FOREST HEALTH CONDITIONS IN THE NORTHWEST REGION OF ONTARIO 2000

Forest Districts: Dryden, Fort Frances, Kenora, Nipigon, Red Lake, Sioux Lookout, and Thunder Bay

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OVERVIEW

The following report deals with the forest health conditions in the Northwest Region of Ontario, as defined by the Ontario Ministry of Natural Resources (OMNR) administrative boundaries for 2000. The report is divided into three sections: 1) major forest disturbances, 2) forest health plot monitoring, and 3) quarantine pests. The Forest Health Monitoring Unit (FHMU) of the Canadian Forest Service (CFS), Natural Resources Canada has taken the lead role in procuring information for this report.

Forest health information is obtained primarily through the monitoring of a variety of established plots. In the northwest these plots include jack pine health plots and spruce/fir health plots.

Exotic pests are monitored under a Memorandum of Understanding (MOU) with the Canadian Food Inspection Agency and trapping and surveys were conducted for gypsy moth in the region. No insects were captured in the traps.

A recent agreement between the OMNR and the CFS provided for six contract OMNR Field Technicians to work in partnership with the six Forest Health Officers of the FHMU for 6 months of the year centering around the summer field season. This co-operative work on monitoring the state of health of Ontario forests through forest health plots, major forest disturbance surveys and exotic pest investigations has resulted in an enhanced forest health monitoring effort and report.

The big news for the region in 2000 was the forest tent caterpillar. There was a 303 percent increase in the size of the infestation and it now covers almost 6 million hectares. A few small infestations of Bruce spanworm were mapped in the Nipigon and Thunder Bay districts. This insect has not been present in the region for a number of years. Two conifer foliage diseases were more prevalent this year, spruce needle rust and Dook's needle blight. Blowdown was the only major climate related injury detected in 2000 with small pockets of damage were found in three districts. Some new forest health studies (Ontario Forest Health) were initiated this year and the longstanding jack pine and spruce/fir plots were tallied again.

The CFS personnel working in the Northwest Region were Bill Biggs based in Sioux Lookout and Simon Melbourne working out of Thunder Bay. The OMNR staff in the region were Mike Lesperance in Nipigon and Mark Breon in Fort Frances.

The cooperation and assistance provided by the staff of OMNR, various forest industries, and other CFS staff are gratefully acknowledged.

If further information is required about data collected in the Northwest Region, please contact one of the report authors or get in touch with: G.M. Howse (ghowse@NRCan.gc.ca), Leader, Forest Health Monitoring Unit, Canadian Forest Service, Great Lakes Forestry Centre, P.O. Box 490, Sault Ste. Marie, Ontario, P6A 5M7. Visit our home page on the World Wide Web at: http://www.glfc.forestry.ca

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MAJOR FOREST DISTURBANCES

Insects

Large Aspen Tortrix, *Choristoneura conflictana* (Wlk.)

Damage by this early season defoliator was detected for the eighth consecutive year, however, the population appears to be in decline. The infestation has broken-up into small stands of defoliated trembling aspen (*Populus tremuloides* Michx.) totaling 12 065 ha in the Thunder Bay and Nipigon districts (Fig. 1).

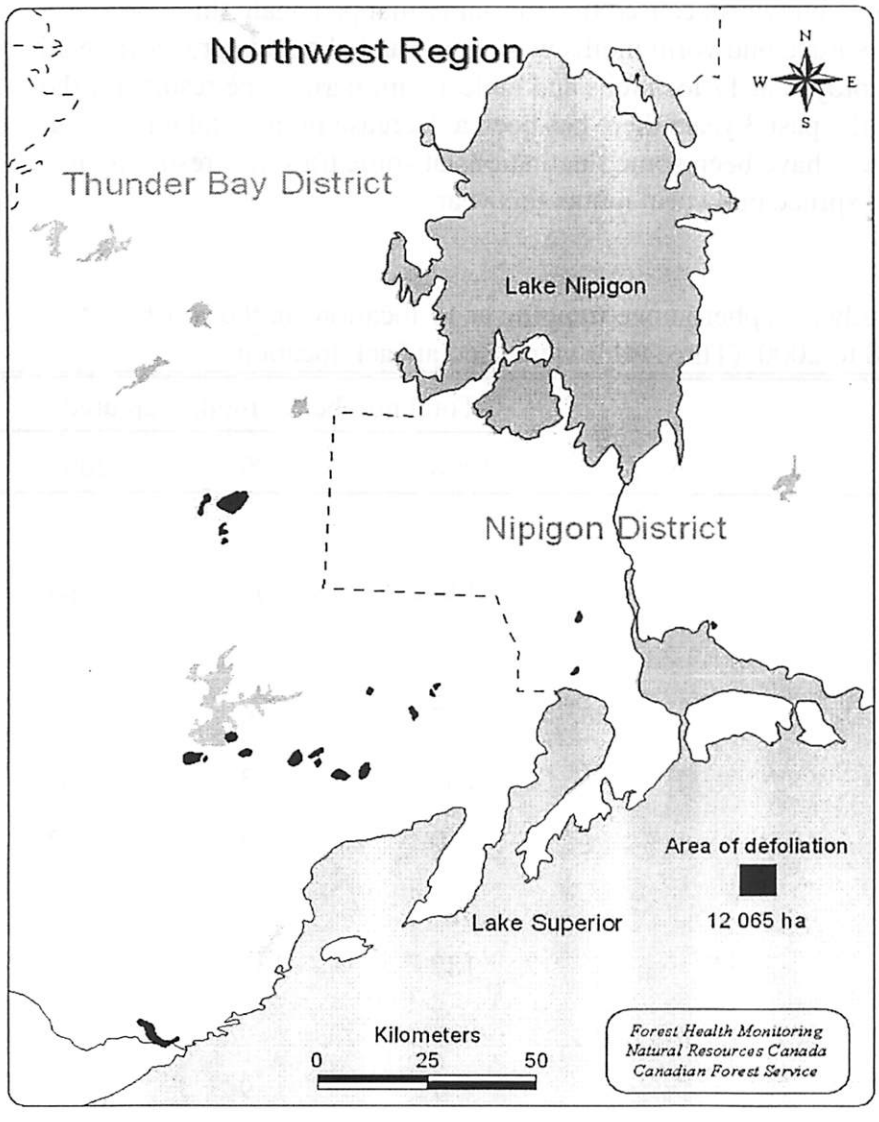

Figure 1. *Area within which moderate to severe defoliation caused by the large aspen tortrix* (Choristoneura conflictana [Wilk.]) *occurred in 2000.*

The total area of damage in the Thunder Bay District was 11 442 ha. Moderate defoliation consisting of nine pockets was mapped in a band extending west from Highway 527 to the south end of Dog Lake. On the east side of Highway 527, four small pockets of defoliation were recorded around Hicks, Current, and Greenwich lakes. The main body of this damage was located in the area between Lac des Iles and Sauerbrei lakes, with two smaller pockets to the south around Camp and Starfish lakes. The highest defoliation levels were recorded along the south end of Highway 61, extending northwest for a few kilometers along Highway 593. This damage was not put on the map because the forest tent caterpillar (*Malacosoma disstria* Hbn.) accounted for most of the defoliation.

Scattered patches of light defoliation were all that remained of the large 1999 infestation recorded in the northern portions of the Thunder Bay and Nipigon districts.

In Nipigon District, only three small pockets of defoliation totaling 623 ha were recorded. Two were in Lyon and Patience townships, with the other pocket straddling Hele and Nipigon townships. Defoliation levels ranged from 60-100 percent, with the heaviest damage occurring in the stands located in Lyon Township.

Spruce Budworm, *Choristoneura fumiferana* (Clem.)

In the year 2000, there was no spruce budworm defoliation found during aerial or ground surveys. Also there was no new budworm caused tree mortality mapped again this year. Pheromone trapping of male spruce budworm moths was again carried out at spruce/fir health plot locations. Traps were deployed at 17 locations and table 1 summarizes the results for the past 3 years. Generally, over the past 3 years there has been a decrease in the total number of moths captured. However, there have been some fluctuations at some trap sites resulting in modest increased numbers of spruce budworm moths this year.

Table 1. Results of spruce budworm pheromone trapping at 17 locations in the Northwest Region of Ontario from 1998 to 2000. (Three traps were used at each location).

	Total number of moths captured		
Location	1998	1999	2000
Dryden District			
Langton Township	149	93	63
Fort Frances District			
Calm Lake	57	39	19
Claxton Township	165	63	7[a]
French Lake (Quetico Park)	0	5	12
Kenora District			
Haycock Township	187	131	45
Nipigon District			
Catlonite Road	7	9	20
Grain Township	22	18	8
Parent Township	37	15	16

Table 1. Results of spruce budworm pheromone trapping at 17 locations in the Northwest Region of Ontario from 1998 to 2000. (Three traps were used at each location). (concl.)

Location	Total number of moths captured		
	1998	1999	2000
Nipigon District **(concl.)**			
Windigokan Lake	9[b]	11	8
Sioux Lookout District			
Burma Lake Road	37	32	14
Foley Township	8	17	15
Lomond Township	19	34	17
Pape Lake	46	24	44
Thunder Bay District			
Buzzer Lake	13	0	3
Fallis Township	13	2	5
Fowler Township	6	3	2
Milkshake Lake	5	0	0

[a] Two traps missing
[b] One trap missing

Jack Pine Budworm, *Choristoneura pinus pinus* Free.

There was no defoliation by the jack pine budworm detected in the region in 2000. As a precautionary measure some egg mass sampling was carried out to check for signs of an insect population for the next year. The sampling was carried out in the intermediate and mature age class stands where the Jack Pine Health Plots are located. Branches were sampled from a total of 32 sites, six in each of Dryden, Fort Frances, and Kenora districts; and seven in each of Red Lake and Sioux Lookout districts. No egg masses were found at any of the locations.

Forest Tent Caterpillar, *Malacosoma disstria* Hbn.

There was a major expansion in the amount of damage caused by the forest tent caterpillar in the Northwest Region in 2000. Steady population increases have been recorded over the past 4 years (Table 2). Three districts now have over a million hectares of defoliation each. The area within which defoliated stands were found covered most of the Dryden, Fort Frances,

and Kenora districts. The regional total is almost 6 million hectares, three times greater over that of 1999 (Fig. 2).

The area within which defoliation of trembling aspen and white birch (*Betula papyrifera* Marsh.) occurred in the Fort Frances District is eighteen times larger compared with 1999 and now covers 1 832 570 ha. Almost all of the district's susceptible stands had moderate to severe defoliation except for the eastern side. Scattered large pockets of damage ranging in size from 1 500 to 5 000 ha were located in the southern portion of Quetico Provincial Park and north of Highway 11 in the northeast corner of the Fort Frances District.

Table 2. Total area of moderate to severe defoliation caused by the forest tent caterpillar in the Northwest Region of Ontario from 1997 to 2000.

	Area of moderate to severe defoliation (ha)			
District	1997	1998	1999	2000
Dryden	9 639	68 911	661 302	1 665 278
Fort Frances	0	0	93 339	1 832 570
Kenora	273	20 548	189 795	1 222 642
Nipigon	0	0	0	717
Red Lake	987	18 749	171 569	530 163
Sioux Lookout	0	8 181	122 727	421 986
Thunder Bay	0	1 834	242 392	307 422
Regional totals	10 899	118 223	1 481 124	5 970 778

The infestation in the Kenora District increased five time in size in 2000 compared with last year. Moderate to severe defoliation was present over most of the district (1 222 642 ha) with the exception of areas in the north central and northwestern portions. In this part of the district two large pockets of damage straddled the Kenora/Red Lake district boundary in the area around Eagle and Sydney lakes. A few smaller patches of defoliation were also detected south and east of Werner Lake.

Over the life of this infestation the amount of damage has steadily grown in the Dryden District and this manifested itself again this year (Table 2). Only the northeast corner of the district was not overrun. A few small pockets of moderate to severe defoliation were found beyond the infestation boundary near Quest Lake and south of Shikag Lake.

In the Red Lake District the infestation expanded to the south and east of the town of Red Lake and now covers an area of 530 163 ha. Increased areas of moderate to severe defoliation were mapped along a wide band between the towns of Red Lake and Ear Falls. Defoliation was once again present south of Trout Lake, but expanded to include a large area east of the lake. The

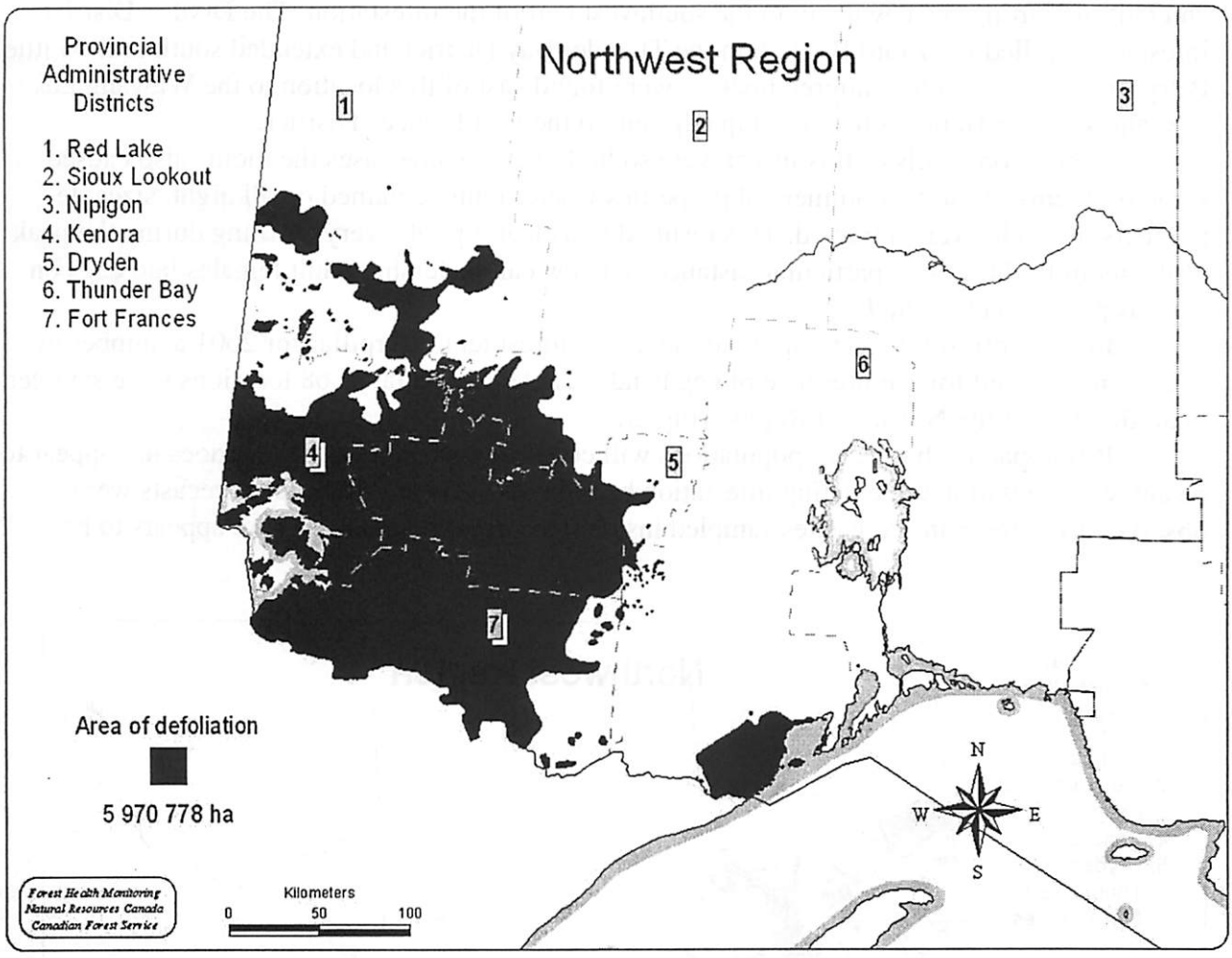

Figure 2. *Area within which moderate to severe defoliation caused by the forest tent caterpillar* (Malacosoma disstria Hbn.) *occurred in 2000.*

large pocket from 1999 which was located northwest of Red Lake expanded and numerous smaller pockets of damage were also found scattered throughout the southwest corner of the district. To the north an isolated stand of damaged aspen was encountered northeast of Stormer Lake.

The infestation in the Sioux Lookout District spread into the southwestern corner of the district, albeit a large part of this included Lac Seul (water is included in the infestation acreage). The main area of expansion was to the northeast of Lac Seul in the Wapesi Lake and Quirt/Brechin bays area. Also there was additional damage northeast and southeast of the town of Sioux Lookout to Mills Lake and Factor Township, respectively.

There was a 65 000 ha increase in the size of the forest tent caterpillar infestation in the Thunder Bay district in 2000. Northeast of the city of Thunder Bay a noticeable spread was observed north of Highway 102 into Gorham Township and along a narrow strip adjacent to Highway 17 past Silver Harbour. New damage was mapped along the western side of the Sibley

Peninsula and on Pie and Caribou islands. The infestation expanded into all of Devon Township and half of Hartington Township in the southwest part of the infestation. The Dryden District infestation spilled-over into Block 6 in the Thunder Bay District and extended south to the Little Petry River. In addition, scattered pockets were found east of this location to the Wawang Lake area and south to Hanniwell Township adjacent to the Fort Frances District.

Population levels of this insect were so high that in some cases the moths also caused some problems. At some commercial properties where lights remained on all night, sizeable numbers of moths were attracted. This resulted in a clean-up job every morning during the peak of the moth flight. In one particular instance at a new car dealership adult females laid eggs on various parts of new vehicles.

In an effort to forecast population levels of forest tent caterpillar for 2001 a number of sites were checked for the presence of egg bands (Table 3). A total of 68 locations were sampled in all districts of the Northwest Region (Fig. 3).

It is apparent that insect populations will continue to expand and there does not appear to be any waning within the existing infestation boundaries. Severe infestation forecasts were observed from the numerous sites sampled inside the current boundary. There appears to be a

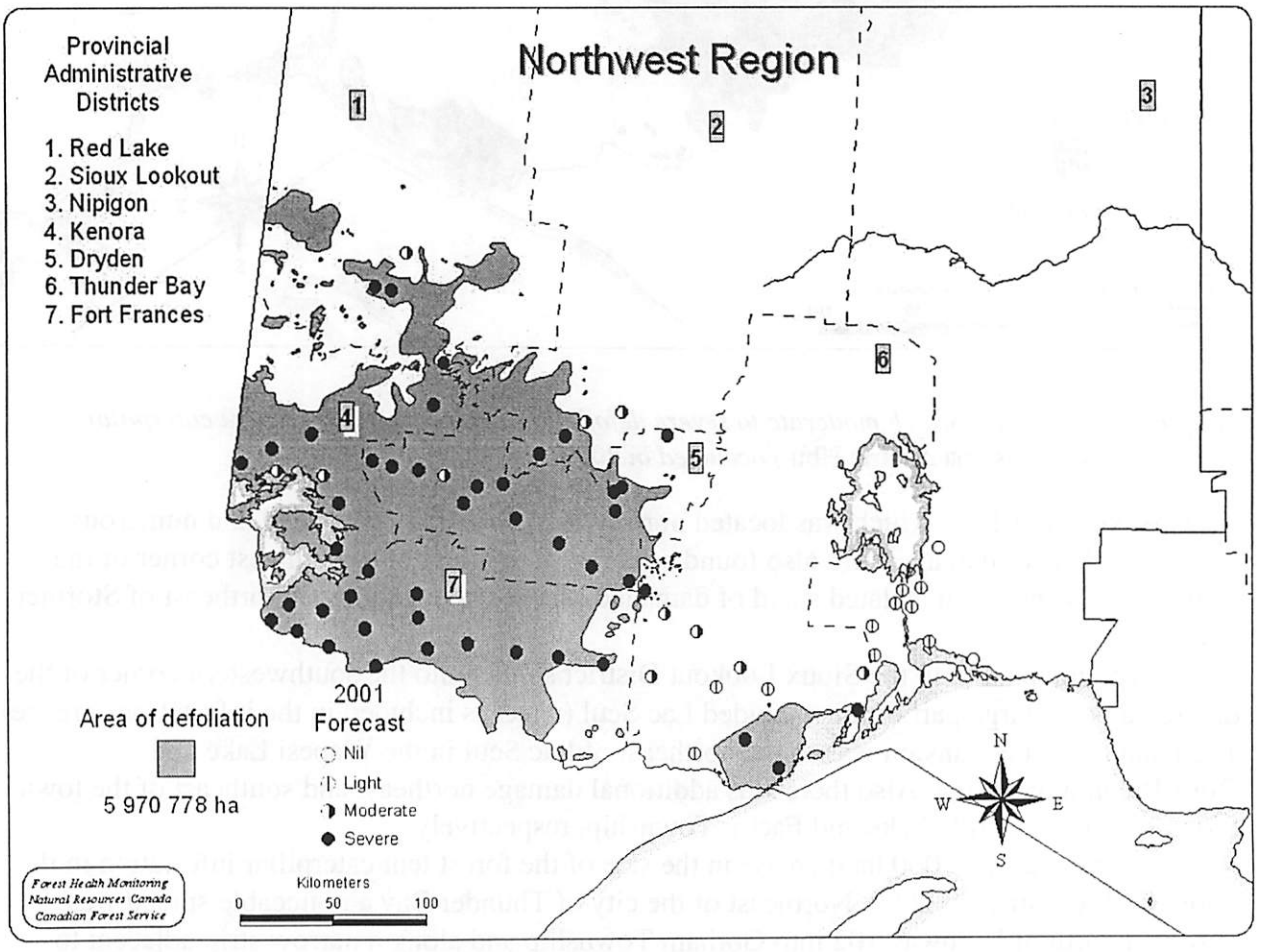

Figure 3. *Infestation forecasts for 2001 for the forest tent caterpillar* (Malacosoma disstria Hbn.) *overlaid on the 2000 infestation map.*

chance of the infestation spreading in a northeasterly direction in the Sioux Lookout and Dryden districts and possibly some joining up of the Dryden/Fort Frances and Thunder Bay infestations. The spread potential seems limited south of Lake Nipigon in the Nipigon District.

Table 3. Summary of forest tent caterpillar egg-band counts on trembling aspen (5-15 cm DBH[a]) at 68 locations in the Northwest Region of Ontario in 2000, with defoliation forecasts for 2001.

Location	Number of trees sampled	Average number of egg-bands/tree	Defoliation forecasts for 2001[b]
Dryden District			
Barclay Township	3	10	S
Bradshaw Township	1	93	S
Corman Township	1	45	S
Dewan Township	3	13	S
Docker Township	1	59	S
Eton Township	3	4	M
Hartman Township	3	10	S
Highway 502, 20 km south of Hwy 594	3	13	S
Highway 599, 45 km north of Sowden Lake Rd	1	22	S
Highway 599, Young Lake Road	1	44	S
Highway 599, north of Ignace	3	7	S
Highway 642, south end	3	6	S
Mutrie Township	3	12	S
Revell Township	3	9	S
Tustin Township	1	89	S
Fort Frances District			
Atwood Township	1	21	S
Cedar Narrows Road	3	109	S
Chapple Township	1	69	S
Crozier Township	1	131	S

Table 3. Summary of forest tent caterpillar egg-band counts on trembling aspen (5-15 cm DBH[a]) at 68 locations in the Northwest Region of Ontario in 2000, with defoliation forecasts for 2001. (cont'd)

Location	Number of trees sampled	Average number of egg-bands/tree	Defoliation forecasts for 2001[b]
Fort Frances District **(concl.)**			
Cuttle Lake Road	3	40	S
Dance Township	1	56	S
Derby Township	3	40	S
Halkirk Township	2	19	S
Highway 11, 3 km west of Flanders	1	33	S
Highway 11, 9 km west of Atikokan	1	66	S
Highway 11, 6 km west of Sapawe	1	18	S
Highway 11, 1 km west of Mine Centre	1	21	S
Nelles Township	1	55	S
Pratt Township	3	10	S
Road 404 off Highway 71	3	54	S
Sifton Township	1	38	S
Kenora District			
Ewart Township	1	19	S
Highway 105 at Aerobus Road	1	40	S
Kirkup Township	3	2	M
Pelican Township	2	16	S
Pellatt Township	3	5	M
Phillips Township	1	33	S
Redditt Township	1	22	S
Work Township	1	95	S

Table 3. Summary of forest tent caterpillar egg-band counts on trembling aspen (5-15 cm DBH[a]) at 68 locations in the Northwest Region of Ontario in 2000, with defoliation forecasts for 2001. (cont'd)

Location	Number of trees sampled	Average number of egg-bands/tree	Defoliation forecasts for 2001[b]
Nipigon District			
Beardmore Township	3	0	N
Cockeram Township	3	1	L
Highway 11, east of Pititawa	3	<1	L
Lahontan Township	3	0	N
Ledger Township	3	1	L
Patience Township	3	1	L
Pine Portage	3	1	L
Purdon Township	3	1	L
Stirling Township	3	1	L
Red Lake District			
Baird Township	3	6	S
Bateman Township	3	5	M
Highway 105, 10 km south of Red Lake	1	13	S
Highway 105, 13 km south of Ear Falls	1	22	S
Sioux Lookout District			
Jordan Township	1	22	S
Highway 516, in Block 10	1	19	S
Highway 516, at the Vermilion River Road	3	4	M
Highway 516, at the Yett Lake Road	3	3	M
Thunder Bay District			
Conacher Township	3	1	L
Dorion Township	3	3	M

Table 3. Summary of forest tent caterpillar egg-band counts on trembling aspen (5-15 cm DBH[a]) at 68 locations in the Northwest Region of Ontario in 2000, with defoliation forecasts for 2001. (concl.)

Location	Number of trees sampled	Average number of egg-bands/tree	Defoliation forecasts for 2001[b]
Thunder Bay District **(concl.)**			
Highway 11, 24 km west of Kashabowie	3	2	M
Highway 588 at Sandstone Lake Road	3	<1	L
Joynt Township	3	3	M
Marks Township	1	31	S
Michener Township	3	2	M
Neebing Township	1	28	S
Pyramid Township	1	28	S
Sibley Peninsula, north end	3	9	S
Stedman Township	3	5	M
Ware Township	3	1	L

[a] DBH = diameter at breast height
[b] N = nil, L = light, M = moderate, S = severe

Bruce Spanworm, *Operophtera bruceata* (Hlst.)

The Bruce spanworm, an early spring feeding looper, was found causing damage in the region for the first time in a number of years. This year there were four pockets of moderate to severe damage totaling 2 334 ha. Two pockets were found in Nipigon District (198 ha) and two in Thunder Bay District (2 136 ha), with trembling aspen the main species affected. The largest area of defoliation was mapped along Highway 17 east of the city of Thunder Bay from Bowker to just south of Dorion. The infestation was the shape of a fiddle, with the narrow end towards Dorion. Some of the stands had severe defoliation. There was another smaller pocket of damage just south of the hydro line, northwest of Dorion. In the Nipigon District, two small pockets of moderate to severe defoliation were mapped north and northwest of Lake Helen (Fig. 4).

Leafblotch Miners, *Phyllonorycter ontario* (Free.), *Phyllonorycter nipigon* (Free.)

As in the past two years, damage and the area infested was widespread except in the Nipigon District. In all the other districts, trembling aspen attacked by *P. ontario* became

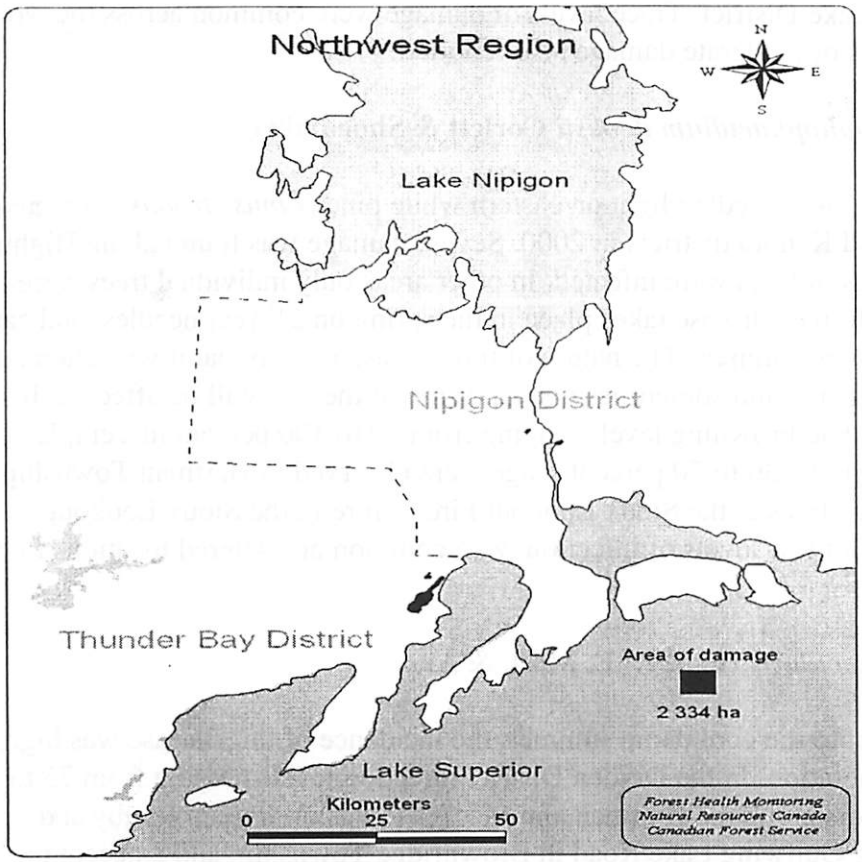

***Figure 4.** Area within which moderate to severe defoliation caused by the Bruce spanworm* (Operophtera bruceata [Hlst.]) *occurred in 2000.*

noticeably discoloured as the summer progressed. Severe damage levels with 100% of the foliage affected were observed along Highway 516 in the Sioux Lookout District. Similar damage was present in the Dryden District in Breithaupt and McIlraith townships and along Highway 17 from Dinorwic east to the district boundary. Moderate defoliation was common along stand edges and in cutovers. Severe damage was also found in the Fort Frances and Kenora districts, mainly in areas affected earlier in the summer by forest tent caterpillar. In Thunder Bay District, damage levels were not as severe in 2000, but defoliation levels still averaged 65 percent in many places.

Also in Thunder Bay District, damage by *P. nipigon* was not as severe as in 1999. However, it was still very prevalent on balsam poplar (*Populus balsamifera* L.) , with an average defoliation level of 50 percent.

Diseases

Spruce Needle Rust, *Chrysomyxa ledicola* Lagerh.

Because of wet weather early in the field season, this needle rust was more prevalent across the region. The largest area of damage was observed along a 30 km stretch of Highway 527 in Thunder Bay District. Both white spruce (*Picea glauca* [Moench] Voss) and black spruce (*Picea mariana* [Mill.] BSP) were infected. Varying degrees of damage were present on large and small trees. Many of the trees were severely damaged and displayed the distinct bright orange colour indicative of heavily infected needles. In Syine Township, Nipigon District, an average 50 percent damage level was observed on white spruce along a 1 km stretch of Highway 17. Heavy infections on ornamental blue spruce (*Picea pungens* Engelm.) were reported in the

town of Red Lake in Red Lake District. Trace levels of damage were common across the work area with some occurrences of moderate damage also reported.

Dooks' Needle Blight, *Lophophacidium dooksii* Corlett & Shoemaker

The incidence of Dooks' needle blight on eastern white pine (*Pinus strobus* L.) increased in both the Fort Frances and Kenora districts in 2000. Severe damage was found along Highway 71 where some large groups of trees were infected. In other areas only individual trees were affected. Infection by this foliage disease takes place in the spring on 2nd year needles, and causes them to turn brown later in the summer. The nature of this disease is such that it will often attack only a single tree within a group and sometimes just a portion of the tree will be affected. In Dryden District some trees had browning levels ranging from 50 to 100 percent in Temple Township. Damage levels in the 30 to 50 percent range were observed in Hartman Township, Dryden District and on large trees at the Sioux Lookout Fire Centre in the Sioux Lookout District. Individual trees with low levels of infection were common at scattered locations in two aforementioned districts.

Shoot Blight , *Venturia macularis* (Fr.:Fr.) E. Müll. & Arx

Probably due in part to the cool damp summer, the incidence of this disease was high and widespread on aspen regeneration. In the Dryden District infection levels ranging from 75 to 100 percent were seen in cutovers along the Hartman and MacFie township line; in Rugby and Mafeking townships; along Gullwing Lake Road in Brownridge Township; and adjacent to Highway 17 from Dinorwic east to Martin. Similar damage was evident along the Ben and Wenasaga roads in the Red Lake District. Moderate damage (25 - 75%) was common in numerous other areas of aspen regeneration in the these two districts as well as in cutovers throughout the Sioux Lookout District.

Abiotic Damage

Blowdown

There were minor amounts of blowdown damage in the Northwest Region in 2000. Two separate occurrences of damage were found by the OMNR and Weyerhaeuser Canada.

The first one was in the southern part of the Dryden District, where high winds in June 2000 result in damage at two sites totaling 248 ha. Blowdown damage to predominately spruce and jack pine (*Pinus banksiana* Lamb.) in the 61-100 year old age class was mapped from Popeye Lake west to the south end of Doreen Lake. The other area of damage was in and around the south end of Church Lake.

Blowdown damage was also located in the southeast corner of the Red Lake District between Swan Bay on Slate Lake and the Wenasaya Road . It totalled 230 ha and was the cumulation of damage that resulted from storms that occurred in August of 1999 and 2000. The stands damaged were comprised of mostly older age class spruce (121-140) and jack pine (61-100).

On July 1, 2000 a tornado-like storm tore through a strip of land just east of the village of Kakabeka Falls in the Thunder Bay District. Since this area is comprised of mostly farmland, there was very little forest damage. In addition to the structural damage to buildings some windbreaks, hedgerows, ornamentals, and individual trees were uprooted.

Observations of Other Forest Pests

Birch Skeletonizer, *Bucculatrix canadensisella* Cham.

Observations of this late season insect were made throughout the Nipigon District. Defoliation levels ranging from 25-75% were present in numerous white birch stands at various locations across the district.

Jack Pine Resin Midge, *Cecidomyia resinicola* (O.S.)

High population levels of this midge were first recorded in the region in 1992. The jack pine resin midge is the most common of the species and often causes twig mortality as a result of its feeding. The heaviest damage occurred on 3 to 4 m jack pine regeneration along many roadways in the Fort Frances and Kenora districts. At these sites it was often found that over 75 percent of the shoots were dead. Damaged trees were also present in the Dryden and Sioux Lookout districts, but at lower levels.

Introduced Pine Sawfly, *Diprion similis* (Htg.)

Introduced pine sawfly populations were low in the Fort Frances and Kenora districts in 2000. In an area along Highway 71, where a concentration of eastern white pine straddles both districts, larvae were easily found. However, defoliation levels were insignificant with no apparent impact to tree health.

Sawyer Beetles, *Monochamus* spp.

Severe damage resulting from the feeding of adult sawyer beetles was detected on 60 percent of the jack pine in a 30 ha plantation along the McKinley Lake Road in the Thunder Bay District. Most of the damage to the 12 year old trees was from feeding completed in 1999, with some current damage also present. In this plantation many of the tree tops were dead and branch mortality levels were high. An adjacent stand of balsam fir (*Abies balsamea* [L.] Mill.) had some trees with heavy branch mortality. Elsewhere in the region noticeable amounts of damage were observed particularly along the edges of cutovers.

Yellowheaded Spruce Sawfly, *Pikonema alaskensis* (Roh.)

High populations of this spruce insect were observed in some of the districts in the Northwest Region in 2000. Severe defoliation (>75%) was found on young roadside spruce regeneration along the Highway 71 right-of-way in both the Kenora and Fort Frances districts.

Several sites along the highway near the town of Sioux Narrows had severe defoliation on 100 percent of the trees, resulting in tree mortality. Scattered 3-m white spruce sustained 50 percent defoliation in Pic Township in the Nipigon District. Varying degrees of damage to roadside trees was observed at numerous locations in the Sioux Lookout and Dryden districts.

Aspen Webworm, *Pococera aplastella* (Hulst)

Pockets of high populations were observed in many trembling aspen stands previously defoliated by the forest tent caterpillar in Dryden and Sioux Lookout districts. Adult aspen webworm lay their eggs in mid summer, after the forest tent caterpillar has completed its feeding. It appeared these moths were attracted to the tied leaves in which the tent caterpillar cocoons were found. In many of the stands the second crop of leaves produced after the earlier feeding were totally consumed by the aspen webworm.

Septoria Leaf Spot, *Septoria betulae* Pass.

The incidence level of this foliar disease of white birch was higher in 2000 compared with the past few years. Damage levels averaging 60 percent were common in many stands in the Thunder Bay District and the eastern part of the Fort Frances District. This late season disease was also observed in the Sioux Lookout and Dryden districts, but at much lower levels.

Drought Damage

Although the early part of the season was wet, Thunder Bay District had very little rain in the later half of the summer. Drought symptoms in the form of leaf yellowing and drooping foliage were observed on white birch growing on rocky sites.

Hail Damage

Large hail stones caused damage to jack pine and red pine (*Pinus resinosa* Ait.) along the northern boundary of the Fort Frances District. The area of damage covered an area approximately 350 ha in size and was located between Lawrence and Frypan lakes.

Single Tree Mortality of Balsam Fir

This condition was noticeable around two major watersheds in the Northwest Region in 2000. Although declining over the past few years single tree mortality of balsam fir was still ongoing along the east and north sides of Lake Nipigon in the Thunder Bay District. Low numbers of recently dead trees were observed in areas around Lac Seul in the Sioux Lookout and Dryden districts.

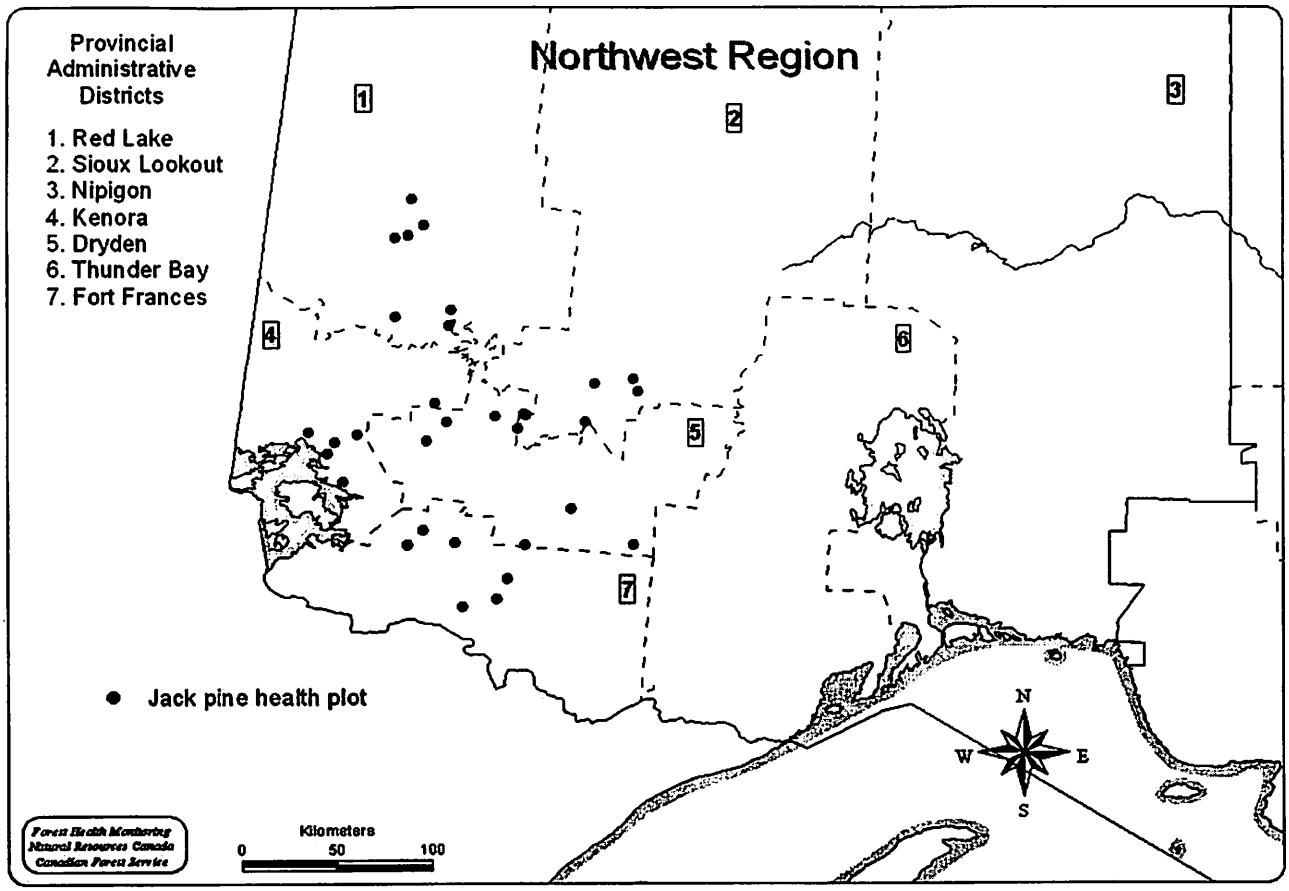

Figure 5. Locations of the jack pine health plots in 2000.

FOREST HEALTH MONITORING

Jack Pine Health Plots

Monitoring of the jack pine health plots continued again in the western half of the Northwest Region (Fig. 5). A minor change in the way the trees were assessed occurred in 2000. The overall condition of the trees was recorded, the tree crowns were no longer separated into thirds. A summary of the crown condition, tree mortality, and top condition for the 32 plots can be found in appendix 1. In comparison with 1999 there was a general increase in the number of trees found in a more weakened state (class 4 and higher). Six trees died from Armillaria root rot, *Armillaria ostoyae* (Romagn.) Herink infection and six were snapped off by the wind and/or snow. Two trees succumbed to western gall rust, *Endocronartium harknessii* (J.P. Moore) Y. Hirats., and seven trees were cut down in the young stand at Coli Lake in the Red Lake District. The only pest found having impact on the living trees was the western gall rust, ten percent of the 1 422 plot trees had varying levels of infection.

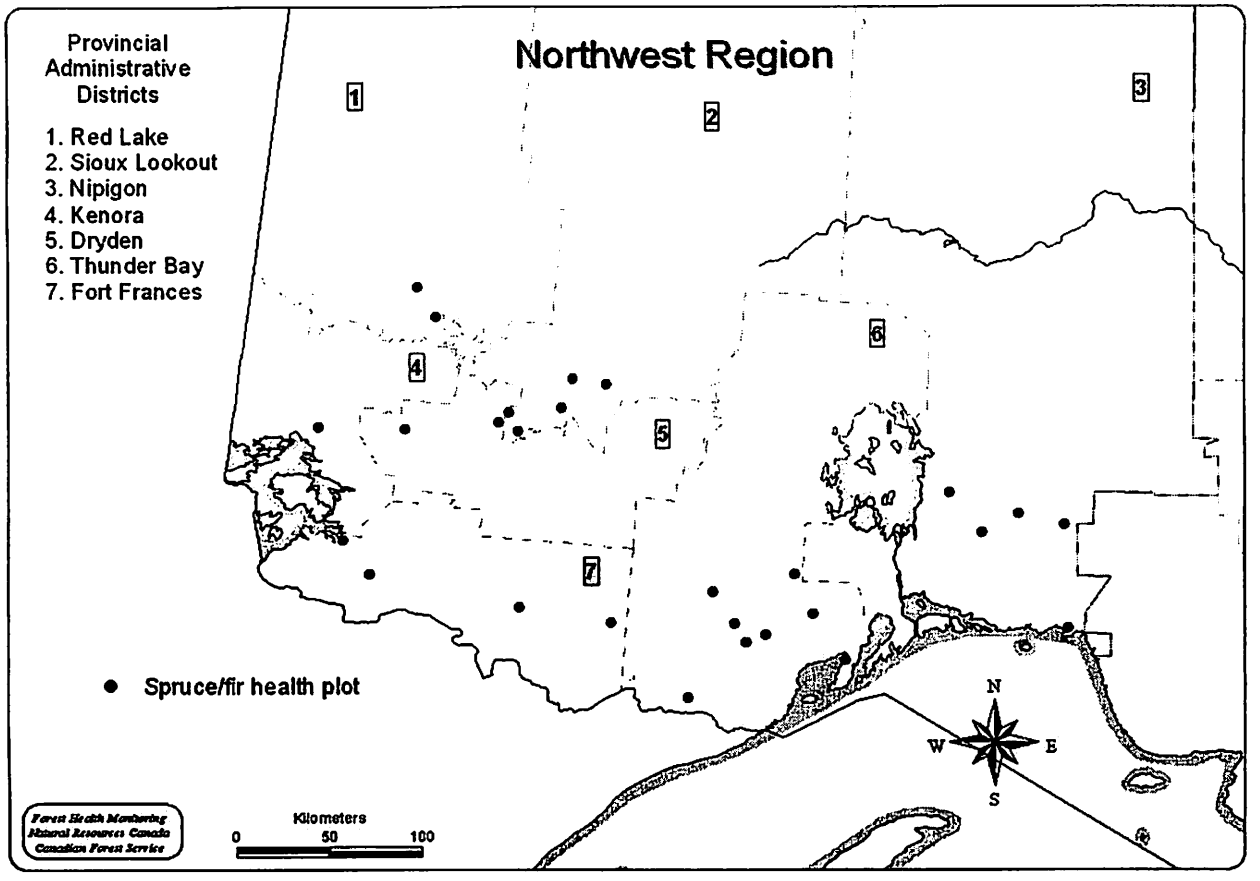

Figure 6. Locations of the spruce/fir health plots in 2000.

Spruce/Fir Health Plots

These boreal forest plots were again visited in 2000 (Fig. 6). As was the case with the jack pine plots, only the overall condition of the crowns of the spruce/fir plot trees was recorded. Appendix 2 summarizes the crown condition, tree mortality, and top condition of all the balsam fir, white spruce, and black spruce in the plots for the past 5 years. Eighteen balsam fir died this year with the majority of the causes being single tree mortality of balsam fir, bark beetles and blow down. Armillaria root rot caused the death of three black spruce and one white spruce and high winds resulted in the death of two black spruce and one white spruce. There was very little change in the crown condition of the remaining living conifers in the plots.

Hypoxylon canker, *Entoleuca mammatum* (Wahlenberg:Fr.) J.D.Rogers & Y.-M. Ju, and Armillaria root rot each killed one trembling aspen with the latter disease also found in three dead white birch. A combination of wind and heavy snow caused the death of two white birch. Appendix 3 summarizes the crown condition and tree mortality for all the trembling aspen and white birch for the past 3 years. Higher levels of crown damage were encountered in some of the plots because of the defoliation by the forest tent caterpillar.

Ontario Forest Health Plots

During the summer of 2000 a total of 55 plots were established across the Northwest Region (Fig. 7). The purpose of these plots was to randomly examine the health of three tree species; eastern white pine, trembling aspen, and white birch. At each plot location dominant and/or co-dominant target tree species were examined along a 4 m wide strip through the stand. Plantations and over mature stands were not utilized for this survey. Some basic measurements were taken for the stand and the trees were evaluated as to their vigor and for pests having impact on tree health. The vigor rating reflects the overall health of the crown based on such factors as branch/twig mortality, discoloured/dwarfed foliage and defoliation (Table 4).

Table 4. Summary of the vigor rating for the three tree species examined in the 55 Ontario forest health plots in 2000 in the Northwest Region of Ontario.

		Vigor rating[a]					
Tree species	Average DBH (cm)	1	2	3	4	5	Total
		Number of trees and (%)					
Eastern white pine	23.7	250 (71)	44 (13)	27 (8)	24 (7)	3 (1)	348
Trembling aspen	15.6	712 (57)	343 (28)	99 (8)	23 (2)	59 (5)	1236
White birch	39.1	473 (61)	213 (27)	51 (7)	17 (2)	23 (3)	777

[a] 1 = healthy, <10% of the crown damaged; 2 = light decline, 10-25% of the crown damaged; 3 = moderate decline, 26-50% of the crown damaged; 4 = severe decline, >50% of the crown damaged; 5 = dead tree.

The most damaging pest found in the eastern white pine was Dooks' needle blight. A total of 20 percent of the trees had some occurrence of this foliage disease with about one third of these infected host classified as unhealthy (vigor rating 3-4).

Fifteen percent of the 1 236 trembling aspen examined had varying levels of defoliation by forest tent caterpillar. A total of 40 trees had hypoxylon canker, with half of these infections resulting in the death of the host. Armillaria root rot infections were responsible for 2 percent of the tree mortality and fruiting bodies of the poplar false tinder fungus (*Phellinus tremulae* [Bondartsev] Bondartsev & Borissov) were present on 91 trees.

The most common pests found on the white birch were two insect defoliators, the forest tent caterpillar and the late season pest the birch skeletonizer. Eighteen percent of the 777 trees had low levels of defoliation by skeletonizer and 10 percent of the trees had light to moderate defoliation by the tent caterpillars.

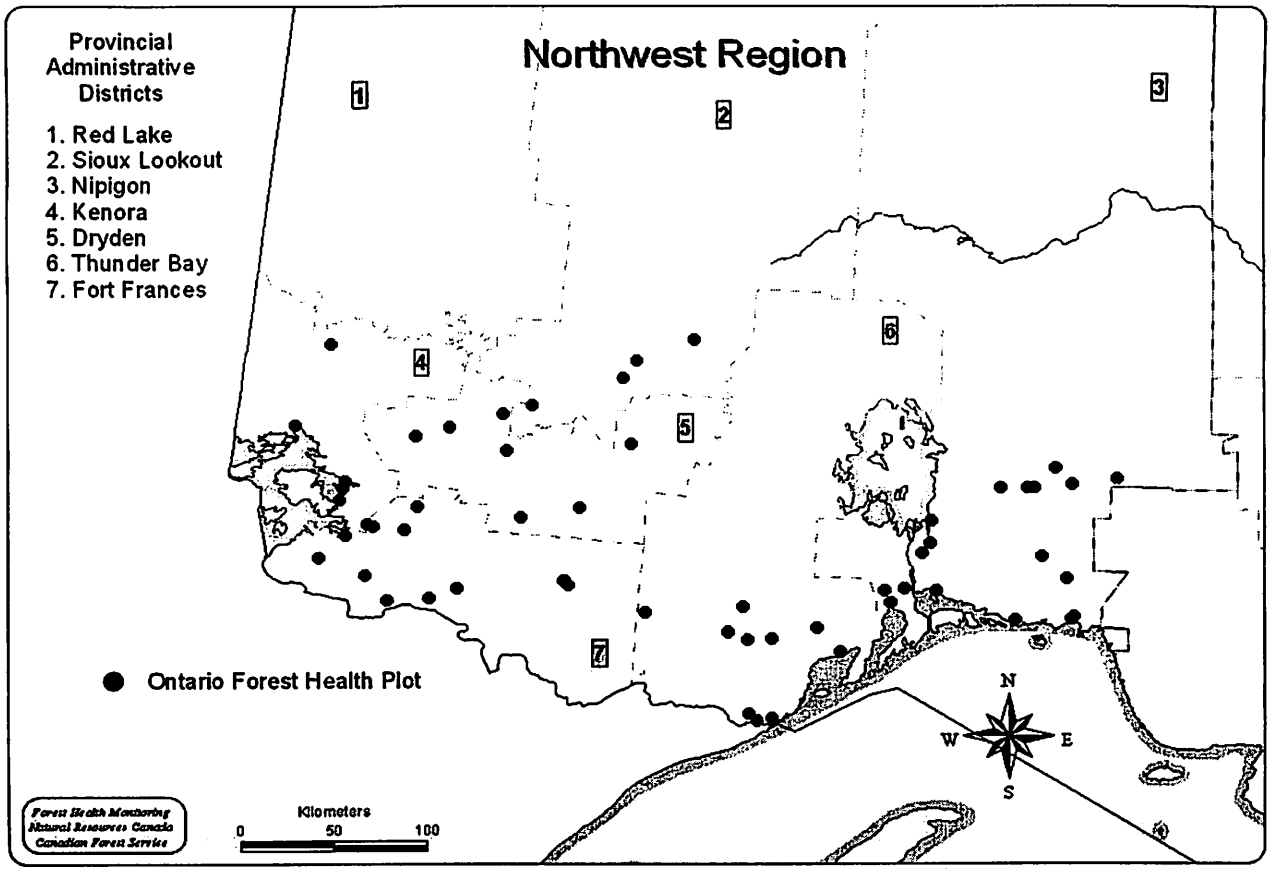

Figure 7. Locations of the Ontario forest health plots in 2000.

QUARANTINE PESTS

Gypsy Moth, *Lymantria dispar* (L.)

The gypsy moth has a habit of laying eggs or pupating on just about anything it comes into contact with, including automobiles. These hitchhiking insects have the potential to significantly extend the current range where this insect is found. For this reason gypsy moth traps containing an artificial pheromone (sex attractant) were once again deployed in the Northwest Region in 2000. The pheromone attracts the males which, unlike the females, can fly. Two baited, deltoid shape sticky traps were placed at 21 locations frequented by tourists, such as parks, campgrounds, lodges and fly-in outfitters (Fig. 8). In 2000 no moths were captured (Table 5). It should be noted that two of the traditional locations were dropped, and two new ones added. Lake Nipigon Provincial Park in Nipigon District, and Inwood Park in Thunder Bay District were canceled this year. As replacements Middle Falls Provincial Park in Thunder District and Nipigon's Tourist Information Centre in Nipigon District were added to the list of locations used for trapping. In the Fort Frances District an additional site was added, the Noden Causeway.

Table 5. Summary of gypsy moth trapping at 21 locations in the Northwest Region of Ontario from 1997 to 2000. (Two deltoid-type traps were used at each location)

	Number of male moths captured			
Location	1997	1998	1999	2000
Dryden District				
Aaron Provincial Park	0	0	0	0
Blue Lake Provincial Park	1	0	0	0
Sandbar Lake Provincial Park	0	0	0	0
Fort Frances District				
Caliper Lake Provincial Park	0	0	0	0
Dawson Trail Campground (Quetico Prov. Park)	0	0	1	0
Lake of the Woods Provincial Park	0	0	0	0
Noden Causeway	-	-	-	0
Kenora District				
Minaki Lodge	0	0	0	0
Rushing River Provincial Park	0	0	0	0
Sioux Narrows Provincial Park	0	0	0	0
Nipigon District				
Leunenburger's - Nakina	1	0	0	0
MacLeod Park	0	0	0	0
Neys Provincial Park	0	0	0	0
Nipigon Tourist Information Centre	-	-	-	0
Rainbow Falls Provincial Park	0	0	0	0
Rossport Provincial Park	0	0	0	0
Red Lake District				
Pakwash Provincial Park	0	0	0	0
Sioux Lookout District				
Ojibway Provincial Park	0	0	0	0

Table 5. Summary of gypsy moth trapping at 21 locations in the Northwest Region of Ontario from 1997 to 2000. (Two deltoid-type traps were used at each location) (concl.)

Location	Number of male moths captured			
	1997	1998	1999	2000
Thunder Bay District				
Kakabeka Falls Provincial Park	0	0	0	0
Middle Falls Provincial Park	-	-	-	0
Sleeping Giant Provincial Park	0	0	0	0

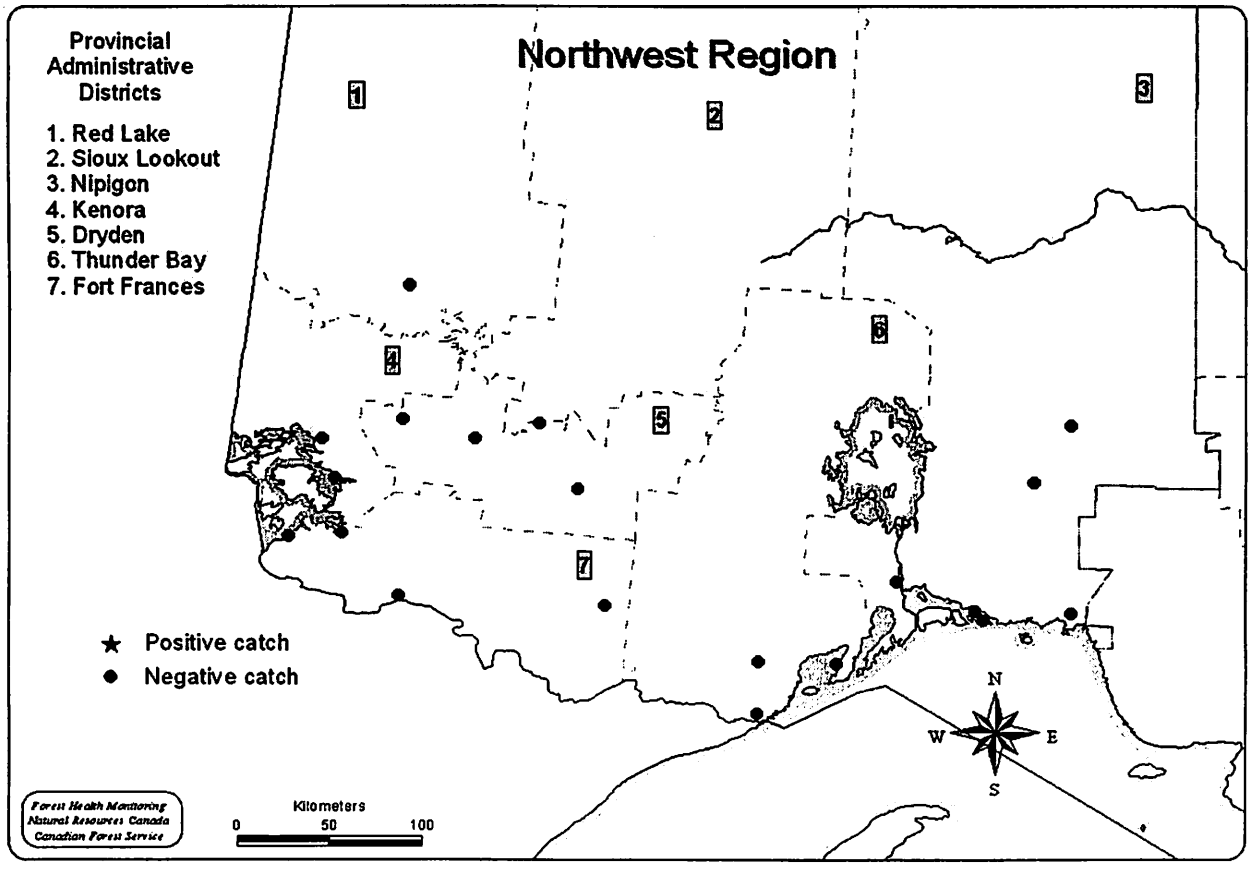

Figure 8. Locations of the gypsy moth (Lymantria dispar [L.]) *pheromone traps*

Appendix 1. Summary of the crown condition, tree mortality, and top condition in the 32 jack pine health plots from 1996 to 2000 in the Northwest Region of Ontario. (Counts based on an examination of 50 jack pine trees at each location.)

Location (Plot no.)	Average DBH[a] (cm)	Year	Crown condition[b]							Cumulative mortality			Condition of top		
			1	2	3	4	5	6	7	New dead[c]	Old dead[c]	Trees cut	Live	Bare	Dead
			Number of trees												
Dryden District															
Breithaupt Township (91)	16.9	1996	42	0	6	0	0	0	0	1	1	0	48	0	0
		1997	43	0	4	1	0	0	0	0	2	0	48	0	0
		1998	39	0	7	2	0	0	0	0	2	0	48	0	0
		1999	0	0	44	0	1	0	0	3	2	0	45	0	0
		2000	2	0	41	0	1	0	0	1	5	0	43	0	0
Bradshaw Township (94)	12.1	1996	44	0	5	0	0	0	0	1	0	0	49	0	0
		1997	43	0	3	3	0	0	0	0	1	0	49	0	0
		1998	38	0	7	1	0	1	0	2	1	0	47	0	0
		1999	0	0	43	2	1	0	0	1	3	0	45	0	1
		2000	0	0	39	5	1	0	0	1	4	0	44	0	1
Mafeking Township (100)	24.6	1996	24	0	24	1	0	0	0	0	1	0	49	0	0
		1997	37	0	12	0	0	0	0	0	1	0	49	0	0
		1998	19	0	30	0	0	0	0	0	1	0	49	0	0
		1999	0	0	48	1	0	0	0	0	1	0	49	0	0
		2000	0	0	49	0	0	0	0	0	1	0	49	0	0
McNevin Township (101)	23.3	1996	45	0	5	0	0	0	0	0	0	0	50	0	0
		1997	33	0	15	1	0	0	0	1	0	0	48	0	1
		1998	22	0	25	1	0	0	0	1	1	0	47	0	1

Appendix 1. Summary of the crown condition, tree mortality, and top condition in the 32 jack pine health plots from 1996 to 2000 in the Northwest Region of Ontario. (Counts based on an examination of 50 jack pine trees at each location.) (cont'd)

Location (Plot no.)	Average DBH[a] (cm)	Year	Crown condition[b] Number of trees 1	2	3	4	5	6	7	Cumulative mortality New dead[c]	Old dead[c]	Trees cut	Condition of top Live	Bare	Dead
Dryden District **(concl.)**															
McNevin Township (101)		1999	0	0	45	2	0	0	0	1	2	0	46	0	1
		2000	0	0	40	6	0	0	0	1	3	0	46	0	0
Mutrie Township (102)	23.0	1996	38	0	11	0	0	0	0	0	1	0	49	0	0
		1997	38	0	10	0	0	0	0	1	1	0	48	0	0
		1998	27	0	21	0	0	0	0	0	2	0	48	0	0
		1999	0	0	47	0	0	0	0	1	2	0	47	0	0
		2000	0	0	44	2	0	0	0	1	3	0	46	0	0
Turtle River (106)	25.4	1996	17	0	32	1	0	0	0	0	0	0	50	0	0
		1997	26	0	23	0	0	0	0	1	0	0	49	0	0
		1998	12	0	37	0	0	0	0	0	1	0	49	0	0
		1999	0	0	48	0	0	0	0	1	1	0	47	0	1
		2000	0	0	37	9	0	0	0	2	2	0	46	0	0
Fort Frances District															
Eltrut Lake (111)	19.8	1996	42	0	0	1	0	0	0	5	2	0	43	0	0
		1997	0	0	37	5	1	0	0	0	7	0	43	0	0
		1998	0	0	40	2	0	0	0	1	7	0	42	0	0
		1999	0	0	39	1	0	0	0	2	8	0	40	0	0
		2000	0	0	27	9	3	0	0	1	10	0	37	2	0

Appendix 1. Summary of the crown condition, tree mortality, and top condition in the 32 jack pine health plots from 1996 to 2000 in the Northwest Region of Ontario. (Counts based on an examination of 50 jack pine trees at each location.) (cont'd)

Location (Plot no.)	Average DBH[a] (cm)	Year	Crown condition[b]							Cumulative mortality			Condition of top		
			1	2	3	4	5	6	7	New dead[c]	Old dead[c]	Trees cut	Live	Bare	Dead
			Number of trees												
Fort Frances District **(cont'd)**															
Gallo Lake (114)	25.5	1996	40	0	0	4	0	0	0	5	1	0	44	0	0
		1997	0	0	29	14	0	0	0	1	6	0	43	0	0
		1998	0	0	38	1	0	0	0	4	7	0	38	1	0
		1999	0	0	33	0	1	0	0	5	11	0	34	0	0
		2000	0	0	22	10	0	0	0	1	16	0	32	0	0
Heathcliff Lake (115)	9.2	1996	50	0	0	0	0	0	0	0	0	0	50	0	0
		1997	7	0	43	0	0	0	0	0	0	0	50	0	0
		1998	0	0	49	0	0	0	0	1	0	0	49	0	0
		1999	0	0	49	0	0	0	0	0	1	0	49	0	0
		2000	0	0	47	2	0	0	0	0	1	0	49	0	0
Hillyer Creek (116)	7.7	1996	49	0	0	0	0	0	0	0	0	1	48	0	1
		1997	30	0	19	0	0	0	0	0	0	1	49	0	0
		1998	0	0	49	0	0	0	0	0	0	1	49	0	0
		1999	0	0	48	1	0	0	0	0	0	1	49	0	0
		2000	0	0	42	6	0	0	0	1	0	1	48	0	0
Prince Road (118)	23.1	1996	46	0	0	1	0	0	0	3	0	0	47	0	0
		1997	0	0	42	4	1	0	0	0	3	0	47	0	0
		1998	0	0	44	2	0	0	0	1	3	0	46	0	0

Appendix 1. Summary of the crown condition, tree mortality, and top condition in the 32 jack pine health plots from 1996 to 2000 in the Northwest Region of Ontario. (Counts based on an examination of 50 jack pine trees at each location.) (cont'd)

Location (Plot no.)	Average DBH[a] (cm)	Year	Crown condition[b]							Cumulative mortality			Condition of top		
			1	2	3	4	5	6	7	New dead[c]	Old dead[c]	Trees cut	Live	Bare	Dead
			Number of trees												
Fort Frances District **(concl.)**															
Prince Road (118)		1999	0	0	42	1	0	0	0	3	4	0	43	0	0
		2000	0	0	27	14	1	0	0	1	7	0	42	0	0
Straw Lake (122)	23.4	1996	46	0	0	0	0	0	0	3	1	0	46	0	0
		1997	0	0	42	4	0	0	0	0	4	0	46	0	0
		1998	0	0	45	1	0	0	0	0	4	0	46	0	0
		1999	0	0	44	0	0	0	0	2	4	0	44	0	0
		2000	0	0	25	16	1	0	0	2	6	0	42	0	0
Kenora District															
April Lake (124)	18.1	1996	50	0	0	0	0	0	0	0	0	0	50	0	0
		1997	48	0	0	0	0	0	0	2	0	0	46	0	2
		1998	2	0	43	2	0	0	0	1	2	0	43	3	1
		1999	0	0	43	4	0	0	0	0	3	0	45	1	1
		2000	0	0	42	2	1	0	0	2	3	0	43	1	1
Kirkup Township (125)	19.9	1996	49	0	0	0	0	0	0	1	0	0	49	0	0
		1997	1	0	41	5	1	0	0	1	1	0	48	0	0
		1998	1	0	38	7	1	0	1	0	2	0	44	1	3
		1999	0	0	40	5	1	0	0	2	2	0	45	0	1
		2000	0	0	40	6	0	0	0	0	4	0	43	2	1

Appendix 1. Summary of the crown condition, tree mortality, and top condition in the 32 jack pine health plots from 1996 to 2000 in the Northwest Region of Ontario. (Counts based on an examination of 50 jack pine trees at each location.) (cont'd)

Location (Plot no.)	Average DBH[a] (cm)	Year	Crown condition[b]							Cumulative mortality			Condition of top		
			1	2	3	4	5	6	7	New dead[c]	Old dead[c]	Trees cut	Live	Bare	Dead
			Number of trees												
Kenora District **(cont'd)**															
Coyle Township (126)	15.6	1996	47	0	0	0	1	0	0	1	1	0	47	1	0
		1997	11	0	26	10	1	0	0	0	2	0	48	0	0
		1998	0	0	39	6	2	0	0	1	2	0	47	0	0
		1999	0	0	44	2	1	0	0	0	3	0	47	0	0
		2000	0	0	41	4	2	0	0	0	3	0	45	2	0
Devonshire Township (127)	16.9	1996	49	0	0	0	0	0	0	0	1	0	49	0	0
		1997	6	0	40	2	0	0	0	1	1	0	48	0	0
		1998	2	0	42	3	1	0	0	0	2	0	48	0	0
		1999	0	0	43	5	0	0	0	0	2	0	48	0	0
		2000	0	0	45	3	0	0	0	0	2	0	48	0	0
MacNicol Township (131)	21.1	1996	47	0	0	0	0	0	0	1	2	0	47	0	0
		1997	10	0	30	4	1	0	1	1	3	0	43	0	3
		1998	0	0	33	6	1	2	1	3	4	0	39	0	4
		1999	0	0	37	5	1	0	0	0	7	0	41	0	2
		2000	0	0	38	3	0	0	0	2	7	0	39	1	1
Jaffray Township (133)	18.0	1996	49	0	0	0	1	0	0	0	0	0	50	0	0
		1997	1	0	48	0	0	0	0	1	0	0	49	0	0
		1998	2	0	40	2	2	1	1	1	1	0	48	0	0

Appendix 1. Summary of the crown condition, tree mortality, and top condition in the 32 jack pine health plots from 1996 to 2000 in the Northwest Region of Ontario. (Counts based on an examination of 50 jack pine trees at each location.) (cont'd)

Location (Plot no.)	Average DBH[a] (cm)	Year	Crown condition[b]							Cumulative mortality			Condition of top		
			1	2	3	4	5	6	7	New dead[c]	Old dead[c]	Trees cut	Live	Bare	Dead
			Number of trees												
***Kenora District* (concl.)**															
Jaffray Township (133)		1999	0	0	45	1	0	0	0	2	2	0	46	0	0
		2000	0	0	40	4	1	0	0	1	4	0	43	1	1
Red Lake District															
Bateman Township (139)	7.6	1996	47	0	0	0	0	0	0	0	1	2	45	0	2
		1997	47	0	0	0	0	0	0	0	1	2	47	0	0
		1998	0	47	0	0	0	0	0	0	1	2	47	0	0
		1999	0	0	47	0	0	0	0	0	1	2	46	1	0
		2000	0	0	47	0	0	0	0	0	1	2	47	0	0
Coli Lake (140)	8.2	1996	47	0	0	0	0	0	0	0	0	3	44	0	3
		1997	44	0	2	0	0	0	0	1	0	3	46	0	0
		1998	0	0	46	0	0	0	0	0	1	3	46	0	0
		1999	0	0	26	0	0	0	0	0	1	23	26	0	0
		2000	0	0	16	2	1	0	0	0	1	30	19	0	0
Ear Falls (142)	20.5	1996	48	0	0	0	0	0	0	0	2	0	46	1	1
		1997	44	0	0	0	0	0	0	2	2	2	42	2	0
		1998	0	0	42	2	0	0	0	0	4	2	41	3	0
		1999	0	0	41	3	0	0	0	0	4	2	41	3	0
		2000	0	0	40	3	0	0	1	0	4	2	41	3	0

Appendix 1. Summary of the crown condition, tree mortality, and top condition in the 32 jack pine health plots from 1996 to 2000 in the Northwest Region of Ontario. (Counts based on an examination of 50 jack pine trees at each location.) (cont'd)

Location (Plot no.)	Average DBH[a] (cm)	Year	Crown condition[b]							Cumulative mortality			Condition of top		
			1	2	3	4	5	6	7	New dead[c]	Old dead[c]	Trees cut	Live	Bare	Dead
			Number of trees												
Red Lake District **(cont'd)**															
McDonough Township (149)	15.3	1996	49	0	0	0	0	0	0	1	0	0	48	1	0
		1997	48	0	0	0	0	0	0	1	1	0	48	0	0
		1998	0	0	47	1	0	0	0	0	2	0	46	2	0
		1999	0	0	44	2	0	0	1	1	2	0	46	1	0
		2000	0	0	41	5	0	1	0	0	3	0	46	1	0
Nungesser River (156)	21.2	1996	45	0	0	0	0	0	0	1	4	0	38	1	6
		1997	43	0	0	0	0	0	0	2	5	0	39	2	2
		1998	0	0	41	2	0	0	0	0	7	0	37	6	0
		1999	0	0	42	1	0	0	0	0	7	0	38	5	0
		2000	0	0	34	9	0	0	0	0	7	0	37	4	2
Overnight Road (157)	22.8	1996	46	0	0	0	0	0	0	1	3	0	45	0	1
		1997	42	0	0	0	0	0	0	4	4	0	41	0	1
		1998	0	0	40	0	0	0	0	2	8	0	40	0	0
		1999	3	0	37	0	0	0	0	0	10	0	40	0	0
		2000	0	0	38	1	0	1	0	0	10	0	40	0	0
Wenesaga Lake (160)	18.4	1996	50	0	0	0	0	0	0	0	0	0	49	1	0
		1997	49	0	0	0	0	0	0	1	0	0	48	1	0
		1998	23	0	25	1	0	0	0	0	1	0	49	0	0

Appendix 1. Summary of the crown condition, tree mortality, and top condition in the 32 jack pine health plots from 1996 to 2000 in the Northwest Region of Ontario. (Counts based on an examination of 50 jack pine trees at each location.) (cont'd)

Location (Plot no.)	Average DBH[a] (cm)	Year	Crown condition[b]							Cumulative mortality			Condition of top		
			1	2	3	4	5	6	7	New dead[c]	Old dead[c]	Trees cut	Live	Bare	Dead
			Number of trees												
Red Lake District **(concl.)**															
Wenesaga Lake (160)		1999	9	0	38	2	0	0	0	0	1	0	48	1	0
		2000	0	0	45	3	0	1	0	0	1	0	46	3	0
Sioux Lookout District															
Drayton Township (163)	10.5	1996	49	0	1	0	0	0	0	0	0	0	50	0	0
		1997	44	0	6	0	0	0	0	0	0	0	50	0	0
		1998	42	0	7	0	0	0	0	1	0	0	49	0	0
		1999	13	0	36	0	0	0	0	0	1	0	49	0	0
		2000	0	0	44	2	3	0	0	0	1	0	49	0	0
Elbow Lake Road (164)	11.8	1996	47	0	3	0	0	0	0	0	0	0	50	0	0
		1997	43	0	7	0	0	0	0	0	0	0	50	0	0
		1998	44	0	6	0	0	0	0	0	0	0	50	0	0
		1999	11	0	39	0	0	0	0	0	0	0	50	0	0
		2000	2	0	48	0	0	0	0	0	0	0	50	0	0
Goodie Lake (165)	16.1	1996	43	0	5	1	0	0	1	0	0	0	49	0	1
		1997	37	0	11	0	0	2	0	0	0	0	49	0	1
		1998	21	0	27	0	0	0	0	2	0	0	47	0	1
		1999	0	0	48	0	0	0	0	0	2	0	47	0	1
		2000	0	0	45	3	0	0	0	0	2	0	47	0	1

Appendix 1. Summary of the crown condition, tree mortality, and top condition in the 32 jack pine health plots from 1996 to 2000 in the Northwest Region of Ontario. (Counts based on an examination of 50 jack pine trees at each location.) (cont'd)

Location (Plot no.)	Average DBH[a] (cm)	Year	Crown condition[b]							Cumulative mortality			Condition of top		
			1	2	3	4	5	6	7	New dead[c]	Old dead[c]	Trees cut	Live	Bare	Dead
			Number of trees												
Sioux Lookout District **(cont'd)**															
Goodie Lake (166)	26.6	1996	42	0	5	0	0	0	0	1	2	0	47	0	0
		1997	36	0	11	0	0	0	0	0	3	0	47	0	0
		1998	18	0	28	1	0	0	0	0	3	0	47	0	0
		1999	0	0	46	0	0	0	0	1	3	0	46	0	0
		2000	0	0	42	4	0	0	0	0	4	0	45	0	1
Lomond Township (170)	9.3	1996	46	0	3	0	0	0	0	1	0	0	49	0	0
		1997	47	0	2	0	0	0	0	0	1	0	49	0	0
		1998	44	0	3	0	0	0	0	2	1	0	47	0	0
		1999	1	0	45	1	0	0	0	0	3	0	47	0	0
		2000	0	0	42	5	0	0	0	0	3	0	47	0	0
Moose Lake Road (173)	20.4	1996	18	0	27	3	0	0	0	0	2	0	47	0	1
		1997	25	0	19	3	0	0	0	1	2	0	47	0	0
		1998	10	0	34	3	0	0	0	0	3	0	47	0	0
		1999	0	0	40	6	1	0	0	0	3	0	47	0	0
		2000	0	0	23	21	1	0	2	0	3	0	46	0	1
Stanzhikimi Lake (177)	21.0	1996	21	0	25	1	0	0	0	0	3	0	47	0	0
		1997	28	0	19	0	0	0	0	0	3	0	47	0	0
		1998	6	0	41	0	0	0	0	0	3	0	46	0	1

Appendix 1. Summary of the crown condition, tree mortality, and top condition in the 32 jack pine health plots form 1996 to 2000 in the Northwest Region of Ontario. (Counts based on as examination of 50 jack pine trees at each location.) (concl.)

Location (Plot no.)	Average DBH[a] (cm)	Year	Crown condition[b]							Cumulative mortality			Condition of top		
			1	2	3	4	5	6	7	New dead[c]	Old dead[c]	Trees cut	Live	Bare	Dead
			Number of trees												
Sioux Lookout District **(concl.)**															
Stanzhikimi Lake (177)		1999	0	0	44	3	0	0	0	0	3	0	46	0	1
		2000	0	0	32	15	0	0	0	0	3	0	47	0	0

[a] Tree diameters re-measured in 2000 on remaining living trees.

[b] 1 = no defoliation, 2 = only current foliage defoliated less than 25 percent, 3 = current and/or some older foliage defoliated less than 25 percent, 4 = 25–50 percent defoliation, 5 = 51–75 percent defoliation, 6 = 76–90 percent defoliation, 7 = more than 90 percent defoliation.

[c] Tree mortality resulting from natural causes.

Appendix 2. Summary of the crown condition, tree mortality, and top condition for three coniferous hosts in the 27 spruce/fir health plots from 1996 to 2000 in the Northwest Region of Ontario.

Location (Plot no.)	Host[a]	Average DBH[b] (cm)	Year	Crown condition[c]							Cumulative mortality			Condition of top		
				1	2	3	4	5	6	7	New dead[d]	Old dead[d]	Trees cut	Live	Bare	Dead
				Number of trees												
Dryden District																
Langton Township (120)	bF	14.5	1996	0	0	0	0	1	1	0	0	4	0	1	0	1
			1997	0	0	0	0	1	0	1	0	4	0	0	0	2
			1998	0	0	0	1	0	0	0	1	4	0	0	0	1
			1999	0	0	0	0	0	0	0	1	5	0	0	0	0
			2000	0	0	0	0	0	0	0	0	6	0	0	0	0
	wS	28.4	1996	0	0	0	10	1	0	0	1	7	0	11	0	0
			1997	0	0	9	2	0	0	0	0	8	0	11	0	0
			1998	1	0	8	2	0	0	0	0	8	0	11	0	0
			1999	0	0	10	0	0	0	0	1	8	0	10	0	0
			2000	0	0	4	6	0	0	0	0	9	0	10	0	0
	bS	19.8	1996	1	0	24	0	0	0	0	0	3	0	25	0	0
			1997	23	0	0	0	0	0	0	2	3	0	23	0	0
			1998	19	0	3	0	0	0	0	1	5	0	22	0	0
			1999	0	0	20	0	0	0	0	2	6	0	20	0	0
			2000	3	0	16	0	0	0	0	1	8	0	19	0	0
McIlraith Township (123)	bF	13.0	1996	0	0	0	4	0	0	0	0	3	0	4	0	0
			1997	0	0	4	0	0	0	0	0	3	0	4	0	0
			1998	1	0	3	0	0	0	0	0	3	0	4	0	0
			1999	0	0	2	1	0	0	0	1	3	0	3	0	0
			2000	0	0	1	0	2	0	0	0	4	0	3	0	0

Appendix 2. Summary of the crown condition, tree mortality, and top condition for three coniferous hosts in the 27 spruce/fir health plots from 1996 to 2000 in the Northwest Region of Ontario. (cont'd)

Location (Plot no.)	Host[a]	Average DBH[b] (cm)	Year	Crown condition[c]							Cumulative mortality			Condition of top		
				1	2	3	4	5	6	7	New dead[d]	Old dead[d]	Trees cut	Live	Bare	Dead
				Number of trees												
***Dryden District* (concl.)**																
McIlraith Township (123)	bS	10.9	1996	18	0	26	1	0	0	0	0	0	0	44	0	1
			1997	44	0	1	0	0	0	0	0	0	0	45	0	0
			1998	44	0	1	0	0	0	0	0	0	0	45	0	0
			1999	0	0	45	0	0	0	0	0	0	0	45	0	0
			2000	5	0	39	1	0	0	0	0	0	0	45	0	0
Fort Frances District																
Calm Lake (132)	bF	13.3	1996	0	0	1	2	4	1	1	0	6	0	9	0	0
			1997	0	0	0	8	0	0	0	1	6	0	8	0	0
			1998	0	0	1	2	4	0	0	1	7	0	5	2	0
			1999	0	0	2	3	1	0	0	1	8	0	6	0	0
			2000	0	0	3	1	2	0	0	0	9	0	4	2	0
	wS	24.3	1996	0	0	1	1	1	0	0	0	0	0	3	0	0
			1997	0	0	0	3	0	0	0	0	0	0	3	0	0
			1998	0	0	0	2	1	0	0	0	0	0	3	0	0
			1999	0	0	3	0	0	0	0	0	0	0	3	0	0
			2000	0	0	2	1	0	0	0	0	0	0	3	0	0
	bS	16.4	1996	6	0	1	3	0	0	0	0	0	0	10	0	0
			1997	5	0	0	5	0	0	0	0	0	0	10	0	0
			1998	0	7	2	1	0	0	0	0	0	0	10	0	0
			1999	0	0	10	0	0	0	0	0	0	0	10	0	0

Appendix 2. Summary of the crown condition, tree mortality, and top condition for three coniferous hosts in the 27 spruce/fir health plots from 1996 to 2000 in the Northwest Region of Ontario. (cont'd)

Location (Plot no.)	Host[a]	Average DBH[b] (cm)	Year	Crown condition[c]							Cumulative mortality			Condition of top		
				1	2	3	4	5	6	7	New dead[d]	Old dead[d]	Trees cut	Live	Bare	Dead
				Number of trees												
Fort Frances District **(cont'd)**																
Calm Lake (132)	bS		2000	0	0	10	0	0	0	0	0	0	0	10	0	0
Claxton Township (133)	bF	8.0	1996	0	0	0	2	7	2	0	10	7	0	11	0	0
			1997	0	0	0	6	4	0	0	1	17	0	9	1	0
			1998	0	0	0	5	1	0	0	4	18	0	2	4	0
			1999	0	0	3	1	0	0	0	2	22	0	3	1	0
			2000	0	0	1	2	1	0	0	0	24	0	3	1	0
	wS	38.1	1996	0	0	0	3	0	0	0	1	2	0	3	0	0
			1997	0	0	0	3	0	0	0	0	3	0	3	0	0
			1998	0	0	1	1	0	0	0	1	3	0	2	0	0
			1999	0	0	2	0	0	0	0	0	4	0	2	0	0
			2000	0	0	2	0	0	0	0	0	4	0	2	0	0
	bS	21.3	1996	2	0	0	0	0	0	0	0	1	0	2	0	0
			1997	1	0	1	0	0	0	0	0	1	0	2	0	0
			1998	1	1	0	0	0	0	0	0	1	0	2	0	0
			1999	1	0	1	0	0	0	0	0	1	0	2	0	0
			2000	1	0	1	0	0	0	0	0	1	0	2	0	0
French Lake (134)	bF	15.8	1996	0	0	6	9	5	1	0	1	30	0	21	0	0
			1997	1	0	0	15	4	0	0	1	31	0	20	0	0
			1998	0	0	16	2	0	0	0	2	32	0	17	0	0
			1999	0	0	13	0	0	0	0	4	34	0	13	0	0

Appendix 2. Summary of the crown condition, tree mortality, and top condition for three coniferous hosts in the 27 spruce/fir health plots from 1996 to 2000 in the Northwest Region of Ontario. (cont'd)

Location (Plot no.)	Host[a]	Average DBH[b] (cm)	Year	Crown condition[c]							Cumulative mortality			Condition of top		
				1	2	3	4	5	6	7	New dead[d]	Old dead[d]	Trees cut	Live	Bare	Dead
				Number of trees												
***Fort Frances District* (concl.)**																
French Lake (134)	bF		2000	0	0	8	5	0	0	0	1	38	0	13	0	0
	wS	22.9	1996	0	0	0	1	1	0	0	0	0	0	2	0	0
			1997	0	0	0	1	1	0	0	0	0	0	2	0	0
			1998	0	0	2	0	0	0	0	0	0	0	2	0	0
			1999	0	0	2	0	0	0	0	0	0	0	2	0	0
			2000	0	0	1	1	0	0	0	0	0	0	2	0	0
Lake Hope (135)	bF	8.1	1996	0	0	0	25	12	0	0	6	4	0	36	1	0
			1997	0	0	8	20	2	2	0	5	10	0	31	1	0
			1998	0	0	4	11	6	2	0	9	15	0	16	6	1
			1999	0	0	14	3	0	0	1	5	24	0	14	4	0
			2000	0	0	11	3	0	0	0	3	29	0	13	1	0
	wS	12.3	1996	0	0	0	3	0	0	0	0	0	0	3	0	0
			1997	0	0	1	2	0	0	0	0	0	0	3	0	0
			1998	0	0	0	2	1	0	0	0	0	0	2	1	0
			1999	0	0	2	1	0	0	0	0	0	0	2	1	0
			2000	0	0	2	0	1	0	0	0	0	0	2	1	0
Kenora District																
Haycock Township (146)	bF	11.8	1996	0	0	2	2	3	1	2	1	5	0	8	0	2
			1997	0	0	0	7	1	1	0	1	6	0	8	1	0
			1998	0	0	1	3	0	2	2	1	7	0	5	1	2

Appendix 2. Summary of the crown condition, tree mortality, and top condition for three coniferous hosts in the 27 spruce/fir health plots from 1996 to 2000 in the Northwest Region of Ontario. (cont'd)

Location (Plot no.)	Host[a]	Average DBH[b] (cm)	Year	Crown condition[c]							Cumulative mortality			Condition of top		
				1	2	3	4	5	6	7	New dead[d]	Old dead[d]	Trees cut	Live	Bare	Dead
				Number of trees												
Kenora District **(concl.)**																
Haycock Township (146)	bF		1999	0	0	4	1	2	0	0	1	8	0	5	1	1
			2000	0	0	4	0	1	2	0	0	9	0	3	3	1
	wS	36.9	1996	0	0	0	1	0	0	0	0	0	0	1	0	0
			1997	0	0	0	1	0	0	0	0	0	0	1	0	0
			1998	0	1	0	0	0	0	0	0	0	0	1	0	0
			1999	0	0	1	0	0	0	0	0	0	0	1	0	0
			2000	0	0	1	0	0	0	0	0	0	0	1	0	0
Nipigon District																
Catlonite Road (161)	bF	23.2	1996	6	0	0	0	0	0	0	14	18	0	4	2	0
			1997	0	0	1	0	0	0	0	5	32	0	1	0	0
			1998	0	0	1	0	0	0	0	0	37	0	1	0	0
			1999	0	0	1	0	0	0	0	0	37	0	1	0	0
			2000	0	0	1	0	0	0	0	0	37	0	1	0	0
	wS	15.8	1996	7	0	0	0	0	0	0	0	0	0	6	1	0
			1997	7	0	0	0	0	0	0	0	0	0	7	0	0
			1998	0	0	6	0	0	0	0	1	0	0	6	0	0
			1999	0	0	6	0	0	0	0	0	1	0	6	0	0
			2000	0	0	6	0	0	0	0	0	1	0	6	0	0
	bS	18.3	1996	12	0	0	0	0	0	0	0	1	0	12	0	0
			1997	12	0	0	0	0	0	0	0	1	0	12	0	0

Appendix 2. Summary of the crown condition, tree mortality, and top condition for three coniferous hosts in the 27 spruce/fir health plots from 1996 to 2000 in the Northwest Region of Ontario. (cont'd)

Location (Plot no.)	Host[a]	Average DBH[b] (cm)	Year	Crown condition[c]							Cumulative mortality			Condition of top		
				1	2	3	4	5	6	7	New dead[d]	Old dead[d]	Trees cut	Live	Bare	Dead
				Number of trees												
Nipigon District **(cont'd)**																
Catlonite Road (161)	bS		1998	0	0	11	0	0	0	0	1	1	0	11	0	0
			1999	2	0	9	0	0	0	0	0	2	0	11	0	0
			2000	0	0	11	0	0	0	0	0	2	0	11	0	0
Grain Township (167)	bF	13.1	1996	7	0	0	0	0	0	0	3	38	0	2	2	3
			1997	0	0	6	0	0	0	0	1	41	0	4	1	1
			1998	0	0	3	3	0	0	0	0	42	0	3	2	1
			1999	0	0	3	3	0	0	0	0	42	0	3	3	0
			2000	0	0	2	4	0	0	0	0	42	0	2	2	2
	wS	17.5	1996	1	0	0	0	0	0	0	0	0	0	1	0	0
			1997	0	0	1	0	0	0	0	0	0	0	1	0	0
			1998	0	0	1	0	0	0	0	0	0	0	1	0	0
			1999	0	0	0	0	1	0	0	0	0	0	0	1	0
			2000	0	0	1	0	0	0	0	0	0	0	0	0	1
	bS	16.4	1996	3	0	0	0	0	0	0	0	0	0	3	0	0
			1997	3	0	0	0	0	0	0	0	0	0	3	0	0
			1998	0	0	3	0	0	0	0	0	0	0	3	0	0
			1999	0	0	3	0	0	0	0	0	0	0	3	0	0
			2000	0	0	3	0	0	0	0	0	0	0	3	0	0
John Ahl Road (168)	bF	11.4	1996	1	0	0	0	0	0	0	7	27	0	0	1	0
			1997	0	0	1	0	0	0	0	0	34	0	0	1	0

Appendix 2. Summary of the crown condition, tree mortality, and top condition for three coniferous hosts in the 27 spruce/fir health plots from 1996 to 2000 in the Northwest Region of Ontario. (cont'd)

Location (Plot no.)	Host[a]	Average DBH[b] (cm)	Year	Crown condition[c]							Cumulative mortality			Condition of top		
				1	2	3	4	5	6	7	New dead[d]	Old dead[d]	Trees cut	Live	Bare	Dead
				Number of trees												
Nipigon District **(cont'd)**																
John Ahl Road (168)	bF		1998	0	0	1	0	0	0	0	0	34	0	0	1	0
			1999	0	0	1	0	0	0	0	0	34	0	0	1	0
			2000	0	0	1	0	0	0	0	0	34	0	0	1	0
	wS	22.4	1996	1	0	0	0	0	0	0	0	4	0	0	1	0
			1997	0	0	1	0	0	0	0	0	4	0	0	1	0
			1998	0	0	0	0	0	0	0	1	4	0	0	0	0
			1999	0	0	0	0	0	0	0	0	5	0	0	0	0
			2000	0	0	0	0	0	0	0	0	5	0	0	0	0
	bS	15.7	1996	10	0	0	0	0	0	0	0	2	0	10	0	0
			1997	8	0	2	0	0	0	0	0	2	0	10	0	0
			1998	0	0	7	0	0	0	0	3	2	0	7	0	0
			1999	0	0	7	0	0	0	0	0	5	0	7	0	0
			2000	0	0	7	0	0	0	0	0	5	0	7	0	0
Parent Township (176)	bF	18.5	1996	23	0	0	0	0	0	0	13	13	0	20	2	1
			1997	19	0	0	0	0	0	0	4	26	0	18	0	1
			1998	0	0	12	0	1	0	0	6	30	0	13	0	0
			1999	0	0	11	1	0	0	0	1	36	0	10	2	0
			2000	0	0	11	1	0	0	0	0	37	0	11	1	0
	wS	33.1	1996	5	0	0	0	0	0	0	0	1	0	5	0	0
			1997	5	0	0	0	0	0	0	0	1	0	5	0	0

Appendix 2. Summary of the crown condition, tree mortality, and top condition for three coniferous hosts in the 27 spruce/fir health plots from 1996 to 2000 in the Northwest Region of Ontario. (cont'd)

Location (Plot no.)	Host[a]	Average DBH[b] (cm)	Year	Crown condition[c]							Cumulative mortality			Condition of top		
				1	2	3	4	5	6	7	New dead[d]	Old dead[d]	Trees cut	Live	Bare	Dead
				Number of trees												
Nipigon District **(cont'd)**																
Parent Township (176)	wS		1998	0	0	4	1	0	0	0	0	1	0	5	0	0
			1999	0	0	5	0	0	0	0	0	1	0	5	0	0
			2000	0	0	5	0	0	0	0	0	1	0	5	0	0
	bS	19.2	1996	11	0	0	0	0	0	0	0	1	0	11	0	0
			1997	11	0	0	0	0	0	0	0	1	0	11	0	0
			1998	0	0	11	0	0	0	0	0	1	0	11	0	0
			1999	0	0	9	2	0	0	0	0	1	0	9	2	0
			2000	0	0	10	1	0	0	0	0	1	0	10	1	0
Windigokan Lake (183)	bF	14.6	1996	7	0	0	0	0	0	1	7	33	0	5	2	1
			1997	0	0	5	0	0	0	0	3	40	0	5	0	0
			1998	0	0	3	1	0	0	0	1	43	0	4	0	0
			1999	0	0	3	1	0	0	0	0	44	0	4	0	0
			2000	0	0	3	1	0	0	0	0	44	0	4	0	0
	wS	11.2	1996	2	0	0	0	0	0	0	0	0	0	2	0	0
			1997	0	0	2	0	0	0	0	0	0	0	2	0	0
			1998	0	0	1	1	0	0	0	0	0	0	1	1	0
			1999	0	0	2	0	0	0	0	0	0	0	1	1	0
			2000	0	0	1	1	0	0	0	0	0	0	1	1	0
	bS	17.0	1996	1	0	0	0	0	0	0	0	0	0	1	0	0
			1997	0	0	0	0	0	0	0	1	0	0	0	0	0

Appendix 2. Summary of the crown condition, tree mortality, and top condition for three coniferous hosts in the 27 spruce/fir health plots from 1996 to 2000 in the Northwest Region of Ontario. (cont'd)

Location (Plot no.)	Host[a]	Average DBH[b] (cm)	Year	Crown condition[c]							Cumulative mortality			Condition of top		
				1	2	3	4	5	6	7	New dead[d]	Old dead[d]	Trees cut	Live	Bare	Dead
				Number of trees												
***Nipigon District* (concl)**																
Windigokan Lake (183)	bS		1998	0	0	0	0	0	0	0	0	1	0	0	0	0
			1999	0	0	0	0	0	0	0	0	1	0	0	0	0
			2000	0	0	0	0	0	0	0	0	1	0	0	0	0
Red Lake District																
Goldpine Road (186)	bF	12.6	1996	0	0	1	5	6	3	3	12	8	0	13	0	5
			1997	0	0	3	3	2	0	0	10	20	0	6	0	2
			1998	0	0	5	0	0	0	0	3	30	0	5	0	0
			1999	0	0	5	0	0	0	0	0	33	0	5	0	0
			2000	0	0	0	2	0	0	0	3	33	0	2	0	0
	wS	29.7	1996	0	0	0	10	0	1	0	1	0	0	11	0	0
			1997	0	0	10	0	0	0	0	1	1	0	10	0	0
			1998	4	0	6	0	0	0	0	0	2	0	10	0	0
			1999	1	0	9	0	0	0	0	0	2	0	10	0	0
			2000	0	0	7	3	0	0	0	0	2	0	10	0	0
	bS	20.5	1996	0	0	1	0	0	0	0	0	0	0	1	0	0
			1997	1	0	0	0	0	0	0	0	0	0	1	0	0
			1998	1	0	0	0	0	0	0	0	0	0	1	0	0
			1999	0	0	1	0	0	0	0	0	0	0	1	0	0
			2000	0	0	0	1	0	0	0	0	0	0	1	0	0
Snake Falls Road (189)	bF	15.0	1996	0	0	0	2	6	5	5	16	11	0	10	0	8

Appendix 2. Summary of the crown condition, tree mortality, and top condition for three coniferous hosts in the 27 spruce/fir health plots from 1996 to 2000 in the Northwest Region of Ontario. (cont'd)

Location (Plot no.)	Host[a]	Average DBH[b] (cm)	Year	Crown condition[c]							Cumulative mortality			Condition of top		
				1	2	3	4	5	6	7	New dead[d]	Old dead[d]	Trees cut	Live	Bare	Dead
				Number of trees												
Red Lake District **(concl.)**																
Snake Falls Road (189)	bF		1997	0	0	0	5	1	0	0	12	27	0	4	0	2
			1998	0	0	1	0	0	0	0	5	39	0	1	0	0
			1999	0	0	1	0	0	0	0	0	44	0	1	0	0
			2000	0	0	0	0	0	0	0	1	44	0	0	0	0
	wS	44.1	1996	0	0	2	7	4	0	0	0	0	0	13	0	0
			1997	0	0	11	2	0	0	0	0	0	0	13	0	0
			1998	7	0	5	0	0	0	0	1	0	0	12	0	0
			1999	0	0	12	0	0	0	0	0	1	0	12	0	0
			2000	0	0	11	0	0	0	0	1	1	0	11	0	0
Sioux Lookout District																
Burma Lake Road (191)	bF	31.2	1996	0	0	0	0	0	7	0	4	7	0	7	0	0
			1997	0	0	1	2	2	0	0	2	11	0	4	0	1
			1998	0	0	2	1	0	0	0	2	13	0	3	0	0
			1999	0	0	3	0	0	0	0	0	15	0	3	0	0
			2000	0	0	1	0	0	0	0	2	15	0	1	0	0
	wS	22.7	1996	0	0	0	0	0	1	0	0	0	0	1	0	0
			1997	0	0	0	0	0	1	0	0	0	0	1	0	0
			1998	0	0	0	1	0	0	0	0	0	0	1	0	0
			1999	0	0	0	1	0	0	0	0	0	0	1	0	0
			2000	0	0	0	0	1	0	0	0	0	0	1	0	0

Appendix 2. Summary of the crown condition, tree mortality, and top condition for three coniferous hosts in the 27 spruce/fir health plots from 1996 to 2000 in the Northwest Region of Ontario. (cont'd)

Location (Plot no.)	Host[a]	Average DBH[b] (cm)	Year	Crown condition[c]							Cumulative mortality			Condition of top		
				1	2	3	4	5	6	7	New dead[d]	Old dead[d]	Trees cut	Live	Bare	Dead
				Number of trees												
Sioux Lookout District **(cont'd)**																
Burma Lake Road (191)	bS	22.3	1996	1	0	20	12	0	0	0	0	1	0	33	0	0
			1997	26	0	4	0	0	0	0	3	1	0	30	0	0
			1998	22	0	8	0	0	0	0	0	4	0	30	0	0
			1999	0	0	30	0	0	0	0	0	4	0	30	0	0
			2000	5	0	20	4	0	0	0	1	4	0	29	0	0
Foley Lake (195)	bF	14.5	1996	0	0	0	5	15	6	0	2	2	0	24	1	1
			1997	0	0	7	12	4	0	0	3	4	0	21	1	1
			1998	0	0	18	2	0	0	0	3	7	0	19	0	1
			1999	0	0	19	0	0	0	0	1	10	0	19	0	0
			2000	0	0	13	6	0	0	0	0	11	0	19	0	0
	wS	9.0	1996	0	0	1	1	0	0	0	0	0	0	2	0	0
			1997	1	1	0	0	0	0	0	0	0	0	2	0	0
			1998	2	0	0	0	0	0	0	0	0	0	2	0	0
			1999	0	0	1	0	0	0	0	1	0	0	1	0	0
			2000	0	0	1	0	0	0	0	0	1	0	1	0	0
	bS	14.9	1996	0	0	6	12	0	0	0	1	0	0	18	0	0
			1997	10	8	0	0	0	0	0	0	1	0	18	0	0
			1998	14	0	3	0	0	0	0	1	1	0	17	0	0
			1999	1	0	15	1	0	0	0	0	2	0	16	0	0
			2000	5	0	9	2	0	0	0	1	2	0	16	0	0

Appendix 2. Summary of the crown condition, tree mortality, and top condition for three coniferous hosts in the 27 spruce/fir health plots from 1996 to 2000 in the Northwest Region of Ontario. (cont'd)

Location (Plot no.)	Host[a]	Average DBH[b] (cm)	Year	Crown condition[c]							Cumulative mortality			Condition of top		
				1	2	3	4	5	6	7	New dead[d]	Old dead[d]	Trees cut	Live	Bare	Dead
				Number of trees												
Sioux Lookout District **(cont'd.)**																
Lomond Township (196)	bF	16.9	1996	0	0	0	4	4	4	0	3	16	0	11	1	0
			1997	0	0	6	4	0	0	0	2	19	0	10	0	0
			1998	7	0	2	1	0	0	0	0	21	0	10	0	0
			1999	0	0	7	1	0	0	0	2	21	0	8	0	0
			2000	0	0	7	0	0	0	0	1	23	0	7	0	0
	wS	30.2	1996	0	0	0	5	0	0	0	1	0	0	5	0	0
			1997	2	0	3	0	0	0	0	0	1	0	5	0	0
			1998	4	0	1	0	0	0	0	0	1	0	5	0	0
			1999	0	0	5	0	0	0	0	0	1	0	5	0	0
			2000	0	0	2	3	0	0	0	0	1	0	5	0	0
	bS	20.4	1996	0	0	9	2	0	0	0	2	1	0	11	0	0
			1997	9	0	1	0	0	0	0	1	3	0	10	0	0
			1998	8	0	1	0	0	0	0	1	4	0	9	0	0
			1999	0	0	9	0	0	0	0	0	5	0	9	0	0
			2000	1	0	8	0	0	0	0	0	5	0	9	0	0
Pape Lake (198)	bF	12.9	1996	0	0	3	8	4	0	0	9	27	0	11	0	4
			1997	0	0	6	5	0	0	0	4	36	0	9	0	2
			1998	0	0	2	2	0	0	0	7	40	0	2	0	2
			1999	0	0	0	2	0	0	0	2	47	0	1	0	1
			2000	0	0	0	1	0	0	0	1	49	0	1	0	0

Appendix 2. Summary of the crown condition, tree mortality, and top condition for three coniferous hosts in the 27 spruce/fir health plots from 1996 to 2000 in the Northwest Region of Ontario. (cont'd)

Location (Plot no.)	Host[a]	Average DBH[b] (cm)	Year	Crown condition[c]							Cumulative mortality			Condition of top		
				1	2	3	4	5	6	7	New dead[d]	Old dead[d]	Trees cut	Live	Bare	Dead
				Number of trees												
Sioux Lookout District **(cont'd.)**																
Pape Lake (198)	wS	26.1	1996	0	0	0	2	0	0	0	0	0	0	2	0	0
			1997	0	0	2	0	0	0	0	0	0	0	2	0	0
			1998	2	0	0	0	0	0	0	0	0	0	2	0	0
			1999	0	0	2	0	0	0	0	0	0	0	2	0	0
			2000	0	0	2	0	0	0	0	0	0	0	2	0	0
	bS	18.7	1996	0	0	4	0	0	0	0	0	0	0	4	0	0
			1997	1	0	3	0	0	0	0	0	0	0	4	0	0
			1998	2	0	2	0	0	0	0	0	0	0	4	0	0
			1999	0	0	4	0	0	0	0	0	0	0	4	0	0
			2000	0	0	4	0	0	0	0	0	0	0	4	0	0
Pickerel Township (199)	bF	10.7	1996	0	0	6	2	1	0	0	2	33	0	6	0	3
			1997	2	0	4	0	0	0	0	3	35	0	5	0	1
			1998	1	0	4	1	0	0	0	0	38	0	4	0	2
			1999	0	0	5	1	0	0	0	0	38	0	4	0	2
			2000	0	0	3	3	0	0	0	0	38	0	5	0	1
	wS	38.0	1996	0	0	0	3	0	0	0	1	2	0	3	0	0
			1997	2	0	1	0	0	0	0	0	3	0	3	0	0
			1998	2	0	1	0	0	0	0	0	3	0	3	0	0
			1999	0	0	3	0	0	0	0	0	3	0	3	0	0
			2000	0	0	1	2	0	0	0	0	3	0	3	0	0

Appendix 2. Summary of the crown condition, tree mortality, and top condition for three coniferous hosts in the 27 spruce/fir health plots from 1996 to 2000 in the Northwest Region of Ontario. (cont'd)

Location (Plot no.)	Host[a]	Average DBH[b] (cm)	Year	Crown condition[c] 1	2	3	4	5	6	7	Cumulative mortality: New dead[d]	Old dead[d]	Trees cut	Condition of top: Live	Bare	Dead
				Number of trees												
Sioux Lookout District **(concl.)**																
Pickerel Township (199)	bS	27.8	1996	0	0	5	1	0	0	0	0	0	0	6	0	0
			1997	3	0	1	1	0	0	0	1	0	0	5	0	0
			1998	3	0	2	0	0	0	0	0	1	0	5	0	0
			1999	0	0	5	0	0	0	0	0	1	0	5	0	0
			2000	0	0	1	1	0	0	1	2	1	0	2	0	1
Thunder Bay District																
Buzzer Lake Road (201)	bF	13.6	1996	0	0	0	0	6	7	7	5	4	0	15	3	3
			1997	0	0	0	10	6	0	0	4	9	0	14	2	0
			1998	0	0	6	4	0	0	0	6	13	0	10	0	0
			1999	0	0	9	1	0	0	0	0	19	0	9	1	0
			2000	0	0	6	3	1	0	0	0	19	0	10	0	0
	wS	5.3	1996	0	0	0	1	2	0	0	0	0	0	2	1	0
			1998	0	0	2	1	0	0	0	0	0	0	3	0	0
			1999	0	0	3	0	0	0	0	0	0	0	3	0	0
			2000	0	0	1	1	0	0	0	1	0	0	1	1	0
	bS	13.1	1996	7	0	0	6	0	1	0	0	1	0	14	0	0
			1997	10	0	0	3	1	0	0	0	1	0	14	0	0
			1998	0	0	13	1	0	0	0	0	1	0	14	0	0
			1999	4	0	9	1	0	0	0	0	1	0	14	0	0
			2000	0	0	11	2	1	0	0	0	1	0	14	0	0

Appendix 2. Summary of the crown condition, tree mortality, and top condition for three coniferous hosts in the 27 spruce/fir health plots from 1996 to 2000 in the Northwest Region of Ontario. (cont'd)

Location (Plot no.)	Host[a]	Average DBH[b] (cm)	Year	Crown condition[c]							Cumulative mortality			Condition of top		
				1	2	3	4	5	6	7	New dead[d]	Old dead[d]	Trees cut	Live	Bare	Dead
				Number of trees												
Thunder Bay District **(cont'd.)**																
Fallis Township (207)	bF	21.9	1996	0	0	0	44	2	0	1	0	5	0	46	0	1
			1997	3	0	0	43	0	0	0	1	5	0	46	0	0
			1998	0	0	46	0	0	0	0	0	6	0	46	0	0
			1999	0	0	45	0	0	0	0	1	6	0	45	0	0
			2000	0	0	28	14	3	0	0	0	7	0	45	0	0
Forbes Township (208)	bF	20.0	1996	0	0	0	4	33	2	2	6	11	0	39	1	1
			1997	0	0	0	37	1	1	0	2	17	0	38	0	1
			1998	0	0	36	0	1	0	0	2	19	0	36	0	1
			1999	0	0	30	2	0	1	1	3	21	0	32	0	2
			2000	0	0	12	14	3	0	1	4	24	0	29	0	1
Fowler Township (209)	bF	15.0	1996	0	0	0	8	2	1	0	1	2	0	11	0	0
			1997	0	0	9	0	0	0	0	2	3	0	9	0	0
			1998	0	0	8	0	0	0	0	1	5	0	8	0	0
			1999	0	0	7	0	0	0	0	0	6	0	7	0	0
			2000	0	0	5	2	1	0	0	0	6	0	8	0	0
	wS	27.9	1996	0	0	0	1	0	0	0	0	0	0	1	0	0
			1997	0	0	0	1	0	0	0	0	0	0	1	0	0
			1998	0	0	0	1	0	0	0	0	0	0	1	0	0
			1999	0	0	1	0	0	0	0	0	0	0	1	0	0
			2000	0	0	0	0	1	0	0	0	0	0	1	0	0

Appendix 2. Summary of the crown condition, tree mortality, and top condition for three coniferous hosts in the 27 spruce/fir health plots from 1996 to 2000 in the Northwest Region of Ontario. (cont'd)

Location (Plot no.)	Host[a]	Average DBH[b] (cm)	Year	Crown condition[c] 1	2	3	4	5	6	7	Cumulative mortality: New dead[d]	Old dead[d]	Trees cut	Condition of top: Live	Bare	Dead
				Number of trees												
Thunder Bay District **(cont'd.)**																
Fowler Township (209)	bS	17.2	1996	45	0	0	0	0	0	0	1	4	0	45	0	0
			1997	33	0	12	0	0	0	0	0	5	0	45	0	0
			1998	0	0	45	0	0	0	0	0	5	0	43	0	0
			1999	7	0	38	0	0	0	0	0	5	0	44	0	0
			2000	0	0	40	5	0	0	0	0	5	0	45	0	0
Hicks Lake Road (212)	bF	12.3	1996	0	0	14	8	4	0	0	0	0	0	26	0	0
			1997	22	0	4	0	0	0	0	0	0	0	26	0	0
			1998	0	0	26	0	0	0	0	0	0	0	26	0	0
			1999	0	0	26	0	0	0	0	0	0	0	26	0	0
			2000	0	0	21	5	0	0	0	0	0	0	26	0	0
	wS	10.4	1996	1	0	2	0	0	0	0	0	0	0	3	0	0
			1997	3	0	0	0	0	0	0	0	0	0	3	0	0
			1998	0	0	3	0	0	0	0	0	0	0	3	0	0
			1999	0	0	3	0	0	0	0	0	0	0	3	0	0
			2000	0	0	3	0	0	0	0	0	0	0	3	0	0
	bS	9.8	1996	8	0	0	2	0	0	0	0	1	0	10	0	0
			1997	10	0	0	0	0	0	0	0	1	0	10	0	0
			1998	0	0	10	0	0	0	0	0	1	0	10	0	0
			1999	3	0	7	0	0	0	0	0	1	0	10	0	0
			2000	0	0	8	2	0	0	0	0	1	0	10	0	0

Appendix 2. Summary of the crown condition, tree mortality, and top condition for three coniferous hosts in the 27 spruce/fir health plots from 1996 to 2000 in the Northwest Region of Ontario. (cont'd)

Location (Plot no.)	Host[a]	Average DBH[b] (cm)	Year	Crown condition[c]							Cumulative mortality			Condition of top		
				1	2	3	4	5	6	7	New dead[d]	Old dead[d]	Trees cut	Live	Bare	Dead
				Number of trees												
Thunder Bay District **(cont'd)**																
Milkshake Lake (218)	bF	14.1	1996	0	0	0	4	5	1	0	9	17	0	9	0	1
			1997	0	0	7	0	0	0	0	3	26	0	5	1	1
			1998	0	0	0	5	0	1	0	1	29	0	3	1	2
			1999	0	0	3	1	0	0	0	2	30	0	3	0	1
			2000	0	0	1	1	2	0	0	0	32	0	3	0	1
	wS	23.2	1996	0	0	0	6	3	0	1	1	4	0	10	0	0
			1997	0	0	10	0	0	0	0	0	5	0	9	0	1
			1998	0	0	3	3	2	0	0	2	5	0	8	0	0
			1999	0	0	6	1	0	0	0	1	7	0	7	0	0
			2000	0	0	0	5	1	0	0	1	8	0	6	0	0
Sandstone Lake (221)	bF	17.8	1996	0	0	29	11	2	1	0	1	4	0	43	0	0
			1997	0	0	40	0	0	0	0	3	5	0	40	0	0
			1998	0	0	37	0	0	0	0	3	8	0	37	0	0
			1999	0	0	37	0	0	0	0	0	11	0	37	0	0
			2000	0	0	25	12	0	0	0	0	11	0	37	0	0
	wS	25.5	1996	0	0	0	2	0	0	0	0	0	0	2	0	0
			1997	0	0	0	2	0	0	0	0	0	0	2	0	0
			1998	0	0	2	0	0	0	0	0	0	0	2	0	0
			1999	0	0	2	0	0	0	0	0	0	0	2	0	0
			2000	0	0	1	1	0	0	0	0	0	0	2	0	0

Appendix 2. Summary of the crown condition, tree mortality, and top condition for three coniferous hosts in the 27 spruce/fir health plots from 1996 to 2000 in the Northwest Region of Ontario. (concl.)

Location (Plot no.)	Host[a]	Average DBH[b] (cm)	Year	Crown condition[c]							Cumulative mortality			Condition of top		
				1	2	3	4	5	6	7	New dead[d]	Old dead[d]	Trees cut	Live	Bare	Dead
				Number of trees												
Thunder Bay District **(concl.)**																
Soper Township (222)	bF	16.5	1996	0	0	1	5	14	6	1	0	0	0	21	6	0
			1997	0	0	19	8	0	0	0	0	0	0	26	1	0
			1998	0	0	20	3	1	0	0	3	0	0	24	0	0
			1999	0	19	4	1	0	0	0	0	3	0	24	0	0
			2000	0	1	13	5	2	0	1	2	3	0	21	1	0
	wS	58.0	1996	0	0	0	1	0	0	0	0	0	0	1	0	0
			1997	0	0	0	0	0	0	0	1	0	0	0	0	0
			1998	0	0	0	0	0	0	0	0	1	0	0	0	0
			1999	0	0	0	0	0	0	0	0	1	0	0	0	0
			2000	0	0	0	0	0	0	0	0	1	0	0	0	0
	bS	14.8	1996	18	0	0	4	1	0	0	0	0	0	23	0	0
			1997	12	0	0	11	0	0	0	0	0	0	23	0	0
			1998	0	0	23	0	0	0	0	0	0	0	23	0	0
			1999	3	0	20	0	0	0	0	0	0	0	23	0	0
			2000	0	0	18	5	0	0	0	0	0	0	23	0	0

[a] bF = balsam fir, wS = white spruce, and bS = black spruce.

[b] Tree diameters re-measured in 2000 on remaining living trees.

[c] 1 = no defoliation, 2 = only current foliage defoliated less than 25 percent, 3 = current and/or some older foliage defoliated less than 25 percent, 4 = 25–50 percent defoliation, 5 = 51–75 percent defoliation, 6 = 76–90 percent defoliation, 7 = more than 90 percent defoliation.

[d] Tree mortality resulting from natural causes, trees dead when plot installed are included with old dead.

Appendix 3. Summary of the crown condition and tree mortality for two deciduous hosts in 25 spruce/fir health plots from 1998 to 2000 in the Northwest Region of Ontario.

Location (Plot no.)	Host[a]	Average DBH[b] (cm)	Year	Crown condition[c]											Cumulative mortality		
				10	20	30	35	40	45	50	55	60	65	70	New dead	Old dead	Trees cut
				Number of trees													
Fort Frances District																	
Calm Lake (132)	wB	16.2	1998	1	0	4	4	3	0	2	1	2	1	0	1	1	0
			1999	0	0	5	4	2	0	2	0	5	0	0	0	2	0
			2000	0	0	4	2	0	5	0	1	2	0	4	0	2	0
	tA	24.2	1998	3	0	6	0	7	2	0	0	0	0	0	0	2	0
			1999	0	0	3	3	4	8	0	0	0	0	0	0	2	0
			2000	0	0	1	2	4	3	1	6	0	1	0	0	2	0
Claxton Township (133)	wB	14.9	1998	0	0	6	0	0	2	0	0	0	0	0	0	4	0
			1999	2	0	4	0	1	1	0	0	0	0	0	0	4	0
			2000	0	0	5	0	1	2	0	0	0	0	0	0	4	0
	tA	19.1	1998	7	0	3	0	5	3	0	1	0	0	0	0	5	0
			1999	0	0	9	4	4	1	0	1	0	0	0	0	5	0
			2000	0	0	5	5	2	3	2	2	0	0	0	0	5	0
French Lake (134)	wB	19.5	1998	7	0	7	0	0	0	0	0	0	0	0	0	0	0
			1999	0	0	14	0	0	0	0	0	0	0	0	0	0	0
			2000	0	0	13	0	0	1	0	0	0	0	0	0	0	0
	tA	26.8	1998	4	0	6	0	2	1	0	0	0	0	0	0	1	0
			1999	0	0	6	0	7	0	0	0	0	0	0	0	1	0
			2000	0	0	3	2	6	2	0	0	0	0	0	0	1	0

Appendix 3. Summary of the crown condition and tree mortality for two deciduous hosts in 25 spruce/fir health plots from 1998 to 2000 in the Northwest Region of Ontario. (cont'd)

Location (Plot no.)	Host[a]	Average DBH[b] (cm)	Year	Crown condition[c]											Cumulative mortality		
				10	20	30	35	40	45	50	55	60	65	70	New dead	Old dead	Trees cut
				Number of trees													
***Fort Frances District* (concl.)**																	
Lake Hope (135)	wB	17.3	1998	1	2	1	0	0	0	0	0	0	0	0	0	1	0
			1999	0	0	1	2	0	1	0	0	0	0	0	0	1	0
			2000	0	0	1	1	0	1	1	0	0	0	0	0	1	0
	tA	18.9	1998	2	1	3	0	3	1	0	0	0	0	0	0	0	0
			1999	0	0	3	2	4	1	0	0	0	0	0	0	0	0
			2000	0	0	8	1	1	0	0	0	0	0	0	0	0	0
Kenora District																	
Haycock Township (146)	wB	15.2	1998	0	0	3	1	0	0	0	0	0	0	0	0	0	0
			1999	0	0	0	2	0	0	1	0	0	0	0	0	0	0
			2000	0	0	0	2	1	0	1	0	0	0	0	0	0	0
	tA	24.3	1998	5	0	2	0	9	0	0	0	0	0	0	0	1	0
			1999	0	0	0	1	2	7	3	3	0	0	0	0	1	0
			2000	0	0	3	1	6	2	1	1	1	0	0	0	1	0
Nipigon District																	
Catlonite Road (161)	wB	17.4	1998	2	0	1	0	0	0	0	0	0	0	0	0	2	0
			1999	0	0	3	0	0	0	0	0	0	0	0	0	2	0
			2000	0	0	2	0	0	0	0	0	0	0	0	0	2	0
	tA	25.4	1998	2	0	5	0	0	0	0	0	0	0	0	0	1	0

Appendix 3. Summary of the crown condition and tree mortality for two deciduous hosts in 25 spruce/fir health plots from 1998 to 2000 in the Northwest Region of Ontario. (cont'd)

Location (Plot no.)	Host[a]	Average DBH[b] (cm)	Year	Crown condition[c]											Cumulative mortality		
				10	20	30	35	40	45	50	55	60	65	70	New dead	Old dead	Trees cut
				Number of trees													
***Nipigon District* (cont'd.)**																	
Catlonite Road (161)	tA		1999	0	0	7	0	0	0	0	0	0	0	0	0	1	0
			2000	0	0	7	0	0	0	0	0	0	0	0	0	1	0
Grain Township (167)	wB	17.8	1998	2	0	5	0	1	0	0	0	0	0	0	0	0	0
			1999	0	0	7	0	1	0	0	0	0	0	0	0	0	0
			2000	0	0	7	1	0	0	0	0	0	0	0	0	0	0
John Ahl Road (168)	wB	18.9	1998	0	0	7	0	2	0	0	0	0	0	0	0	2	0
			1999	0	0	6	1	2	0	0	0	0	0	0	0	2	0
			2000	0	0	6	2	1	0	0	0	0	0	0	0	2	0
	tA	32.1	1998	1	0	21	4	0	0	0	0	0	0	0	0	3	0
			1999	0	0	21	2	0	0	0	0	0	1	0	2	3	0
			2000	0	0	21	0	0	0	0	0	0	0	0	1	5	0
Parent Township (176)	tA	19.7	1998	1	1	3	0	1	0	0	0	0	0	0	0	0	0
			1999	0	0	6	0	0	0	0	0	0	0	0	0	0	0
			2000	0	0	6	0	0	0	0	0	0	0	0	0	0	0
Windigokan Lake (183)	wB	13.4	1998	0	0	1	0	0	0	0	0	0	0	0	0	0	0
			1999	0	0	1	0	0	0	0	0	0	0	0	0	0	0
			2000	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	tA	15.9	1998	0	0	2	0	0	0	0	0	0	0	0	0	0	0

Appendix 3. Summary of the crown condition and tree mortality for two deciduous hosts in 25 spruce/fir health plots from 1998 to 2000 in the Northwest Region of Ontario. (cont'd)

Location (Plot no.)	Host[a]	Average DBH[b] (cm)	Year	Crown condition[c]											Cumulative mortality		
				10	20	30	35	40	45	50	55	60	65	70	New dead	Old dead	Trees cut
				Number of trees													
***Nipigon District* (concl.)**																	
Windigokan Lake (183)	tA		1999	0	0	2	0	0	0	0	0	0	0	0	0	0	0
			2000	0	0	2	0	0	0	0	0	0	0	0	0	0	0
Red Lake District																	
Goldpine Road (186)	wB	22.0	1998	20	0	7	2	0	1	0	0	0	0	0	0	1	0
			1999	3	0	4	21	2	0	0	0	0	0	0	0	1	0
			2000	4	0	15	5	4	1	0	0	0	0	0	1	1	0
Snake Falls Road (189)	wB	13.0	1998	1	0	0	0	0	0	0	0	0	0	0	0	0	0
			1999	0	0	0	1	0	0	0	0	0	0	0	0	0	0
			2000	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	tA	22.4	1998	4	0	1	1	0	0	0	0	0	0	0	0	2	0
			1999	0	0	1	5	0	0	0	0	0	0	0	0	2	0
			2000	0	0	3	0	2	1	0	0	0	0	0	0	2	0
Sioux Lookout District																	
Burma Lake Road (191)	wB	17.3	1998	1	0	0	0	0	0	0	0	0	0	0	0	0	0
			1999	0	0	0	1	0	0	0	0	0	0	0	0	0	0
			2000	0	0	1	0	0	0	0	0	0	0	0	0	0	0
	tA	23.8	1998	1	0	0	0	0	0	0	0	0	0	0	0	0	0
			1999	0	0	0	0	1	0	0	0	0	0	0	0	0	0

Appendix 3. Summary of the crown condition and tree mortality for two deciduous hosts in 25 spruce/fir health plots from 1998 to 2000 in the Northwest Region of Ontario. (cont'd)

Location (Plot no.)	Host[a]	Average DBH[b] (cm)	Year	Crown condition[c]											Cumulative mortality		
				10	20	30	35	40	45	50	55	60	65	70	New dead	Old dead	Trees cut
				Number of trees													
Sioux Lookout District **(cont'd)**																	
Burma Lake Road (191)	tA		2000	0	0	0	0	1	0	0	0	0	0	0	0	0	0
Foley Lake (195)	wB	16.7	1998	5	0	0	1	0	0	0	1	0	0	0	0	1	0
			1999	0	0	2	2	1	1	0	1	0	0	0	0	1	0
			2000	1	0	3	2	0	0	0	1	0	0	0	0	1	0
Lomond Township (196)	wB	13.0	1998	3	0	0	0	0	0	0	0	0	0	0	0	2	0
			1999	0	0	0	3	0	0	0	0	0	0	0	0	2	0
			2000	0	0	0	2	1	0	0	0	0	0	0	0	2	0
Pape Lake (198)	wB	18.1	1998	7	0	0	0	0	0	0	0	0	0	0	0	0	0
			1999	0	0	2	4	1	0	0	0	0	0	0	0	0	0
			2000	0	0	3	4	0	0	0	0	0	0	0	0	0	0
	tA	27.4	1998	6	0	0	0	0	0	0	0	0	0	0	0	0	0
			1999	0	0	1	4	1	0	0	0	0	0	0	0	0	0
			2000	0	0	0	2	4	0	0	0	0	0	0	0	0	0
Pickerel Township (199)	wB	16.9	1998	15	0	4	0	1	0	0	0	0	0	0	0	5	0
			1999	1	0	7	10	1	1	0	0	0	0	0	0	5	0
			2000	0	0	4	11	1	0	0	1	0	0	0	3	5	0
	tA	50.4	1998	2	0	3	0	0	0	0	0	0	0	0	0	3	0
			1999	0	0	0	5	0	0	0	0	0	0	0	0	3	0

Appendix 3. Summary of the crown condition and tree mortality for two deciduous hosts in 25 spruce/fir health plots from 1998 to 2000 in the Northwest Region of Ontario. (cont'd)

Location (Plot no.)	Host[a]	Average DBH[b] (cm)	Year	Crown condition[c]											Cumulative mortality		
				10	20	30	35	40	45	50	55	60	65	70	New dead	Old dead	Trees cut
				Number of trees													
***Sioux Lookout District* (concl)**																	
Pickerel Township (199)	tA		2000	0	0	0	0	1	3	0	0	0	1	0	0	3	0
Thunder Bay District																	
Buzzer Lake Road (201)	wB	2.0	1998	0	0	0	0	0	0	0	0	0	0	0	0	1	0
			1999	0	0	0	0	0	0	0	0	0	0	0	0	1	0
			2000	0	0	0	0	0	0	0	0	0	0	0	0	1	0
	tA	16.1	1998	3	0	0	0	0	0	0	0	0	0	0	0	0	0
			1999	1	0	2	0	0	0	0	0	0	0	0	0	0	0
			2000	0	0	2	0	1	0	0	0	0	0	0	0	0	0
Fallis Township (207)	tA	29.8	1998	11	1	19	0	13	0	0	0	0	0	0	0	5	0
			1999	0	0	25	0	14	3	1	0	0	0	0	1	5	0
			2000	0	0	19	0	18	4	0	0	0	1	0	1	6	0
Forbes Township (208)	tA	24.4	1998	1	0	0	0	1	0	0	0	0	0	0	0	0	0
			1999	0	0	0	0	2	0	0	0	0	0	0	0	0	0
			2000	0	0	1	0	1	0	0	0	0	0	0	0	0	0
Fowler Township (209)	tA	25.1	1998	2	0	0	0	0	0	0	0	0	0	0	0	0	0
			1999	0	0	1	0	1	0	0	0	0	0	0	0	0	0
			2000	0	0	1	0	1	0	0	0	0	0	0	0	0	0
Hicks Lake Road (212)	wB	8.1	1998	5	0	3	0	0	0	0	0	0	0	0	0	0	0

Appendix 3. Summary of the crown condition and tree mortality for two deciduous hosts in 25 spruce/fir health plots from 1998 to 2000 in the Northwest Region of Ontario. (cont'd)

Location (Plot no.)	Host[a]	Average DBH[b] (cm)	Year	Crown condition[c] Number of trees											Cumulative mortality		
				10	20	30	35	40	45	50	55	60	65	70	New dead	Old dead	Trees cut
Thunder Bay District **(cont'd)**																	
Hicks Lake Road (212)	wB		1999	0	0	7	0	1	0	0	0	0	0	0	0	0	0
			2000	0	0	7	1	0	0	0	0	0	0	0	0	0	0
	tA	17.4	1998	13	0	10	0	1	2	0	0	0	0	1	1	2	0
			1999	1	0	17	0	6	2	0	0	0	0	1	0	3	0
			2000	0	0	9	6	8	1	2	0	0	0	0	1	3	0
Milkshake Lake (218)	wB	19.3	1998	14	6	5	1	3	1	2	0	0	0	0	1	4	0
			1999	1	0	24	1	3	0	0	0	1	0	0	1	5	0
			2000	0	0	24	3	2	0	0	0	0	0	0	2	6	0
	tA	35.7	1998	0	7	1	1	0	0	0	0	0	0	0	0	2	0
			1999	0	0	3	0	6	0	0	0	0	0	0	0	2	0
			2000	0	0	3	2	3	0	0	0	1	0	0	0	2	0
Sandstone Lake (221)	wB	27.6	1998	2	0	3	0	0	0	0	0	0	0	0	0	0	0
			1999	0	0	3	0	2	0	0	0	0	0	0	0	0	0
			2000	0	0	4	0	1	0	0	0	0	0	0	0	0	0
	tA	29.6	1998	11	0	10	0	5	0	0	0	1	0	0	2	0	0
			1999	0	0	18	0	8	0	0	0	0	0	0	1	2	0
			2000	0	0	6	3	15	0	1	0	0	0	0	1	3	0
Soper Township (222)	tA	24.4	1998	0	0	11	0	2	0	0	0	0	0	0	0	0	0

Appendix 3. Summary of the crown condition and tree mortality for two deciduous hosts in 25 spruce/fir health plots from 1998 to 2000 in the Northwest Region of Ontario. (concl.)

Location (Plot no.)	Host[a]	Average DBH[b] (cm)	Year	Crown condition[c] Number of trees											Cumulative mortality		
				10	20	30	35	40	45	50	55	60	65	70	New dead	Old dead	Trees cut
Thunder Bay District **(concl.)**																	
Soper Township (222)	tA		1999	0	0	4	0	8	1	0	0	0	0	0	0	0	0
			2000	0	0	3	2	5	2	0	0	1	0	0	0	0	0

[a] wB = white birch and tA = trembling aspen.

[b] Tree diameters re-measured in 2000 on remaining living trees.

[c] 10 = no damage; 20 = foliage thin, off-colour with no dead branches or bare twigs visible; 30 = no dead branches present and bare twigs present in up to 5 percent of the crown; 35 = no dead branches present and bare twigs present in more than 6 percent of the crown; 40 = dead branches and bare twigs present in up to 15 percent of the crown; 45 = dead branches and bare twigs present in 16 to 25 percent of the crown; 50 = dead branches and bare twigs present in 26 to 37 percent of the crown; 55 = dead branches and bare twigs present in 38 to 50 percent of the crown; 60 = dead branches and bare twigs present in 51 to 75 percent of the crown; 65 = dead branches and bare twigs present in 76 percent or more of the crown; and 70 = more than 50 percent of the crown dead with only small adventitious branches present, usually at the base of the crown or stem.