

2005 Annual Report



Forest Health in Alberta

Alberta

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Annual Report

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Forest Health Vision

A healthy forest environment that provides sustainable fibre resources and a diverse forest ecosystem that supports biodiversity and critical wildlife habitats.



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Acknowledgements and Executive Summary

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Executive Summary

This annual report contains details of forest insect pests, diseases and invasive plants monitored on forested Crown land of Alberta in 2005. Reported here are the results of pest infestation surveys; forest pest and invasive plant management programs; forest health training, increased awareness, and research and development.

Below is a summary of the extent of major forest pest infestations surveyed in 2005:

Pest Species	Extent of Infestation
Spruce budworm	10 020 ha net area and 3 869 ha gross area
Mountain pine beetle	7 956 of 8 226 attacked trees removed.
Aspen defoliators	2 818 387 ha of gross area

Spruce budworm defoliation on inventoried forested Crown land decreased from an estimated 26 922 ha in 2004 to 10 020 ha in 2005. The severity of defoliation also decreased during this period.

The Ministerial Order prohibiting transportation of pine wood and wood products with bark was enforced in cooperation with Alberta Transportation. There were four intercepts of unauthorized pine log movement in 2005.

Between fall 2004 and summer 2005, aerial and ground surveys detected mountain pine beetle activity in Willmore Wilderness Park, Kakwa Wildland Provincial Park and surrounding area, Bow Valley, Cypress Hills Inter-Provincial Park, Spray Lake, Oldman River and Crowsnest Pass. Infestations also occurred in Banff and Jasper national parks.

Under pine beetle control programs from September 2004 until August 2005, 7 956 infested pines were removed from municipal and private lands (252 trees), Banff National Park (1 200 trees), and forested Crown lands (6 504 trees). About 500 pheromone baits were deployed in Banff National Park. Over 1 100 baits were deployed in provincial parks to contain pine beetles and control during the winter.

Yellowheaded spruce sawfly defoliated spruce plantations on reclaimed sites in the Northeast Region. Aerial spraying was successfully tested to control this pest.

Forest tent caterpillar defoliation was scattered over a gross area of about three million hectares, mainly in the Northwest Region. Severity of defoliation also increased. Large aspen tortrix defoliation was still persistent in southern Alberta. Aspen two-leaf tier was widespread in the Northeast Region. No gypsy moths were trapped in 2005 in pheromone-baited traps deployed by the SRD.

No major forest diseases were monitored in 2005 on forested Crown land. However, large-scale hail damage affected aspen stands in the Northwest Region.

The number of smaller European elm bark beetles (SEEBB) trapped in the province decreased significantly in 2005, compared to 2004. Alberta remains free of DED. However, a similar vascular wilt disease was affecting elm trees in the City of Edmonton. The ash leaf cone roller and the red elm weevil damaged some elm trees in Edmonton. Edmonton also lost many ash trees due to drought.

As a member of an interdepartmental invasive alien species working group established in 2005, Sustainable Resource Development (SRD) commenced development of a risk management framework on invasive species. Regionally, increased education and awareness, detection, and control programs received priority under invasive species management programs.

The forecast for 2006 indicates increase of mountain pine beetle infestations, new spruce budworm infestations in the northeast and expanding forest tent caterpillar infestations. The risk of two-year cycle budworm outbreaks occurring in 2006 in the Southwest Region is high but may not materialize.

The results of a two-year field study indicated that checking has a bigger impact than woodborer damage on dimensional lumber produced from fire-killed timber.

The Forest Health Section (FHS) published an annual report, hosted and took part in the annual Integrated Forest Pest Management Forum and the Alberta/B.C. Intermountain Forest Health Workshop. The forest health web site was regularly updated.



Introduction

This is a report on forest insect and disease pests, and forest invasive alien plants (weeds) monitored in Alberta in 2005. This report contains historical details, current conditions in 2005 and predictions on occurrence of major forest pests in the province. The forest pest management programs carried out in 2005 are also described. In addition, this report carries details of programs carried out to increase forest health awareness, provide training, conduct field research and develop technology.

Management of tree health on forested Crown land is the responsibility of the Forest Health Section of the Department of Sustainable Resource Development (SRD). This is accomplished by effective detection and monitoring of forest pests, and by implementing pest management strategies that recognize joint responsibility with forest industry.

Managing forest health issues on national parks and native Indian reserves in the province is a federal responsibility. The Department of Community Development is responsible for tree health in provincial parks and protected areas. The municipal governments, private landowners and Metis Settlements look after tree health on their respective lands.

The forest health program in Alberta is administered and coordinated by the provincial headquarters. In 2005, the Regional Forest Health Officers - Northeast Corporate Region (Tom Hutchison), Northwest Corporate Region (Mike Maximchuk) and Southwest Corporate Region (Dan Lux/Christie Ward and Erica Lee) - looked after operational aspects of regional forest health programs. Embedded within each corporate region are several corporate areas (Appendix I).



The current mountain pine beetle (MPB) infestation in Alberta was first reported in 1998 when nearly a dozen patches of MPB-killed pines were confirmed by ground surveys carried out in Banff National Park. At the initial stages the events of the MPB program were reported on a calendar year basis. This reporting led to confusion because events of the MPB program overlap two calendar years. Consequently, the Forest Health Section decided to base its reporting on a “beetle year” basis, i.e., beginning with results of the pheromone-based monitoring program in the summer and aerial overview surveys in the fall of one year, and ending up with the resulting management program in the following year. This enables us to report on events related to the same generation of beetles.

The 2005 annual report covers MPB-related events beginning with the pheromone-based monitoring program carried out in 2004 summer and ending with the control program carried out in 2005 summer. However, results of the 2005 pheromone-based monitoring program and 2005 aerial survey are briefly discussed in relation to predictions on MPB occurrence in 2006.



Many other forest pests, besides those reported here, affect forested Crown land in Alberta. These include major diseases such as the lodgepole pine dwarf mistletoe, rusts, cankers, stem rots and root rots like Armillaria root disease. As well, insect pests such as terminal weevils, other defoliators, other bark beetles and the root collar weevil are known to affect forest trees in the province. However, details of these pests are not reported here because they were not monitored in 2005.

The surveys reported in this document were conducted for operational purposes over the forested Crown land and may not cover the entire forested provincial land base. Although every effort is made to ensure that information reported in this document is accurate and complete, its integrity is not guaranteed.

Note: Details about the operational use of pheromones are in Appendix II.



Forest Pest Conditions in 2005

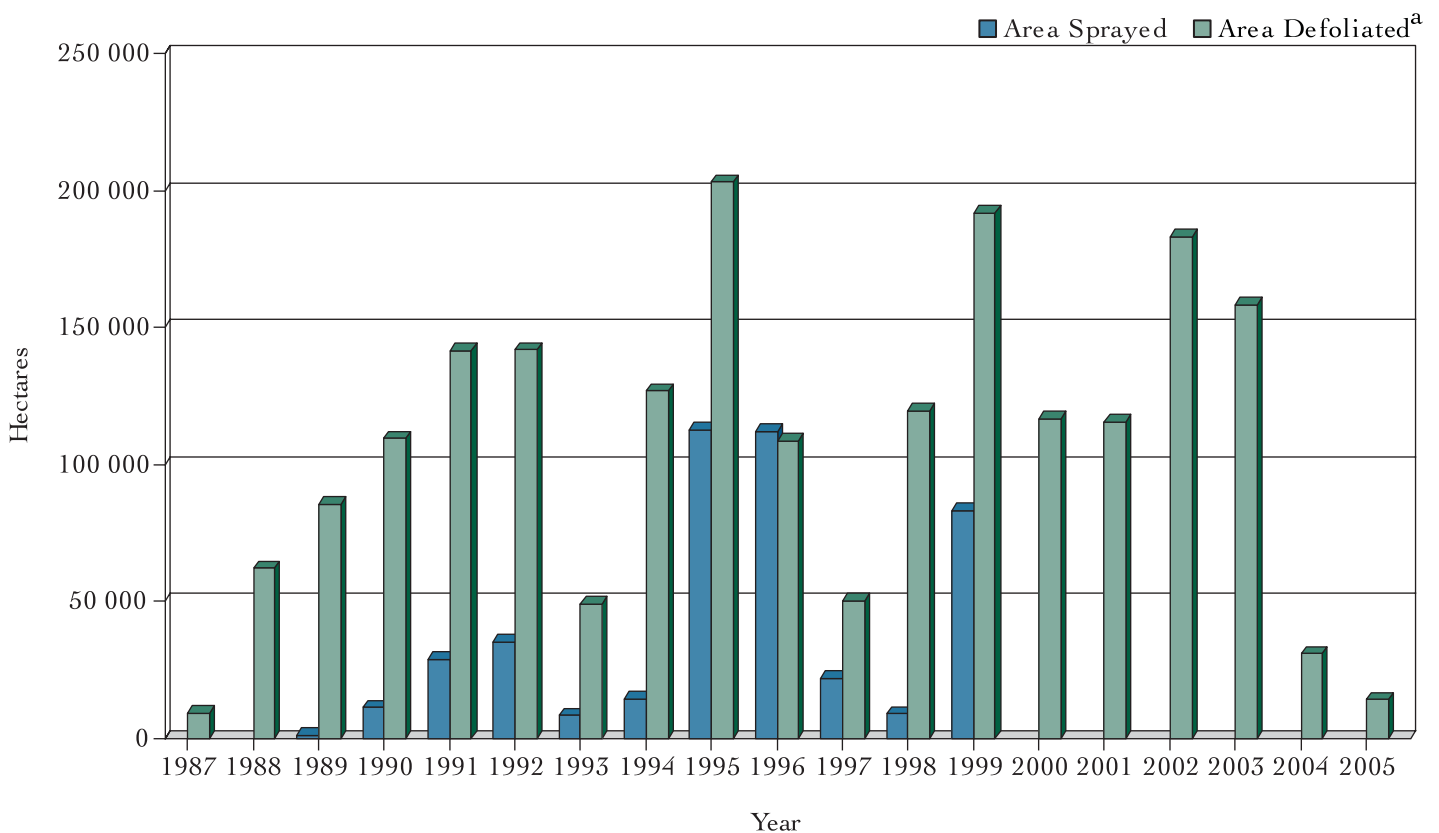
Insect Pests

Defoliators

Spruce Budworm

Choristoneura fumiferana (Clemens)

The current outbreak, first recorded in 1987 reached a peak in 1995. Aerial spraying to control the spruce budworm was discontinued in 1999 (Figure 1). In 2004, the outbreak collapsed in most of the infested areas. Relatively large-scale tree kill has been observed in areas severely defoliated for over eight consecutive years.



^a Forested Crown Land

Figure 1

Area annually defoliated by the spruce budworm and area annually sprayed to control spruce budworm infestations in Alberta, 1987 - 2005.

Aerial surveys are carried out in the summer to detect infestations and estimate the extent and severity of spruce budworm defoliation. Fixed wing aircraft are used for these surveys. Defoliation is recorded either digitally by using a tablet personal computer loaded with an electronic map (in conjunction with a Global Positioning System) or manually by using hard copies of 1:250 000 scale maps. The surveyors record spruce budworm defoliation either as moderate (35-70%) or as severe (>70%).



In 2005, the total number of hectares defoliated declined by 55% compared to the number defoliated in 2004. The number of hectares severely defoliated declined by 49% and number of hectares moderately defoliated by 57% compared to the corresponding figures in 2004. (Figures 2 and 3; Table 1)

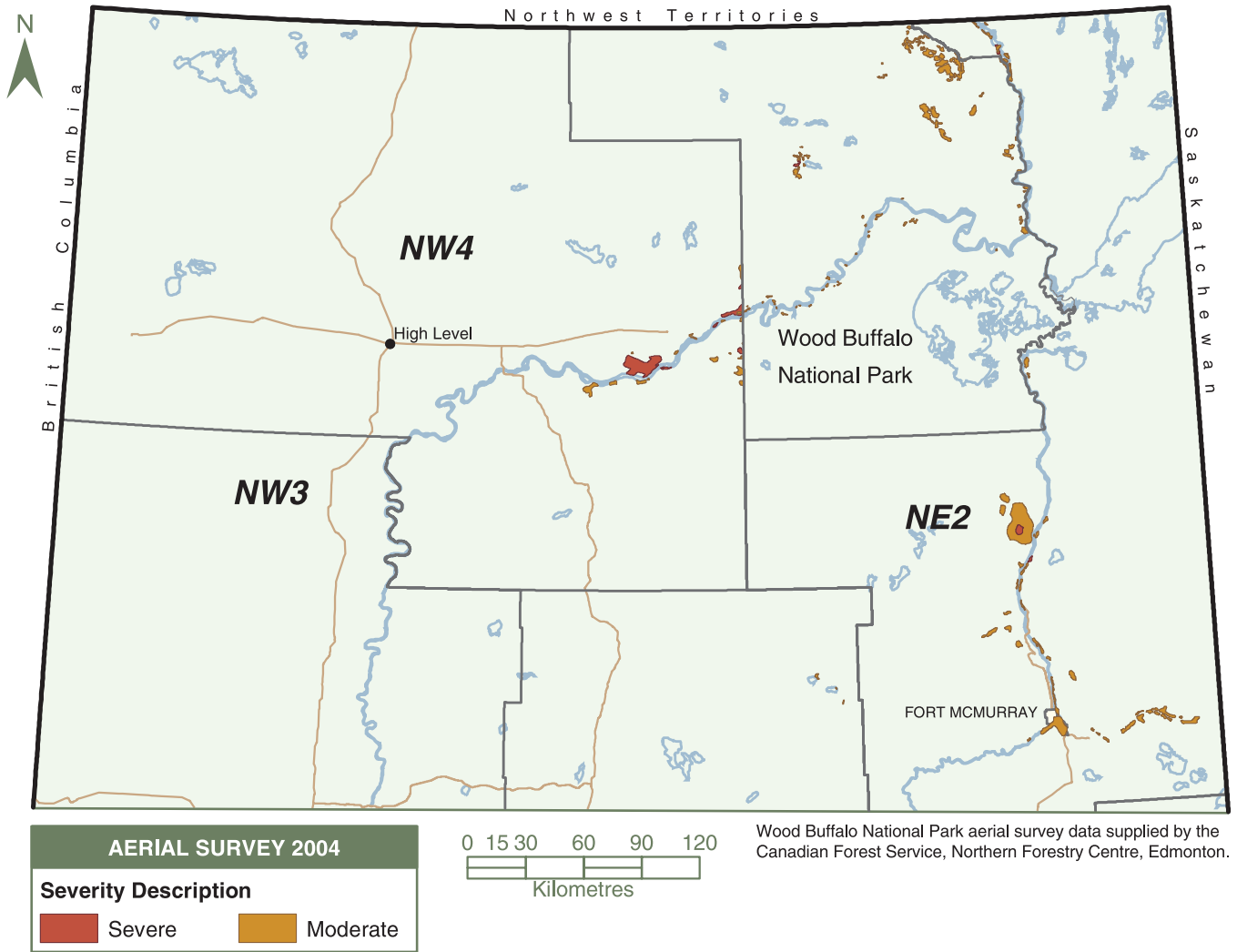


Figure 2
Spatial distribution of aerially visible spruce budworm defoliation on forested areas surveyed in Alberta in 2004.



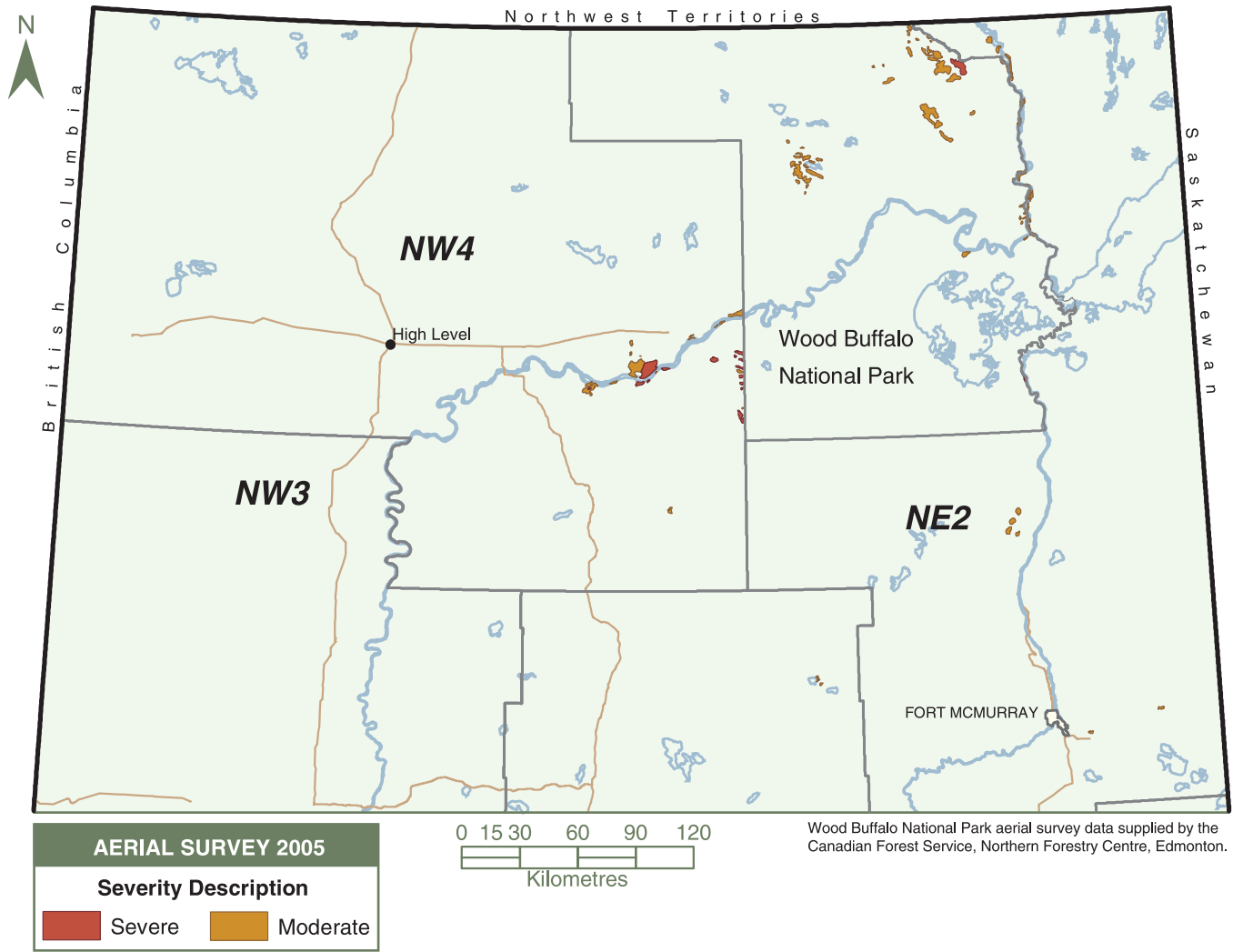


Figure 3

Spatial distribution of aerially visible spruce budworm defoliation on forested areas surveyed in Alberta in 2005.



Table 1

The extent of spruce budworm defoliation (ha) by severity categories in Alberta^a, 2004 vs. 2005

	2004			2005		
	Moderate	Severe	Total	Moderate	Severe	Total
Net ^b	20 245	6 677	26 922	6 636	3 384	10 020
Gross ^c	3 105	624	3 729	3 495	374	3 869
Total	23 350	7 301	30 651	10 131	3 758	13 889
% Changed ^d	-	-	-	-57%	-49%	-55%

^a Extent of defoliation reported from forested Crown land surveyed; national parks excluded

^b Extent of defoliation reported from inventoried forest land

^c Extent of defoliation reported from non-inventoried forest land

^d Percent change of totals in 2005 compared to the corresponding figures in 2004

Northeast Corporate Region (NE)

The regional Forest Health personnel and a private contractor carried out overview aerial surveys during the last week of July and the first week of August. The surveyors used a fixed wing aircraft (Cessna 206). This survey concentrated on major river drainages in this region.

Personnel from the Northern Forestry Centre of Canadian Forest Service, Natural Resources Canada surveyed budworm defoliation on Wood Buffalo National Park. The combined results of these surveys are shown on Figure 3.

Overall, there was a 75% decrease in spruce budworm defoliated area in this region.

In the non-inventoried area of this region (north of 58° N latitude), the gross area of defoliation was 2 318 ha, a 38% decrease compared to the gross area defoliated in 2004. This included an estimated 374 ha that were severely defoliated and 1 944 ha that were moderately defoliated (Table 2). However, this may be an underestimation because defoliation symptoms, i.e., reddish brown needle remnants, appeared to have

been washed off by the time the survey was conducted².

In the inventoried area of this region (south of the latitude 58° N), the gross defoliated area increased by 100% compared to 2004 (Table 2). The net spruce budworm-defoliated area decreased by 91%, compared to the defoliated area in 2004.



² Tom Hutchison, FHO, NE Region, personal communication

Table 2

The extent of spruce budworm defoliation in the Northeast Corporate Region by severity categories, 2004 vs. 2005

Defoliated Area	Extent of Defoliation (ha)						
	Moderate	2004 Severe	Total	Moderate	2005 Severe	Total	Change
North of Lat. 58° N ^a	3 105	624	3 729	1 944	374	2 318	-38%
South of Lat. 58° N ^a	0	0	0	1 551	0	1 551	100%
^b	17 080	690	17 770	1 580	0	1 580	-91%
NE Region Totals	20 185	1 314	21 499	5 075	374	5 449	-75%

^a gross area (non-inventoried forest land)

^b net area (inventoried forest land)

The extent and severity of spruce budworm defoliation during the last four years in areas north of 58° N are shown on Figure 4. There was no consistent pattern of defoliation, i.e., an increase in these parameters in 2003 followed by a collapse in 2004 and 2005. In contrast, a consistent decline of the same parameters was observed in areas south of latitude 58° N over the same period (Figure 5).

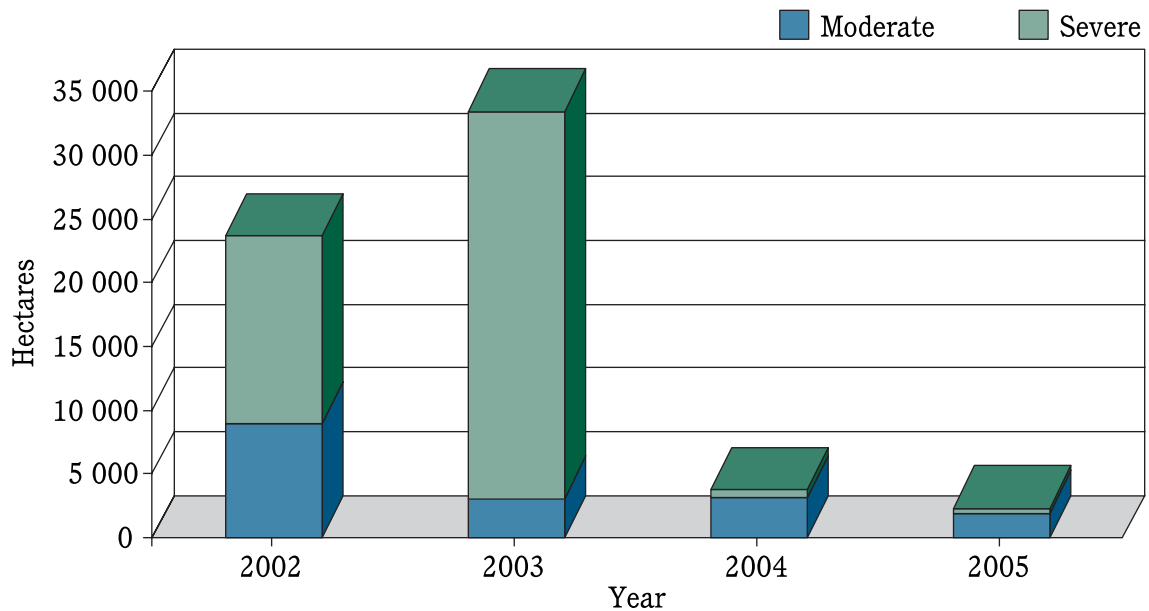


Figure 4

Gross area (ha) of spruce budworm defoliation north of latitude 58° N in the Northeast Region in Alberta, 2002-2005.



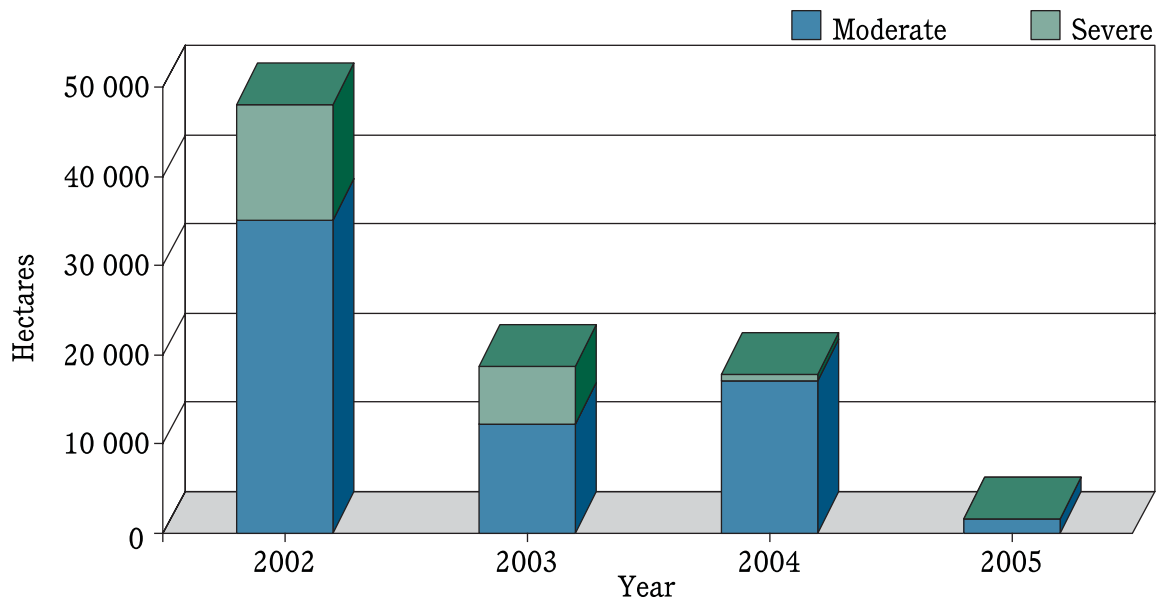


Figure 5

Net area (ha) of spruce budworm defoliation south of latitude 58° N in the Northeast Region in Alberta, 2002-2005.

Northwest Corporate Region (NW)

The Forest Health Officer carried out an aerial survey between August 8-10 to record the extent and severity of spruce budworm defoliation over the Lesser Slave (NW2), Peace (NW3) and Upper Hay (NW4) areas of this region. The extent of defoliation was recorded by digital sketch mapping with the use of a tablet personal computer combined with a Global Positioning System (GPS).

The results of this survey are shown on Figure 3. The spruce budworm defoliated an estimated net area of 8 440 ha in this region in 2005. This is an 8% decrease compared to the 9 152 ha defoliated in 2004 (Table 3). In the NW2 Area, an estimated 268 ha were moderately defoliated near Chipewyan Lakes. No defoliation was recorded in the NW3 Area. In the NW4 Area, 4 788 hectares were moderately defoliated

(65% increase) and 3 384 hectares were severely defoliated (43% decrease) compared to figures in 2004. Most defoliation in this area was found along the Peace River, between John D’or Indian Reservation and Wood Buffalo National Park. An additional patch of moderate defoliation was observed along the Mikkwa River located northeast of Loon River.

Figure 6 shows the net areas of spruce budworm defoliation in this region in the last five years. The spruce budworm infestation in this region collapsed in 2004. The pattern of defoliation in 2005 was similar to that of 2004.



Table 3

Spruce budworm defoliation in the Northwest Corporate Region in Alberta by severity categories, 2004 vs. 2005

Corporate Unit	Net Defoliation (ha)						
	2004			2005			Change ^a
	Moderate	Severe	Total	Moderate	Severe	Total	
Lesser Slave Area (NW2)	263	0	263	268	0	268	2%
Upper Hay Area (NW4)	2 902	5 987	8 889	4 788	3 384	8 172	-8%
Total	3 165	5 987	9 152	5 056	3 384	8 440	-8%

^a percent change between 2004 and 2005

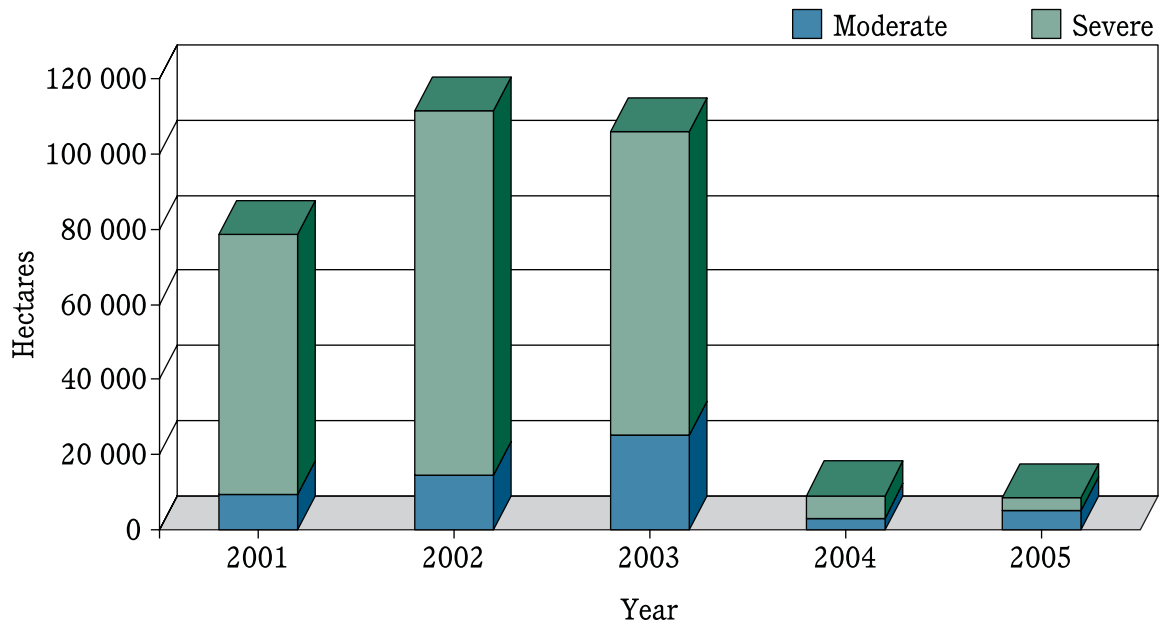


Figure 6

Net budworm-defoliated area by severity categories in the Northwest Region of Alberta, 2001-2005.



Southwest Corporate Region (SW)

There were no reports of spruce budworm defoliation in this region in 2005.

Cypress Hills Inter-Provincial Park

Although some spruce budworm pupae were collected during a field study, no spruce budworm defoliation was found in this park. Most pupal cases have been damaged and the survival ratio appeared to be low (Large and Weekes, 2005).

Federal Lands

Wood Buffalo National Park

Most of the defoliation in the area north of 58° N latitude was in Wood Buffalo National Park. This defoliation was of moderate intensity. It occurred along the drainages of Peace, Athabasca and Slave rivers (Figure 3). The extent of gross defoliated area within the park (excluding the defoliation fully in the Northwest Territories) was 39 084 hectares. Some areas in the south were not mapped due to weather conditions during the aerial survey.

Municipal Lands

In the past few years, the Municipality of Wood Buffalo has had an ongoing spruce budworm infestation in Fort McMurray. In 2005, some areas of the municipality had severe spruce budworm defoliation. However, this defoliation was not aerially surveyed³.



Western Spruce Budworm

Choristoneura occidentalis (Freeman)

An aerial overview flight was carried out following a report received from the general public on severe

defoliation of Douglas-fir stands in Porcupine Hills area of southern Alberta.

The causative organism of this defoliation was tentatively identified as the western spruce budworm⁴. However, neither the infestation was mapped nor was the causative organism verified.



Yellowheaded Spruce Sawfly

Pikonema alaskensis (Rohwer)

The yellowheaded spruce sawfly (YHSS) continued to defoliate young white spruce growing on reclaimed oil and gas lands near Fort McMurray, Cold Lake and Bonnyville in northeastern Alberta. However, data on the extent and severity of these defoliations were not collected.

A perennial YHSS infestation on Cypress Hills Inter-Provincial Park continued to damage some ornamental white spruce at the townsite and near Elkwater Lake.

Yellowheaded spruce sawfly (YHSS) populations have increased dramatically to infest a large number of white spruce throughout the City of Edmonton. In 2005, the pest management operations staff treated 3 584 YHSS-infested trees in the city.



³ Stephen Rice, Municipality of Wood Buffalo, personal communication

⁴ Daniel Lux, Mountain Pine Beetle Coordinator, personal communication

Bark Beetles

Mountain Pine Beetle*Dendroctonus ponderosae* (Hopkins)

Provincial Crown Land

The results of the 2004 ground surveys with pheromone baits and the aerial overview surveys are described below. The details of the 2004/05 operational ground surveys for control are in the Mountain Pine Beetle Management Program section (page 23). The results of the 2005 ground surveys with pheromone baits and the aerial overview surveys are mentioned in the Forecast for 2006 section (page 41).

2004 Ground Surveys to Detect MPB Presence by Using Pheromone Baits

A two-component aggregation pheromone bait (Phero Tech Inc., B.C.) was used to monitor MPB presence in high-risk lodgepole pine stands in southwestern Alberta. The plot locations were readjusted in 2004 by removing plots located in stands where MPB is known to occur. The procedure for deploying these pheromone baits is described in "Mountain Pine Beetle Management Guide" (Kominek, 1999). The results of this survey are shown in Figure 7.

Northwest Corporate Region (NW)

In 2004, four plots with mountain pine beetle pheromone baits were established in the Smoky Area (NW1). Baited trees at two of these plots were attacked by the MPB (Figure 7). One of these plots located north of the Narraway River had 3 and 13 hits respectively on two baited trees; the other plot located north of the Wapiti River had 1, 4 and 5 hits respectively on three baited trees. None of the attacks was successful in producing progeny.

Southwest Corporate Region (SW)*Southern Rockies (SW1) and Clearwater (SW2) Corporate Areas*

A total of 15 sites in the SW1 Area were baited in 2004. Trees at 10 of these baited sites had beetle hits ranging from 1-200 per tree. In addition, three non-baited trees also were attacked with hits ranging from 12-100 per tree. Six sites were baited in the SW2 Area. One of these sites had all three trees attacked with hits ranging from 2-19 per tree (Figure 7).

Foothills Corporate Area (SW3)

In 2004, fourteen sites with pheromone-baited trees were established in the SW3 Area. Only two sites had trees with beetle hits. One of the three sites (Jackpine/Spider) located in Willmore Wilderness Park (WWP) had all three trees attacked with hits ranging from 38-81 per tree; one non-baited tree at this site had a spill-over attack with 50 hits. The other two sites located in WWP did not have beetle hits.



Only one of the 11 sites (Bloodroot Creek) located outside WWP had beetle hits in 2004. Two out of three trees at this site had 72 and 54 hits respectively. The other 10 sites, including the site in Kakwa Wildland Provincial Park (relocated further downstream along the Lower Kakwa River in 2004) were not attacked (Figure 7).

Cypress Hills Inter-Provincial Park

In 2004, pheromone-baited trees at 4 out of 25 sites had beetle hits. Three of the attacked sites were located west of Willow Creek Road and the other was located at Nine Mile Coulee in the southeast corner of the park. The number of beetle hits ranged from 1-3 per tree.

2004/05 Aerial Surveys

The Forest Health Officers and a private contractor carried out aerial surveys over high MPB-risk forested areas of the province. These surveys covered mature pine forest along the eastern slopes of the Rockies extending from Kakwa Wildland Provincial Park in Smoky Lake (NW1) Area in the north to the U.S. border in the south. The results of these surveys are shown on Figure 8.

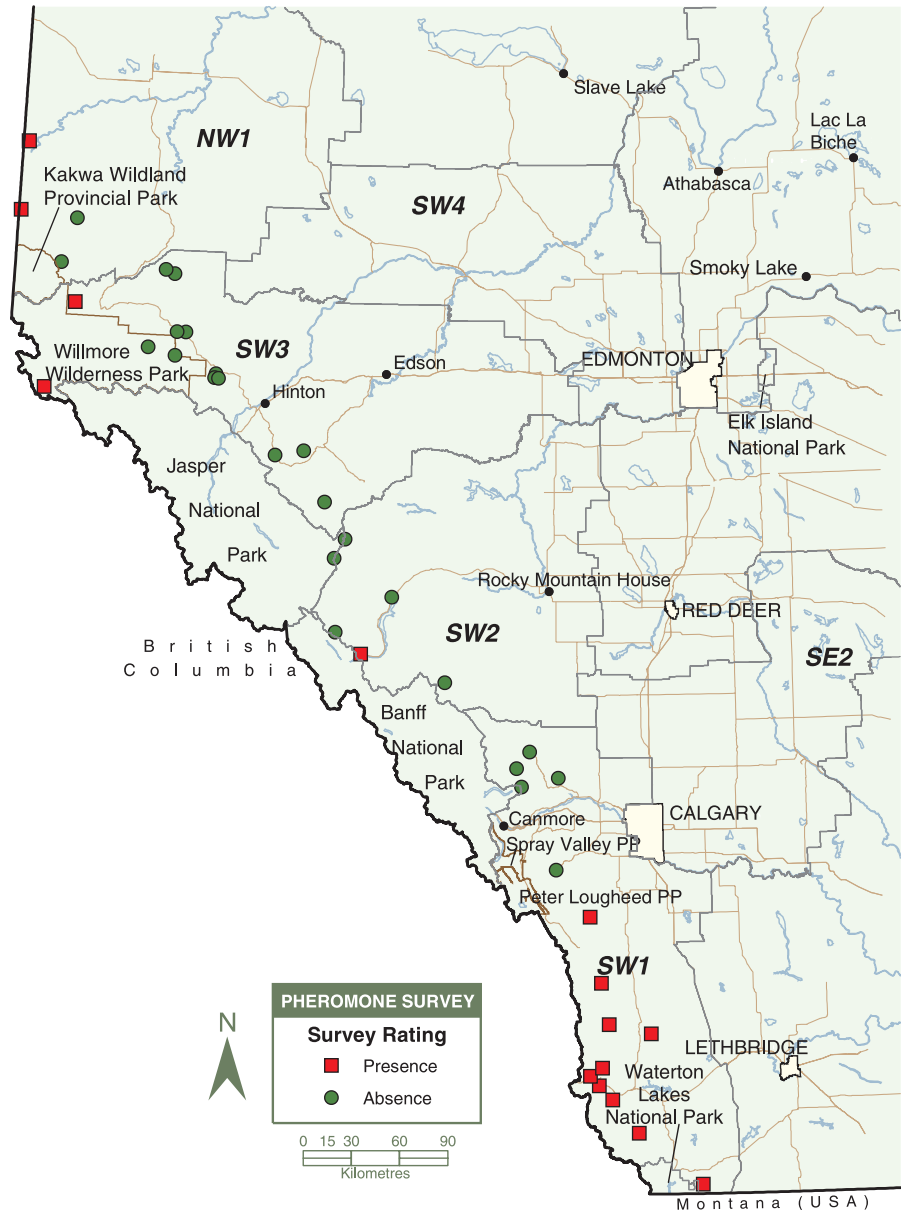


Figure 7

Presence/absence of mountain pine beetle hits on trees in pheromone-baited plots located in Alberta, 2004.



Northwest Corporate Region (NW)

Aerial surveys were carried out in the fall of 2004 over Kakwa Wildland Provincial Park to detect pine trees symptomatic of MPB infestations. These surveys indicated no trees symptomatic of MPB infestations on this park (Figure 8).

Southwest Corporate Region (SW)

Southern Rockies (SW1) and Clearwater (SW2) Corporate Areas

Pine trees symptomatic of the MPB were detected in the Bow Valley, south of Spray Lake, along the Oldman River and south of Crowsnest Pass during aerial surveys carried out between October 5-8, 2004 (Figure 8). The surveyors covered about 70% of the pine stands with high and extreme MPB-risk in these two corporate areas.

Foothills (SW3) and Woodlands (SW4) Corporate Areas

Pine trees symptomatic of the MPB were found along the Beaverdam Creek/Avalanche; Meadowland and the Casket creeks in Willmore Wilderness Park (WWP) during the initial aerial survey carried out in the fall of 2004 (Figure 8). However, hundreds of either red or fading trees were later observed on drainages of Fetherstonhaugh Creek, Muddywater River and Sheep Creek during a rotary-wing flight over WWP on June 28, 2005. This observation prompted another survey program that led to detection of a few thousand more suspected fading trees in WWP in July 2005.



Figure 8
Locations of suspected mountain pine beetle-killed trees detected during aerial surveys carried out in the fall of 2004.



Federal Lands

Banff National Park

Leo Unger (Canadian Forest Service, Pacific Forestry Centre), carried out aerial overview surveys over Banff National Park in July 2004. Approximately 5 000 suspected MPB-killed pines were mapped during these surveys. This is about a 25% increase compared to the number of suspected MPB-killed trees mapped in 2003. Major infestations were located in Healy Creek and Mount Norquay areas. Significant increase in tree kill was observed in Bow River Valley between Ranger Canyon and Castle Mountain, along the lower Spray River and near Aylmer Creek along Lake Minnewanka. The Fairholme Range was not mapped.



Jasper National Park

Leo Unger reported mountain pine beetle activity in two areas of the Park in 2004. In the Upper Smoky River area about 30 faders were detected. Beetle activity was detected for the first time near Adolphus Lake in this area. The main area with beetle activity stretched from the West Gate to Jasper along the Miette River Valley. Along this stretch 125 beetle-killed trees were observed.



Major Aspen Defoliators

The regional forest health officers and a contractor carried out aerial surveys to estimate the extent and severity of insect pest-caused aspen defoliation over the forested Crown land. Personnel from Canadian Forest Service and Parks Canada surveyed defoliation on Wood Buffalo National Park; the other national parks and provincial parks were not surveyed. Fixed wing aircraft were used in these surveys. Either a tablet PC loaded with digital maps of the survey area combined with a GPS, or hard copies of 1:250 000 scale maps were used to record extent and severity of defoliation during these surveys. The surveyors categorized aspen defoliation as light (<35%), moderate (35-70%) or severe (>70%).



In 2005, this defoliation was mostly caused by **forest tent caterpillar**, *Malacosoma disstria* (Hübner) and **large aspen tortrix**, *Choristoneura conflictana* (Walker). The results of these surveys are summarized in Table 4 and are shown on Figure 9.

The total gross area defoliated in 2005 was over 2.8 million hectares (Table 4). This is about a 3.5-fold increase compared to the gross defoliated area in 2004.

Table 4

The extent (ha) of insect pest-caused aspen defoliation in Alberta^a, 2004 vs. 2005

Corporate Region	Gross area of defoliation (ha)					
	Light	2004 Moderate	Severe	Light	2005 Moderate	Severe
Northeast	5 182	105	0	2 753	5 035	40 173
Northwest	5 567	305 933	277 419	379 271	287 944	2 061 360
Southwest	15 773	19 848	2 983	16 347	7 442	18 062
Total		632 810			2 818 387	

^a National and provincial parks excluded



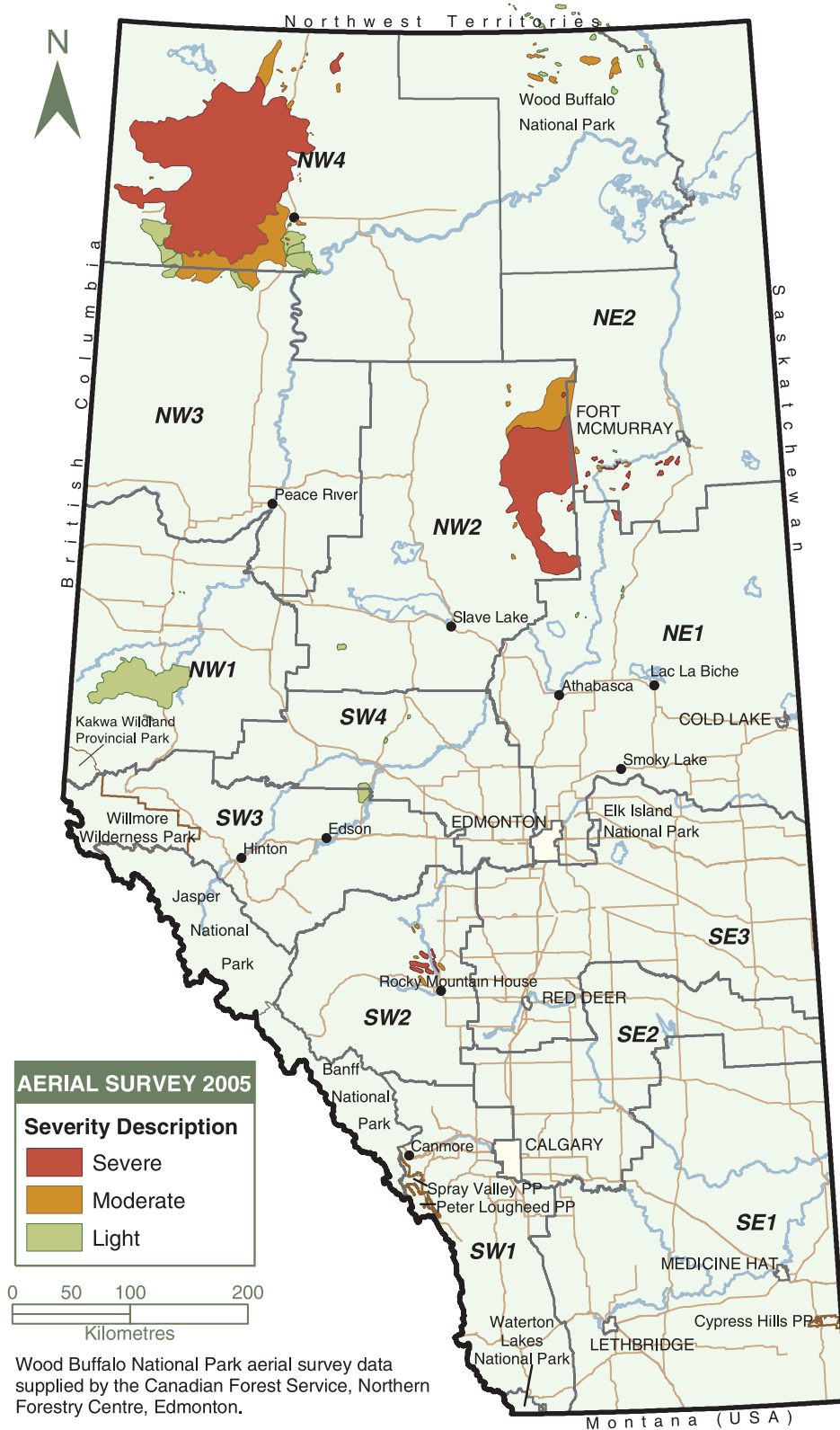


Figure 9
Spatial distribution of aerially visible insect pest-caused aspen defoliation on forest areas surveyed in Alberta, 2005.



Northeast Corporate Region (NE)

Aerial overview surveys were carried out on July 4-6 and on July 20. A fixed wing aircraft (Cessna 206) was used for these surveys.

The **forest tent caterpillar** defoliated aspen along the Athabasca River on the Thickwood Hills area located southwest of Fort McMurray in the Waterways Area. A ground verification survey carried out on August 4 confirmed this observation. During this ground survey, aspen defoliation much more extensive than what was recorded during the aerial overview surveys was observed. This indicates an underestimation of aspen defoliation during the 2005 aerial surveys.

In the future it may be prudent to check the pheromone traps for signs of moth flight to ensure that aerial surveys are not carried out until defoliation is complete.

Some **large aspen tortrix**-caused damage was also observed in this region. However, aspen defoliation was ascribed to the **forest tent caterpillar**, which was the main defoliator.

The extent and severity of aspen defoliation in this region during 2002-2005 are shown on Figure 10. This figure shows a rather short-lived aspen defoliation caused by the **large aspen tortrix** in 2002-2003. This infestation collapsed in 2004. The modest increase in aspen defoliation in 2005 is due to the **forest tent caterpillar**. As indicated above, the extent of 2005 defoliation may be underestimated.

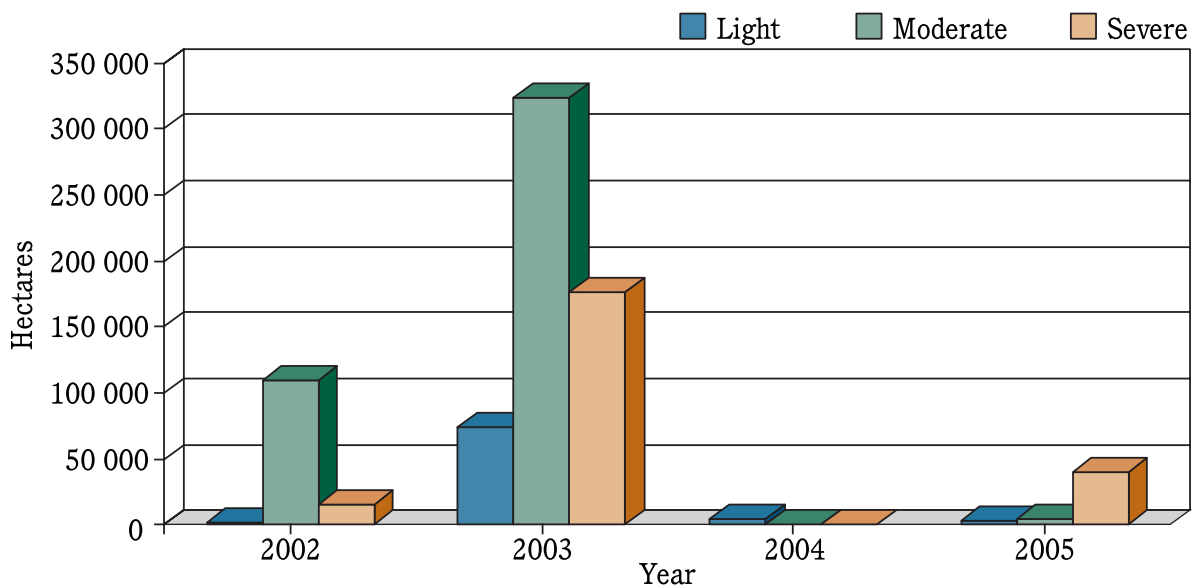


Figure 10

Extent and severity of insect pest-caused aspen defoliation in the Northeast Region of Alberta, 2002-2005.



Northwest Corporate Region (NW)

The FHO carried out most of the digital sketch mapping of aspen defoliation between June 20-July 13; the remainder of mapping was completed on August 3. A tablet personal computer connected with a GPS unit was used for these surveys. The results of these surveys are shown on Figure 9.

The extent and severity of aspen defoliation in this region during 2001-2005 are shown on Figure 11. This figure shows a longer than usual large aspen tortrix defoliation that collapsed in 2004. The increase in aspen defoliation in 2005 is due to the forest tent caterpillar.

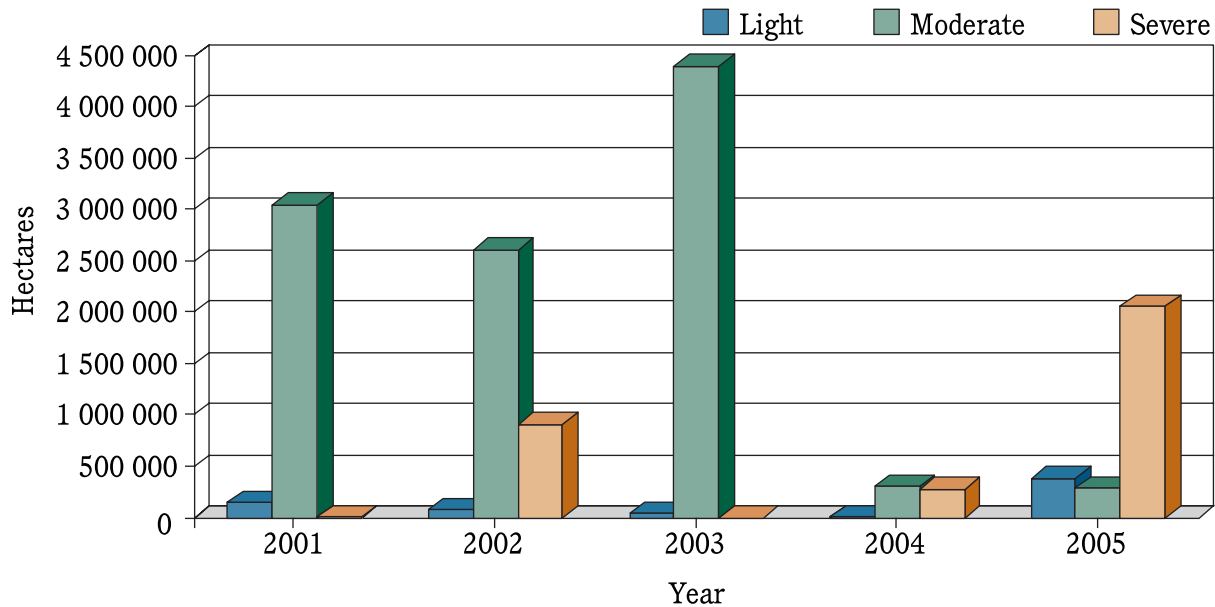


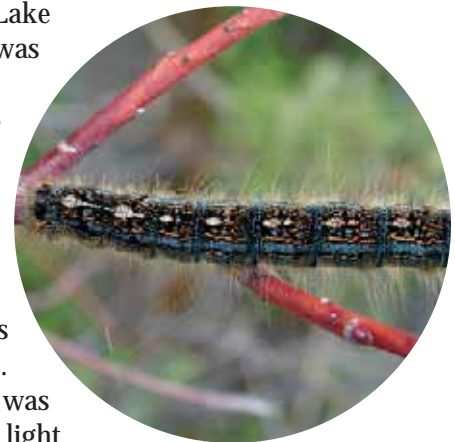
Figure 11

Extent and severity of aspen defoliation in the Northwest Region in Alberta, 2001-2005.

Forest tent caterpillar defoliation in this region was scattered over an estimated 2 501 574 ha. This is almost an eight-fold increase compared to the 287 244 ha defoliated in 2004. Most of this defoliation was severe.

There were two large patches of defoliation in this region. One large patch was scattered over an estimated 1 996 191 ha. Most of this patch was located in the Upper Hay Area with a small portion extending in to the Peace Area (Figure 9). This large patch extended over the areas of Chinchaga River, Rainbow Lake, Zama City, High Level, north of Paddle Prairie, Meander River, Steen River and Yates River. The other patch was located near Wabasca in

the Lesser Slave Lake Area. This patch was scattered over an estimated 520 078 ha south of South Wabasca Lake, near Teepee Lake, Little Buffalo Lake and as further north as Chipewyan Lakes. In addition, there was a smaller patch of light defoliation in the Smoky Area (NW1).

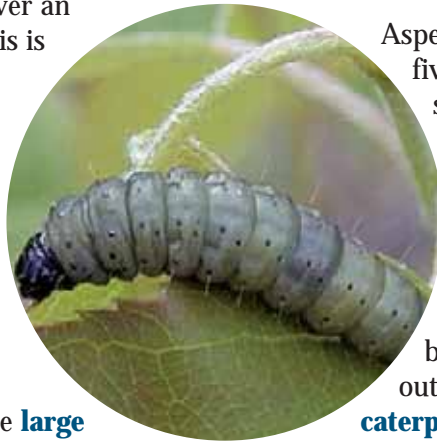


The area defoliated by the **large aspen tortrix** further declined in 2005 compared to area defoliated in 2004. This defoliation was found scattered over an estimated gross area of 227 001 ha. This is a 25% decline compared to 301 675 ha defoliated in 2004. Areas of defoliation were found south of Grande Prairie in the Smoky Area and on Saddle Hills and south of High Prairie in the Lesser Slave Area.

Southwest Corporate Region (SW)

Aspen defoliation, mostly caused by the **large aspen tortrix**, was scattered over a total of 41 851 hectares throughout this region in 2005 (Figure 9).

More than half of this defoliation was in the Clearwater (SW2) Corporate Area.



Aspen defoliation in this region in the last five years is shown on Figure 12. This shows the collapse of large aspen tortrix populations in 2004. This infestation began in 1999 and continued for five years before collapsing in 2004. Historically, **large aspen tortrix** infestations last for about three years and are followed up by the **forest tent caterpillar** outbreaks. In 2005, some **forest tent caterpillar** larvae were observed in this region foretelling another outbreak in the near future.

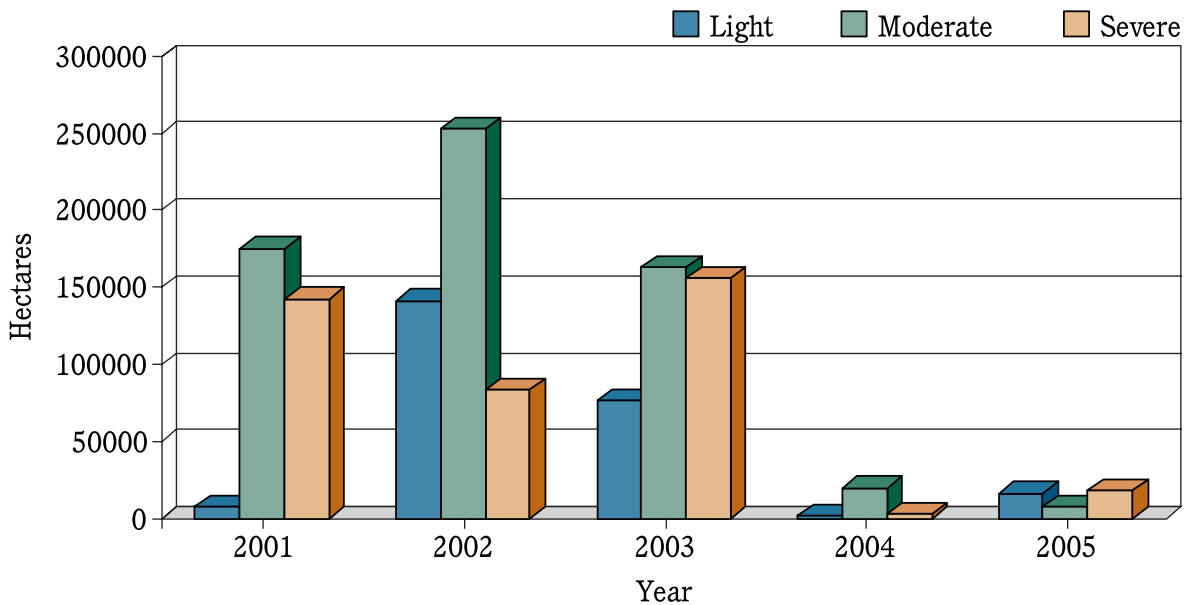


Figure 12
Aspen defoliation in the Southwest Corporate Region, 2001-2005.



Southern Rockies (SW1) and Clearwater (SW2) Corporate Areas

The Forest Health Officer carried out aerial overview surveys on aspen defoliation from June 28-29 over the Southern Rockies (SW1) and Clearwater (SW2) areas. A fixed wing aircraft was used for these surveys. The results of these surveys are shown on Figure 9.

Aspen defoliation was scattered over an estimated gross area of 25 504 hectares. This is about an 8% decline compared to 27 792 hectares defoliated in 2004. The **large aspen tortrix** was the main defoliator of aspen in these two areas.

Foothills (SW3) and Woodlands (SW4) Corporate Areas

The Forest Health Officer and a private contractor carried out an aerial overview survey on July 12 on aspen defoliation over the Foothills (SW3) and Woodlands (SW4) areas. The results of this survey are shown on Figure 9.

Aspen defoliation in these corporate areas was attributed to the dominant defoliator, the **large aspen tortrix**, although some **aspen two-leaf tier** *Enargia decolor* (Walker) damage was observed during the survey. The defoliation was confined to Whitecourt area. Defoliation was scattered over an estimated 16 347 ha. This is a 51% increase in defoliated area, compared to the 10 812 ha defoliated in 2004.

Other Aspen Defoliators

The **aspen leafroller**, *Pseudoxentera oregonana* (Walsingham), damage was common in northern Alberta. In the Northwest Region, aspen leafroller was abundant in areas along the Peace River from British Columbia border to the Town

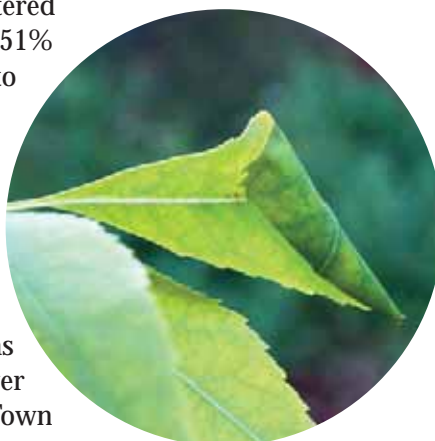
of Peace River. In some areas up to 80% of the aspen leaves were infested with this pest. The **aspen leafroller** damage was widespread in the Northeast Region.

The **aspen two-leaf tier** was partly responsible for aspen defoliation in the northern part of the Southwest Region.

Minor Insect Pests

Extensive areas of willow with **willow leafminer**, *Micrurapteryx salicifoliella* (Chambers) damage were observed in the Northeast region. Willow dieback was evident in the areas north of Wandering River and in the Waterways Area.

The **ash leaf cone roller**, *Caloptilia fraxinella* (Ely) infested some ash trees around Athabasca, Wandering River and Fort McMurray in the Northeast Region. The range of this pest appears to be increasing within the region.



Diseases & Disorders

Many diseases have been reported to affect forest trees in Alberta. Needle casts and rusts, dwarf mistletoe, stem cankers and rusts, stem and root decay caused by fungi, cone rusts, seedling diseases, leaf rusts and blights are among the common diseases of forest trees. However, these diseases were not surveyed in 2005 and consequently, not reported here.

Hypoxylon Canker

A substantial increase in the **hypoxylon canker** *Hypoxylon mammatum* (Wahl.) was observed on aspen in Cypress Hills Inter-Provincial Park. The infection was particularly severe near the Elkwater Townsite. Some aspen stands in the park were nearly 100% infected. The mature aspen in the park is showing advanced signs of decay.

Hail Damage

Hail damaged an estimated 2 171 hectares of aspen in the Peace River Area of the Northwest Region. Aerial observation of this hail damage was confirmed by ground survey. The affected area was located along the Chinchaga Forestry Road, north of Manning. All broadleaf trees were completely stripped of foliage in the worst affected areas.



Urban Forest Pests⁶

Insect Pests

Yellowheaded spruce sawfly (YHSS) populations increased dramatically throughout the City of Edmonton. In 2005, the City of Edmonton staff treated 3 584 YHSS-infested white spruce. This pest problem is expected to exacerbate in the coming years.

The **satin moth**, *Leucoma salicis* (L.), numbers in Edmonton appeared to have increased in the past few years; as well as in their **parasitoid wasp**, *Cotesia* sp., which kept the satin moth increase to a minimum. The **apple maggot**, *Rhagoletis pomonella*, (a minor pest causing cosmetic damage) has become established in Edmonton area. No **gypsy moths**, *Lymantria dispar* (L.), were caught in pheromone-baited traps set up at various strategic locations around the city, in conjunction with the Canadian Food Inspection Agency (CFIA). The **larger boxelder leafroller**, *Archips negundana*, defoliated several Manitoba maples along the river valley. The populations of the **forest tent caterpillar**, **fall cankerworm** (*Alsophila pometaria*), and **amber-marked birch leafminer** (*Profenusa thompsoni*) also increased slightly. The **spiny ash sawfly**, *Euparophora parca*, was found in low numbers. The **ash leaf cone roller**, *Caloptilia fraxinella*, was widespread in the city. In many of the 27 neighbourhoods surveyed, an unidentified *Apanteles* sp. parasitized up to 20% of this caterpillar larvae.

The **European elm scale**, *Gossyparia spuria*, has become established in Edmonton. Spraying of dormant oil appears to have contained this problem. The **ash plant bugs**, predominantly *Tripidosteptes glaber*, were found at low population levels on green ash; on black ash *T. plagifer* was the common species. The populations of the **cottony psyllid**, *Psyllopsis discrepans*, decreased across the city.

The **western ash bark beetles**, *Hylesinus californicus*, killed many ash trees. Experiments have shown that the western ash bark beetle is killed if the infested wood chip piles are heated to over 50°C for at least an hour. The numbers of **red elm weevil**, *Magdalis armicollis*, diminished in the city.

Diseases and Disorders

Ninety new cases of the **fungal wilt disease**, *Dothiorella ulmi*, were confirmed in Edmonton in 2005⁷; thirty-three of these trees were removed. A

fungal canker, probably

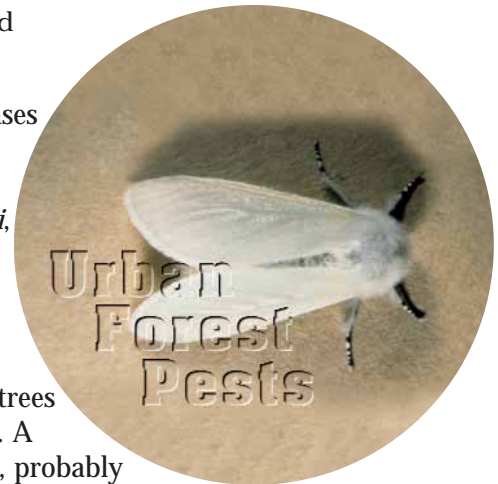
Cytospora, occurred on a small number of drought-stressed trees near the west end of the city. Cankers similar to those caused by *Fusicoccum* sp. were reported from a number of green ash trees in St. Albert.

In spite of a relatively wet year, the city lost more trees to drought than in previous years. The city up to now has lost a few thousand trees due to drought.

Dutch Elm Disease⁸

Eight suspected elm samples from across the province, submitted to Dr. Tewari's laboratory for diagnosis, tested negative for *Ophiostoma ulmi* and *O. novo ulmi*, the pathogens that cause the disease. Alberta still remains free of Dutch Elm Disease.

In addition, the Society to Prevent Dutch Elm Disease (STOPDED) placed 422 pheromone-baited sticky traps in 113 cities, towns, villages and hamlets as well as 31 nurseries, 5 ports of entry to the province and 29 provincial parks and recreational areas. Overall, the number of **smaller European elm bark beetle**, *Scolytus multistriatus* (SEEBB) captured in the sticky traps has been declining in the past few years. In 2005, single SEEBB was trapped for the first time in the Town of Brooks and villages of Raymond and Forestburg. Seven SEEBB were captured in Calgary.⁸



⁶ Based on an unpublished report by M. Jenkins and M. Wartenbe of the City of Edmonton.

⁷ Confirmed by Dr. J.P. Tewari, University of Alberta

⁸ Based on an unpublished report by Janet Feddes-Calpas of STOPDED Society