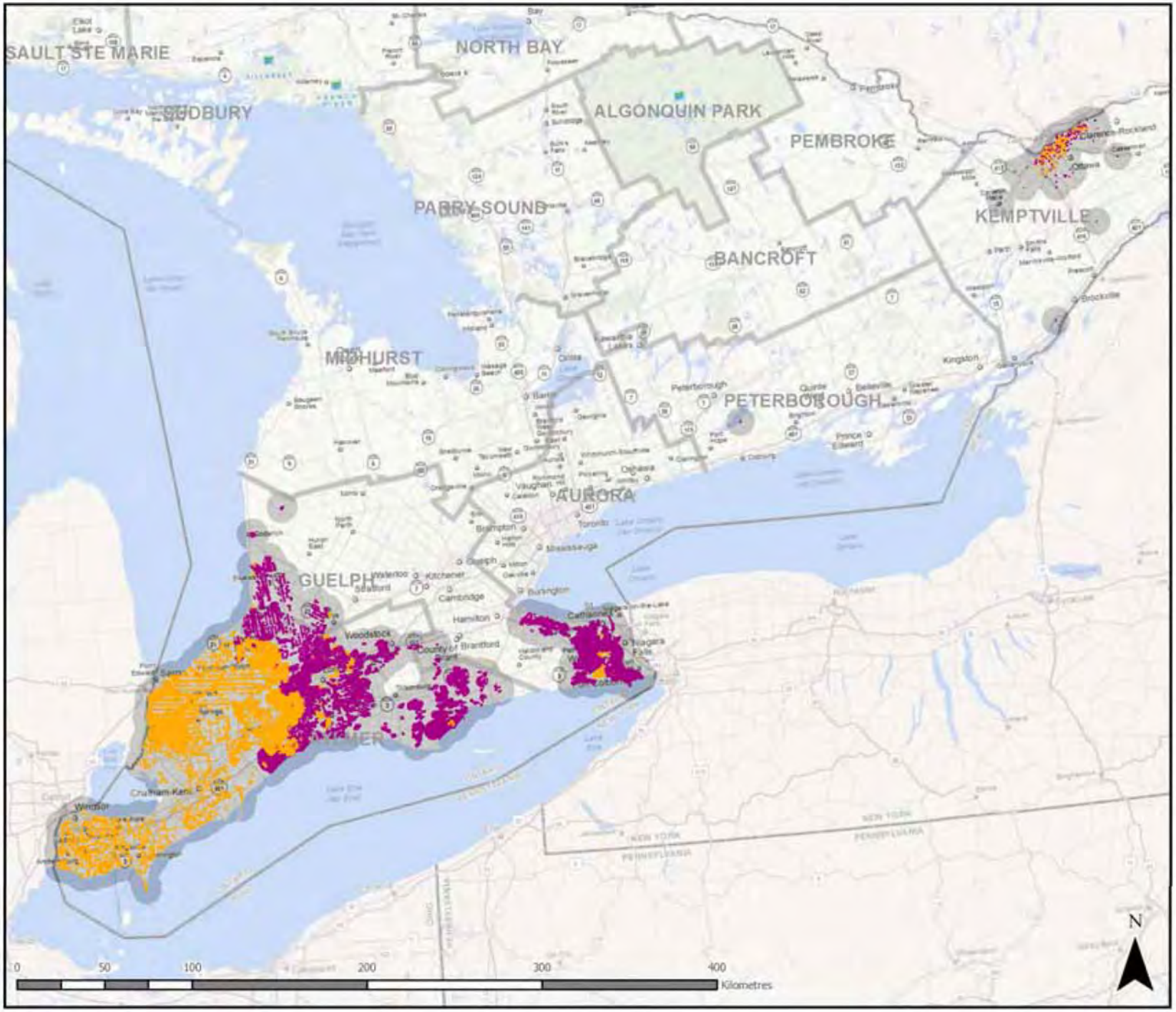
Map 4

Southern Region

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

Area of Mortality 2013

Cumulative Mortality 2004-2012



Fall Webworm

Pest Information

Common Name:	Fall Webworm
Latin Name:	*Hyphantria cunea* (Drury)
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Variety of broadleaf species

Provincial Key Facts

- One of the few North American insects accidently introduced into Europe and Asia.
- Webs are more prevalent on open stands or edge trees, along roadside and street trees.
- Impact on tree health is usually limited because defoliation typically occurs late in the growing season. Persistent infestation can cause branch and crown dieback.
- Ornamental trees are particularly susceptible and lose aesthetic value.

Silken tent created by fall webworm larvae

Severe defoliation caused by fall webworm.

Regional Summary

Northwest

- In Thunder Bay and Nipigon districts, low population levels were observed along Hwys 593, 595 and 588 in Cloud Bay, Pardee, Crooks and Pigeon River townships on black ash.

Northeast

- In Chapleau and Wawa districts, fall webworm was common, particularly throughout the southeast portion of Chapleau District along Hwy 667 between Hwy 129 and the community of Sultan between Nimitz and Neelands townships.
- In Sault Ste. Marie District, fall webworm was found throughout the district, but was more common along Ranger Lake Road, Hinckler Road and Hwy 129 north of Seymour Lake road.
- In Sudbury District, fall webworm was observed on roadsides in the towns of Azilda and Naughton, on Hwy 627 outside of the town of Killarney, and on Spanish River Road, Manitoulin Island.
- In North Bay District, nests were observed along Hwy 17 East outside of Sturgeon Falls, in Latchford, and as far south as Restoule.

Southern

- In Guelph District, light-to-moderate defoliation occurred in pockets throughout the district. Notable populations included areas throughout Guelph-Eramosa Township, Wellington County and north of Hwy 403 within Hamilton.
- In Aylmer District, light-to-moderate defoliation occurred in pockets throughout the district. Moderate-to-severe defoliation was observed within Longwoods Conservation Area and along Hwy 402 in the town of Strathroy-Caradoc, Middlesex County.
- In Peterborough and Bancroft districts, scattered pockets of moderate levels of defoliation were observed with a higher abundance in the City of Kawartha Lakes, and Haliburton and Muskoka counties.
- In Midhurst District, low levels of defoliation occurred in low lying woodlands with several smaller nests present rather than large tree enveloping webbing.
- In Aurora District walnut was affected in moderate levels.

Ontario Ministry of Natural Resources and Forestry

Forest Tent Caterpillar

Pest Information

Common Name:	Forest Tent Caterpillar
Latin Name:	*Malacosoma disstria* Hubner
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Broadleaf species
Infestation Area:	195,625 ha

Provincial Key Facts

- Forest tent caterpillar outbreaks in Ontario occur approximately every 10-12 years.
- Forest tent caterpillar prefers sugar maple and oak in the southern part of the province and trembling aspen in northern areas.
- Defoliation was mapped in both the Southern and Northwest Regions in 2013.
- The outbreak continued to collapse in Southern Region.
- In the Northwest Region the infestation increased six times over 2012, indicating a new outbreak is underway with the potential to reach several million hectares.
- In most outbreaks, tree mortality is usually 10% or less, unless other stressors affect the same stand.

Outlook

- Populations are expected to build in Northwest Region into a large scale outbreak.
- In 2013, a small scale egg band survey was done in Northwest Region to forecast forest tent caterpillar defoliation in 2014 (22 locations). Refer to Map 3
- Populations are expected to collapse in Southern Region.

Defoliation Forecast 2014

District	Nil	Light	Moderate	Severe	Total
Dryden	3	2	1	1	7
Kenora	2	1	-	1	4
Red Lake	1	5	-	1	7
Sioux Lookout	-	-	-	3	3
Total Plots	6	8	1	6	21

Forest tent caterpillar larvae.

Overview Map

Forest tent caterpillar defoliation in Northwest Region.

Forest Tent Caterpillar

Regional Summary

Northwest

- This is the second year of infestation in the Northwest Region. Defoliation was mapped in Kenora, Red Lake, Sioux Lookout, Dryden, Thunder Bay and Nipigon districts totalling 191,831 ha of moderate-to-severe defoliation.
- Defoliation was mainly on trembling aspen, but when aspen was absent or defoliated early, balsam poplar and white birch were defoliated. In some areas cocoons were spun in many species of trees and shrubs, including balsam fir, black spruce, red pine and pin cherry.
- In Kenora District, defoliation was mapped primarily in the district's east portion with smaller areas scattered around Grassy Narrows and Sioux Narrows.
- Defoliation was mapped in Red Lake District around Balmertown, along Hwy 105 around Pakwash and Gullrock lakes, and around Poplar Hill.
- Most defoliation in Dryden District occurred in the central portion, north to the border with Sioux Lookout District.
- Sioux Lookout District had 59,898 ha of defoliation mapped from Lac Seul First Nations, south to Big Vermilion Lake in Ojibway Provincial Park to areas around Minnitaki Lake (including the majority of Sioux Lookout city limits). Defoliation was also mapped in Pickle Lake area and south between Pickle Lake and Osnaburgh First Nations.
- Small isolated pockets of defoliation were found in and around the city of Thunder Bay.
- In Nipigon District, wide spread defoliation occurred around Fort Hope where defoliation of aspen was severe. Also, pockets of defoliation were found in the northern and southern parts of the district.

Northeast

- Forest tent caterpillar was not reported through aerial or ground surveys.

Southern

- In its fourth year, defoliation in Midhurst District continued to decline totalling 12,303 ha with 8,509 ha of light and 3,794 ha of moderate-to-severe defoliation.
- Widespread defoliation of sugar maple, white ash, white elm, American beech, basswood, white birch, and poplar was found across Bruce, Grey and Simcoe counties.
- In Bruce County the main area of light and moderate defoliation remained in the Colpoys Bay area.
- In Grey County light and moderate-to-severe defoliation occurred through Georgian Bluffs, Meaford, Chatsworth, Grey Highlands and the Town of The Blue Mountains.
- In Simcoe County defoliation in Oro Medonte and Springwater was reduced to light, including defoliation of red oak. The large area affected south east of Elmvale significantly receded.
- Collapsing populations in Grey County may be due to naturally occurring biological controls: the fungus Furia gastropachae, the nucleopolyhedrosis virus (NPV) and the parasitic fly Sarcophaga aldrichi, also known as the friendly fly, were all prevalent in 2012.

Area Summary

Area-within-which forest tent caterpillar caused defoliation moderate-to-severe defoliation 2009 - 2013 by MNR Region and District (area in hectares).

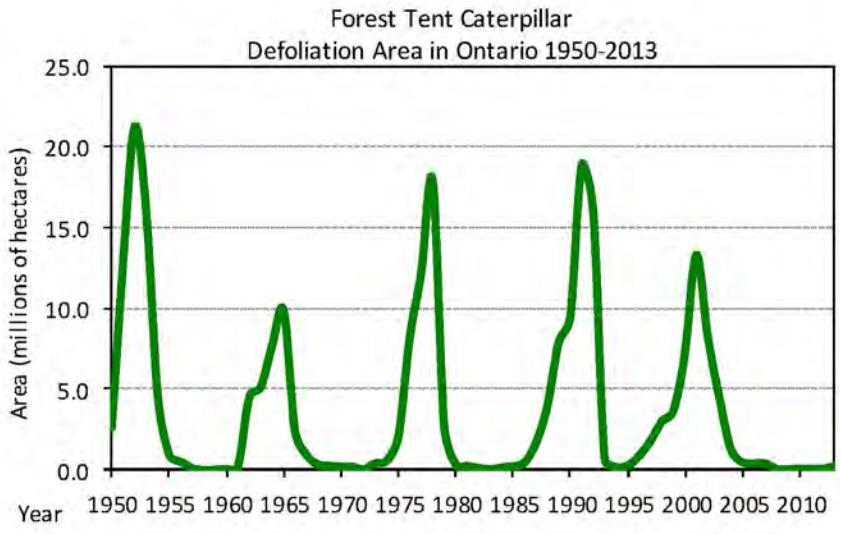
Region/District	2009	2010	2011	2012	2013
Northwest					
Dryden	-	-	-	1,638	37,100
Kenora	-	-	-	2,381	36,738
Nipigon	-	-	-	25,325	48,371
Red Lake	-	-	-	-	9,724
Sioux Lookout	-	-	-	871	59,898
Subtotal:	-	-	-	30,215	191,831
Northeast					
All Districts	-	-	-	-	-
Southern					
Bancroft	-	30,074	12,551	-	-
Guelph	-	3,073	975	102	-
Kemptville	-	-	-	-	-
Midhurst	-	20,755	49,658	17,665	3,794
Parry Sound	-	141	-	-	-
Peterborough	8,912	6,381	3,755	-	-
Subtotal:	8,912	60,424	66,939	17,767	3,794
Provincial Total:	8,912	60,424	66,939	47,982	195,625

Ontario Ministry of Natural Resources and Forestry

Forest Tent Caterpillar

Trend Analysis

- Forest tent caterpillar outbreaks are a natural part of the forest ecosystem. They occur on a cycle of approximately 10-12 years and typically last 3-4 years in a given location.
- Populations in one area of the province often increase to outbreak levels and coalesce with populations in other regions to form very large outbreaks causing severe defoliation across several million hectares.
- Significant defoliation in Southern Region began in 2010 with scattered pockets totalling 60,424ha. By 2012, the defoliation in the region was greatly reduced, and was almost entirely in Midhurst District (17,665ha). In 2013, defoliation was only found in the Midhurst District (12,303ha). The outbreak collapse in this part of Ontario will likely continue in 2014 with limited defoliation expected in this area.
- In the Northwest Region there was a considerable expansion of area defoliated with many new areas of defoliation detected. The outbreak is expected to continue to expand in 2014. Existing areas of defoliation are expected to coalesce and new areas are likely to erupt.



Forest Tent Caterpillar Egg Band Survey Plots

- Forest tent caterpillar egg band counts help forecast defoliation for the next year.
- Egg bands are laid in mid- to late-July. The tiny larvae emerge the following spring to feed on expanding leaves.
- Egg band surveys are done in the fall by sampling three, widely separated, codominant aspen trees at each plot. The trees are tallied and new egg bands on the branches are counted. Forecasting is done separately for trees 10-15 cm diameter at breast height (dbh) and trees greater than 15 cm dbh (see table below).
- The average number of new egg bands per tree is used to forecast defoliation as nil, light, moderate or severe.
- At the beginning of an infestation this scale tends to underestimate defoliation, and tends to over-estimate defoliation in declining infestations.

Average number of egg bands / tree	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

Crown defoliation caused by forest tent caterpillar.

Forest tent caterpillar larval colony.

Ontario Ministry of Natural Resources and Forestry

Forest Tent Caterpillar

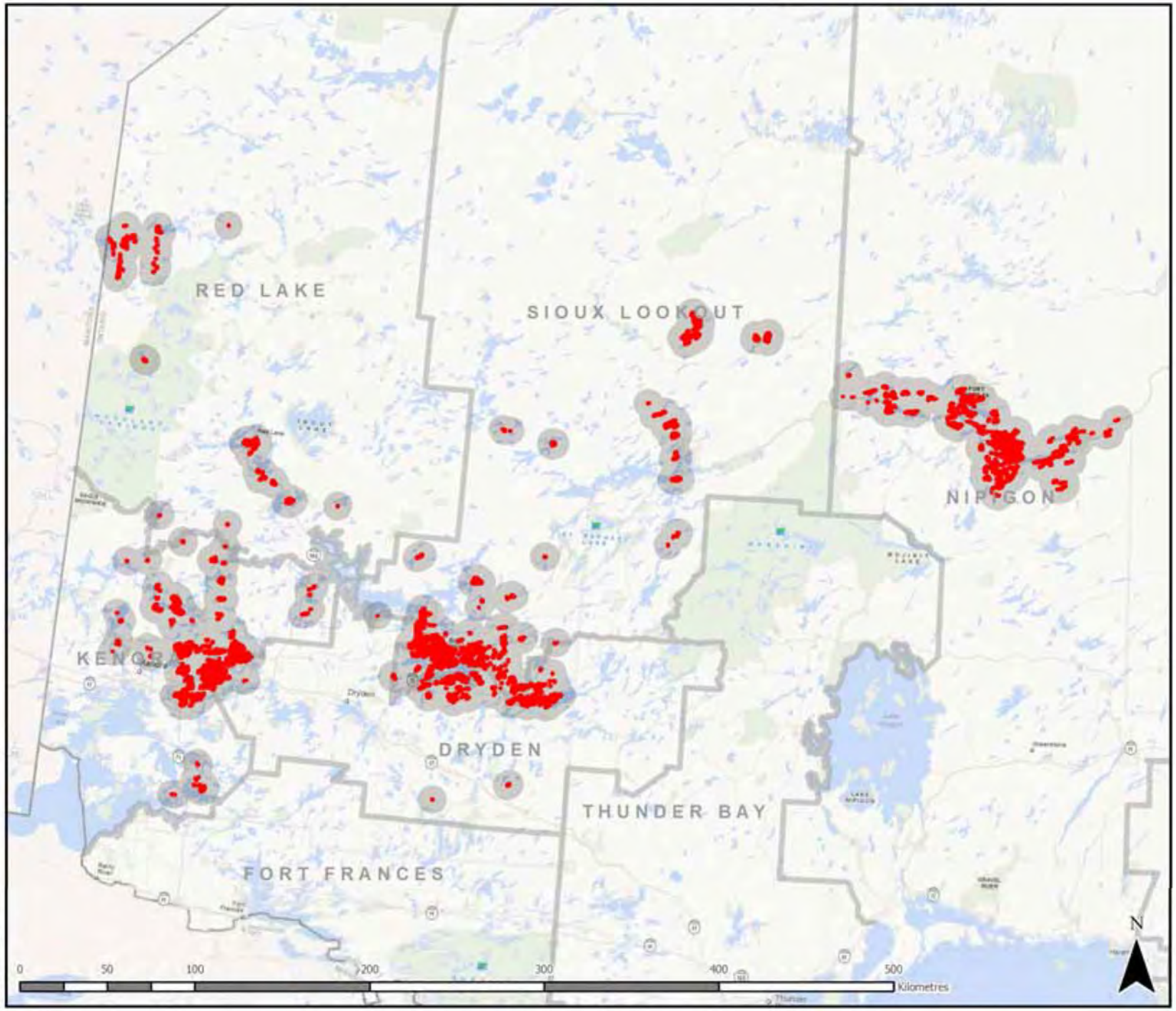
Forest Tent Caterpillar 2013

Map 1

Northwest Region

Areas-within-which forest tent caterpillar caused defoliation.

Area of Moderate-to -Severe Defoliation



Forest Tent Caterpillar

Forest Tent Caterpillar 2013

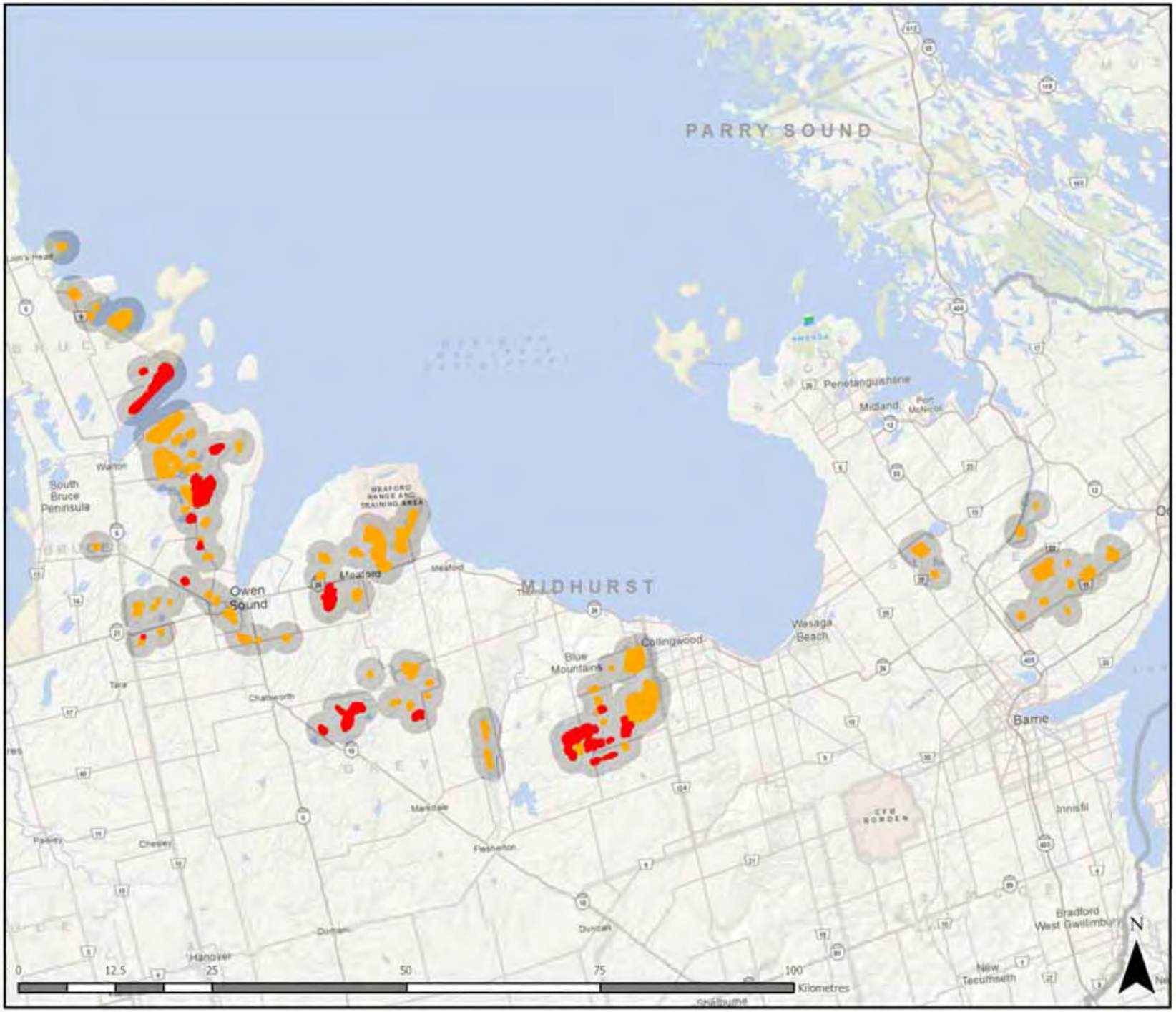
Map 2

Southern Region

Areas-within-which forest tent caterpillar caused defoliation.

Area of Light Defoliation

Area of Moderate-to-Severe Defoliation



Ontario Ministry of Natural Resources and Forestry

Forest Tent Caterpillar

Forest Tent Caterpillar 2013

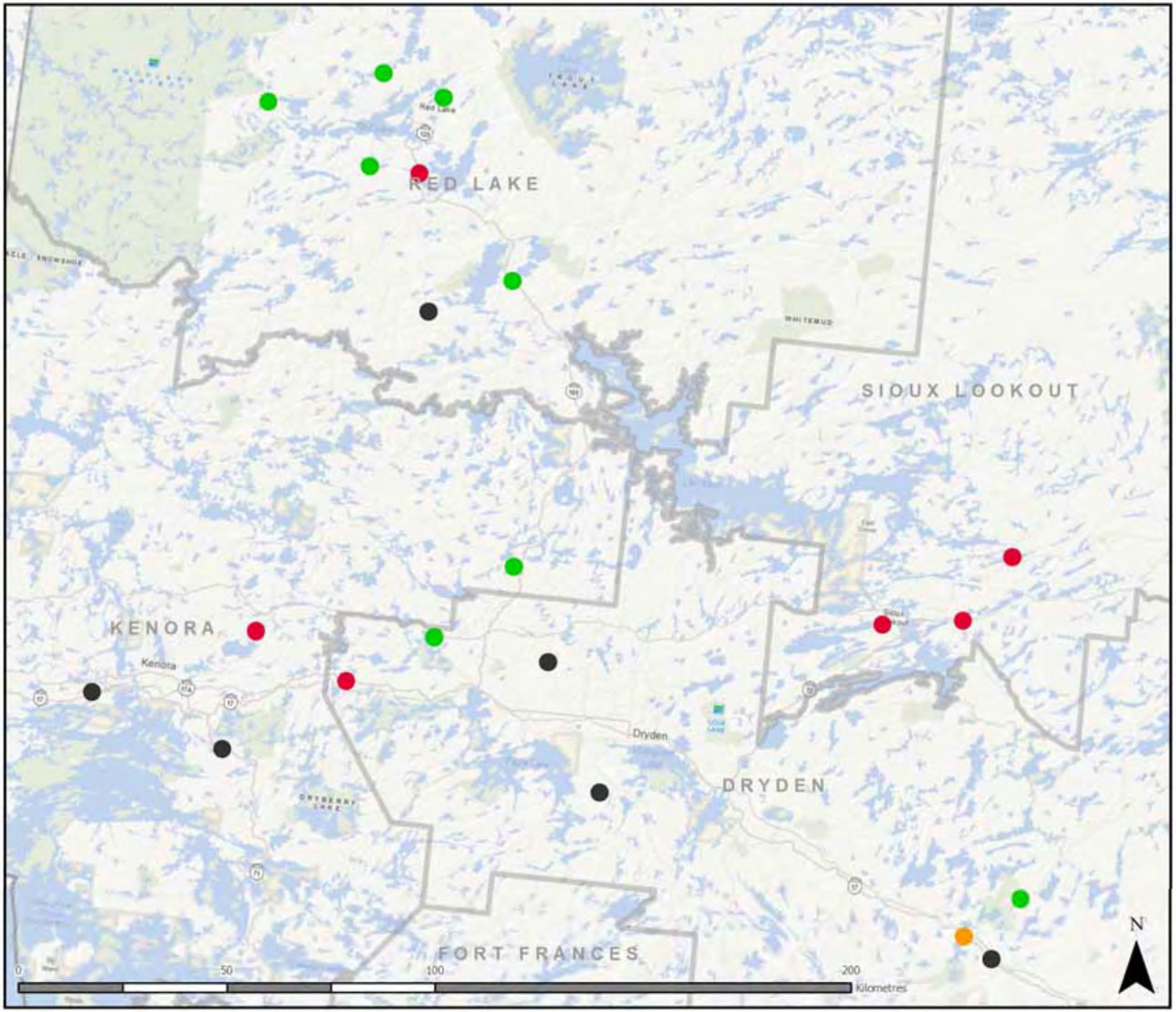
Map 3

Northwest Region

Egg Band Survey Locations

Forecast:

- Nil
- Light
- Moderate
- Severe



Frost

Damage Information

Damage Name:	Frost
Damage Type:	Abiotic damage - weather event
Damage Area:	281,794 ha

Provincial Key Facts

- Frost can adversely affect both conifers and hardwoods with new shoots and leaves being the most susceptible.

Regional Summary

Northwest

- Frost damage occurred on trembling aspen in Dryden, Fort Frances, Thunder Bay and Nipigon districts totalling 281,794 ha of moderate-to-severe damage.
- In Fort Frances District, 6,706 ha were mapped.
- Dryden District had the least amount of frost damage with 16 ha mapped.
- In Thunder Bay District, frost caused dwarfing of leaves within an area of 38,275 ha. Larger swaths of damage were found in the southern portion of the district. In the north, damage was recorded around Armstrong and along the west side of Caribou Lake 20 km north of Armstrong. The rest of the district experienced smaller, scattered patches of damage.
- Nipigon District experienced a significant amount of frost damage with 236,797 ha mapped. It extended as far north as Ogoki Lake and as far south as Lake Helen. A significant amount of leaf dwarfing occurred north of Polly Lake and along both sides of Hwy 11.

Northeast

- In Sault Ste. Marie District, frost damage was not aerially mapped, but was observed in pockets during ground surveys. Areas damaged included the south end of St. Joseph Island in Hilton and Jocelyn townships, north of Elliot Lake in Vance Township, on Black Creek Road in Wardle and Winkler townships and in and around the city of Sault Ste. Marie. Damage occurred mostly on mature trembling aspen trees following four consecutive days of below freezing temperatures at the end of May. Damage was evident by the delay in shoot development, re-flushing of some leaves that were very small and pale, creating thin crowns.

Southern

- Frost damage was not aerially mapped, but ground observations showed similar symptoms as seen in the Northeast Region. Copses of trembling aspen trees exhibited thin crowns and small leaves. The event was scattered, occurring at various locations from south eastern Ontario north to Mattawa and North Bay.

Leaf dwarfing: unusually small trembling aspen leaves grown following frost (left) to those not affected by frost (right).

Overview Map

Thin trembling aspen crowns caused by a frost event at the end of May in Sault Ste. Marie.

Frost

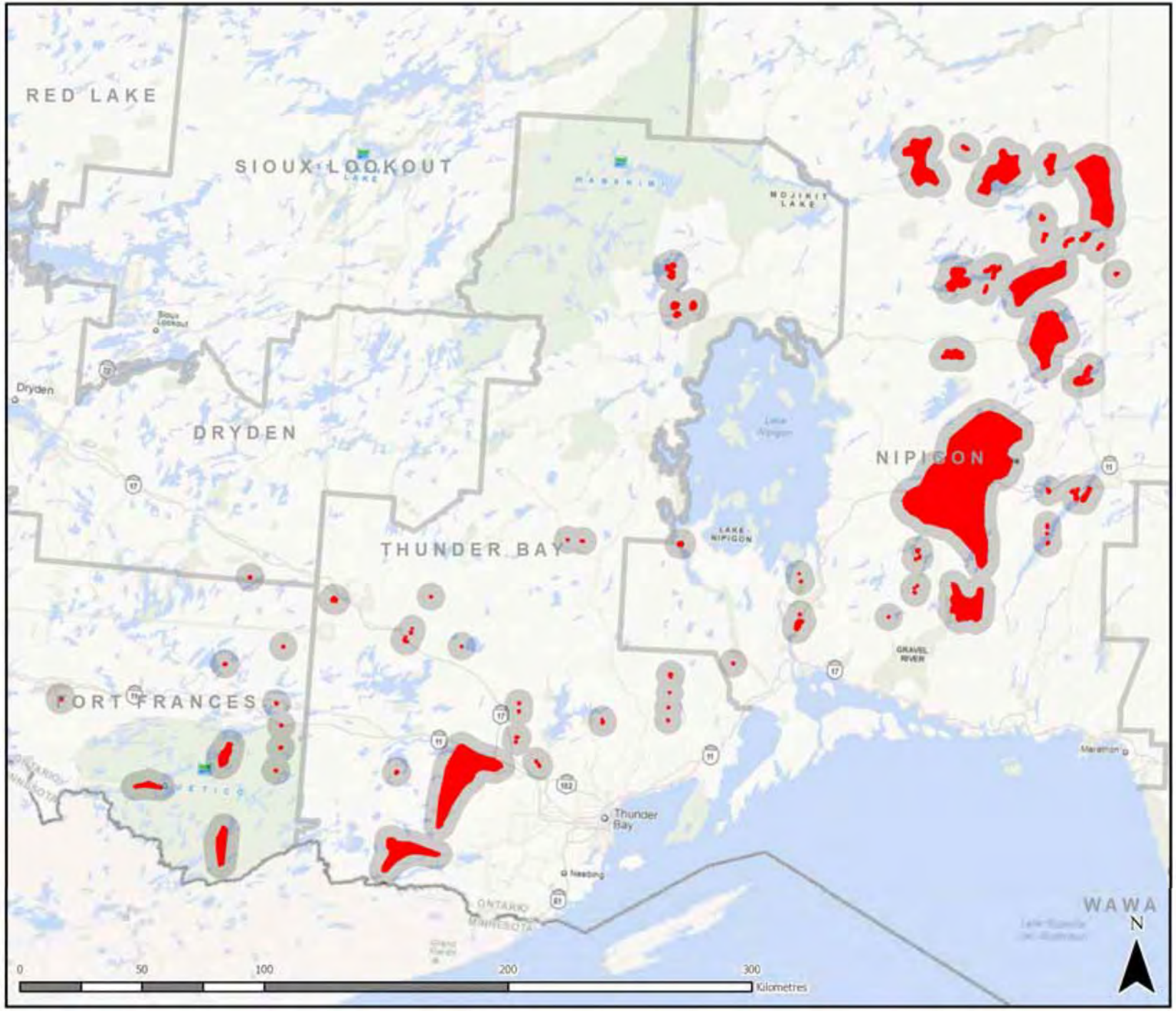
Frost Damage 2013

Map 1

Northwest Region

Areas-within-which frost caused moderate-to-severe damage.

Area of Moderate-to-Severe Frost Damage



Ontario Ministry of Natural Resources and Forestry

Gypsy Moth

Pest Information

Common Name:	Gypsy Moth
Latin Name:	*Lymantria dispar* (L.)
Pest Origins:	**Invasive** - native to Europe
Pest Type:	Defoliator
Host Species:	Oak, birch, aspen and various broadleaf species and conifers
Infestation Area:	9,188 ha

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 and have a duration of two to three years in a given stand.
- Major outbreaks in Ontario peaked in 1985, 1991 and 2002.
- Gypsy moth has spread throughout much of the southern oak range. Oak is its preferred host.
- Overall population levels have remained relatively low following widespread and extensive mortality in 2009 and 2010 of the larvae caused by the fungus Entomophaga maimaiga (Humber, Shimazu & R.S. Soper).
- 2013 marks the second year of defoliation around the city of Sudbury.
- An aerial spray program using B.t.k was conducted in the Etobicoke area of Toronto to protect the health of large oak trees.
- Hardwood tree mortality is more common when defoliation occurs in tandem with other stressors. Whole tree mortality can occur after one year of complete defoliation of white pine trees.

Outlook

- Despite signs of gypsy moth populations starting to increase in Southern Region, the extremely cold winter temperatures of 2013-14 will likely cause widespread mortality of gypsy moth eggs. Therefore, severe defoliation is not expected in 2014.
- Collapse of the gypsy moth population is also expected in Northeast Region where the infestation has already existed for two years. Cold winter temperatures have likely killed egg masses above the snow.
- Populations in northern Minnesota have increased with the potential to spread into ranges of bur oak in Northwest Region, especially around Fort Frances and Lake of the Woods.

Adult gypsy moths and egg masses.

Overview Map

Gypsy Moth larva on a twig in Sudbury District.

Gypsy Moth

Regional Summary

Northwest

- Gypsy moth has not been found established.

Northeast

- A total of 8,451 ha of moderate-to-severe defoliation were mapped in Sudbury District. The majority of defoliation was north of Ramsey Lake south to Long Lake and McFarlane Lake. The fungal insect pathogen Entomophaga maimaiga was present in the population of gypsy moth this summer. On Manitoulin Island there were four pockets of defoliation mapped totalling 40 ha.
- In Sault Ste. Marie District, ground surveys were performed in historical areas of infestation because of the outbreak in Sudbury District. Low numbers of larvae were detected south of Elliot Lake with light defoliation (<5%) on trembling aspen. Some of the dead larvae were found to be infected with either the fungal pathogen Entomophaga maimaiga, or the nucleopolyhedrosis virus (NPV). There were a few single larvae found in the city of Sault Ste. Marie.

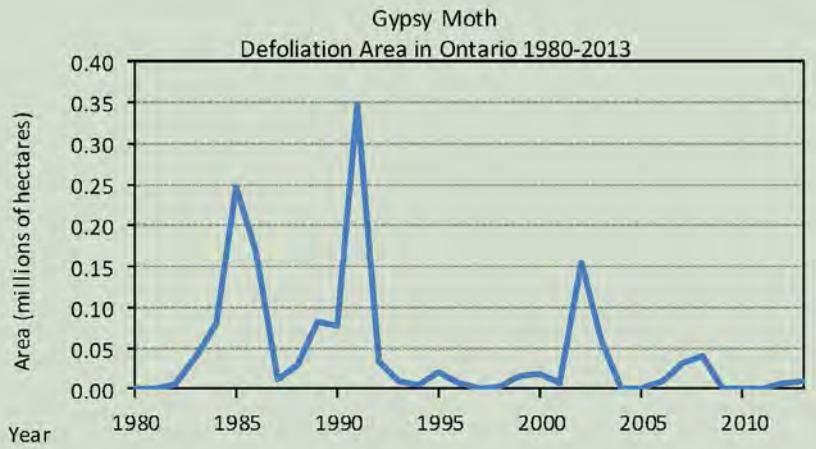
Southern

- Aylmer, Guelph, Midhurst, Aurora, Parry Sound, Peterborough, Pembroke and Kemptville districts all reported defoliation. Light defoliation was aerially mapped in Aylmer District (737 ha) south of Sarnia on white and bur oak. Remaining occurrences throughout Southern Region were too small, scatiered or light to be aerial mapped.
- In Alymer District, larvae were detected in a residential neighbourhood of LaSalle causing moderate-to-severe defoliation on boulevard and open grown oak and white birch.
- In Guelph District, various hardwood species were infested along Huron Bruce Rd. in Howick Township, Huron County and in a woodlot near the hamlet of Lakelet in Howick Township. A small population was detected at the Niagara Parks Commission Botanical Gardens on Colorado blue spruce.
- In Midhurst District, larvae were detected throughout Grey and Bruce counties on several hardwood tree species. Light defoliation occurred near Owen Sound, rural Meaford, Shallow Lake and Kemble areas. Egg masses were observed near Sparrow Lake in Simcoe County on white and red oak.
- In Aurora District, moderate-to-severe defoliation was observed. A control program for the larvae was undertaken in Etobicoke area of Toronto.
- In Parry Sound District, moderate-to-severe defoliation on red oak, trembling aspen and blueberry was observed around Magnetawan River. Moderate defoliation occurred in a jack pine stand around Magnetawan River and high numbers of egg masses were present on a few scattered semi-mature jack pine trees along Hwy 69.
- Trace levels of defoliation occurred across Peterborough District extending into southern Kemptville District. Larvae and egg-masses were observed in pockets within the City of Kawartha Lakes, southern Lennox and Addington County and Frontenac County within Peterborough District.
- In both Pembroke and Kemptville districts, while not detected by air, gypsy moth populations and associated defoliation were widespread. The most commonly affected host species were oak and elm.

Area Summary

Total area-within-which gypsy moth caused defoliation moderate-to-severe defoliation 2009 - 2013 by MNR Region and District (area in hectares).

Region / District	2009	2010	2011	2012	2013
Northwest					
All Districts	-	-	-	-	-
Northeast					
Sault Ste. Marie	-	-	-	-	-
Sudbury	-	-	-	8,123	8,451
Subtotal:	-	-	-	8,123	8,451
Southern					
Aurora	-	-	-	-	-
Aylmer	84	-	-	-	-
Guelph	97	-	-	-	-
Midhurst	204	-	-	-	-
Subtotal:	385	-	-	-	-
Provincial Total:	385	-	-	8,123	8,451



Gypsy Moth

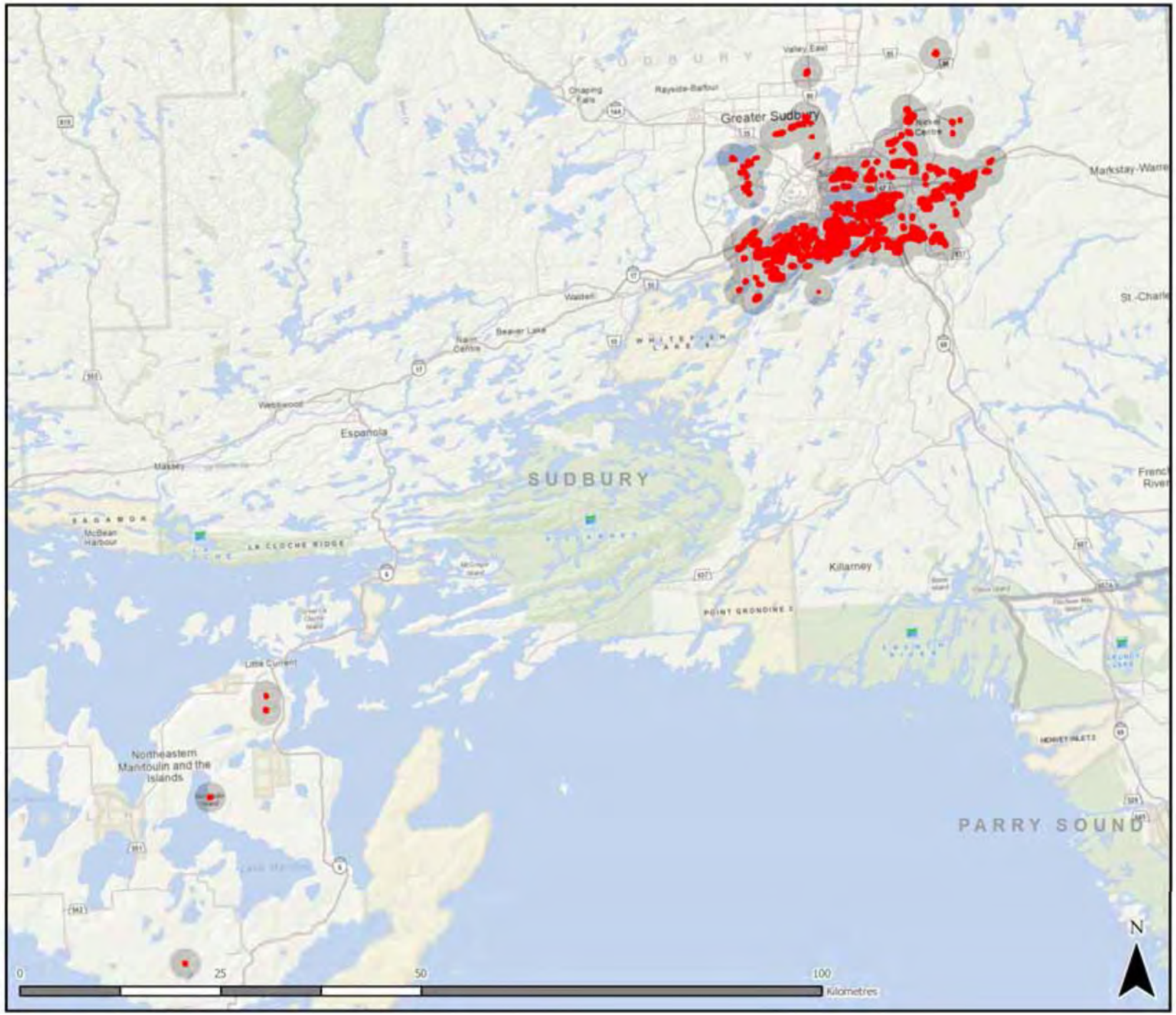
Gypsy Moth 2013

Map 1

Northeast Region

Areas-within-which gypsy moth caused moderate-to-severe defoliation.

Area of Moderate-to -Severe Defoliation



Gypsy Moth

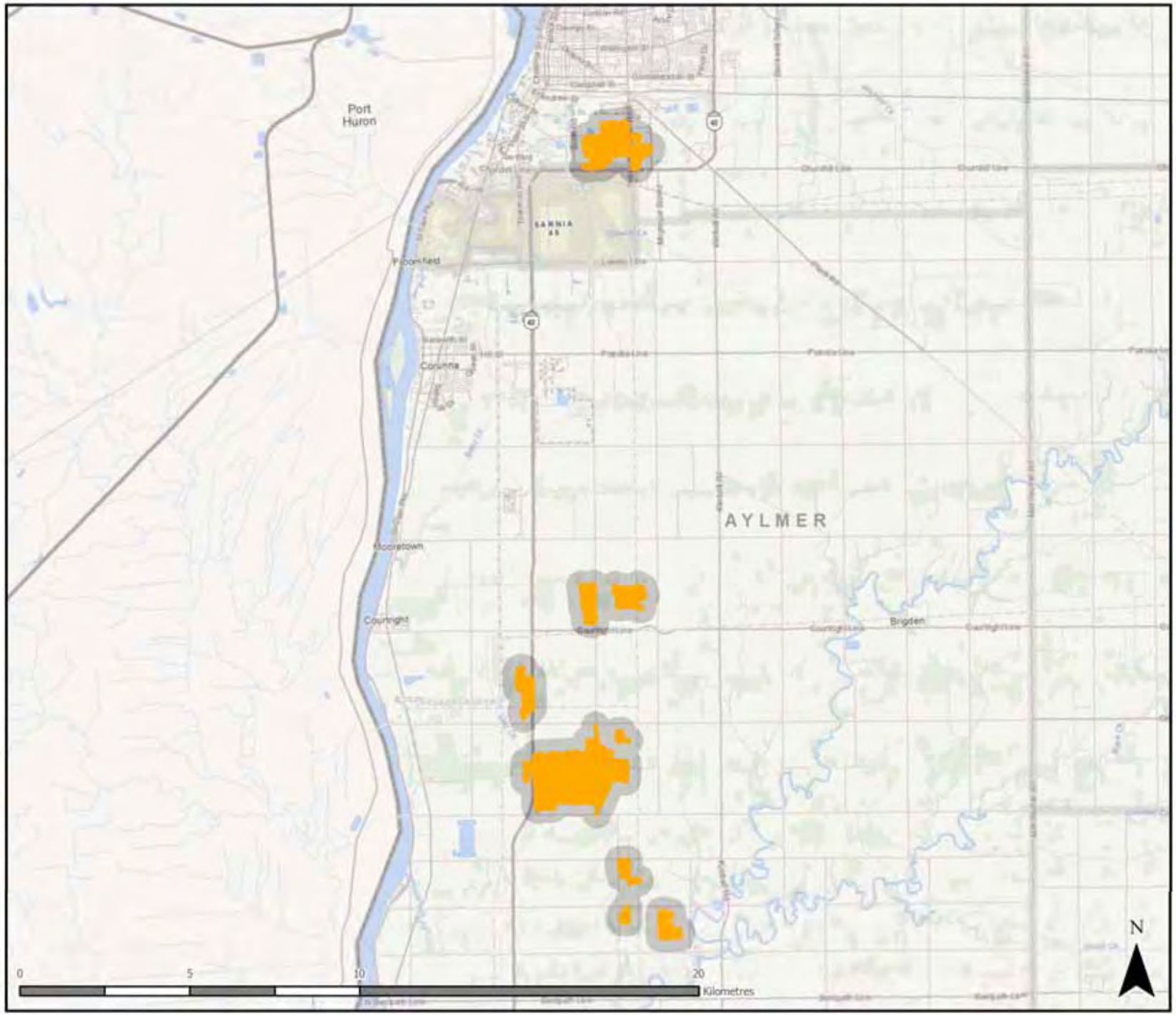
Gypsy Moth 2013

Map 1

Southern Region

Areas-within-which gypsy moth caused light defoliation.

Area of Light Defoliation



Ontario Ministry of Natural Resources and Forestry

Hemlock Woolly Adelgid

Pest Information

Common Name:	Hemlock Woolly Adelgid
Latin Name:	*Adelges tsugae* Annand
Pest Origins:	**Invasive** - native to Japan
Pest Type:	Defoliator
Host Species:	Hemlock species
Infestation	Area: One tree

Provincial Key Facts

- In 2012, hemlock woolly adelgid was first found in Etobicoke, Toronto in five ornamental trees. It likely arrived on nursery stock from an infested part of the United States. These trees were cut and incinerated. In the fall of 2013, two more trees in this area were found to be infested with hemlock woolly adelgid.
- In 2013, during a survey by Canadian Food Inspection Agency (CFIA), a single infested tree was found in the Niagara Gorge. The insect disperses naturally by wind, birds or mammals. Birds from the United States were the most likely cause of the Niagara gorge infestation.
- Tree mortality can be variable depending on location. If the insect spreads in Ontario, it has the potential to cause widespread hemlock mortality and alter ecosystems where hemlock is commonly found.

Regional Summary

Northwest

- Hemlock woolly adelgid is not known to occur in the region.

Northeast

- Hemlock woolly adelgid is not known to occur in the region.

Southern

- In Guelph District, on May 30, 2013 at Niagara Glen Park along the Niagara River the Canadian Food Inspection Agency identified a single eastern hemlock tree that was possibly infested by hemlock woolly adelgid. A sample was collected on June 5, 2013 and identification of the insect was confirmed.
- A 500 metre radius delimitation survey by CFIA, MNR and CFS was carried out and no additional infested trees were identified. The one infested tree was cut and burned by the Niagara Parks Commission.

Hemlock woolly adelgid.

Overview map.

Woolly masses caused by the hemlock woolly adelgid found on the infested tree.

Jack Pine Budworm

Pest Information

Common Name:	Jack Pine Budworm
Latin Name:	*Choristoneura pinus pinus* Freeman
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Jack pine, red pine, Scots pine, white pine
Infestation Area:	83,075 ha

Provincial Key Facts

- Outbreaks occur in Ontario every 8-10 years.
- Outbreaks last approximately two to three years in a given stand. Outbreaks have a pattern of abruptly increasing and then abruptly decreasing.
- The current infestation began in 2004 and peaked in 2006 at 740,116 ha.
- 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).
- The outbreak has collapsed to zero defoliation in Northeast and Southern regions. In Northwest Region, the outbreak began in the Fort Francis area in 2005, followed by Kenora, Atikokan, Dryden, and then Red Lake and Sioux Lookout areas. As the outbreak began in a new area, it collapsed in the previously defoliated areas. As of 2013, defoliation is limited to the northern portion of Sioux Lookout District.

Outlook

- Even though defoliation increased in Sioux Lookout District in 2012 and 2013, these increases follow five years of decreasing defoliation. Because of this, and because defoliation is still less than 100,000 ha, a significant expansion of the area affected is not expected in 2014.
- Tree mortality will likely increase in Sioux Lookout District in stands that have been severely defoliated.

Jack pine budworm larvae feeding.

Overview Map

Jack pine budworm defoliation.

Jack Pine Budworm

Regional Summary

Northwest

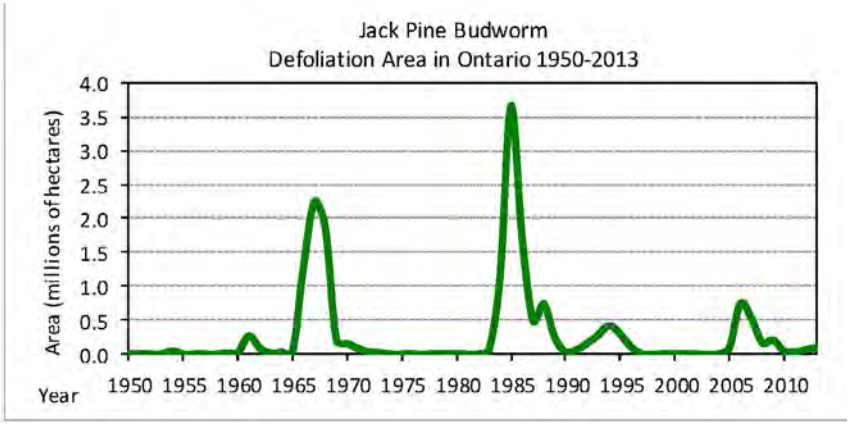
- In Sioux Lookout District, aerial surveys revealed 83,075 ha of moderate-to-severe jack pine defoliation and 8,790 ha of jack pine mortality. The main area of defoliation was north of the community of Pickle Lake, primarily along Hwy 808, Lysander Lake and northwest to Mawley Lake. Several smaller pockets were detected west of the main area of defoliation near Horseshoe Lake, Kecheokagan and Sasiginaga lakes, Yates Lake, and Ariott Lake.
- Jack pine mortality in Sioux Lookout District was observed in the area around Pipestone River Provincial Park, east of the access road to the Musselwhite mine.
- In Thunder Bay and Nipigon districts low defoliation amounts were scattered throughout the districts at too small a scale to be aerially mapped.

Northeast

- The population of jack pine budworm observed in 2012 causing 4,356 ha of moderate-tosevere defoliation in Sudbury District had collapsed in 2013. Aerial surveys did not find jack pine budworm defoliation. Jack pine budworm pheromone traps results were negative, except at the trap site in Merritt Township in the town of Espanola and in Nairn Township where moth counts were an average of 15.5 and 8.5, respectively, at these locations.

Southern

- In Parry Sound District, pre-aerial survey ground sampling indicated low populations around Magnetawan First Nation and the town of Britt. Jack pine in these areas had heavy flowers and appeared to have little defoliation. Defoliation was not severe enough to be mapped by air.
- In both Algonquin and Pembroke Districts, defoliation by jack pine budworm was not visible by air. Pheromone traps set across these districts found considerably lower jack pine budworm populations levels than in the past.



Area Summary

Total area-within-which jack pine budworm caused moderate-to-severe defoliation (MS) 2009-2013 by MNR Region and District and tree mortality for year 2013 (area in hectares).

Region / District	2009 MS	2010 MS	2011 MS	2012 MS	2013 MS	2013 Mortality
Northwest						
Red Lake	147,204	1,633	-	-	-	
Sioux Lookout	7,350	3,987	6,904	11,955	83,075	8,790
Subtotal:	154,554	5,620	6,904	11,955	83,075	8,790
Northeast						
Chapleau	98	23	-	-	-	-
North Bay	195	3	-	-	-	-
Sudbury	2,426	14,667	1,793	4,356	-	-
Timmins	6,682	365	1,048	-	-	-
Subtotal:	9,401	15,058	2,841	4,356	-	-
Southern						-
Algonquin	1,703	350	451	-	-	-
Parry Sound	39,701	23,762	17,537	44,708	-	-
Pembroke	75	138	32	-	-	-
Subtotal:	41,479	24,250	18,020	44,708	-	-
Provincial Total:	205,434	44,928	27,765	61,019	83,075	8,790

Jack pine budworm defoliation.

Jack pine pupa.

Jack Pine Budworm

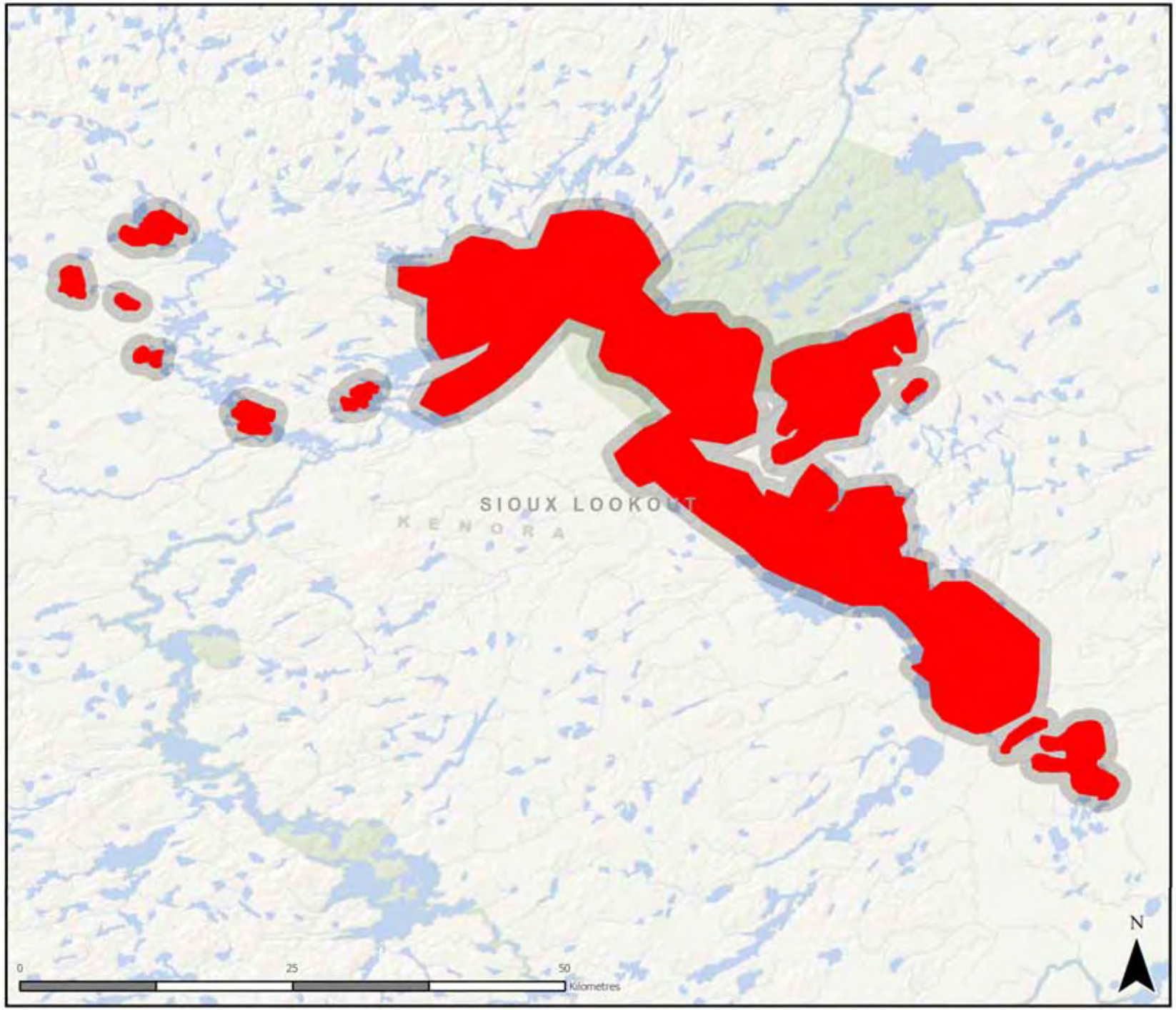
Jack Pine Budworm 2013

Map 1

Northwest Region

Areas-within-which jack pine budworm caused defoliation.

Area of Moderate-to -Severe Defoliation



Jack Pine Budworm

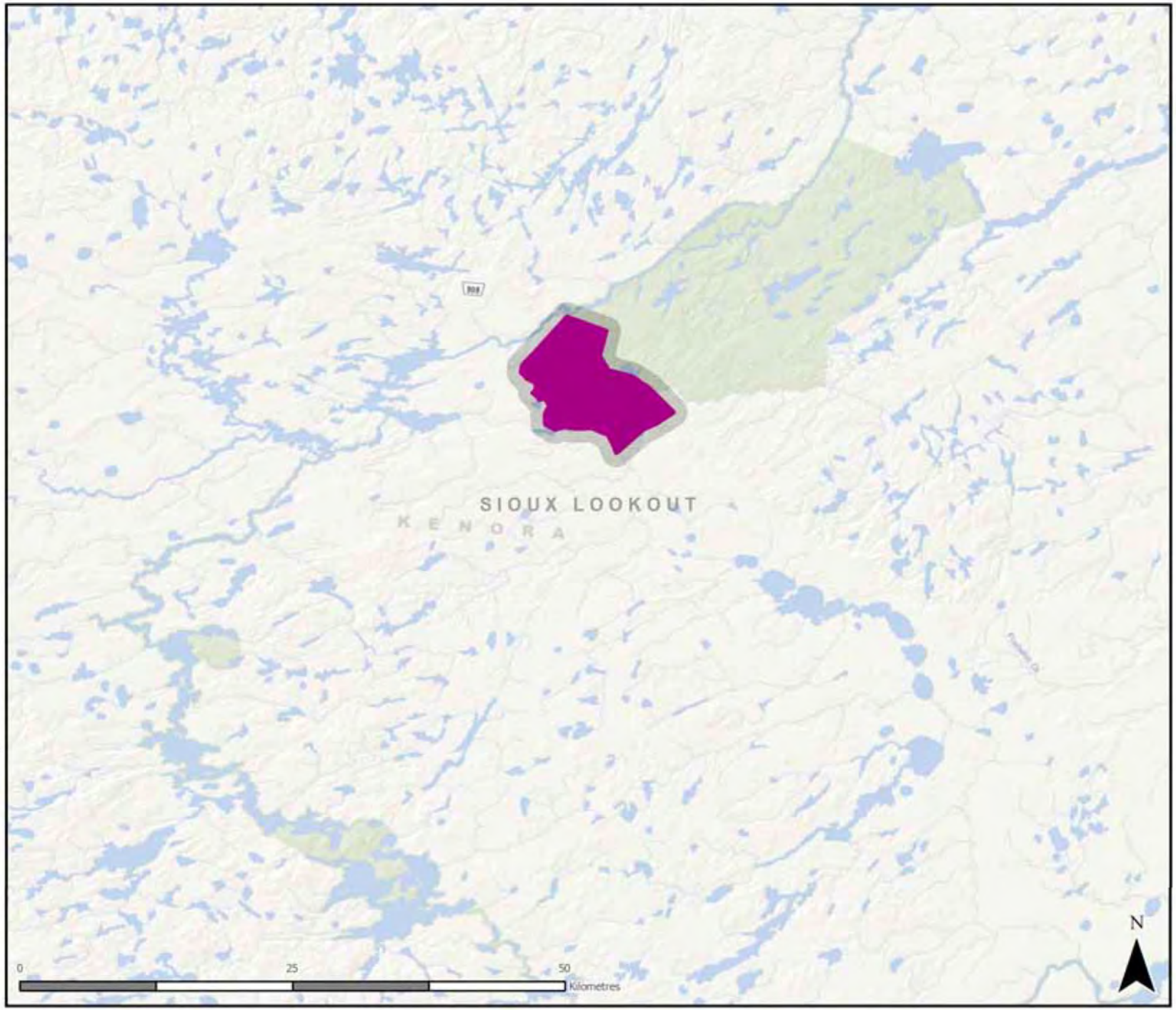
Jack Pine Budworm 2013

Map 1

Northwest Region

Areas-within-which jack pine budworm caused mortality.

Area of Mortality



Jack Pine Budworm

Jack Pine Forest Health Plots

Jack pine health plots were established across northern Ontario in the 1990s. Each plot consists of 50 jack pine trees which are monitored annually for mortality, male flower abundance, and defoliation (needle loss from any cause including insects, girdling by gall rusts, and bare branches)

A total of 118 plots, comprising 5,900 trees (55 plots in Northeast Region, 63 plots in Northwest Region) were assessed in 2013. The trees were rated for the presence of any pests, diseases or abiotic factors that affect jack pine as well as the abundance of male (pollen) flowers.

2013 Regional Plot Summary

- Jack pine tree condition in the plots was similar between Northeast and **Northwest** regions in Ontario. Overall tree health was excellent with <1.5% of the trees having >75% defoliation.
- A total of 37 jack pine plot trees in Northeast Region died, giving an average annual mortality rate of 2.1 %. Just over 54% of this mortality was caused by armillaria root rot. Western gall rust, sweet fern blister rust, comandra blister rust and wood borers contributed to 38% of the mortality while the cause of the remaining mortality could not be identified.
- There were 91 jack pine trees within the plots that died in Northwest Region (average annual mortality 4.7%); 65% died from snow damage and 21% from armillaria root rot. The remaining mortality was caused by blowdown, western gall rust and whitespotted sawyer beetle.
- Most of the tops of live jack pine trees were healthy in both regions (Table 2), with top kill at ≤2%.
- Jack pine male flowers were abundant in both regions. In Northeast Region over 78% of the live jack pine trees assessed had moderate-to-high levels of male flowers, which is 18% more than 2012. In Northwest Region there was a dramatic increase in amount of male flowers compared to 2012. In 2012 over 70% of trees assessed had nil-to-light levels of male flowers. In 2013 it was a complete reversal with over 81% of trees having moderate-to-high levels of flowers.
- There was no jack pine budworm defoliation in Northeast Region. In the Northwest Region there were only two plots with trace jack pine budworm defoliation (<5%).
- A total of 1046 trees had other agents affecting jack pine health during including western gall rust, sweet fern blister rust and abiotic factors such as drought, blowdown and snow damage. The most common of these in both regions was western gall rust. A total of 734 trees had some level of gall rust, the majority in Northeast Region (546 trees). Most of the western gall rust in Northeast Region was trace-to-low in severity, which was very similar to Northwest Region. The second most damaging agent was snow damage with 106 plot trees affected, all in Northwest Region.

Plot Summary

Table 1. Condition of all trees in jack pine forest health plots in Ontario, 2013.

Region	Tree Condition (% of all trees)					
	Total defoliation*				Mortality (%)	
	<25	25-50	51-75	>75	New	Old (pre-2013)
Northeast (2,750 trees)	49.6	10.8	1.8	1.4	1.3	35.0
Northwest (3,072 trees)	45.2	12.0	1.7	1.3	3.0	36.8

- Defoliation: refers to absence of needles not necessarily due to insect feeding.

Table 2. Condition of all tree tops and abundance of flowers of live trees in jack pine forest health plots in Ontario, 2013.

Region	Tree Condition (% of trees)						
	Tree Top (%)			Abundance of Flowers (%)			
	Live	Bare	Dead	Nil	Light	Moderate	High
Northeast (1,750 trees)	98.6	0.0	1.4	5.4	16.1	19.2	59.3
Northwest (1,852 trees)	96.1	1.9	2.0	0.5	18.5	29.8	51.2

A jack pine budworm pheromone trap in a jack pine stand.

Ontario Ministry of Natural Resources and Forestry

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: 5,486 ha

Provincial Key Facts

- Mapped in Southern Region since 2001.
- In 2003 defoliation in Ontario peaked at 16,839 ha.
- In 2013 larch case bearer was mapped entirely in Southern Region with a total of 5,486 ha, a slight increase from 2012.
- Populations are mostly kept in check by introduced parasites. Since 1998, however, it has caused defoliation in various locations across Southern Region and the southern parts of Northwest, and Northeast Regions.
- Trees that have been defoliated by larch casebearer beetle are often subsequently attacked by eastern larch beetle. Tree mortality is common after attack by these two insects, but typically not all tamarack trees in the stand are killed

Larch casebearer defoliation.

Larch casebearer larvae.

Overview Map

Aerial view of larch casebearer defoliation.

Larch Casebearer

Regional Summary

Northwest

- Larch casebearer was not reported through aerial or ground surveys.

Northeast

- Larch casebearer was not reported through aerial or ground surveys.

Southern

- Midhurst, Guelph, Aurora, Parry Sound, Bancroft, Peterborough, Pembroke and Kemptville districts all reported moderate-to-severe defoliation caused by larch casebearer totalling 5,486 ha.
- Midhurst District had the most defoliation, 1,928 ha, similar in size and location as in 2012. In Bruce County, sporadic pockets of defoliation were mapped from Hepworth to Howdenvale along the Bruce Peninsula. A small pocket was mapped south of Flesherton in Grey County. In Simcoe County, defoliation occurred in Tiny Township, central Oro-Medonte east of Hwy 400, Severn, north half of Ramara and north of Udney. Two small pockets of defoliation south of Shelburne, Dufferin County were also mapped.
- In Guelph District, 563 ha of defoliation were mapped. The largest area occurred at Luther Marsh Wildlife Management Area in the townships of East Luther Grand Valley and Wellington North in Wellington County. Not mapped, but found through ground surveys was light defoliation around the Beverly Swamp within the city of Hamilton and throughout Dundas Valley.
- In Aurora District, 449 ha of defoliation were mapped. Areas included Durham Regional Municipality where a large pocket was mapped in central Brock Township and two small pockets in Uxbridge and Oshawa.
- In Parry Sound District, a satellite pocket of severe defoliation, approximately 5 ha in size, occurred just north of North Healy Lake east of Bracebridge in the Municipal District of Muskoka.
- In Bancroft District, defoliation dropped from 526 ha in 2012 to 89 ha in 2013. Areas of defoliation occurred in small isolated pockets throughout the district.
- Peterborough District had 1,028 ha of defoliation. Approximately 600 ha of that occurred south of Stoney Lake to Hwy 7 and from Hwy 29 east to Crowe Lake in Peterborough County. Small isolated pockets were also found throughout the district.
- In Pembroke District, 143 ha of defoliation were mapped within Westmeath Township, a fraction of what was mapped in 2012.
- In Kemptville District the area of mapped defoliation was more than double compared to 2012. Defoliation was mapped between Montague and Beckwith townships in Lanark County and within Elizabethtown-Kitley Township in United Counties of Leeds and Grenville. A smaller population was mapped in the Greater Region of Ottawa near Manion Corners.

Area Summary

Total area-within-which larch casebearer caused moderate-to-severe defoliation 2009 - 2013 by MNR Region and District (area in hectares).

Region / District	2009	2010	2011	2012	2013
Northwest					
All Districts	-	-	-	-	-
Northeast					
North Bay	-	115	-	146	-
Subtotal:	-	115	-	146	-
Southern					
Algonquin	-	-	-	34	-
Aurora	-	-	-	449	258
Bancroft	-	-	67	526	89
Guelph	-	-		563	942
Kemptville	10	-	227	478	1,093
Midhurst	132	316	503	1,163	1,928
Parry Sound	-	1,289	-	-	5
Pembroke	-	-	232	805	143
Peterborough	-	-	562	705	1,028
Subtotal:	142	1,605	1,591	4,723	5,486
Provincial Total:	142	1,720	1,591	4,869	5,486

Larch casebearer larvae.

Larch Casebearer

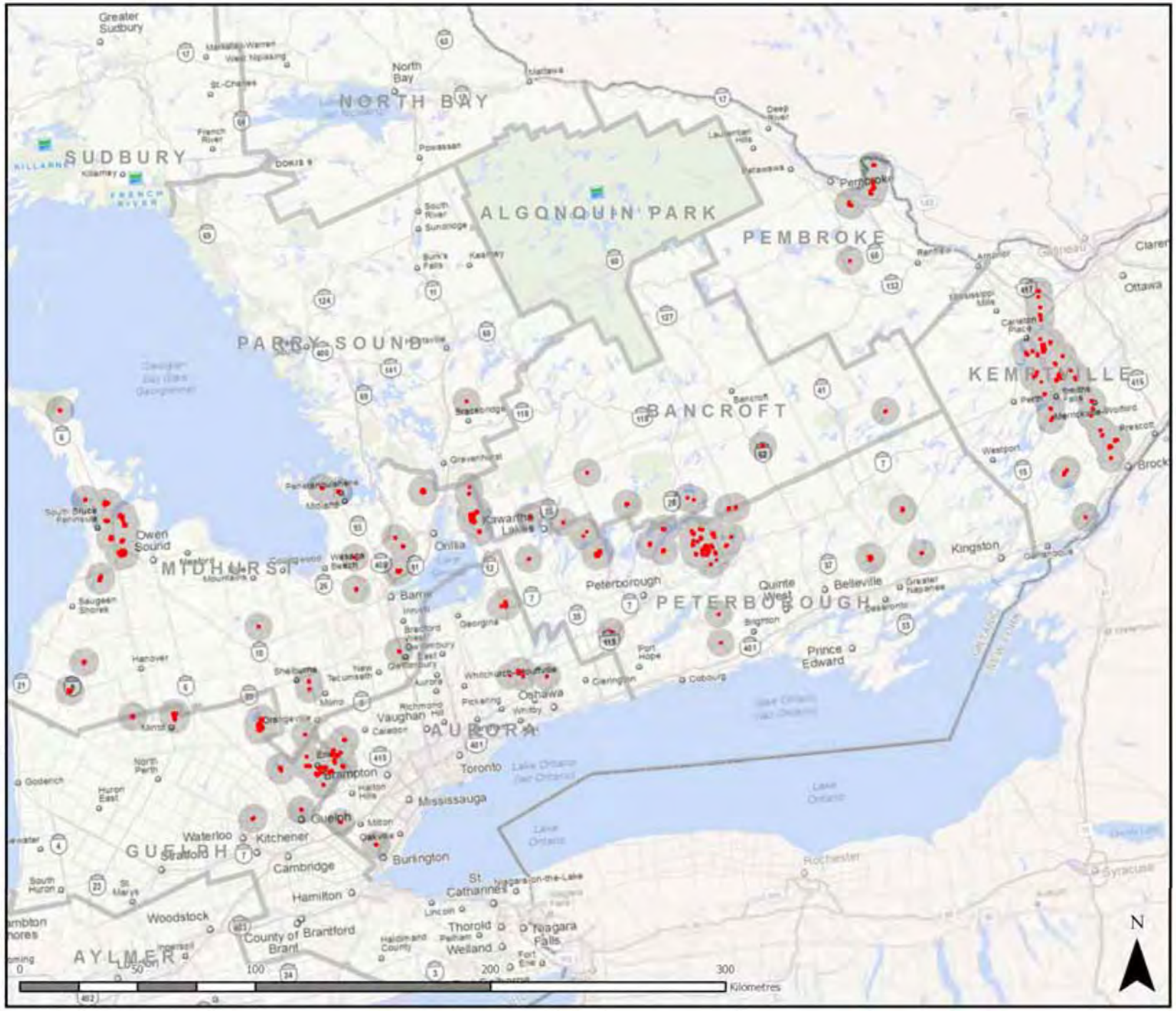
Larch Casebearer 2013

Map 1

Southern Region

Areas-within-which larch casebearer caused defoliation.

Area of Moderate-to -Severe Defoliation



Ontario Ministry of Natural Resources and Forestry

Large Aspen Tortrix

Pest Information

Common Name:	Large Aspen Tortrix
Latin Name:	*Choristoneura conflictana* (Wlk.)
Pest Origins:	Native to North America
Insect Type:	Defoliator
Host Species:	Trembling aspen, white birch, willow and alder

Provincial Key Facts

- Second only to forest tent caterpillar as an important aspen defoliator.
- Periodic outbreaks occur with sharp increases and decreases after two to three years of moderate-to-severe defoliation.
- Many natural parasites, predators and diseases are associated with declining large aspen tortrix populations.
- Infestation has been declining since 2009, with a complete collapse in 2013.

Outlook

- Populations are expected to remain low in 2014.

Large aspen tortrix larva.

Damage caused by large aspen tortrix.

Aerial view of crown damage caused by large aspen tortrix.

Damage caused by large aspen tortrix on trembling aspen.

Large Aspen Tortrix

Regional Summary

Northwest

- Large aspen tortrix was not reported through aerial or ground surveys.

Northeast

- In Sudbury District, large aspen tortrix defoliation was observed during ground surveys on both young and semi-mature trembling aspen along Hwy 553 north of Chutes Provincial Park. Areas were not large enough to map by air, unlike 2012 when 3,521 ha of area within which moderate-to-severe defoliation occurred was aerially mapped.

Southern

- Large aspen tortrix was not reported through aerial or ground surveys.

Aerial view of large aspen tortrix defoliation in a trembling aspen stand.

Area Summary

Total area-within-which large aspen tortrix caused moderate-to-severe defoliation 2009 - 2013 by MNR Region and District (area in hectares).

Region / District	2009	2010	2011	2012	2013
Northwest					
All Districts	-	-	-	-	-
Northeast					
Chapleau	7,326	-	3,892	-	-
Cochrane	-	-	-	-	-
Hearst	-	-	-	-	-
Kirkland Lake	-	-	-	-	-
North Bay	1,032	-	-	-	-
Sault Ste. Marie	34,293	4,483	31	-	-
Sudbury	46,092	9,845	5,498	3,521	-
Timmins	-	-	3,298	-	-
Wawa	-	-	263	-	-
Subtotal:	88,743	14,328	12,982	3,521	-
Southern					
All Districts	-	-	-	-	-
Provincial Total:	88,743	14,328	12,982	3,521	-

Large aspen tortrix defoliation on trembling aspen.

Pine False Webworm

Pest Information

Common Name:	Pine False Webworm
Latin Name:	*Acantholyda erythrocephala* (L.)
Pest Origins:	**Invasive** - native to Europe and Asia
Pest Type:	Defoliator
Host Species:	White pine, red pine, Scots pine, jack pine
Infestation Area:	7 ha

Provincial Key Facts

- First collected in Ontario in 1961, it was initially a pest of young pine plantations. Starting in 1993 severe defoliation was recorded on semi-mature and mature pine near Peterborough and Simcoe.
- Infestation peaked in 1997 with almost 9,000 ha of moderate-to-severe defoliation.
- Since 2008, low levels of defoliation have been aerially mapped in Ontario.
- Although a few localized pockets of defoliation may persist, populations of this insect are expected to remain low to nil for the next few years.

Regional Summary

Northwest

- Pine false webworm was not reported through aerial or ground surveys.

Northeast

- In Sault Ste. Marie District, pine false webworm populations declined. Within the city of Sault Ste. Marie, the arboretum saw a smaller infestation with very young white pine experiencing light-to-moderate defoliation at much lower levels than 2012.
- In Chapleau District, low level defoliation caused by the pine false webworm was found in an eastern white pine plantation in Bordeleau Township. Damage was concentrated on small trees growing on the periphery of the plantation. This is the first record of the insect in the Chapleau District found outside of the town of Chapleau.
- In North Bay District, 7 ha of moderate-to-severe defoliation were mapped on four islands near the west bay of Lake Nipissing. Eastern white pine and red pine were defoliated.

Southern

- Pine false webworm was not reported through aerial or ground surveys.

Pine false webworm larvae.

Overview Map

Damage caused by pine false webworm on immature pine

Pine False Webworm

Trap Results

- Pheromone trapping since 2010 has been done to develop a means of detecting rising populations and forecasting defoliation.
- In 2013, trapping at the Sault Ste. Marie arboretum and on islands in Lake Nipissing caught few to no webworm adults. This suggests populations can be expected to decline.

Area Summary

Area-within-which pine false webworm caused moderate-to-severe defoliation 2009 - 2013 by MNR Region and District (area in hectares).

Region / District	2009	2010	2011	2012	2013
Northwest					
All Districts	-	-	-	-	-
Northeast					
North Bay	12	10	55	48	7
Sault Ste. Marie	179	26	-	-	-
Subtotal:	191	36	55	48	7
Southern					
Midhurst	11	-	-	-	-
Subtotal:	11	-	-	-	-
Provincial Total:	202	36	55	48	7

Pine false webworm larva on pine needles.

Male (left) and female (right) pine false webworm adults laying eggs on white pine needles.

Pine False Webworm

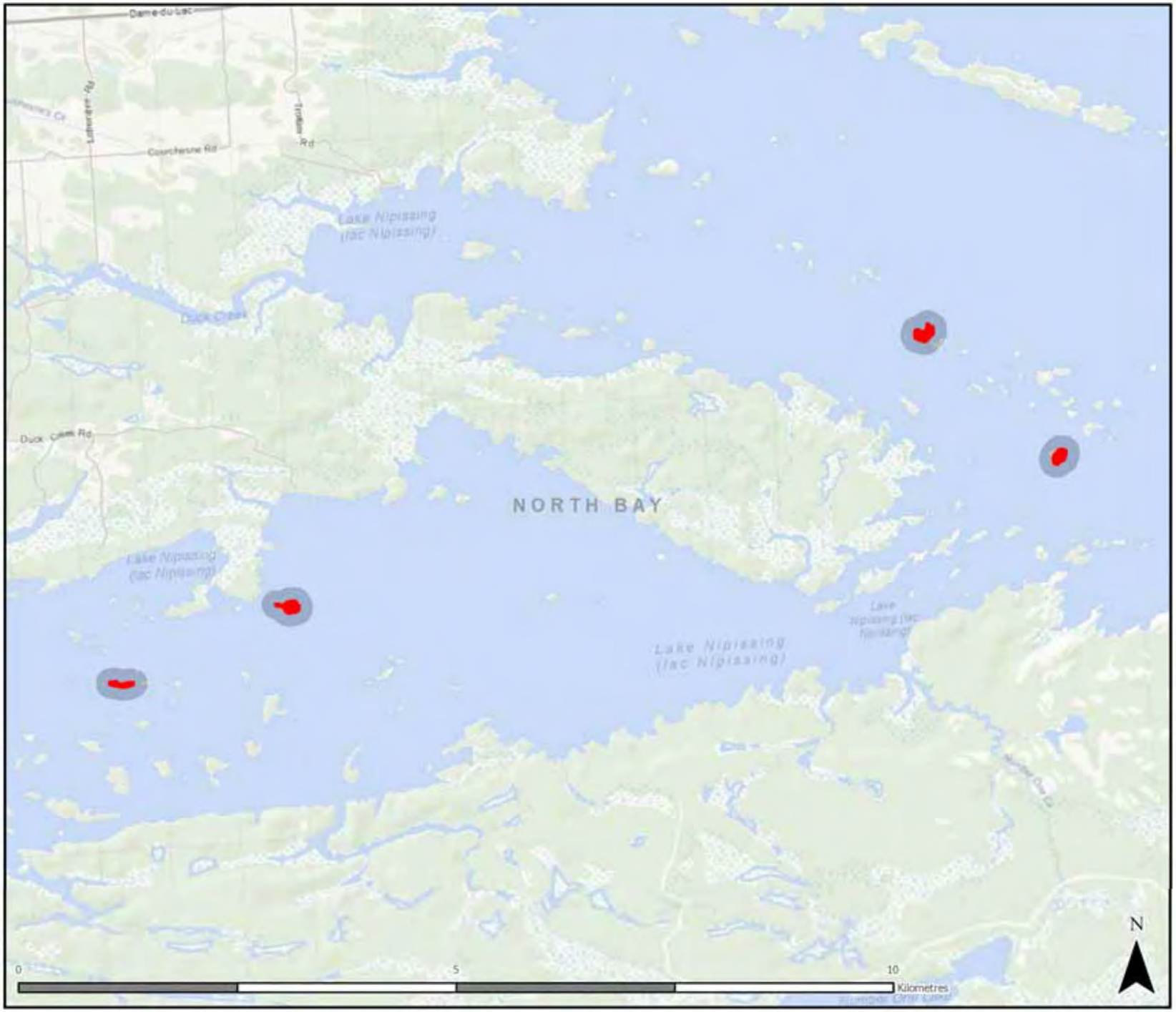
Pine False Webworm 2013

Map 1

Northeast Region

Areas-within-which pine falsewebworm caused defoliation

Area of Moderate-to -Severe Defoliation



Ontario Ministry of Natural Resources and Forestry

Satin Moth

Pest Information

Common Name:	Satin Moth
Latin Name:	*Leucoma salicis* (L.)
Pest Origins:	**Invasive** - native to Europe
Pest Type:	Defoliator
Host Species:	Poplar species
Infestation	Area: 101 ha

Pest Information

- Satin moth can be found in northeastern and western North America including the majority of southern Ontario. This pest continues to expand its range in Ontario as it spreads from the south. The pest continues to spread in Ontario as it fills in areas in the south that are not currently infested, and expands its range further north.
- Satin moth normally prefers individual or small groups of ornamental aspen trees especially European and Carolina poplar, but will occasionally defoliate native aspen stands. In 2013 this was the case when several stands of aspen were defoliated in Northeast Region.

Satin moth larva.

Overview Map

Regional Summary

Northwest

- Satin moth was not reported through aerial or ground surveys.

Northeast

- In Sault Ste. Marie District the incidence of satin moth was less in 2013, but where it was found, defoliation was severe. Defoliation was not aerially mapped in 2013, but was found in a small stand of European white poplar near Thessalon and a hedgerow of balsam poplar in Sault Ste. Marie.
- In Sudbury District, a total of 93 ha of moderate-to-severe defoliation were mapped north of Manitoulin Island on trembling aspen along Old Village Road off of Hwy 6. An inaccessible stand of aspen was also aerially mapped in the southwest corner of Phillip Edward Island near Beaverstone Bay, east of Killarney. Other areas with satin moth defoliation included the south end of the City of Greater Sudbury, Nairn Centre, Garson and Walford. In these cases the host was individual or small groups of European or Carolina poplar trees. These areas were too small to aerially map.

Southern

- In Peterborough District, moderate-to-severe defoliation was observed on open grown large tooth aspen at the intersection of Hwy 33 and County Road 10 on the west side of Picton.

Poplar defoliation caused by Satin Moth.

Satin Moth

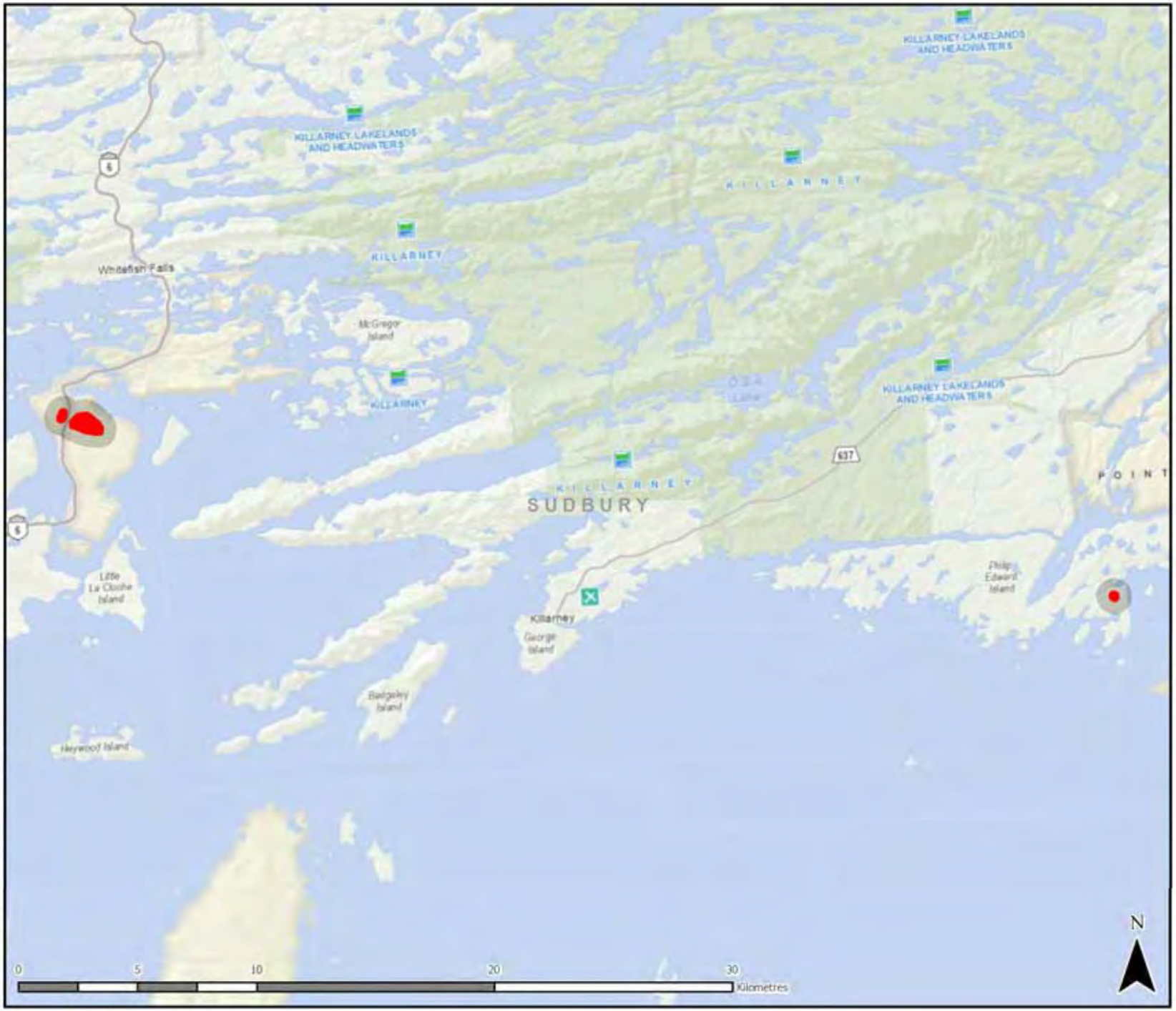
Satin Moth 2013

Map 1

Northeast Region

Areas-within-which satin moth caused defoliation.

Area of Moderate-to -Severe Defoliation



Septoria Leaf Spot on Birch

Pest Information

Common Name:	Septoria Leaf Spot on Birch
Latin Name:	*Septoria betulae* Pass.
Pest Origins:	Native to North America
Pest Type:	Leaf disease
Host Species:	Birch spp.

Provincial Key Facts

- Common fungal disease of birch species causing premature yellowing to browning of leaves and leaf drop.
- Normally prevalent in wet and humid weather conditions.
- Septoria leaf spot has been co-occurring with birch skeletonizer since 2010, starting in Northwest Region and spreading to Northeast Region in 2012.
- Aerial mapping has not been done because the event has occurred at the end of the season and has been spread across a large expanse of the province.
- Foliage yellowing and browning, followed by premature leaf drop occurs at the end of the growing season and has little impact on tree health.
- Some tree decline and mortality has been observed, particularly in pockets in Northwest Region where septoria leaf spot has occurred longer and has been more severe.

Damage to a birch leaf caused by septoria leaf spot as well as the birch skeletonizer.

Septoria leaf spot on birch.

Regional Summary

Northwest

- Septoria leaf spot on birch was observed in Red Lake, Sioux Lookout, Kenora, Dryden, Thunder Bay and Nipigon districts. Many of the infected stands were later infested with birch skeletonizer.
- Areas from the intersection of Hwy 17 and 72 in Dryden District, north to Foley Lake in Sioux Lookout District had greater than 50% infected foliage.
- In Dryden District, north of Vermilion Bay along Hwy 105, around the shores of Cliff Lake, Cedar Lake and Perrault Lake, high levels (greater than 50%) of infected foliage were observed. High levels of infection were also observed around Thaddeus Lake, south of Lac Seul, across the Route Lake area and north of Hwy 17.
- The disease was scattered across Thunder Bay and Nipigon districts causing light-tomoderate damage.

Northeast

- Sepotria leaf spot on birch was observed in Wawa, Chapleau, Sudbury and North Bay districts.
- The disease was scattered throughout Wawa and Chapleau districts affecting single or small groups (10-15) of trees along roadsides and stand edges. Infection was most prolific along Hwy 101 between Chapleau and Timmins. In Wawa District it was also commonly found in conjunction with birch skeletonizer.
- In Sudbury District, light-to-moderate damage was observed within the City of Greater Sudbury on young and semi-mature birch and along the eastern portion of Manitoulin Island.
- In North Bay District, light-to-moderate damage was observed north of the city of North Bay on semi-mature white birch in Barr Township.

Southern

- Septoria leaf spot on birch was not reported through aerial or ground surveys.

Snow Damage

Pest Information

Damage Name:	Snow Damage
Damage Type:	Abiotic damage - weather event
Damage Area:	3,210,317 ha

Provincial Key Facts

- Damage consists of trees of all ages and sizes uprooted, snapped off, bent over or suffering crown damage of various intensities
- Snow damage in Ontario can be significant. Events are sporadic, and vary considerably by location, severity, and size of area affected.

Outlook

- It is expected that over the next few years populations of sawyer beetles and bark beetles will increase in the damage area due to the abundant brood material. Armillaria root rot may also increase.
- As the populations of sawyer beetles and bark beetles rise, the area will be at a higher risk of additional conifer mortality. After the beetles complete their life cycle and emerge from the snow damaged trees, they will seek out other weakened trees in which to lay their eggs. The feeding by adult sawyer on twigs of live trees can lead to whole-tree mortality
- These damaged areas contain high fuel load and may increase be a fire hazards.

Damage to conifer trees caused by snow.

Snow damage in conifer stand.

Overview Map

Trees bent over due to heavy snow load.

Snow Damage

Regional Summary

Northwest

- In early October 2012, an intense winter storm hit parts of northwestern Ontario and southern Manitoba blanketing the region in several feet of snow. As a result of the heavy snowfall, a large area of forest (mainly conifer) was severely impacted in northwestern Ontario. In 2012, detailed mapping was not possible because of poor weather. In 2013, a more complete aerial survey was performed and is discussed in this section.
- The 2012 snowstorm caused a total of 3,210,317 ha of damage. Red Lake District experienced the most damage with 2,524,728 ha followed by Kenora District with 684,928 ha of damage.
- The area-within-which damage occurred extends from MacDowell Lake in the northeastern reaches, west to Stout Lake near the Ontario-Manitoba border in Red Lake District, south to Hwy 17 on the Ontario-Manitoba border in Kenora District and east-northeast along the north shore of the English River waterway towards Ear Falls, Red Lake District.
- The most intense damage encompassed most of Woodland Caribou Provincial Park, the Pine Ridge Road, across to the Nungessor Road near Coli Lake, south of the town of Red Lake to Dixie Road, south to Conifer Lake and west to the Ontario-Manitoba border.
- During surveys in the 2013 season, it was very common to hear sawyer beetles feeding in the downed tree material which is prime brood material for the wood boring insect.
- The damage in Sioux Lookout District was mainly broken branches and partial tops, with some areas experiencing bent over trees, totalling 477 ha.
- Dryden District had one isolated patch of damage near Lac Seul's McIntyre Bay totaling 184 ha.

Northeast

- Snow damage was not reported through aerial or ground surveys.

Southern

- A winter storm that hit many areas of Southern Ontario in April 2013 caused extensive damage to homes, trees and hydro poles throughout Huron, Perth and Wellington counties and the Regional Municipality of Waterloo in Guelph District. Ice damage was reported on woodlot fringe, open-grown, road-allowance, windbreak and landscape trees throughout these areas. Damage to entire trees and large branches was observed on sugar maple, willow and poplar species along Hwy 23 from Woodham to Listowel in Perth County, Guelph District, however this damage was not mapped.

Area Summary

Total area-within-which snow caused damage 2009 - 2013 by MNR Region and District (area in hectares).

Region/District	2009	2010	2011	2012	2013
Northwest					
Dryden	-	-	33	-	184
Fort Frances	-	-	-	-	-
Kenora	-	-	-	-	684,928
Nipigon	-	-	-	-	-
Red Lake	-	-	-	-	2,524,728
Sioux Lookout	-	-	-	-	477
Thunder Bay	-	-	9	-	-
Subtotal:	-	-	42	-	3,210,317
Northeast					
All Districts	-	-	-	-	-
Southern					
Algonquin	-	-	-	496	-
Aurora	-	-	-	-	-
Aylmer	-	-	-	-	-
Bancroft	-	-	-	-	-
Guelph	-	-	-	-	-
Kemptville	-	-	-	-	-
Midhurst	730	-	-	-	-
Parry Sound	-	-	-	-	-
Pembroke	-	-	-	69	-
Peterborough	-	-	-	-	-
Subtotal:	730	-	-	565	-
Provincial Total:	730	-	-	565	3,210,317

Snow Damage

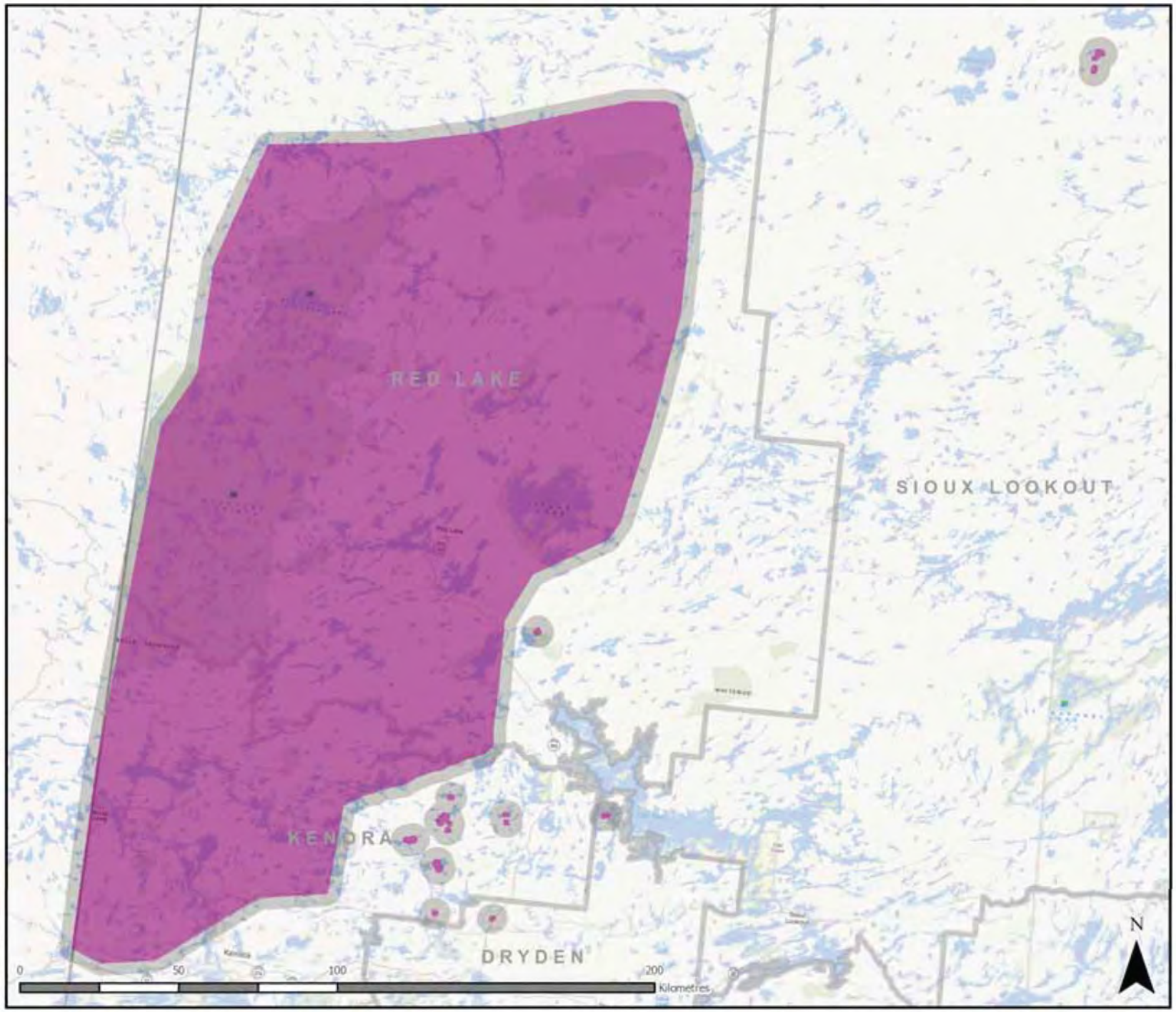
Snow Damage 2013

Map 1

Northwest Region

Areas-within-which snow caused forest damage.

Area of Damage



Ontario Ministry of Natural Resources and Forestry

Spruce Budworm

Pest Information

Common Name:	Spruce Budworm
Latin Name:	*Choristoneura fumiferana* Clemens
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Balsam fir, white spruce, black spruce
Infestation Area:	253 ha

Provincial Key Facts

- Outbreaks occur periodically when the primary host, balsam fir, reaches 40 years of age. Outbreaks can last several decades and can result in extensive mortality to balsam fir and spruce.
- For the third consecutive year there was a decline in moderate-to-severe spruce budworm defoliation in Ontario. It was almost a complete collapse in 2013 with only 253ha of defoliation aerially mapped.
- Four consecutive days of cold temperatures (<0°C) at the end of May 2013 could have been the contributing factor for this huge decline. Young emerging larvae may have been killed by the frost.
- Tree mortality has been occurring in Sudbury and North Bay districts. No management activities have been undertaken because either the affected stands are on private land, or the balsam fir and spruce are not highly valued for their the local wood supply.

Outlook

- Provincially, populations are expected to remain low for the next few years. In Northeast Region, defoliation may persist or increase in Sudbury and North Bay districts if the budworm is able to recover from the larval population reductions in 2013 caused by cold temperatures.
- The population decline in Ontario may only be temporary, as there are rising populations in northwestern Quebec as well as in the St. Lawrence River and Gaspe areas of Quebec. These increases may signal the beginning of an outbreak that may expand to areas outside Quebec.

Spruce budworm larva.

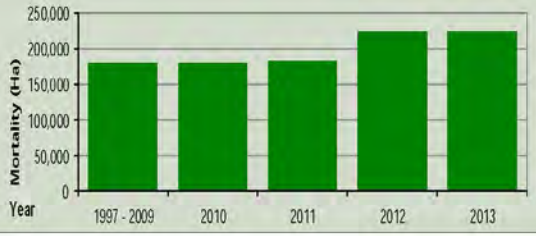
Overview Map

Area Summary

Total area-within-which spruce budworm caused mortality 1997 - 2013.

Region/District	1997-2009	2010	2011	2012	2013
Northeast					
North Bay	-	-	1,842	4,528	23
Sault Ste. Marie	111,121	-	95	26	-
Sudbury	65,020	-	33	37,034	63
Subtotal:	176,141	0	1,970	41,588	85
Southern					
Algonquin	2,804	-	-	-	-
Parry Sound	1,108	-	-	1,187	-
Subtotal:	3,912	0	0	1,187	0
Annual Total:	180,053	0	1,970	42,776	85
Cumulative Total:	180,053	180,053	182,023	224,799	224,884

Cumulative total area-within-which spruce budworm caused mortality 1997-2013



Spruce Budworm

Regional Summary

Northwest

- Defoliation by spruce budworm was not reported through aerial or ground surveys.

Northeast

- In Chapleau District, defoliation by spruce budworm was not mapped. The population collapsed in the northeast corner of the district where it was detected in 2011 and 2012. Low numbers of adult moths were captured at surrounding pheromone traps.
- In Sault Ste. Marie District, defoliation was not visible by air. Light defoliation was detected by ground around the town of Little Rapids and the city of Sault Ste. Marie. Pheromone traps had very low populations of adult moths.
- In Sudbury District, 80 ha of moderate-to-severe defoliation were mapped, comprised of several small pockets scattered across the district: Alymer Township north of Wanapitei Lake, Sandfield Township on Manitoulin Island, Cartier Township and Valley East. Areas of mortality (63 ha) included small pockets west of Wanapitei Lake in Davis Township and in the Whitefish Worthington area in Louise and Drury townships.
- In North Bay District, defoliation occurred in similar areas as in 2012, but with a significant decrease in the total amount of area (173 ha). The majority of moderate-to -severe defoliation was seen in Coleman, Firstbrook and Bucke townships between Latchford and Haileybury. Smaller pockets of defoliation were found near the Quebec border along Lake Timiskaming in South Lorrain Township between Fourbass Lake and Montreal River. A few small areas of mortality (23 ha) were aerially mapped north of Tilden Lake in McLaren and Gladman townships.

Southern

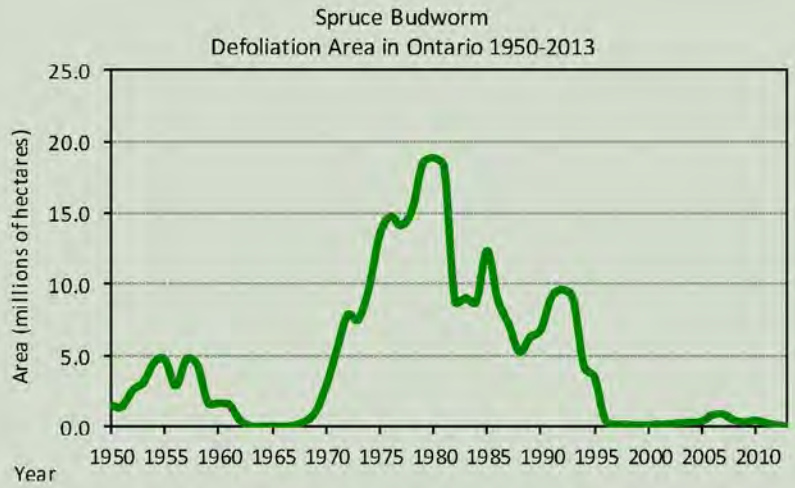
- In Peterborough District, trace levels of defoliation were identified on mature white spruce and balsam fir trees at Balsam Lake Provincial Park in Bexley Township.

Defoliation caused by spruce budworm.

Area Summary

Total area-within-which spruce budworm caused moderate-to-severe defoliation (MS) 2009-2013 by MNR Region and District and mortality for year 2013 (area in hectares).

Region / District	2009 MS	2010 MS	2011 MS	2012 MS	2013 MS	2013 Mortality
Northeast						
Chapleau	-	-	13,457	147	-	-
North Bay	164,919	124,588	156,405	10,889	173	23
Sault Ste. Marie	4,249	5,205	64	-	-	-
Sudbury	121,291	281,254	72,849	87,819	80	63
Subtotal:	290,459	411,047	242,775	98,855	253	86
Southern						
Bancroft	381	-	-	-	-	-
Parry Sound	644	1,164	-	943	-	-
Peterborough	101	109	146	-	-	-
Subtotal:	1,126	1,273	146	943	-	-
Provincial Total:	291,585	412,320	242,921	99,797	253	86



Spruce Budworm

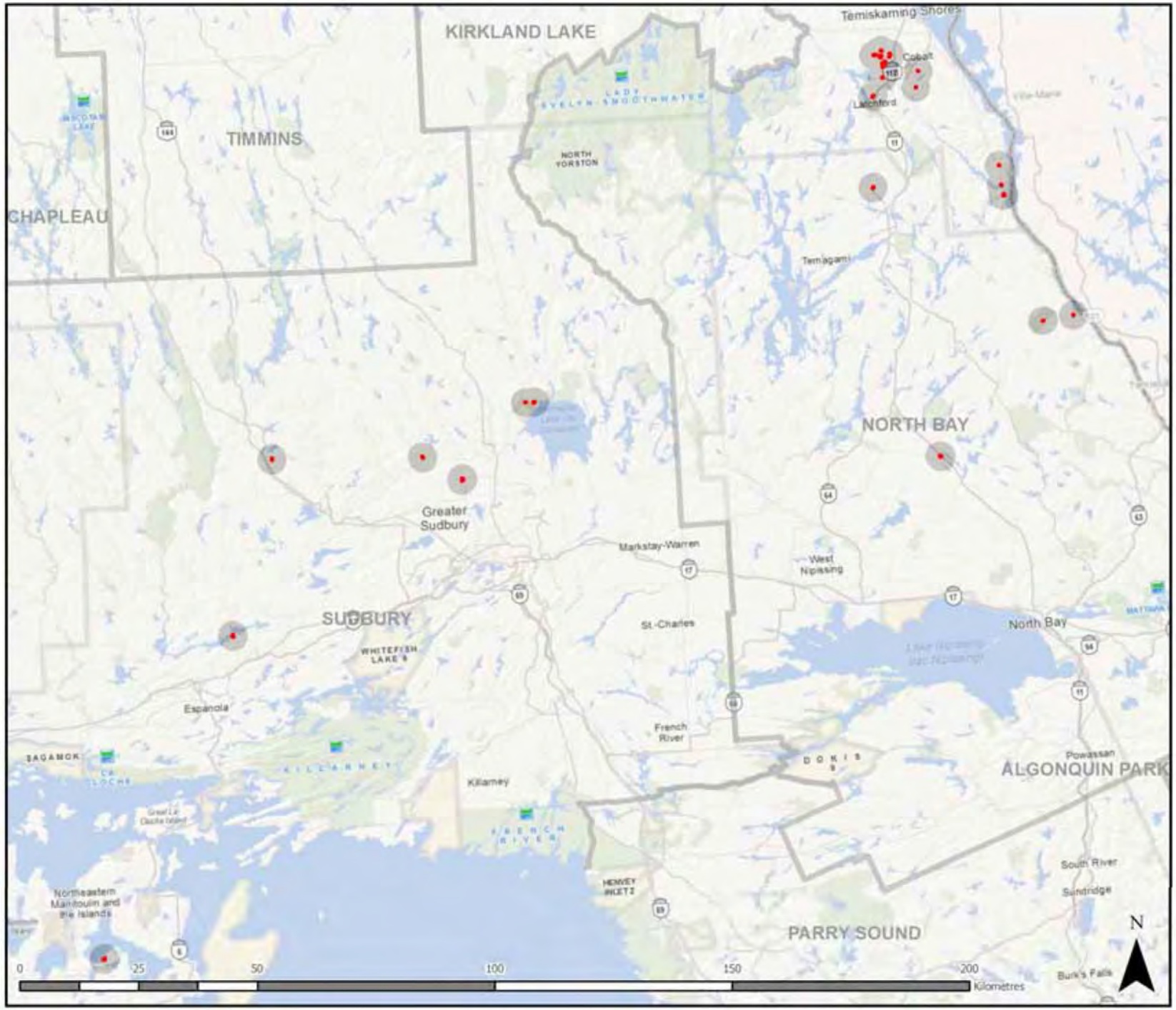
Spruce Budworm 2013

Map 1

Northeast Region

Areas-within-which spruce budworm caused defoliation.

Area of Moderate-to -Severe Defoliation



Spruce Budworm

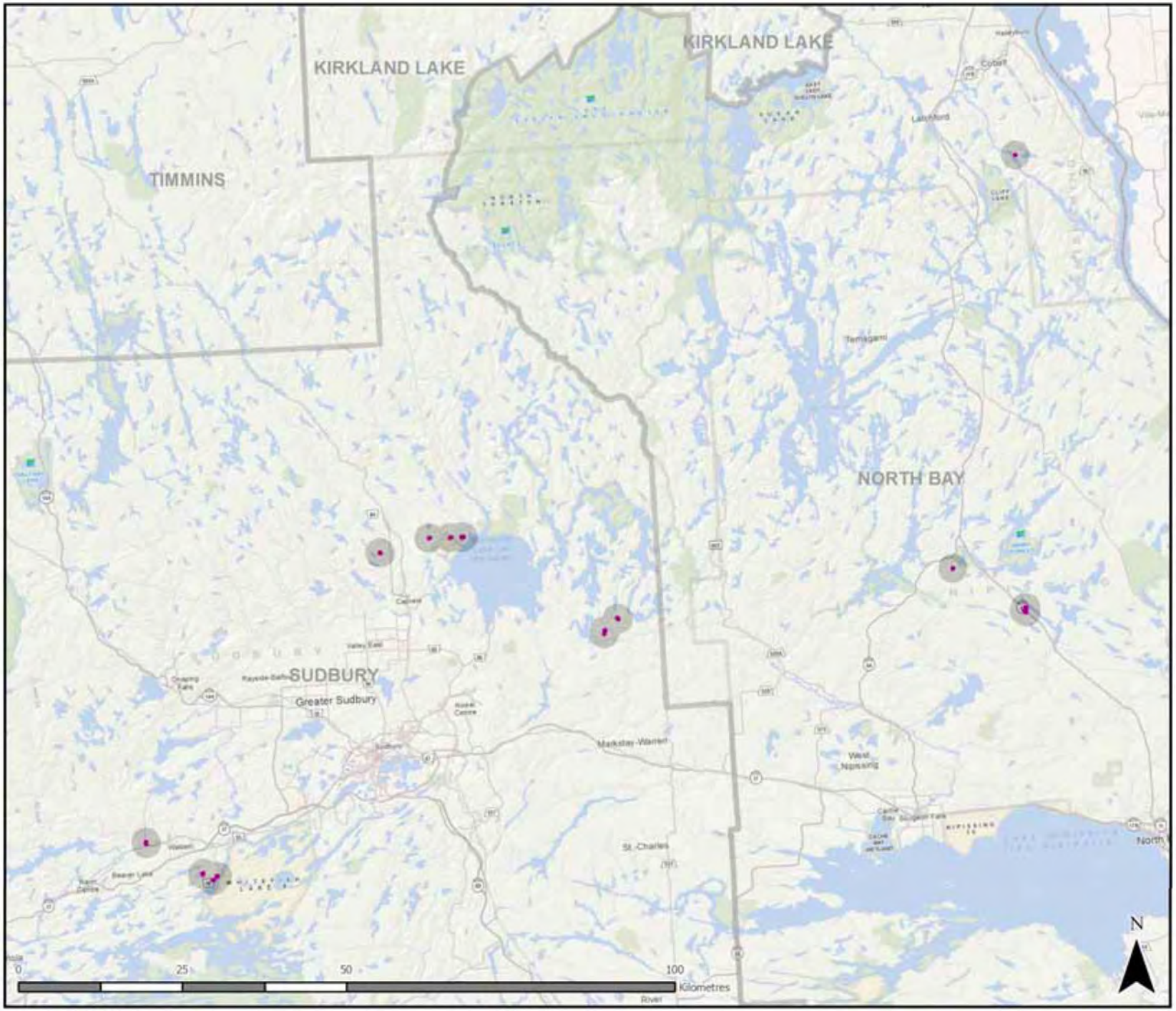
Spruce Budworm 2013

Map 1

Northeast Region

Areas-within-which spruce budworm caused mortality.

Area of Mortality



Aspen Leafblotch Miner

Pest Information

Common Name:	Aspen Leafblotch Miner
Latin Name:	*Phyllonorycter apparella* (Herrich-Schäffer)
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Trembling aspen

Provincial Key Facts

- Commonly encountered in Ontario.
- Outbreaks occur periodically.
- Population collapses are due to natural factors such as parasites and compeltion for feeding space.

Regional Summary

Northwest

- Scattered areas of infestation occurred in southern portions of Red Lake and Sioux Lookout districts into Dryden and Kenora districts. Pure and mixed stands of trembling aspen ranging in size from 5 to 22 m tall were affected.

Northeast

- In Sault Ste. Marie District, aspen leafblotch miner was recorded in the north central portion of the district. Defoliation was most severe on understory trembling aspen along the Hwy 129 corridor between Aubry Falls and Flame Lake as well as along Hinckler Road.

Southern

- Not reported through aerial or ground surveys.

Damage caused by aspen leafblotch miner.

Bagworm

Pest Information

Common Name:	Bagworm
Latin Name:	*Thyridopteryz ephemeraeformis* (Haworth)
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Various broadleaf species, eastern white cedar

Provincial Key Facts

- Not a very common species in Ontario, but has been a significant defoliator on urban trees in Windsor for five years.
- Most often a pest of shade and ornamental trees in urban areas, parks and recreational areas. Defoliation is not common on forest trees.
- Tree mortality can be expected on trees that have experienced multiple years of defoliation

Regional Summary

Southern

- In Windsor, Aylmer District, the population of bagworm identified in 2008 continued to spread throughout the city. New infestations were observed on boulevard, open-grown and park setting honeylocust, cedar and Norway maple.

Northwest and Northeast

- Not reported through aerial or ground surveys.

Bagworm pupal case.

Balsam Twig Aphid

Pest Information

Common Name:	Balsam Twig Aphid
Latin Name:	*Mindarus abietinus* Koch
Pest Origins:	Native to North America
Pest Type:	Foliar/shoot
Host Species:	Balsam fir

Provincial Key Facts

- Frequently encountered on balsam fir and other fir trees.
- Damage to tree health is usually slight.
- Trees grown for Christmas trees can look unhealthy with twisted, curled needles and shoot damage. Aphids feeding on trees excrete aphid honeydew which attracts mold which turns these droplets to a sooty black.

Regional Summary

Northwest

- Infestations were observed across Dryden and Sioux Lookout districts. Balsam fir needles and shoots were damaged. Open grown or small understory trees experienced the heaviest infestations.

Northeast and Southern

- Not reported through aerial or ground surveys.

White, woolly threads produced by the Balsam twig aphid.

Basswood Leafminer

Pest Information

Common Name:	Basswood Leafminer
Latin Name:	*Baliosus nervosus* (Panz.)
Pest Origins:	Native to North America
Pest Type:	Leaf miner
Host Species:	Basswood species

Provincial Key Facts

- Localized damage can reach moderate-to-severe levels after several consecutive years of infestation, causing thin crowns, branch dieback and an overall decrease in tree vigour. Some trees may die after two to three years of defoliation.

Regional Summary

Southern

- In the Wiarton area of Midhurst District, severe defoliation occurred in the overstory as well on young regeneration. This had been the case in previous years. Basswood throughout Oro Medonte, Simcoe County, also suffered light defoliation in the main crowns.
- This leafminer is not commonly detected east of Lake Simcoe, but was identified in Peterborough District on mature basswood in the Balsam Lake area and in a mixed-wood forest in Indian Point Provincial Park.

Northwest and Northeast

- Not reported through aerial or ground surveys.

Basswood leafminer adults feeding on foliage.

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 and European beech

Provincial Key Facts

- First found in Halifax, Nova Scotia in 1890's.
- First found in Ontario in 1966 in Elgin County in southwestern Ontario along the north shore of Lake Erie.
- Continues to spread in Ontario, most likely on the wind. It is expected to become established throughout the range of beech.
- Predisposes beech trees to beech bark disease. Beech bark disease significantly impacts beech trees and results in tree mortality.

Regional Summary

Northeast

- Surveys conducted in Hilton and Jocelyn townships on St. Joseph Island for beech scale found an increase in the insect population, but beech bark disease was not detected.

Southern

- In Guelph District, a light level of infestation was reported within Gibney Regional Forest, Regional Municipality of Waterloo.
- In Aylmer District, low population levels of beech scale were reported within the Meadowlily Woods in south London. High population levels were reported throughout Springwater Forest, Malahide Township.

Northwest

- Not reported through aerial or ground surveys.

Beech scale along the trunk of a beech tree.

Introduced Pine Sawfly

Pest Information

Common Name:	Introduced Pine Sawfly
Latin Name:	*Diprion similis* (Htg.)
Pest Origins:	**Invasive** - native to Europe
Pest Type:	Defoliator
Host Species:	Eastern white pine, Scots pine

Provincial 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.
- Introduced parasites help to keep populations low and to bring about collapses of outbreaks.

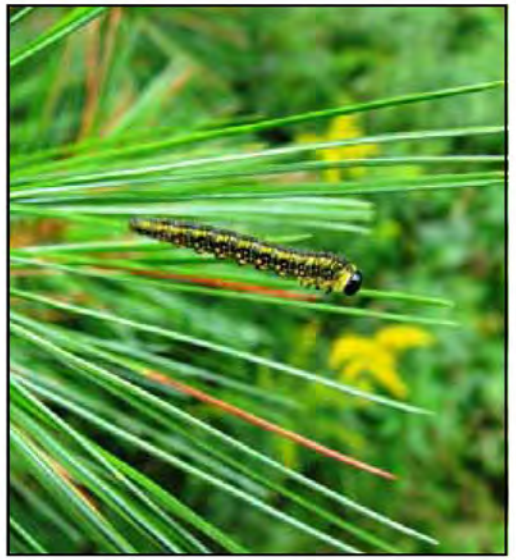
Regional Summary

Northeast

- In Chapleau District, this insect caused trace amounts of defoliation. Larvae were found on white pine trees growing at the edge of a stand within the Municipality of Chapleau and within a Scots pine stand in Daoust Township.

Northwest and Southern

- Not reported through aerial or ground surveys.



Introduced pine sawfly larva.

Maple-Basswood Leaf Roller

Pest Information

Common Name:	Maple-Basswood Leaf Roller
Latin Name:	*Sparganothis pettitana* (Rob.)
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Maple, basswood and apple species

Provincial Key Facts

- Occasionally has outbreaks in Ontario, but outbreaks are more common in the Maritimes.
- Parasites and bird populations help to return the insect's populations to endemic levels

Regional Summary

Southern

• In Bancroft and Peterborough districts, moderate levels of defoliation were recorded in many scattered pockets in Peterborough County.

• Damage was most often associated with fringe and hedgerow trees. In total, five separate areas were assessed averaging 50-66% defoliation of host species.

Northwest and Northeast

• Not reported through aerial or ground surveys.

Leaf shelter made by a maple-basswood leaf roller.

Maple Webworm

Pest Information

Common Name:	Maple Webworm
Latin Name:	*Tetralopha asperatella* (Clemens)
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Sugar maple, ash, basswood, beech

Provincial Key Facts

- Not usually a serious pest in Ontario. It has been associated with decline in the state of Wisconsin, United States.

Regional Summary

Southern

• In Midhurst District, maple webworm has increased in frequency since 2011. In 2013, this insect was present throughout the area of forest tent caterpillar infestation taking advantage of the tied leaves holding forest tent caterpillar cocoons. Maple webworm was reported in north Bruce Peninsula, Georgian Bluffs, Pretty River Valley, Kolopore Uplands and throughout Oro Medonte.

Northwest and Northeast

• Not reported through aerial or ground surveys.

Maple webworm larva.

Northern Tent Caterpillar

Pest Information

Common Name:	Northern Tent Caterpillar
Latin Name:	*Malacosoma californicum pluviale* (Dyar)
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Various broadleaf species

Provincial Key Facts

- Does not have extensive outbreaks.
- Often confused with eastern tent caterpillar. To differentiate, the northern tent caterpillar has a broken white line down its back.
- Impacts are usually minimal, although individual trees may be defoliated.

Regional Summary

Northwest

- In Dryden District, defoliation was localized in small areas less than 0.1 ha. It affected various tree species including trembling aspen, white birch, pin cherry and alder species. All foliage was generally consumed on infested small trees and shrubs <4m tall.
- In Thunder Bay and Nipigon Districts, low-tomoderate distribution across the landscape was evident. Host species, primarily willow and cherry trees, were severely defoliated.

Northeast and Southern

- Not reported through aerial or ground surveys.

Northern tent caterpillar larvae and the silken tent structure they spun.

Pine Shoot Beetle

Pest Information

Common Name:	Pine Shoot Beetle
Latin Name:	*Tomicus piniperda* (L.)
Pest Origins:	**Invasive** - native to Asia, Europe and northern Africa
Pest Type:	Borer
Host Species:	Pine species

Provincial Key Facts

- Discovered in Ontario in 1993, causing mortality to red pine, jack pine and Scots pine stands in southern Ontario.
- An annual trapping program has been conducted since 2000.
- Current range extends south of a line from Sault Ste. Marie to North Bay.
- Initially caused significant mortality in the late 1990s. Since that time, it has become mostly a secondary pest contributing to tree mortality after trees have been severely attacked by other stressors.

Regional Summary

Northeast

- Lindgren funnel traps baited with alpha-pinene lure and myrtenol/trans-verbenol lures were placed throughout the Northeast Region. The contents for all traps, except for one, were negative for pine shoot beetle. One trap located in a semi-mature jack pine stand near Tehkummah on Manitoulin Island, Sudbury District, contained five individuals.
- Traps are annually deployed to monitor populations and insect range. The findings from this year are notconsidered new as beetles have been trapped at the same location in the past.

Northwest and Southern

- Not reported through aerial or ground surveys.

Galleries created by the pine shoot beetle.

Redheaded Pine Sawfly

Pest Information

Common Name:	Redheaded Pine Sawfly
Latin Name:	*Neodiprion lecontei* (Fitch)
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Red pine, jack pine, tamarack

Provincial Key Facts

- A common pest in plantations and on open grown trees. Often defoliation is most severe in stressed sites and in frost pockets.
- Tree mortality can occur after severe defoliation.
- High value trees are sometimes protected by applying a chemical insecticide or the Lecont virus biocontrol insecticide.

Regional Summary

Northeast

- In Sault Ste. Marie District, this insect was recorded in many areas and was found to infest jack pine and tamarack in addition to the common host, red pine. In all cases, colonies were found on single trees and defoliation ranged from 30-70%. Colonies were found on young roadside trees, in open areas and on the edge of forest stands.

Northwest and Southern

- Not reported through aerial or ground surveys.

Redheaded pine sawfly in Sault Ste. Marie District.

Willow Leafminer

Pest Information

Common Name:	Willow Leafminer
Latin Name:	*Micrurapteryx salicifoliella* (Chambers)
Pest Origins:	Native to North America
Pest Type:	Defoliator
Host Species:	Willow species

Provincial Key Facts

- Willow leafminer has been a common defoliator of trees for at least the last 10 years in various locations in northern Ontario.

Regional Summary

Northwest

- Areas across the Red Lake, Sioux Lookout, Kenora and Dryden districts experienced defoliation by the willow leaf miner. Willow found on roadsides, lake shores, swamps and in creek beds were affected including areas north of the communities of Red Lake and Pickle Lake. Generally 50% of the willow shrubs experienced 40-75% foliage infestation.

Northeast and Southern

- Not reported through aerial or ground surveys.

Defoliation caused by the willow leafminer.

Anthracnose species

Pest Information

Common Name:	Anthracnose Species
Latin Name:	Various species
Pest Origins:	Native and non-native origins
Pest Type:	Leaf disease
Host Species:	Various broadleaf species

Provincial Key Facts

- In Southern Region rain and high humidity were common in the spring and summer of 2013, an ideal environment for anthracnose to flourish.
- Impacts on tree health are usually not severe. Affected leaves will drop prematurely. If the event occurs for several years, trees can become weakened and vulnerable to insects or other diseases.

Regional Summary

Southern

- In Aylmer District, maple anthracnose was observed on sugar maple trees.
- In Peterborough and Bancroft districts, light levels of oak anthracnose were identified on young red oak north of Buckhorn Lake and Stoney Lake extending west north of Sturgeon Lake.
- In Algonquin Provincial Park, anthracnose species were found on maple species and basswood foliage.
- In Pembroke District, anthracnose was confirmed on ash species.
- In Kemptville District, collections were taken from black walnut, maple species and basswood.

Northwest and Northeast

- Not reported through aerial or ground surveys.

Anthracnose species on maple.

Dutch Elm Disease

Pest Information

Common Name:	Dutch Elm Disease
Latin Name:	*Ophiostoma novo-ulmi* (Brasier) *Ophiostoma ulmi* (Baisman) Nannf.
Pest Origins:	**Invasive** - native to Asia and Europe
Pest Type:	Vascular disease
Host Species:	Elm species

Provincial Key Facts

- This disease has been widespread across the range of elm species in Ontario for several decades. In some years infection and tree mortality rates appear to be more severe than in other years.
- In 2013, this pathogen continued to cause damage across the range of elm species in Ontario.
- Infection levels and damage varied considerably between sites and from tree to tree.

Regional Summary

Northwest

- In Dryden District a sample was taken in the town of Dryden. Several mature white elms in a residential area experienced dieback.

Northeast

- In Sudbury and North Bay districts, the disease continued to cause mortality of American elm. New areas of infestation were around the towns of Warren and Field and on Manitoulin Island near the communities of Sheguindah and Tehkummah.

Southern

- Throughout Midhurst and Aurora districts, the disease was wide spread ranging in severity from a wilting branch to whole-tree mortality. The most prevalent areas included Grey and Bruce counties in Midhurst District.

Tree dieback caused by Dutch elm disease.

Rhizosphaera Needlecast

Pest Information

Common Name:	Rhizosphaera Needlecast
Latin Name:	*Rhizosphaera kalkhoffii* Bubak
Pest Origins:	Native to North America
Pest Type:	Needle disease
Host Species:	Colorado blue spruce, white spruce, Norway spruce and occasionally pine species

Provincial Key Facts

- Common endemic needle disease.
- Damage in forest stands is rarely significant.
- Can cause severe defoliation of ornamental and Christmas trees.

Regional Summary

Southern

- In Aylmer and Guelph districts, rhizosphaera needlecast was common on urban and landscape spruce, particularly on open grown spruce species.
- Needle casts were observed on Norway spruce, white spruce and most commonly on Colorado blue spruce causing light-to-severe defoliation.

Northwest and Northeast

- Not reported through aerial or ground surveys.

Spruce tree infected with Rhizosphaera needlecast in the city of London.

Spruce Needle Rust

Pest Information

Common Name:	Spruce Needle Rust
Latin Name:	*Chrysomyxa nagodhii* P. E. Crane
Pest Origins:	Native to North America
Pest Type:	Needle disease
Host Species:	Black spruce

Provincial Key Facts

- Wide spread needle rust species.
- Alternate hosts are Labrador tea and leatherleaf.
- Causes needle death, but impacts on tree health are usually not severe.
- Defoliation may result in reduced tree growth. Infection levels typically do not remain high for consecutive years.

Regional Summary

Northwest

- Spruce needle rust was abundant in Red Lake, Kenora, Dryden and Sioux Lookout districts as 2013 experienced very wet weather.
- Red Lake, Kenora and Dryden Districts had lighter infections on spruce trees ranging from 0-15% affected foliage compared to Sioux Lookout District where the heaviest infected trees had 25-50% foliage affected.
- In Sioux Lookout District, the most severely affected spruce trees were found on the 702 road east of Savant Lake. Over 80 ha of young (<5 m tall), black spruce were heavily infected with the fungus. Mature black spruce in the area, mainly bordering the younger plantations, were also affected.

Northeast and Southern

- Not reported through aerial or ground surveys.

Spruce needle rust.

Tar Spot on Maple

Pest Information

Common Name:	Tar Spot on Maple
Latin Name:	*Rhytisma* spp.
Pest Origins:	Native and non-native origins
Pest Type:	Leaf disease
Host Species:	Maple species

Provincial Key Facts

- Exacerbated by wet springs.
- Only aesthetically damaging
- Heavy infestations can cause early leaf drop.

Regional Summary

Northeast

- In Sault Ste. Marie District, tar spot was severe in the city of Sault Ste. Marie. Norway maple, especially the cultivar Crimson King maple, was infected the most (invasive strain of tar spot). Silver and sugar maple street trees were infected to a lesser extent. The wet and cooler spring and summer seasons were ideal conditions for the spread of this leaf disease. Tar spot was not detected in forest stands.

Northwest and Southern

- Not reported through aerial or ground surveys.

Tar spot on maple.

White pine blister rust

Pest Information

Common Name:	White Pine Blister Rust
Latin Name:	*Cronartium ribicola* J.C. Fischer
Pest Origins:	**Invasive** - native to Europe
Pest Type:	Rust fungus
Host Species:	Eastern white pine

Provincial Key Facts

- This disease is relatively common throughout Ontario especially where Ribes spp. are found growing in close proximity to white pine.

Regional Summary

Northwest

- White pine blister rust was observed in Dryden and Sioux Lookout districts. Many mature Eastern white pine trees across Dryden District and parts of Sioux Lookout District show signs of old and new infections.

Northeast

- In Chapleau District, trace damage was observed in an eastern white pine plantation in Bordeleau Township. Main stems on trees three metres tall or less were affected.
- In Kirkland Lake and North Bay distircts, tree improvement areas were monitored for the disease. The Evanturel test site, Kirkland Lake District, had the highest lethal infection at 13%. The lethal infection rate at the Gurd test site, North Bay District, was much less at 1%.

Southern

- Not reported through aerial or ground surveys.

White pine blister rust