

Summary of Forest Pest Conditions in New Brunswick in 2018

Prepared by

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Overview

This report provides an overview on the status of forest insect and diseases conditions in New Brunswick (NB) for 2018; it highlights many of the activities carried out by the NB Department of Energy and Resource Development (here after “the Department”), Forest Pest Management Group (FPMG), but it is not intended to itemize all details for each survey conducted. The reader may contact the FPMG for more information as needed.

Monitoring for insect and disease pests occurs in many ways and numerous reports are received each year identifying potential pest concerns. This report covers pests considered to be a risk to NB forest values, timber or otherwise; this includes invasive alien species that have been detected in, or close to NB. The Miscellaneous Observations section, as well as the Forest Disturbance Reporting System (FDRS) section of this report present some incidental reports and a summary list of the FDRS.

Introduction

Under the authority of the Minister of Energy and Resource Development in the NB Crown Lands and Forest Act, the Forest Pest Management Group has the mandate of protecting New Brunswick's forests from native insect and disease pests. For regulated, non-native pests, the Department works with the Canadian Food Inspection Agency (CFIA). Under the Federal Plant Protection Act, the CFIA is responsible for preventing the introduction of non-native pests into Canada, as well as preventing their spread within and from Canada.

Annual monitoring and forecast surveys are conducted for only a limited number of targeted pests. An effective forest pest management program requires both efficient monitoring and the ability to accurately forecast future conditions of both forest and pest. Numerous techniques may be employed to accomplish these tasks. Both technique and survey intensity are reflective of the Department's objectives and assessed level of risk associated with the particular pest at that time. For example, some insects that have had severe, broad-scale impacts on forest values in the past—such as spruce budworm (*Choristoneura fumiferana*) or hemlock looper (*Lambdina fuscicollis*)—are more intensively monitored than insects less likely to cause significant damage in our region (e.g., jack pine budworm, *Choristoneura pinus*). For some pests, monitoring programs are well established and repeated annually with only minor changes in intensity or technology; for others (e.g., novel pests), survey approaches are typically unrefined and conducted at a coarser level (e.g., aerial surveys, public reports). General surveillance of forest conditions is done in collaboration with the Department's regional staff, members of forest industry, and the general public; incidental observations are often reported through the Department's Forest Disturbance Reporting System which can be found online at: <http://dnr-mrn.gnb.ca/ForestHealth/MaintainReportData/Details.aspx>.

Softwood Pathogens

Sudden fir mortality/Stillwell's Syndrome: In early to mid-spring, FPMG began noticing individual and small patches of balsam fir (*Abies balsamea*) suddenly turning red and dying. In an effort to establish a baseline distribution, affected trees were recorded during a targeted roadside survey in June, and during the annual aerial survey; additional observations and reports were submitted by members of the public, the Department's regional staff, industry, and other government bodies (Figure 1). Below average rainfall during the 2017 growing season, followed by rapid snow melt and high spring wind conditions in 2018 is believed to have been the primary stressor for these trees. A close inspection of individuals revealed no definitive cause of mortality, however some secondary pests and stressors were observed (e.g., bark beetles, *Armillaria* spp.). It is believed that the drought-like conditions may have amplified the prevalence and effects of secondary stressors, the combination of which ultimately leading to rapid decline and death. Similar observations were reported in the early 1980s, which also resulted in many dead fir trees across Central and Eastern Canada; at the time, the phenomenon was given the label "sudden fir mortality", or "Stillwell's syndrome". FPMG, in collaboration with colleagues at the University of New Brunswick and the Canadian Forest Service, has begun exploring potential causes and susceptibility factors of affected stands.

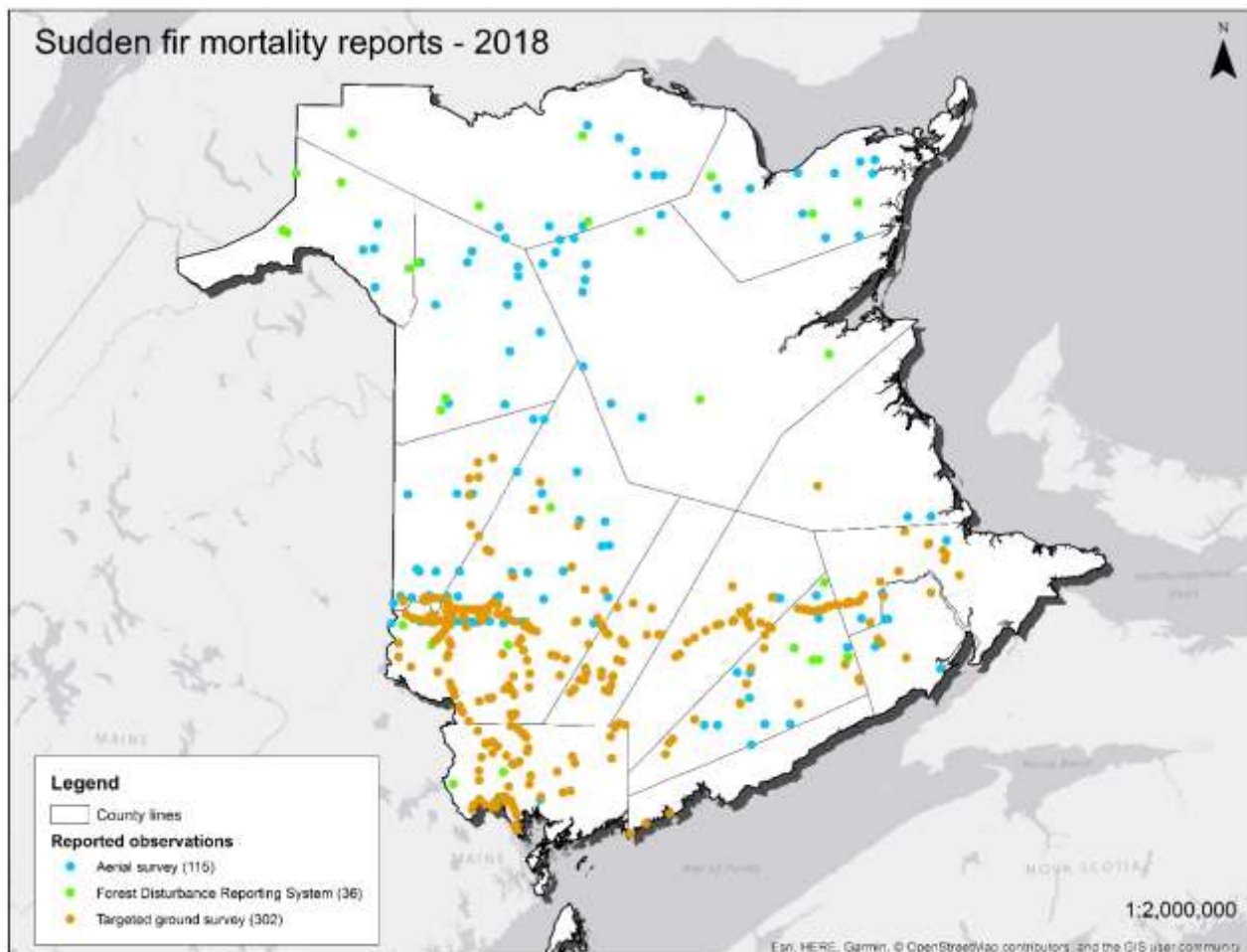


Figure 1. Reports and observations attributed to sudden fir mortality, 2018.

Insect Pests of Softwoods

Hemlock Looper: After three years of testing, this was the first year FPMG trapped for hemlock looper using exclusively Sylvar pheromone lures. The trapping network established was comprised of 99 traps distributed throughout the province (Figure 2). Resulting moth counts were lower than in 2017, and an endemic (baseline) level population is anticipated for 2019. Despite low numbers, we will continue to monitor populations through trapping next year as this pest has the potential to kill trees in a single season.

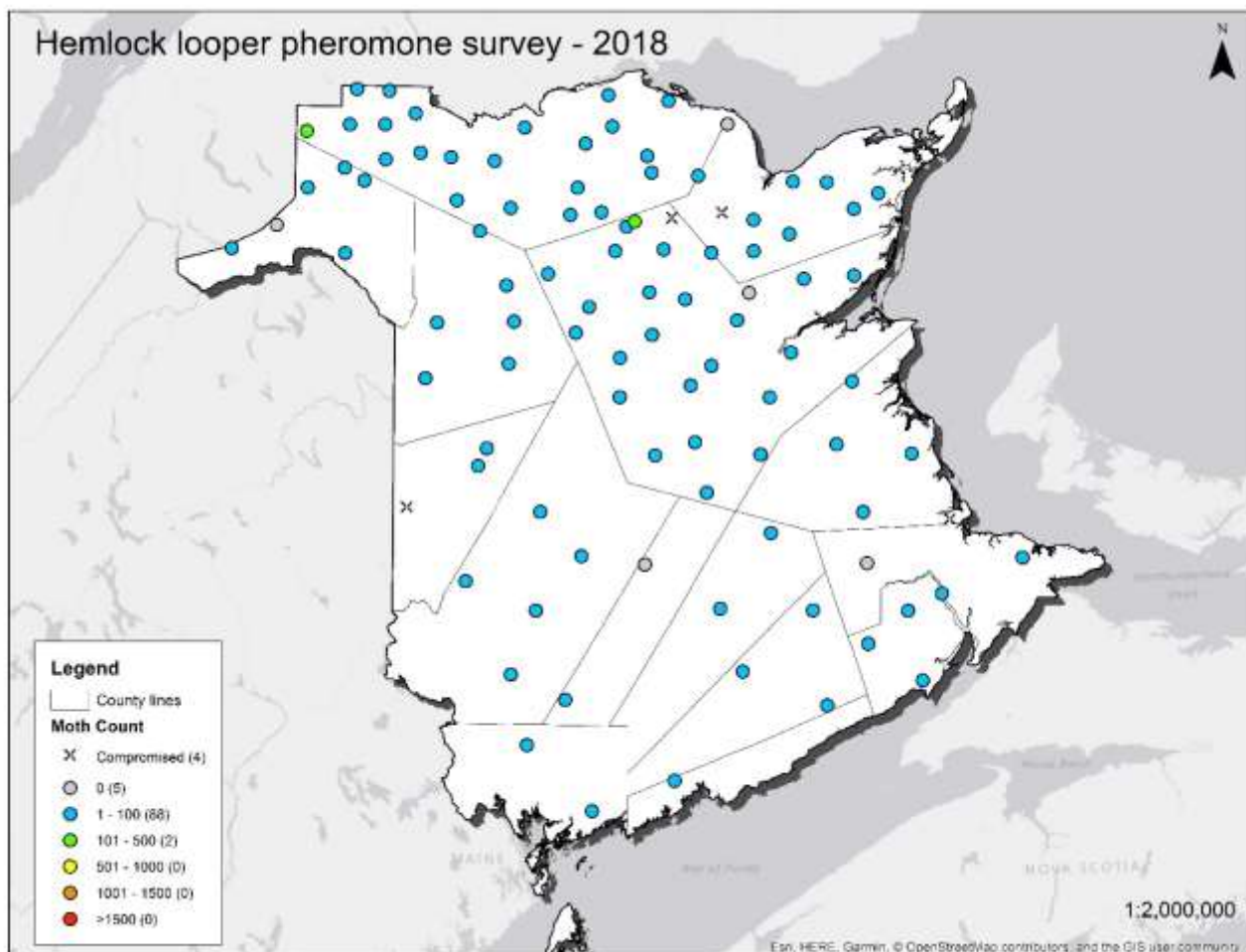


Figure 2. Hemlock looper pheromone trapping results, 2018.

Hemlock Woolly Adelgid (*Adelges tsugae*): The invasive hemlock woolly adelgid (HWA) is a sap sucking member of the order Hemiptera. These small insects have the potential to kill native eastern hemlock (*Tsuga canadensis*) in as little as 4 years. Although HWA has not been documented in New Brunswick, it has been found in southern Nova Scotia and in Maine. Due to its proximity to the province and the potential damage it can cause, FPMG surveyed 23 hemlock stands in 2018. No signs or symptoms of HWA were observed. FPMG will continue to survey for HWA in 2019 and will work closely with CFIA should HWA be detected in the province.

Spruce Beetle (*Dendroctonus rufipennis*): Clumps of dead and dying large diameter spruce (*Picea* sp.) were reported along the Fundy coastline this year. A follow-up survey by FPMG determined the damage was caused by the native spruce beetle (Figure 3). Damage attributed to the spruce beetle is not new in this area, and has been recorded intermittently by FPMG in recent years—mainly in protected areas such as Fundy National Park. FPMG will continue to monitor for spruce beetle along the Fundy coast and will be discussing new reporting options and strategies with stakeholders in the area.



Figure 3. One of numerous adult spruce beetles (*Dendroctonus rufipennis*) recovered from a dead spruce tree (*Picea* sp.) during a follow-up survey along the Fundy coast, New Brunswick, August 2018. The beetle is about 6mm in length.

Spruce Budworm: 2018 was the fifth year that FPMG was involved in the Early Intervention Strategy (EIS) research program aimed at testing early intervention strategies to prevent or impede an outbreak of spruce budworm (SBW). The Healthy Forest Partnership, comprised of Federal and Provincial agencies, industry partners, and educational institutes, was formed to address these research issues. Some FPMG contributions to this program are highlighted hereunder. For more information on the Healthy Forest Partnership, please visit www.healthyforestpartnership.ca.

A pheromone trapping array consisting of 98 sites was established across the province. At each site, 3 traps were placed at least 40 metres apart. The average moth count per site is used, in part, to evaluate population trends (Figure 4). Overall counts were down from 2017, a trend also observed by industry and other government agencies monitoring within the province.

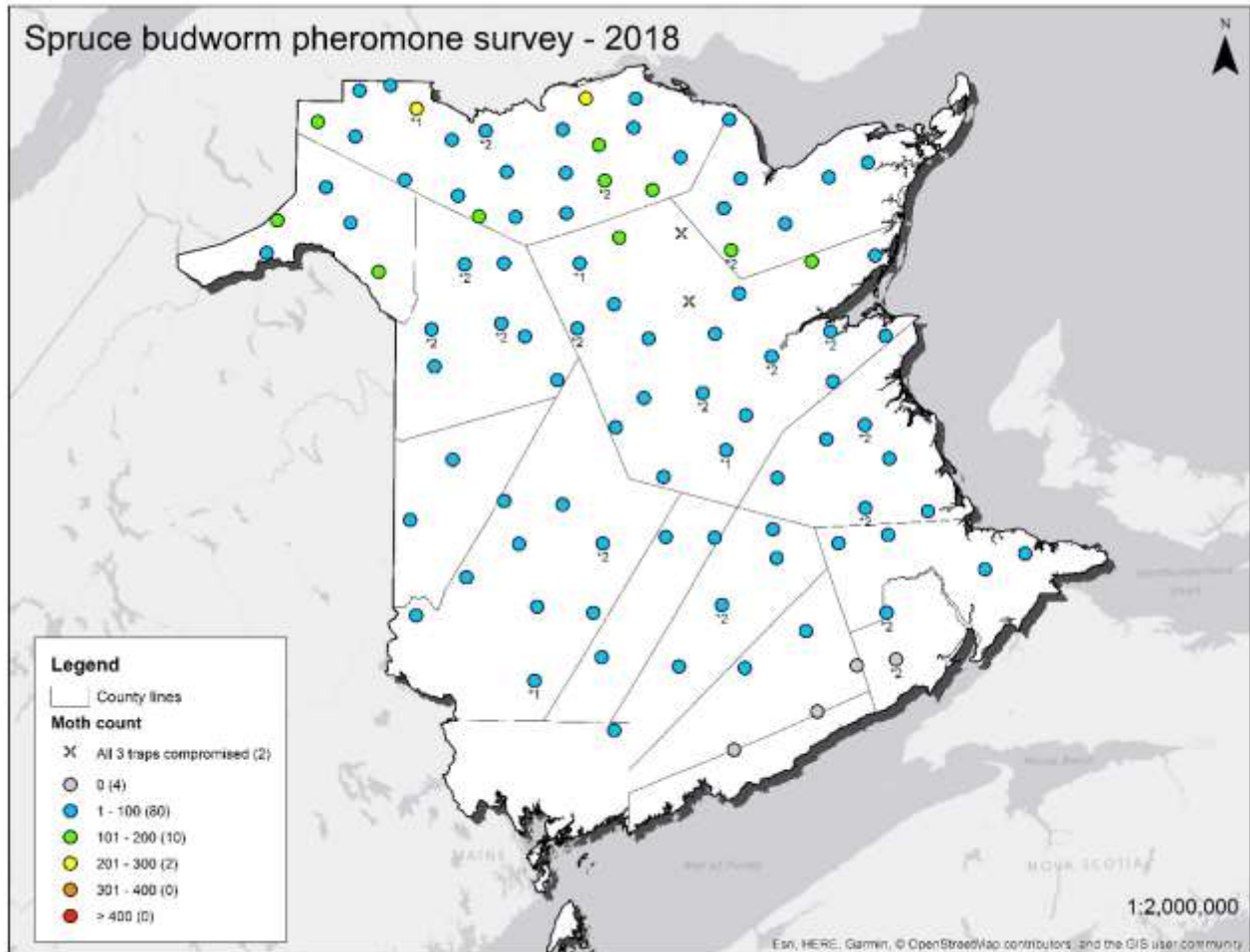


Figure 4. Spruce budworm pheromone trapping results, 2018. Locations show the average moth count from three traps. Where traps were compromised, the plot is marked with an asterisk and the number of traps averaged.

This year's aerial defoliation survey (Figure 5) revealed less overall area (~440 hectares), and lower severity of SBW defoliation than in 2017, despite similar sampling intensity. All observed defoliation was within the northern half of the province, particularly in the northwest corner. Similarly, defoliation recorded during a simultaneous ground (roadside) survey was also lower than in 2017, as were defoliation estimates recorded during branch sampling for overwintering second instar larvae (L2) later in the season. There were, however, a few scattered 'hotspots' where current year defoliation observed on L2 branch samples was moderate to high (i.e., >40%).

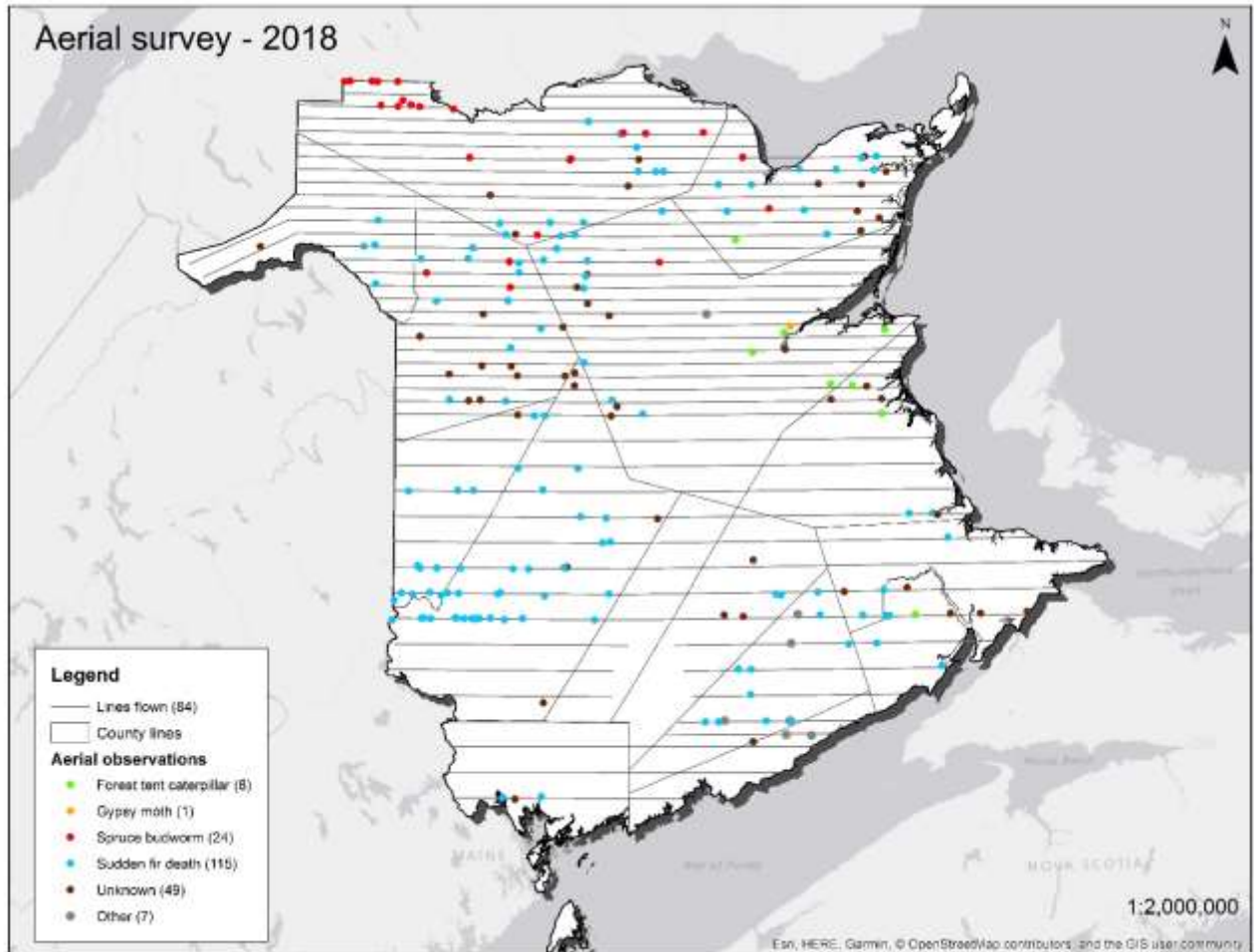


Figure 5. Aerial survey results, July 2018.

In collaboration with industry partners (Acadian Timber, AV Group, Fornebu Lumber Company Inc., J.D. Irving Limited, and Twin Rivers Paper Co.), Kouchebougouac National Park, and the Department's regional staff, 1851 plots were sampled (3 branches per plot) and processed as part of the 2018 L2 survey (Figure 5). The total number of plots sampled was less than in 2017; there were fewer primary plots with counts at or above treatment threshold level (average of 7 L2 per branch), so there was less supplementary sampling required to delineate 'hot spots'. A total of 7 (<1%) primary plots and 3 (4%) supplementary plots met or exceeded the treatment threshold in 2018, compared to 83 (5%) and 29 (9%) respectively in 2017.

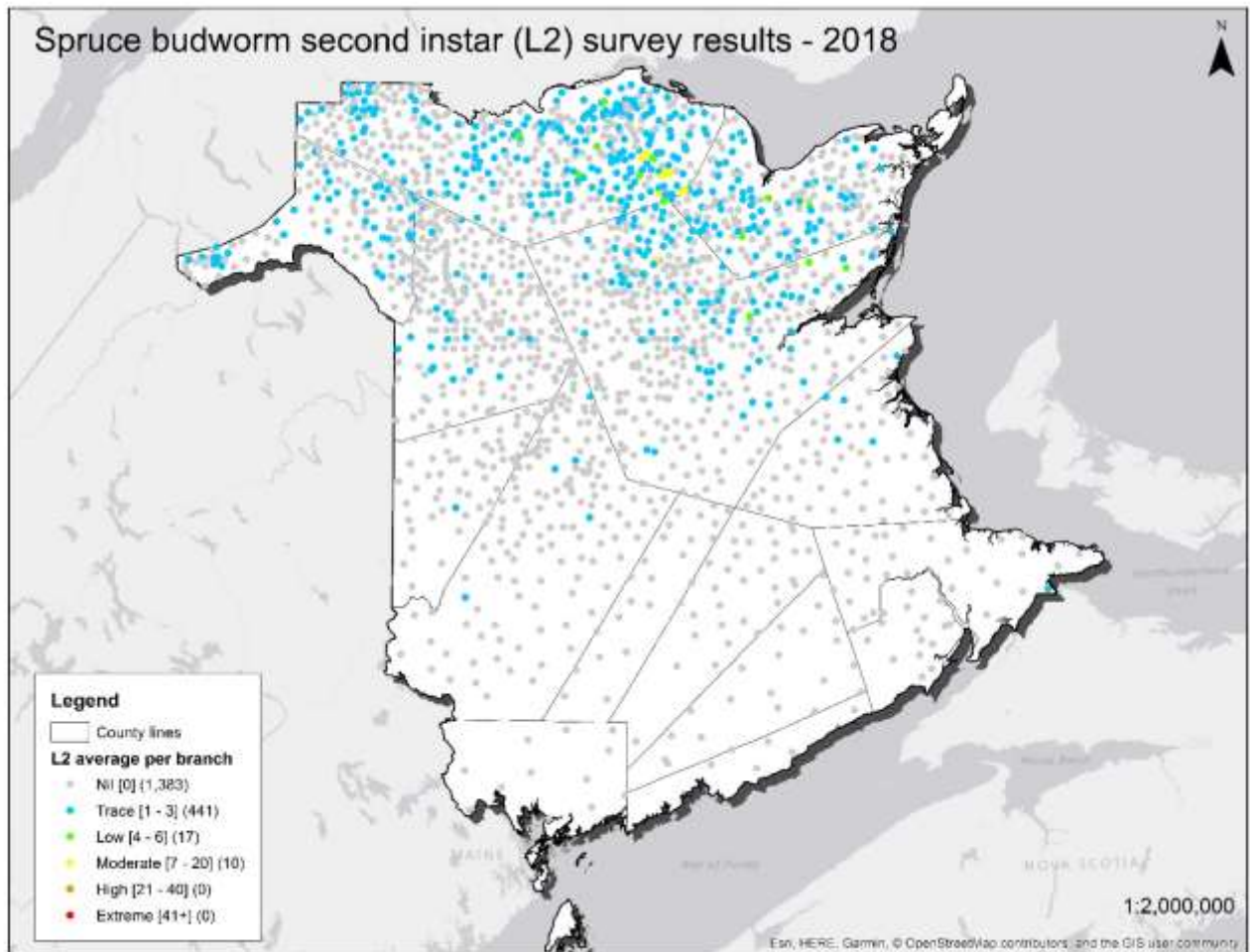


Figure 6. Spruce budworm second instar (L2) survey results, 2018. Each plot value (n=1851) represents the average number of L2 found on three 75 cm long, mid-crown branches of either balsam fir or spruce species.

As part of the EIS program, ~200,000 hectares of spruce and balsam fir forest were treated for SBW (Figure 7). The treatment block sizes and locations were determined using the results of the 2017 L2 sampling efforts. Based on the decrease in threshold plots in 2018, the total treatment area for 2019 will be greatly reduced.

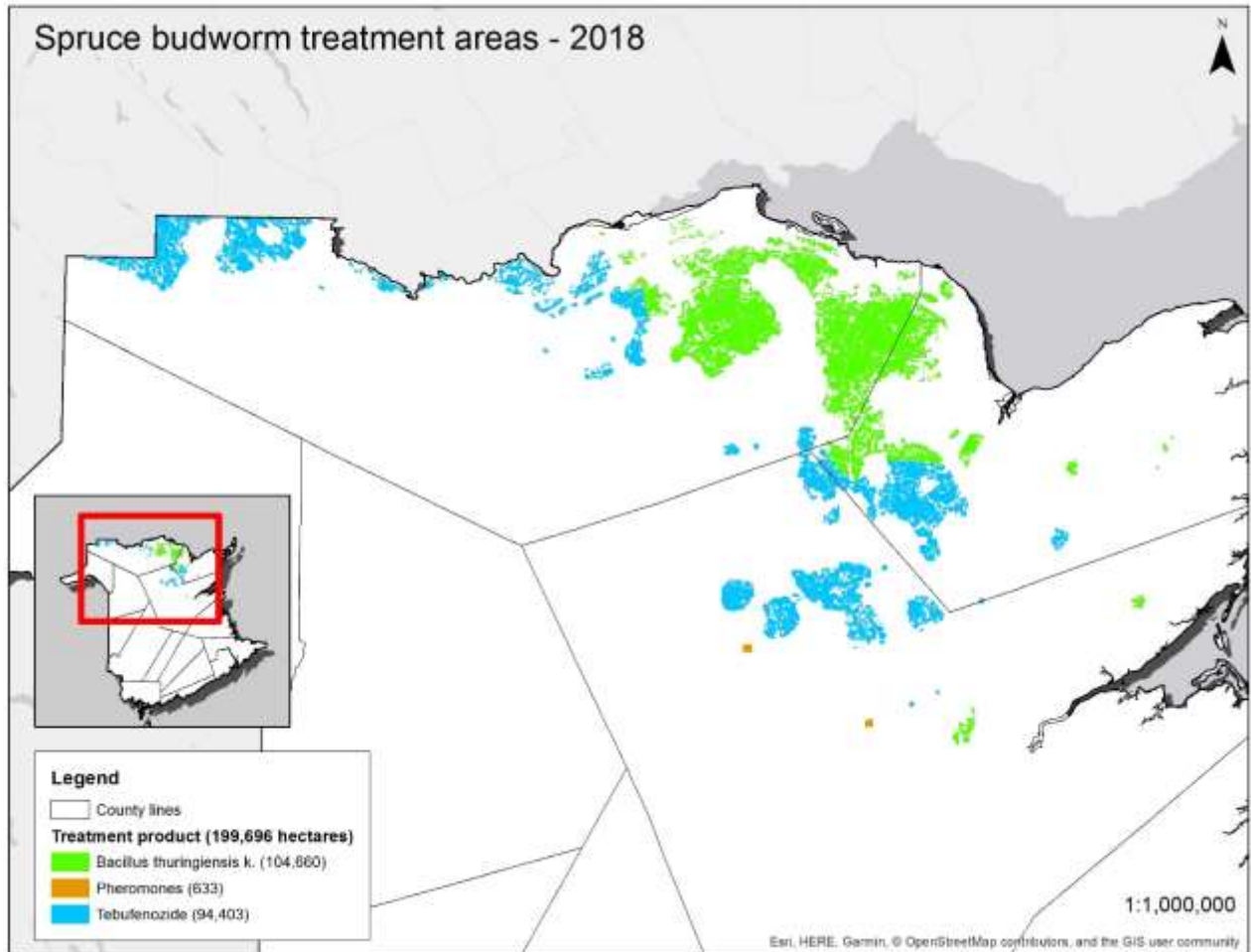


Figure 7. Treatment areas for spruce budworm, 2018. Areas were determined based off of larval sampling results from 2017.

Hardwood Pathogens

No major cases of hardwood pathogens were reported or observed this year; some incidental observations may be found in the FDRS section.

Insect Pests of Hardwoods

Emerald Ash Borer (*Agrilus planipennis*): Originating from Asia, this highly destructive beetle was first detected in North America in Ontario, 2002. It has since spread across the continent, killing millions of ash trees (*Fraxinus spp.*). On May 17, 2018 CFIA officially confirmed that emerald ash borer (EAB) were detected in New Brunswick for the first time. The initial detection site was comprised of several urban ash trees on private property in Edmundston. FPMG and other partners assisted CFIA in conducting a survey throughout the Edmundston area to better determine the geographical spread of this population. More evidence of EAB was found outside the initial detection site during this survey, and a later survey conducted by the Maine Forest Service also revealed EAB just over the border from Edmundston in Aroostook County. In an effort to stop the spread of EAB, CFIA has regulated Madawaska County (excluding Grand Falls).

FPMG has since inspected approximately 70 additional stands in and around the Saint John River Valley (Figure 7); no further detections of EAB have been recorded in the province. FPMG will increase survey efforts in 2019, and will continue to work with CFIA and other organizations to help detect and stop the spread of EAB.

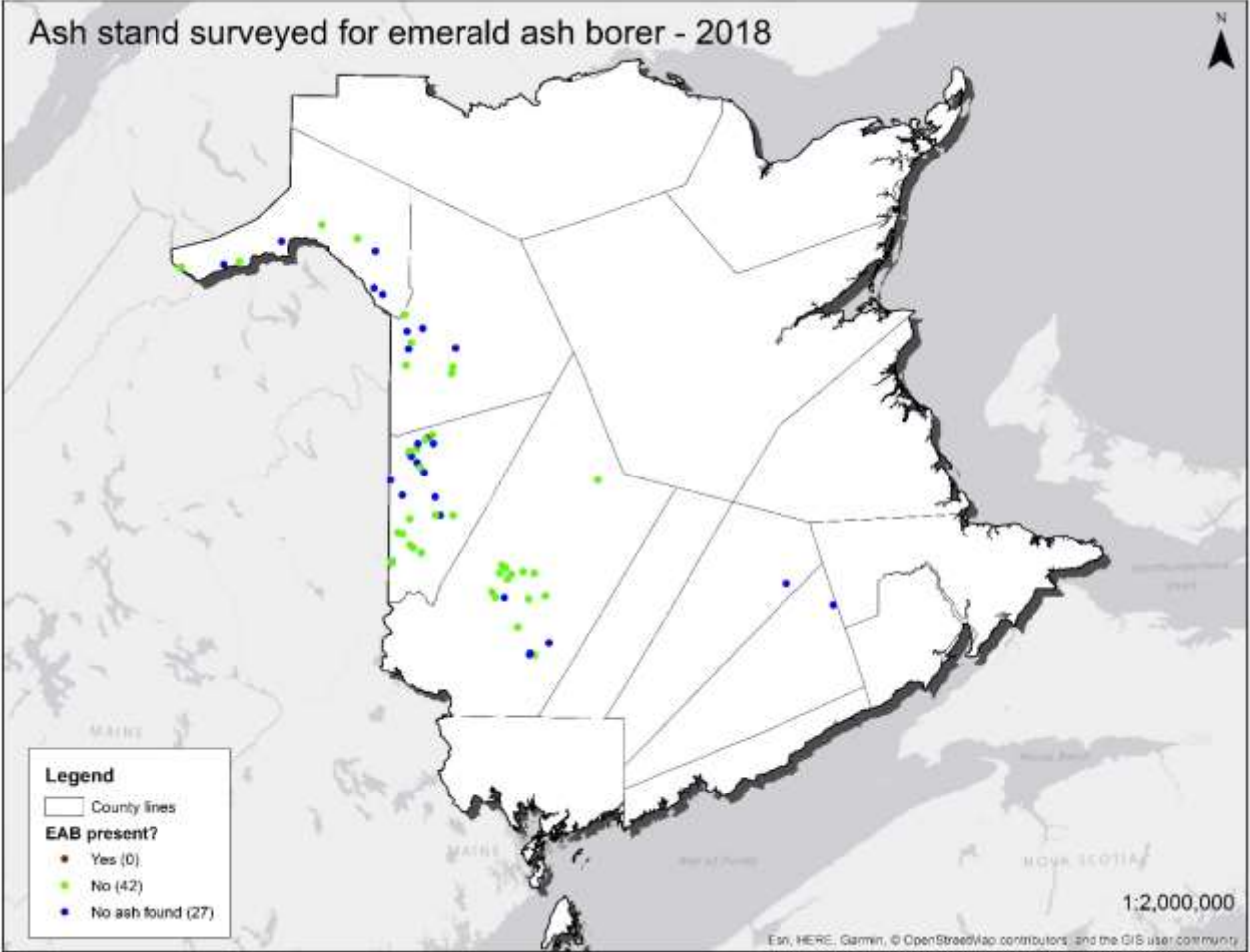


Figure 8. Additional ash stands surveyed by FPMG for emerald ash borer (*Agrilus planipennis*), 2018. No additional signs or symptoms of emerald ash borer were found.

Forest Tent Caterpillar (*Malacosoma disstria*): Continuing the trend of recent years, small areas (~550 ha total) of defoliated aspen (*Populus* sp.) in the northeast of the province were attributed to this native pest (Figure 5). Except in extreme cases, defoliated trees suffer no long lasting effects or mortality, and can often produce a secondary leaf flush after any severe defoliation; control options are often unnecessary.

Gypsy Moth (*Lymantria dispar*): A small (~25 ha) patch of defoliation observed in the Miramichi area during the aerial survey (Figure 5) was found to be caused by gypsy moth after an on-site verification. The observed area of defoliation fell within a zone already regulated by CFIA and no other significant gypsy moth populations were reported or observed this year by FPMG; however, CFIA has confirmed gypsy moth lifestages were found in non-regulated areas this year and an update to the provincial regulated areas map should follow in 2019.

Miscellaneous Observations

Browntail Moth (*Euproctis chrySORrhea*): A single browntail moth was observed and photographed in 2018 in the Cormierville area. This unwelcomed exotic moth can cause serious defoliation of a wide variety of hardwood trees including oaks (*Quercus* spp.), apples (*Malus* spp.), and cherries (*Prunus* spp.). Equally disconcerting is the potential health risk; the hairs from this moth (especially the caterpillar stage) may become airborne and result in severe rashes and troubled breathing. The closest confirmed population to New Brunswick is in southern Maine.

Forest Disturbance Reporting System

The Forest Disturbance Reporting System is an important monitoring tool used to identify emerging and potential threats to New Brunswick's forest resources. The system is made up of two components: an online public website <http://dnr-mrn.gnb.ca/ForestHealth/MaintainReportData/Details.aspx>, and an internal ERD reporting system. The internal ERD system is managed by FPMG staff in Fredericton in cooperation with regional coordinators. Reports are completed digitally by regional ERD staff, using the Forest Health form within the *Forest Ranger* mobile app (an internally-developed mobile application), or using an internal website.

Table 1. Forest Disturbance Reporting System reports by region, up to 16 November 2018.

As of November 16, a total of 1178 reports were completed by 97 reporting officers, 2 industry personnel, and 8 members of the public. This represents more than a 40% increase in the number of individuals involved in the program compared to 2017 (Table 1). In 2018, the majority of reports were completed between June and October (Figure 8). Geographic distribution improved considerably compared to the 2017 season, with better representation from each region (Table 1; Figure 9).

The majority of reports were of healthy stands (Table 2). The most commonly reported insect pests were spruce budworm (38 reports), and white pine weevil (*Pissodes strobi*; 24 reports). Reports of spruce budworm defoliation increased significantly from 2017, and were generally concentrated in the northeast, though most were of trace to light defoliation. White pine weevil is reported frequently each year, mainly because it is widespread and causes distinctive, highly visible damage. Although it can stunt the growth of pine (*Pinus* sp.) and Norway

| Metric | 2018 | 2017 |
|--------------------------|------------|------------|
| Total Reports | 1178 | 680 |
| Total Officers Reporting | 97 | 71 |
| Industry Reports | 2 | 2 |
| Public Reports | 8 | 1 |
| REPORTS BY REGION | | |
| Region 1 | | |
| East | 161 | 34 |
| North | 106 | 41 |
| West | 79 | 59 |
| TOTAL | 346 | 134 |
| Region 2 | | |
| North | 44 | 56 |
| South | 68 | 29 |
| West | 56 | 63 |
| TOTAL | 168 | 148 |
| Region 3 | | |
| East | 103 | 82 |
| North | 129 | 52 |
| South | 96 | 49 |
| West | 203 | 107 |
| TOTAL | 531 | 290 |
| Region 4 | | |
| North | 77 | 52 |
| South | 56 | 56 |
| TOTAL | 133 | 108 |

spruce (*Picea abies*), it is typically not treated. In addition to various reports of foliage discolouration, there were many reports of balsam fir and other softwoods suddenly turning red and dying which was attributed to “Stillwell’s Syndrome”. Some other pathogens reported frequently included beech bark disease (*Neonectria faginata*; 8 reports), and Sirococcus shoot blight (*Sirococcus sp.*; 6 reports) of red pine (*Pinus resinosa*) and white spruce (*Picea glauca*).

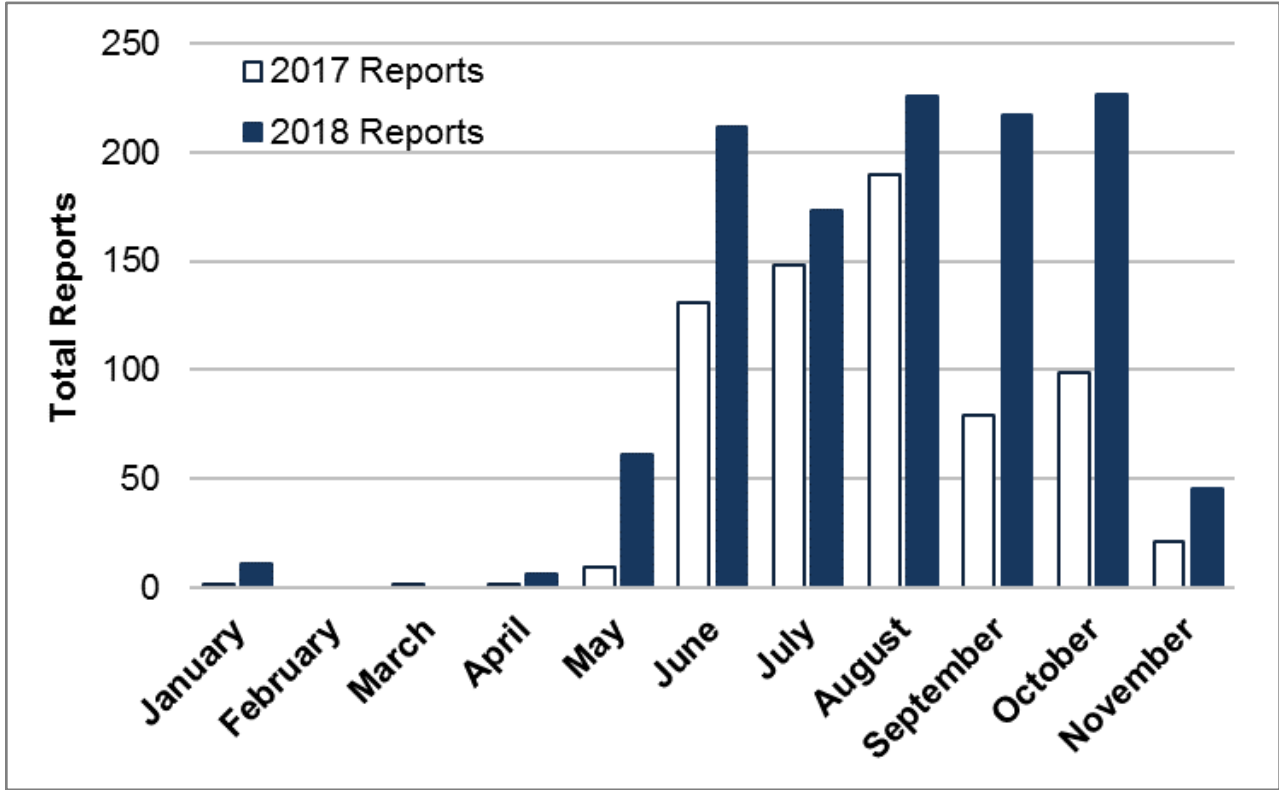


Figure 9. Forest Disturbance Reporting System reports by month, up to 16 November 2017 and 2018.

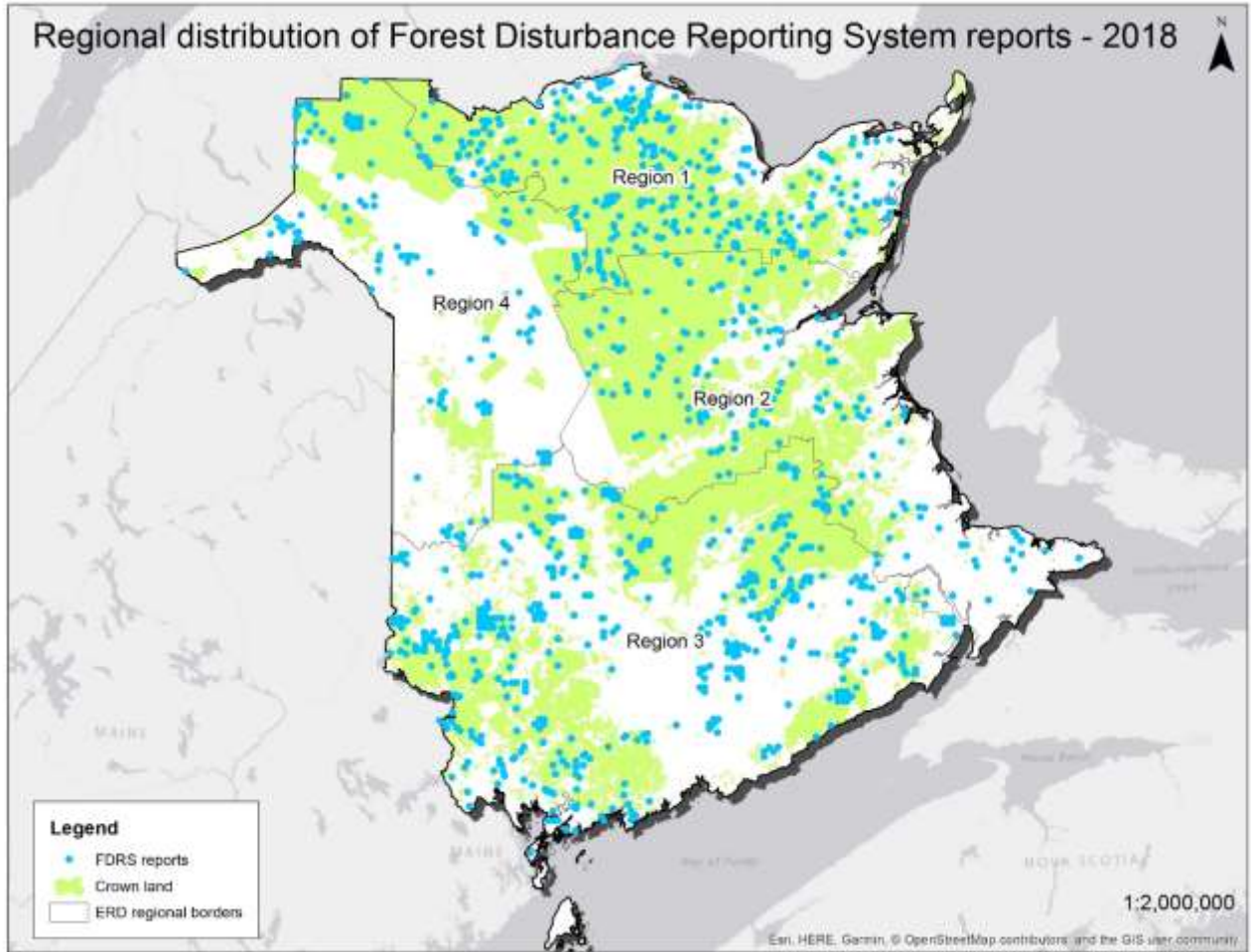


Figure 10. Distribution of Forest Disturbance Reporting System reports, up to 16 November 2018.

Table 2. Forest Disturbance Reporting System reports by disturbance agent (condensed), up to 16 November 2018.

| AGENT | Severity | | | | | Total |
|-----------------------------|------------|-----------|-----------|-----------|-----------|-------------|
| | Trace | Light | Moderate | Severe | Mortality | |
| Healthy Stand | | | | | | 952 |
| Vertebrate | 24 | 20 | 6 | 1 | 4 | 55 |
| Abiotic | 10 | 13 | 8 | 5 | 6 | 42 |
| Spruce Budworm | 17 | 10 | 11 | | | 38 |
| Stillwell's Syndrome | 5 | 6 | 3 | 4 | 18 | 36 |
| White Pine Weevil | 7 | 7 | 10 | | | 24 |
| Leaf Fungi/Miners/Galls | 12 | 4 | 5 | | | 21 |
| Misc./Unidentified Insects | 8 | 2 | 3 | | | 13 |
| Discolouration/Dieback | 4 | 3 | 1 | 2 | 2 | 12 |
| Beech Bark Disease | | 2 | 2 | 4 | | 8 |
| Human | 5 | 2 | 1 | | | 8 |
| Sirococcus | 1 | 1 | 2 | | 2 | 6 |
| Unknown | 4 | | | 1 | | 5 |
| Eastern Spruce Gall Adelgid | 4 | 1 | | | | 5 |
| Borers/Bark Beetles | 2 | | | 2 | 1 | 5 |
| Discolouration/Dieback | | | 2 | 1 | 2 | 5 |
| Conks/Cankers/Stem Rot | 2 | | 2 | | | 4 |
| Forest Tent Caterpillar | 2 | 1 | | 1 | | 4 |
| Pitch Nodule Maker | 2 | | 1 | | 1 | 4 |
| Gall/Broom/Needle Rusts | 1 | 1 | 1 | | | 3 |
| Balsam Twig Aphid | 2 | 1 | | | | 3 |
| Black Knot | | 1 | 2 | | | 3 |
| Emerald Ash Borer | | 2 | | | 1 | 3 |
| Spruce Beetle | 1 | | | | 1 | 2 |
| Balsam Woolly Adelgid | | | 1 | | | 1 |
| Herbicide | | | 1 | | | 1 |
| Fall Webworm | | | 1 | | | 1 |
| GRAND TOTAL | 113 | 77 | 63 | 21 | 38 | 1264 |

Acknowledgments

FPMG would like to thank all government and industry partners for providing survey support and expertise. We would also like to acknowledge all of the Department's regional staff for an outstanding year of reporting through the FDRS.