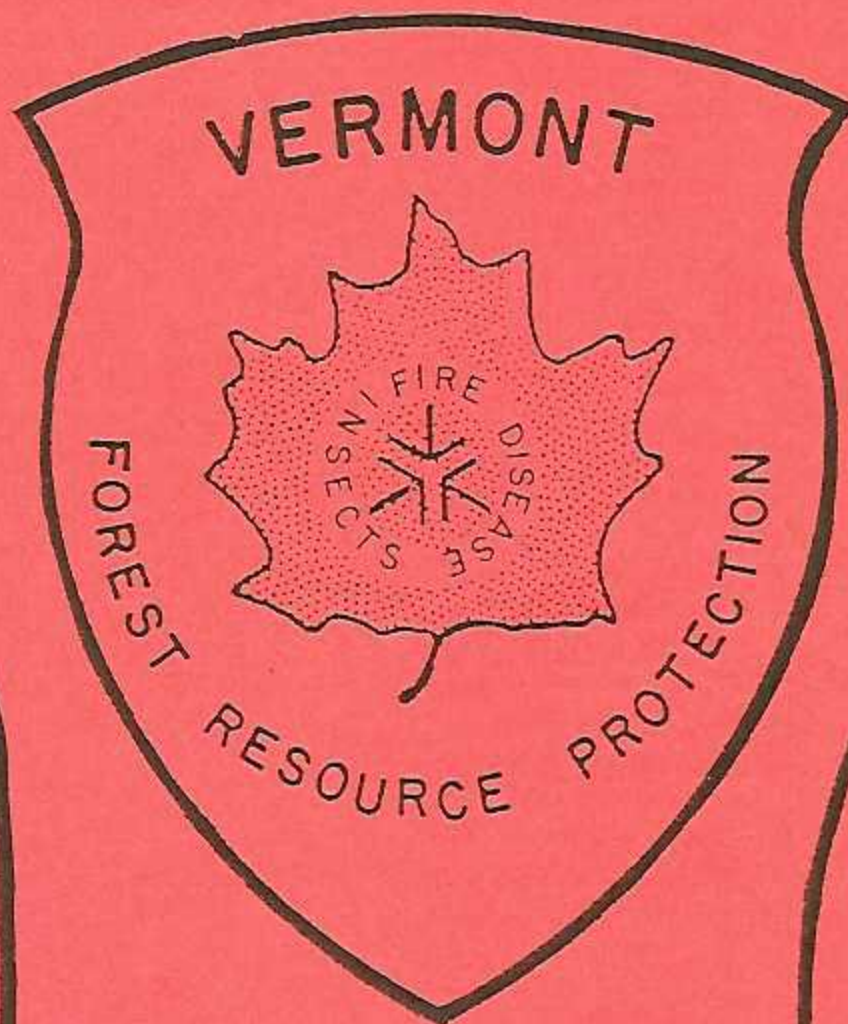


**FOREST INSECT AND DISEASE  
CONDITIONS IN VERMONT  
CALENDAR YEAR 1985**



AGENCY OF  
ENVIRONMENTAL CONSERVATION  
DEPARTMENT OF FORESTS,  
PARKS, AND RECREATION  
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FOREST INSECT AND DISEASE  
CONDITIONS IN VERMONT  
CALENDAR YEAR 1985

Prepared by

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AGENCY OF ENVIRONMENTAL CONSERVATION  
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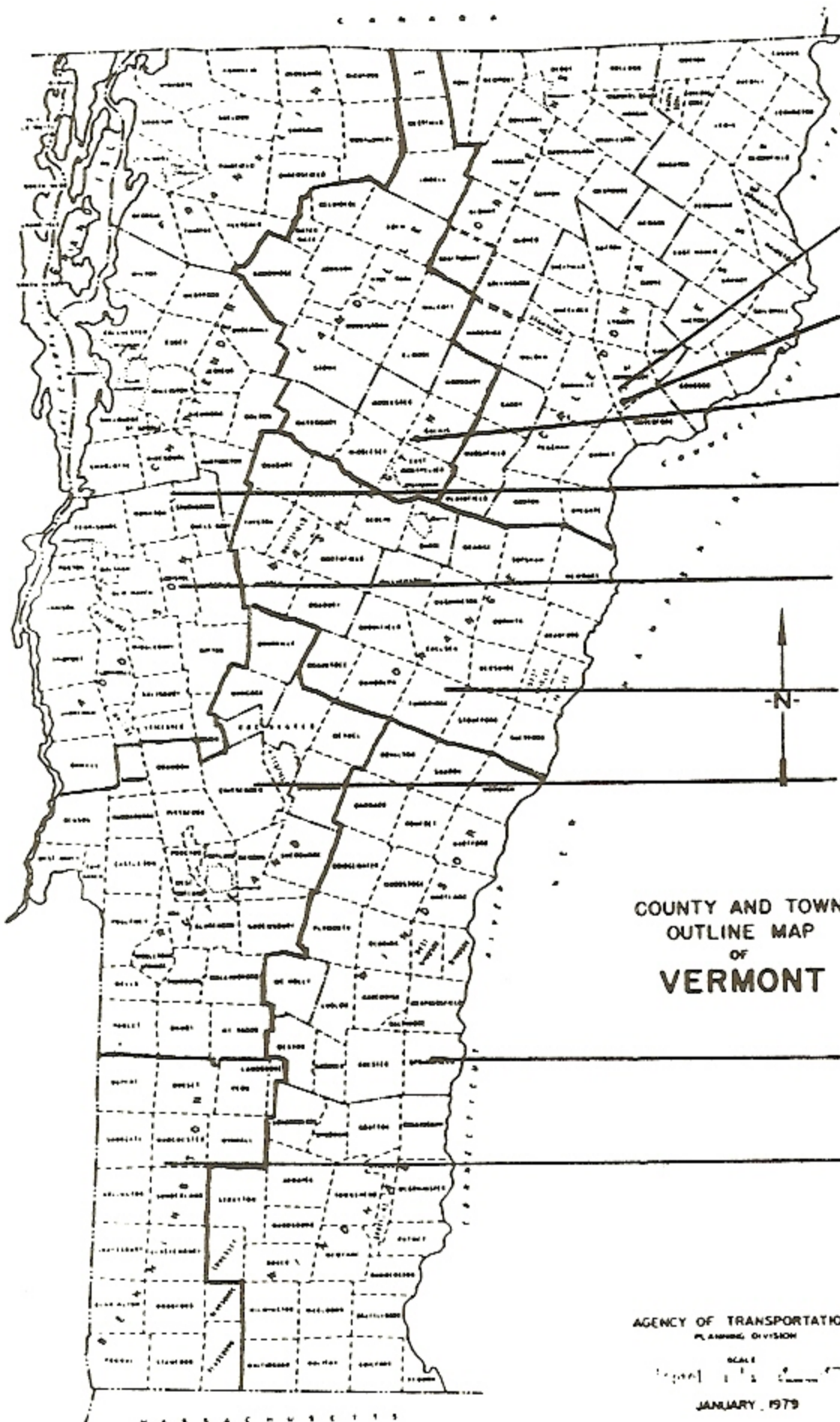
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 JANUARY, 1979

VERMONT  
INSECT AND DISEASE HIGHLIGHTS

1985

Gypsy Moth populations remain low, with small numbers of egg masses indicating continued low levels in 1986. A technique of population disruption, by releasing eggs which produce sterile adults, was tested in cooperation with the University of Vermont and the U. S. Forest Service.

Maple Leaf Cutter remains widespread at light population levels with no defoliation visible from the air.

Forest Tent Caterpillar caused no visible defoliation, although occasional larvae were observed throughout the State. Many trees are showing signs of recovery from previous defoliations, although some additional acres of dieback were detected. About 33,500 acres of dieback associated with previous defoliation have now been mapped. A ground impact survey of over 80 defoliated sites was completed; results should be available in early 1986. Pheromone traps were placed in four locations to test this method of population monitoring.

Oak Skeletonizer caused widespread light defoliation in Bennington and Windham Counties. Overwintering pupae indicate that significant populations will occur in 1986.

Spruce Budworm populations remained very low, with no defoliation visible from the air. Pheromone trapping methods continue to be refined. Budworm-caused tree mortality rate and acres of mortality detected are both down from 1984 levels. Statewide 1985 losses are estimated at \$115,440.

Balsam Gall Midge populations collapsed in most balsam fir Christmas tree plantations. Experimental data indicate that Dursban may be effective in controlling gall midge, although it is not yet registered for this use.

Balsam Twig Aphid populations have increased in balsam fir Christmas trees, and are expected to cause additional damage in 1986.

Pear Thrips caused damage to developing sugar maple foliage throughout the State early in the season. Affected leaves were mottled, tattered, dwarfed and/or crinkled. Damage was particularly heavy in sugarbushes and stands with a high percentage of sugar maple. Some refoiliation occurred, but many crowns remained thin throughout the growing season.

Spruce Spider Mite damage continues to be detected on a variety of conifer species statewide, including Christmas trees.

Scleroderris Canker was found in seventeen pine plantations not known to be affected before, including infections in eight towns previously outside the quarantine area. Wet spring weather in 1983 and 1984 have led to an increased incidence of the disease. A survey of ninety plantations in the four southern Vermont counties indicated that Scleroderris Canker has not spread to this area.

Fir-Fern Rust caused widespread light to moderate defoliation of Christmas trees in northern Vermont, but damage has declined from previous years.

Maple Decline was observed in new locations. Some of the observed damage is in previously defoliated areas. A statewide sugarbush survey was conducted to determine whether there have been changes in tree conditions since 1977. Aerial photographs were taken as the first step of a hardwood decline survey to be completed in 1986.

White Pine Needle Blight continued to be widespread on susceptible white pines.



## INTRODUCTION

The information in this report is based largely on aerial survey to detect defoliation, as well as ground surveys and observations of Forest Resource Protection personnel and other forestry staff. Aerial surveys were flown in late August or early September to detect defoliation, dieback and mortality. A special survey to evaluate thrips damage was flown in Bennington County and southern Rutland County in late June. Diagnostic assistance was provided by the University of Vermont.

The winter of 1984 began with seasonable temperatures, and snowfall somewhat below normal. Spring began with a dry April and early May. A hard frost occurred on May 9. Temperatures were seasonable, with a wetter than normal early summer, and a dry August. Several periods of extended rainfall occurred in September (Figure 1).

Growing conditions over the season were generally good. Dry conditions in August did generate stress symptoms on droughty sites. Oak areas produced a heavy crop of acorns.

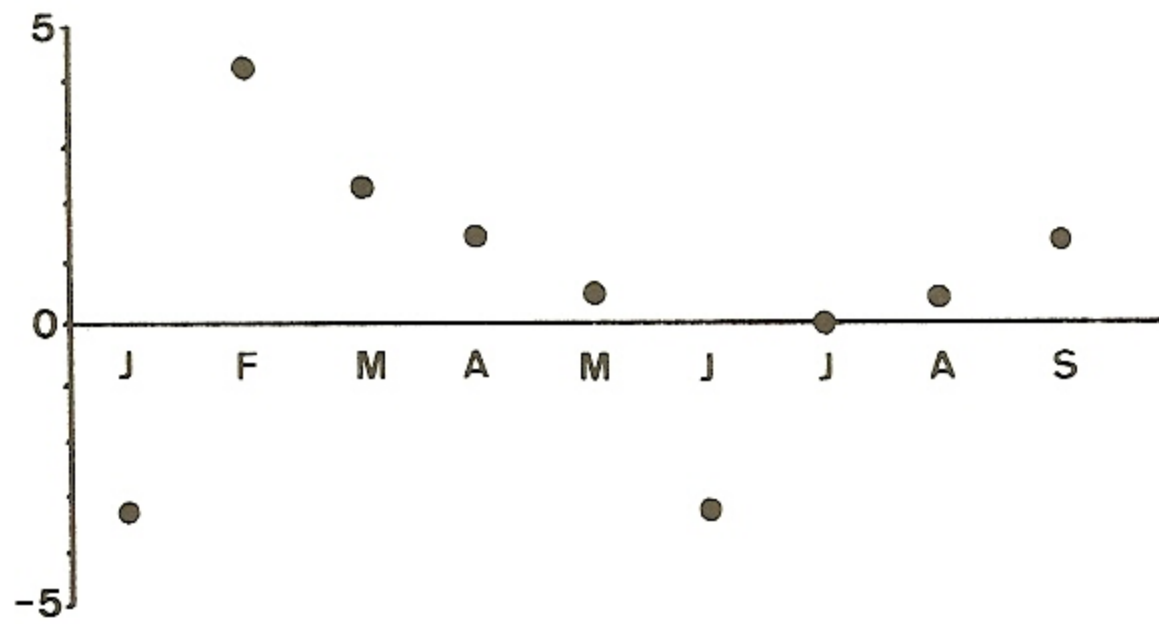
FIGURE 1.

1985 MONTHLY WEATHER SUMMARY

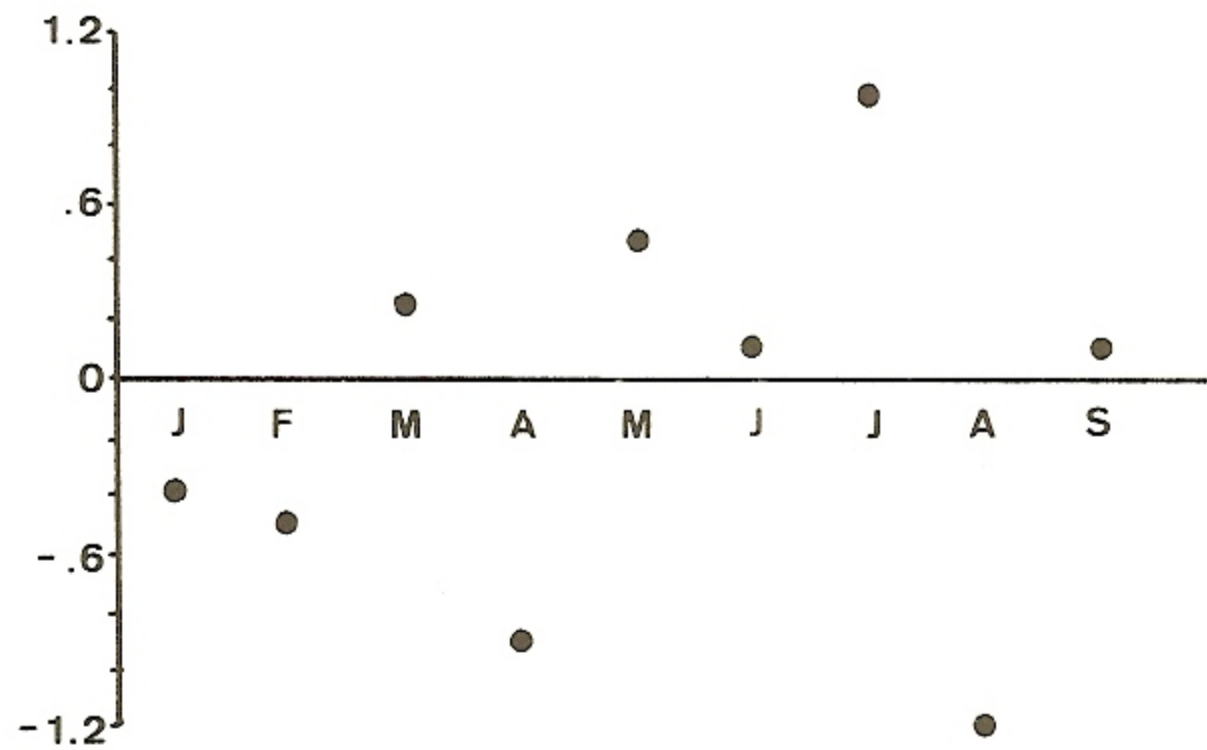
Data From NOAA Local Climatological Data

Monthly Summary - Burlington International Airport

TEMPERATURE (°F)  
Departure From Normal



PRECIPITATION (IN)  
Departure From Normal



## FOREST INSECTS

### Hardwood Defoliators

Gypsy Moth, Lymantria dispar, populations remain stable at low levels. No defoliation was observed. Populations in southern Vermont initially showed a moderate increase, with larva counts dropping dramatically during the final instars, and few egg masses produced.

Monitoring of gypsy moth life stages using burlap bands and pheromone traps has continued, now on six sites. These are located in Bennington, Chittenden, Rutland and Windham Counties. Low counts were obtained. Larval counts in future years may help determine when the next population increase will occur.

Assistance was provided to a cooperative project between the University of Vermont and the U. S. Forest Service. This was a trial of population disruption through release of eggs which produce sterile adults. Details of this project can be obtained from Dr. Bruce Parker at the University of Vermont.

Monitoring of red oak mortality, first observed in 1982 following several years' defoliation by the gypsy moth, continued on four plots in Glen Lake State Forest. After three growing seasons, there is no additional mortality, and little change in the remaining trees.

Maple Leaf Cutter, Paraclemensia acerifoliella, remains widespread at light population levels with no defoliation visible from the air. Populations are building slightly in Windham and Windsor Counties. Light to moderate damage was also found in several locations in Stockbridge and in a West Pawlet sugarbush. No sugarbushes required aerial spraying for this insect in 1985.

Forest Tent Caterpillar, Malacosoma disstria, caused no visible defoliation this year, although occasional larvae were observed throughout most of the State. Tree mortality, mostly of sugar maple, following the 1978-1982 outbreak was less noticeable this year, but an additional 3,192 acres of dieback and mortality associated with defoliation was detected for the first time (Table 1, Map 4).

Table 1. Acres of mortality associated with Forest Tent Caterpillar Defoliation, detected for the first time in 1985.

County	Acres of Mortality*			Total
	Light	Moderate	Heavy	
Franklin	1909	0	0	1909
Lamoille	0	1083	0	1083
Orleans	200	0	0	200
TOTAL	2109	1083	0	3 92

\*Light mortality = 1-10 percent, scattered or patchy  
 Moderate mortality = 11-25 percent, scattered  
 Heavy mortality = over 25 percent

This brings the total area of dieback and mortality associated with this insect to approximately 33,500 acres for the state. Another 5,259 acres of hardwood decline (including sugar maple) not associated with insect defoliation was also detected, and will be discussed under Diebacks and Declines. A ground impact survey of over 80 defoliated sites was completed this summer, and the results should be available in early 1986.

Sugar maples in plots established in Camels Hump State Forest to compare tree condition between an area that received a shelterwood cut following two years of heavy defoliation with an adjacent uncut area continue to show improvement in the cut area, but remain fairly stable in the uncut area (Table 2).

Table 2. Average percent crown dieback on sugar maple, cut vs. uncut areas on Camels Hump State Forest.

N.	Area	Average Percent Dieback			
		1982	1983	1984	1985
31	Shelterwood (BA=51)	25	23	20	18
36	Uncut (BA=113)	22	22	23	22

The only individual trees in either area that worsened in crown condition in 1985 were those with complicating stress problems such as stem rot or severe logging wounds.

Forest Tent Caterpillar pheromone traps were tried for the first time this year to see if they would be useful for predicting population increases in advance of noticeable defoliation. Clusters of five traps

were placed in a sugar maple stand in each of the following towns: Roxbury, Bethel, Waterbury and Fairfield. Each cluster caught an average of 0.6 moths per trap, regardless of location. This unusual consistency may indicate that when the insect is at very low levels, populations tend to be uniform throughout its host range. Future trapping should determine whether this uniformity remains consistent as well as predict when populations are increasing.

Oak Skeletonizer, Bucculatrix ainsliella, caused widespread light defoliation in oak stands throughout Bennington and Windham Counties. Some Bennington County stands sustained heavier damage, with up to 90% of individual crowns skeletonized. High numbers of overwintering pupae indicate that populations will be high in 1986.

OTHER HARDWOOD DEFOLIATORS

<u>INSECT</u>	<u>HOST(S)</u>	<u>LOCALITY</u>	<u>REMARKS</u>
American Dagger Moth  <u>Acronicta</u> <u>americana</u>	Sugar Maple Red Maple	Widespread	Very light de- foliation; larvae common in late summer
Birch Leaf Miner  <u>Fenusa pusilla</u>	White Birch Grey Birch	Widespread	Increased damage in Southern Vermont.
Birch Leaf Folder  <u>Ancylis</u> <u>discigerana</u>	Yellow Birch	Lamoille Co.	Very light and scattered.
Birch Skeletonizer  <u>Bucculatrix</u> <u>canadensisella</u>			Not observed.

OTHER HARDWOOD DEFOLIATORS (Cont.)

INSECT	HOST(S)	LOCALITY	REMARKS
Bruce Spanworm <u>Operophtera</u> <u>bruceata</u>	Sugar Maple	Orleans County Washington Co.	Light defoliation only.
Eastern Tent Caterpillar <u>Malacosoma</u> <u>americanum</u>	Apple, Cherry	Widespread	Nests & Heavy damage more evident in Windham County
Elm Leaf Beetle <u>Pyrrhalta</u> <u>tuteola</u>	American Elm	Addison, Chittenden Lamoille Orange Counties	Heavy on some trees, especially in Addison County.
Fall Cankerworm <u>Alsophila</u> <u>pometaria</u>			Not observed
Fall Webworm <u>Hyphantrea</u> <u>cunea</u>	Cherry, Butter- nut & others	Throughout	Heavy in scattered southern Vermont roadside locations.
Forest Tent Caterpillar <u>Malacosoma</u> <u>disstria</u>			See Narrative
Green Striped Mapleworm <u>Anisota</u> <u>rubicunda</u>	Sugar Maple	Windham, Franklin & Chittenden Cos.	Occasional larvae observed.

OTHER HARDWOOD DEFOLIATORS (Cont.)

<u>INSECT</u>	<u>HOST(S)</u>	<u>LOCALITY</u>	<u>REMARKS</u>
Gypsy Moth <u>Lymantria</u> <u>dispar</u>			See narrative.
Half Winged Geometer <u>Phigalia</u> <u>titea</u>			Not observed
Hickory Tussock Moth <u>Halisidota</u> <u>carpae</u>		Southern Vermont	No visible defoliation.
Japanese Beetle <u>Popillia</u> <u>japonica</u>	Yellow Birch	Essex Junction St. Johnsbury	Found defoliating containerized nursery stock and ornamentals.
Large Aspen Tortrix <u>Choristoneura</u> <u>conflictana</u>			Not observed.
Lilac Leaf Miner <u>Gracillaria</u> <u>syringella</u>	Lilac	Chittenden Lamoille Cos.	Widespread light to moderate damage.
Linden Looper <u>Erranis</u> <u>tiliaria</u>			Not observed

OTHER HARDWOOD DEFOLIATORS (Cont.)

<u>INSECT</u>	<u>HOST(S)</u>	<u>LOCALITY</u>	<u>REMARKS</u>
Locust Leaf Miner <u>Odontota dorsalis</u>	Black Locust	Statewide except Northeast Kingdom & Southwestern Counties	Damage occasionally very heavy.
Maple Leaf Cutter <u>Paraclemensia acerifoliella</u>			See narrative.
Maple Petiole Borer <u>Caulocampus acericaulis</u>	Sugar Maple	Ira Caledonia County	Defoliation on reproduction.
Maple Trumpet Skeletonizer <u>Epinotia acerifolia</u>	Sugar Maple	Widespread	Occasional damage, very light.
Maple Webworm <u>Tetralopha asperatella</u>	Sugar Maple	Essex Junction Pawlet	Occasional colonies
Mountain Ash Sawfly <u>Pristophora geniculata</u>	Mountain Ash	Widespread	On ornamentals.
Oak Skeletonizer <u>Bucculatrix ainsliella</u>	Oak		See narrative.



OTHER HARDWOOD DEFOLIATORS (Cont.)

INSECT	HOST(S)	LOCALITY	REMARKS
Orange-humped Mapleworm  <u>Symmerista</u> <u>leucitys</u>	Sugar Maple	Fletcher Duxbury	Occasional colony noticed.
Pearslug  <u>Caliroa</u> <u>cerasi</u>	Cherry	Stowe	Heavy on ornamental shrubs.
Pin Oak Sawfly  <u>Caliroa</u> <u>sp.</u>			Not observed.
Rose Chafer  <u>Macroductylus</u> <u>subspinosus</u>	Ornamentals	Caledonia Co.	Light
Saddled Prominent  <u>Heterocampa</u> <u>guttivata</u>	Sugar Maple Beech	Addison, Bennington, Chittenden, Franklin, Rutland & Windsor Cos.	Occasional larvae or pupa cases only.
Satin Moth  <u>Leucoma</u> <u>salicis</u>	Poplar	Milton Essex	Heavy on a few ornamentals
Solitary Leaf Roller  <u>Sparganothis</u> <u>pettitana</u>	Sugar Maple	Essex Junction	Light population at nursery

OTHER HARDWOOD DEFOLIATORS (Cont.)

<u>INSECT</u>	<u>HOST(S)</u>	<u>LOCALITY</u>	<u>REMARKS</u>
Spiny Oak Sawfly <u>Perclista sp.</u>	Red Oak	Milton	Light defoliation in an oak stand.
Spring Cankerworm <u>Paleacrita vernata</u>			Not observed.
Uglynest Caterpillar <u>Archips cerasivoranus</u>	Cherry	Scattered	Light.
Willow Sawfly <u>Nematus salicisodoratus</u>	Willow	Underhill	Moderate on a single tree.

## SOFTWOOD DEFOLIATORS

Spruce Budworm, *Choristoneura fumiferana*, populations continued to be very low in 1985 with no defoliation visible by aerial survey for the second consecutive year. Numbers of large larvae remained at very low levels equal to those found in 1984.

Pheromone traps were deployed in 15 stands, including five that were formerly heavily infested. Moth catch was less than expected, but since trap methodology is still in the experimental stage, it is not known whether this is a true indication of a further population decline. In plots containing the same trap and lure combination, as used in 1984, moth catch was down 94 percent. Unitraps with PVC lures and Vapona strips as a killing agent were the most effective at catching spruce budworm male moths, while Multi-pher traps (Figure 2.) with the same lure and flea collars as killing agents were the least effective. Moth counts in formerly heavily infested stands were not much greater than in the traditionally lightly infested stands. This was unexpected, and could indicate an area-wide population drop if trap results are reliable. The results of our current survey for numbers of overwintering larvae should determine whether this is the case. Six pheromone traps placed by the U. S. Forest Service on the Green Mountain National Forest yielded no moths; a decrease from 1984.



Figure 2. Multi-pher pheromone trap used in 1985 to monitor light spruce budworm populations by capturing male moths.

Spruce-fir mortality detected during the annual aerial survey dropped from 46,417 acres in 1984 to 11,750 acres this year (Table 3, Map 1).

Table 3. Acres of mortality in 1985 due to Spruce Budworm

County	Acres of Mortality*			Total
	Light	Moderate	Heavy	
Caledonia	1260	820	274	2354
Essex	181	1059	4736	5976
Lamoille	0	0	595	595
Orleans	520	613	1692	2825
TOTAL	1961	2492	7297	11750

\*Light mortality = 1-10 percent, scattered or patchy  
 Moderate mortality = 11-25 percent, scattered  
 Heavy mortality = over 25 percent

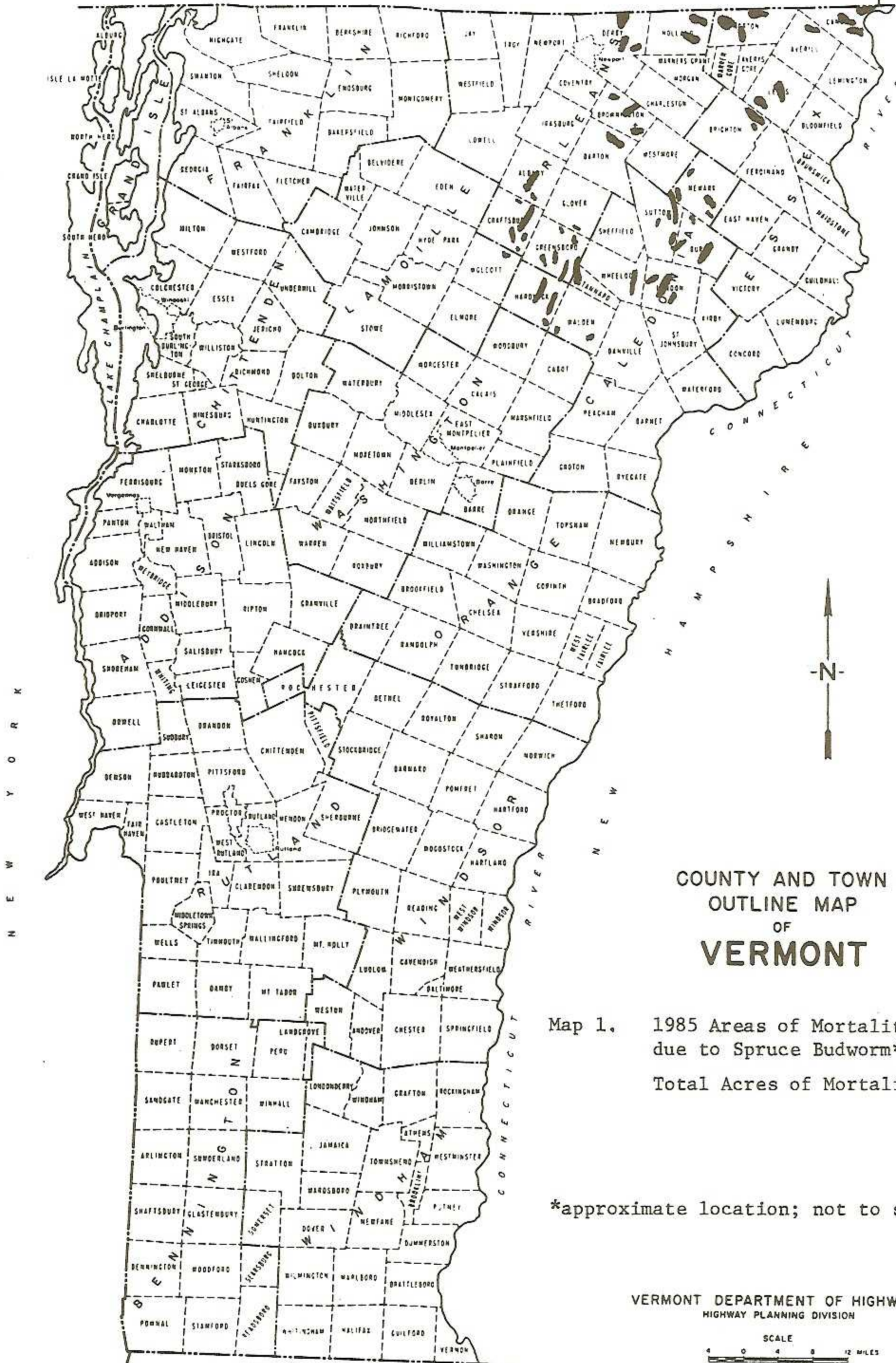
The majority of areas that were formerly mapped as having less than heavy mortality went undetected this year because there are now fewer standing dead trees, and many trees whose crowns have recovered.

Budworm-caused mortality of fir and spruce that occurred during the past year was estimated from a survey of 12 plots in areas that contain light, moderate and heavy mortality, four plots per category. Mortality rates (percent of original number of trees over 4.5 inches, dbh) for 1985 were 2.5, 2.5, and 6.5 percent, respectively for lightly, moderately and heavily damaged stands compared to 3.5, 5.6 and 16.3 percent for 1984. These percentages were applied to average per acre volume and density data from the 1980 Orleans County Spruce Budworm Mortality Survey and acres of mortality from Table 3 to produce the loss estimates in Table 4.

Table 4. Estimated tree mortality in 1985 due to Spruce Budworm

County	Number of Trees Dead	Total Volume Lost (Cords)
Caledonia	16,100	1,720
Essex	78,200	8,350
Lamoille	8,900	950
Orleans	31,900	3,410
TOTAL	135,100	14,430

The reduction in mortality rates as well as acres of mortality detected this year is reflected in a total volume loss for 1985 of 14,430 cords compared to 94,150 cords in 1984. Timber value of 1985 losses based on an average stumpage price of \$8 per cord is 115,440 dollars.



COUNTY AND TOWN  
OUTLINE MAP  
OF  
**VERMONT**

Map 1. 1985 Areas of Mortality  
due to Spruce Budworm\*  
Total Acres of Mortality=11 750

\*approximate location; not to scale

VERMONT DEPARTMENT OF HIGHWAYS  
HIGHWAY PLANNING DIVISION



JUNE, 1969

OTHER SOFTWOOD DEFOLIATORS

<u>INSECT</u>	<u>HOST(S)</u>	<u>LOCALITY</u>	<u>REMARKS</u>
Arborvitae Leaf Miner <u>Argyresthia thuiella</u>	Northern White Cedar	Widespread in Northern Vermont	Very light.
European Pine Sawfly <u>Neodiprion sertifer</u>		Throughout So. Vermont	Observed in scattered locations including Clarendon, Chittenden and Shaftsbury. Heavy bird predation.
Introduced Pine Sawfly <u>Diprion similis</u>	White Pine	Montpelier	A single larva found.
Larch Casebearer <u>Coleophora laricella</u>	Eastern Larch	Chittenden, Orange & Washington Cos.	Moderate to heavy defoliation in a few stands; populations probably increasing.
Larch Sawfly <u>Pristophora erichsonii</u>			Not observed
Pine Tip Moth Species undetermined	Mugho Pine	Chittenden County	Light damage.
Red Headed Pine Sawfly <u>Neodiprion lecontei</u>	Red Pine	Franklin Co.	Light defoliation of a few trees.

OTHER SOFTWOOD DEFOLIATORS (Cont.)

<u>INSECT</u>	<u>HOST(S)</u>	<u>LOCALITY</u>	<u>REMARKS</u>
Spruce Budworm  <u>Choristoneura fumiferana</u>			See narrative.
Spruce Bud Moth  <u>Zeiraphera canadensis</u>	White Spruce	Orleans, Caledonia, Essex, Lamoille Cos.	Scattered light defoliation
White Pine Sawfly  <u>Neodiprion pinetum</u>	White Pine	Brookfield	A few caterpillars observed.
Yellow-headed Spruce Sawfly  <u>Pikonema alaskensis</u>	Blue Spruce	Johnson Swanton	Moderate defoliation of ornamentals.

## SAPSUCKING INSECTS, MIDGES AND MITES

Balsam Gall Midge, Paradiplosis tumifex, populations collapsed in most balsam fir Christmas tree plantations. Most plantations that experienced heavy damage in the past two to three years had extremely light damage this year. This was expected due to the control influence of the non-gall-making midge that was reported to be abundant in 1985. A few northern Vermont plantations where populations peaked later than in most, still suffered moderate to heavy damage this year, but this should decline in 1986.

Dursban, an insecticide not yet registered for balsam gall midge control, was compared to diazinon at two rates and two different shoot lengths (35mm and 50mm) in a heavily infested plantation in Hyde Park. This was a cooperative experiment with the University of Vermont Entomology Laboratory. Diazinon at the recommended shoot length (35mm) still gave the best results but Dursban 50W provided acceptable control and was equally effective at the 50mm (two inch) shoot length. The later (50mm) treatments with either material resulted in fewer developed galls than the early (35mm) treatments but left more needles with undeveloped galls. These needles do not drop from the branches, but do cause some disfigurement of the foliage. We expect that Dursban (chlorpyrifos) will become registered for gall midge based on this data, providing growers with an alternative to diazinon.

Balsam Twig Aphid, Mindarus abietinus, populations increased, causing light to heavy damage to balsam fir Christmas trees. During the annual Scleroderis survey of Christmas trees, twig aphid was reported present on 230 acres, causing moderate to heavy damage to 116 of these acres. This compares to only 17 acres of light damage detected in the same locations in 1984. Populations are expected to peak in 1986.

Pear Thrips, Taeniothrips inconsequens, was responsible for widespread damage to sugar maple foliage early in the season. This is the first time that this damage has been identified in Vermont, but it has been a problem in Pennsylvania during the past six years. The tiny sucking insect feeds within developing buds and on young foliage, causing yellow and green mottling between the veins and small brown wounds along the veins on the undersides of the leaves, and sometimes in the petioles. Heavy damage results in dwarfed, cutleafed and distorted leaves with irregular margins (Figures 3 and 4). Tattered leaves superficially resemble frost damage.

A limited aerial survey and ground observations indicated that light damage was present throughout the State. The heaviest damage was in Bennington and Windham Counties, with heavy damage also in Rutland, Windsor, Orange and Addison Counties and the southern portions of Washington and Chittenden Counties. Sugarbushes and stands with a high percentage of sugar maple, particularly those at upper elevations, were the most affected. Where damage was heavy, leaf fall and early refoliation occurred, particularly in the tops of the crowns. These crowns appeared full later in the season. Often, however, leaves remained on the tree in a stunted, distorted condition. In some stands, this was equivalent to a moderate defoliation for the duration of the growing season. Root starch sampling in one heavily damaged sugarbush revealed mostly medium starch levels in roots of trees with heavy thrips damage compared to high levels in undamaged trees. These damaged trees can be considered moderately vigorous.





Figures 3 and 4. Heavy Pear Thrips damage to sugar maple foliage. Note the tattered, crinkled, mottled, and stunted appearance of the upper leaves (left) and individual leaves (below).



Spider Mites, identified as Oligonychus aceris, and Aphids, identified as Periphyllus americanus, were common on thrips damaged leaves during mid-to-late summer, causing a further deterioration in foliage quality.

Spruce Spider Mite, Oligonychus ununquis, caused scattered light damage to fir Christmas trees in northern Vermont, where populations are higher than previous years. In southern Vermont, where high populations have declined, damage from previous feeding continues to be detected. Feeding has led to a loss of older foliage on balsam fir and white spruce Christmas trees. Light to moderate damage was observed on occasional ornamentals in scattered locations throughout the state. Affected species include white and blue spruce, hemlock and northern white cedar. Symptoms are generally more severe on droughty sites.

OTHER SAPSUCKING INSECTS, MIDGES & MITES

<u>INSECT</u>	<u>HOST(S)</u>	<u>LOCALITY</u>	<u>REMARKS</u>
Aphids <u>Cinara</u> sp.	White Pine Balsam Fir	Hyde Park	Heavy on ornamental pine. Common on fir Christmas trees.
Balsam Gall Midge <u>Paradiplosis</u> <u>tunifex</u>			See narrative
Balsam Twig Aphid <u>Mindarus</u> <u>abietinus</u>			See narrative
Balsam Woolly Aphid <u>Adelges</u> <u>piceae</u>	Balsam Fir	Lamoille & Rutland Counties	Scattered light populations.

OTHER SAPSUCKING INSECTS, MIDGES & MITES (CONT.)

<u>INSECT</u>	<u>HOST(S)</u>	<u>LOCALITY</u>	<u>REMARKS</u>
Coolley Spruce Gall Aphid  <u>Adelges cooleyi</u>	Blue Spruce Douglas Fir	Bennington, Chittenden, Franklin, Addison, Orleans, Washington & Orange Counties	Heavy damage to or- namentials in Calais & light damage else- where to ornamentals & Christmas trees.
Eastern Spruce Gall Aphid  <u>Adelges abietis</u>	Red, White & Norway Spruce	Widespread	Light and scattered.
Maple Gall Mites  <u>Eriophyidae</u>	Sugar Maple Red Maple	Widespread	Light.
Oystershell Scale  <u>Lepidosaphes ulmi</u>	American Beech Flowering Crab	Addison Chittenden Franklin, Windsor & Lamoille Cos.	Moderate to heavy on beech understory; also on ornamental crab in Stowe.
Pear Thrips  <u>Taeniothrips inconsequens</u>	Sugar Maple		See narrative.
Pine Bark Aphid  <u>Pineus strobi</u>	White Pine	Widespread	Occasionally heavy, damaging Christmas tree seedlings in some locations.
Pine Leaf Chermid  <u>Pineus pinifoliae</u>	White Pine	Stockbridge Rochester	Causing discolored foliage. Galls present on spruce.

OTHER SAPSUCKING INSECTS, MIDGES & MITES (CONT.)

<u>INSECT</u>	<u>HOST(S)</u>	<u>LOCALITY</u>	<u>REMARKS</u>
Pine Needle Midge <u>Contarinea</u> <u>baeri</u>	Scots Pine	Bakersfield	Heavy scattered damage to Christmas trees.
Pine Needle Scale <u>Phenacaspis</u> <u>pinifoliae</u>	Mugho Pine White Pine	Chittenden County	Scattered, light damage.
Pine Spittlebug <u>Aphrophora</u> <u>parallela</u>	White Pine Scots Pine	Windsor, Rutland, Addison, Chittenden, Franklin, Caledonia, Washington & Lamoille Counties	Widespread, light populations; building populations on some Christmas trees in southern Vermont.
Roct Aphid <u>Prociphilus</u> <u>americanus</u>	Balsam Fir	Lamoille County	Continues to infest Christmas tree seedlings in a few plantations.
Spruce Gall Midge <u>Mayetiola</u> <u>piceae</u>	Norway Spruce Ornamental	Barre	Heavy damage, first report of this pest in Vermont.

BUD, SHOOT & STEM INSECTS

<u>INSECT</u>	<u>HOST(S)</u>	<u>LOCALITY</u>	<u>REMARKS</u>
Ants  Species unidentified	White Pine Scots Pine	Chelsea	A pocket of mortality & scattered individuals killed in a Christmas tree plantation.
Balsam Shootboring Sawfly  <u>Pleroneura bruneicornis</u>	Balsam Fir	Scattered in Northern Vt.	Very light damage to Christmas trees; populations down from 1984.
Maple Seed Caterpillar  <u>Proteoteras aesculana</u>	Sugar Maple	Addison Chittenden Franklin Cos.	Light damage to understory maples.
Northern Pine Weevil  <u>Pissodes approximatus</u>			Not observed
Pales Weevil  <u>Hylobius pales</u>	Scots Pine Balsam Fir	Widespread in northern Vt.	Light to moderate damage to Christmas trees and some ornamentals. Populations up from 1984.
Pine Gall Weevil  <u>Podapion gallicola</u>	Red Pine	Quechee	Moderate damage to a plantation
A Pine Shoot Mite  <u>Trisetacus alborum</u>	White Pine	Middlesex	Light shoot damage in a plantation.

BUD, SHOOT & STEM INSECTS (Cont.)

<u>INSECT</u>	<u>HOST(S)</u>	<u>LOCALITY</u>	<u>REMARKS</u>
Pitted Ambrosia Beetle  <u>Corthylus</u> <u>punctatissimus</u>	Sugar Maple Seedlings	Addison Franklin Chittenden Counties	Common in sugarbushes.

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BARK BEETLES

Pine Engraver  <u>Ips pini</u>	Red Pine	Westmore Leicester	Causing scattered mortality of pole- sized plantation trees.
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## FOREST DISEASES

### STEM DISEASES

Scleroderris Canker, caused by Gremmeniella abietina, was found in eight previously negative towns again this year (Map 2), during a survey of 130 plantations in 19 towns bordering the quarantine zone. This means that 16 new towns have been found to contain infected trees during the past two years. Infection rates have increased during this period, probably due to wet spring weather in 1983 and 84. Seventeen pine plantations (three within the quarantine zone), comprising 69 acres, were found to be infected for the first time this year.

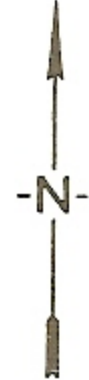
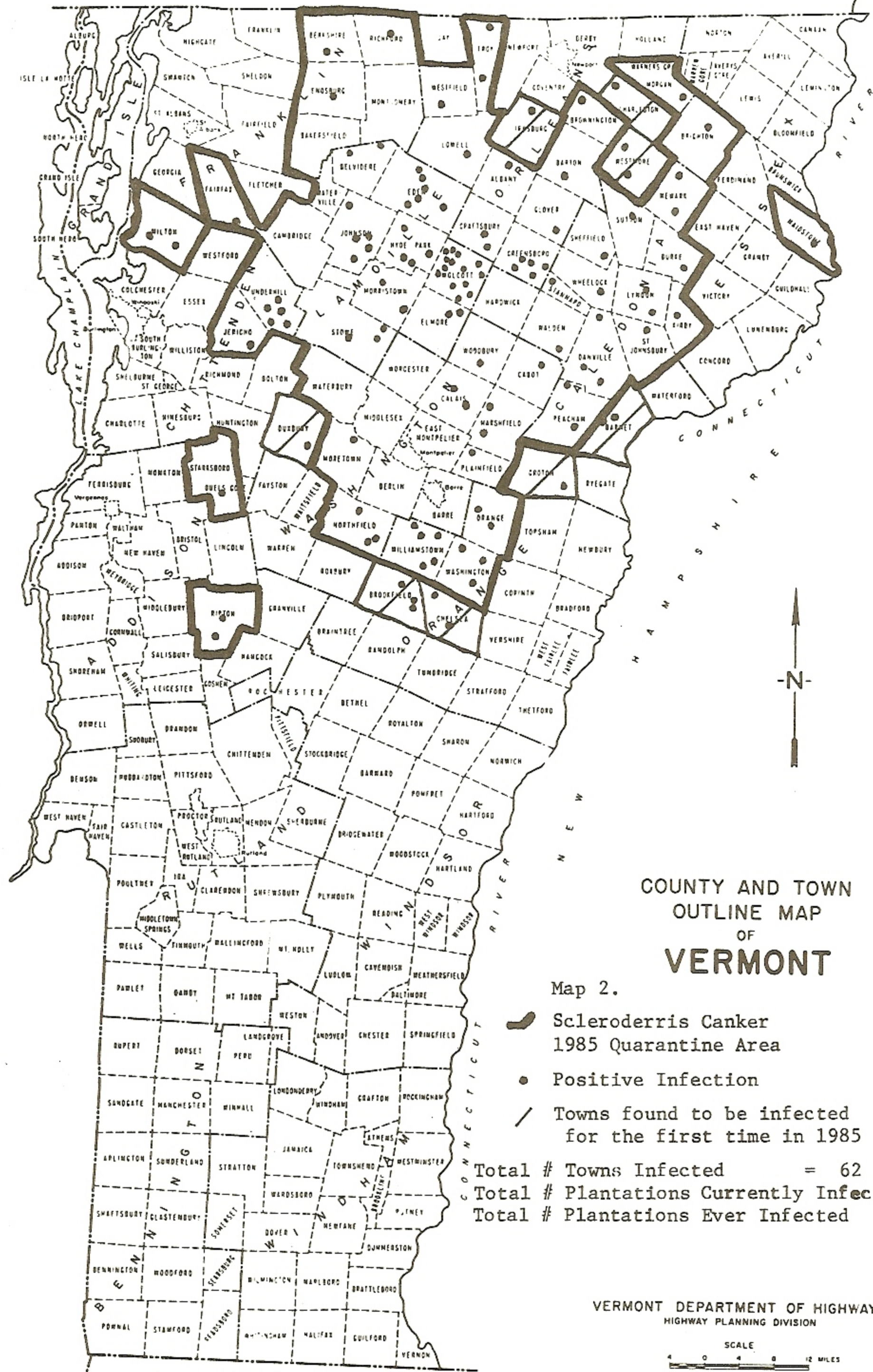
Because of the increased incidence of the disease in northern Vermont, a survey was carried out in the four southern counties to certify that they continue to be free of Scleroderris canker. At least five towns in each county were surveyed. In these towns, Red and Scots pine plantations at least two acres in size, which were planted between 1960 and 1969, were inspected for the disease. A total of 90 plantations (314 acres) were surveyed. No symptomatic trees were found. Towns inspected are indicated in Map 3.

Forty-three pine Christmas tree plantations within 22 towns inside the quarantine area were inspected this year. One of these, a plantation in Wolcott containing Scots pines that are now too large to be marketable, was found to be infected for the first time. Scots pine from many older plantations are being cut and replaced with non-susceptible species while some Scots and White pine seedlings are being planted in other locations.

A survey of Lyndon State Forest that was reported infected in 1984 revealed that 75 percent of the Scots pine regeneration is infected and another 18 percent dead, while 91 percent of the White pine is infected and six percent dead. A survey of the White pine seedlings that were planted in 1984 revealed that 26 percent were infected in early June, 1985, increasing to 29 percent in October. Since seedlings closest to infected Scots pine regeneration had the most infection, this regeneration was cut during the summer in the hope that it will reduce future seedling infection.

The total number of plantations in the state known to be infected is now 122, consisting of 104 red pine and 18 Scots pine plantations. This represents 820 and 150 acres, respectively, for a total of 970 acres infected. Another six plantations were infected at one time, but have since had the disease eradicated or the trees cut.

N E W Y O R K



COUNTY AND TOWN  
OUTLINE MAP  
OF  
**VERMONT**

Map 2.

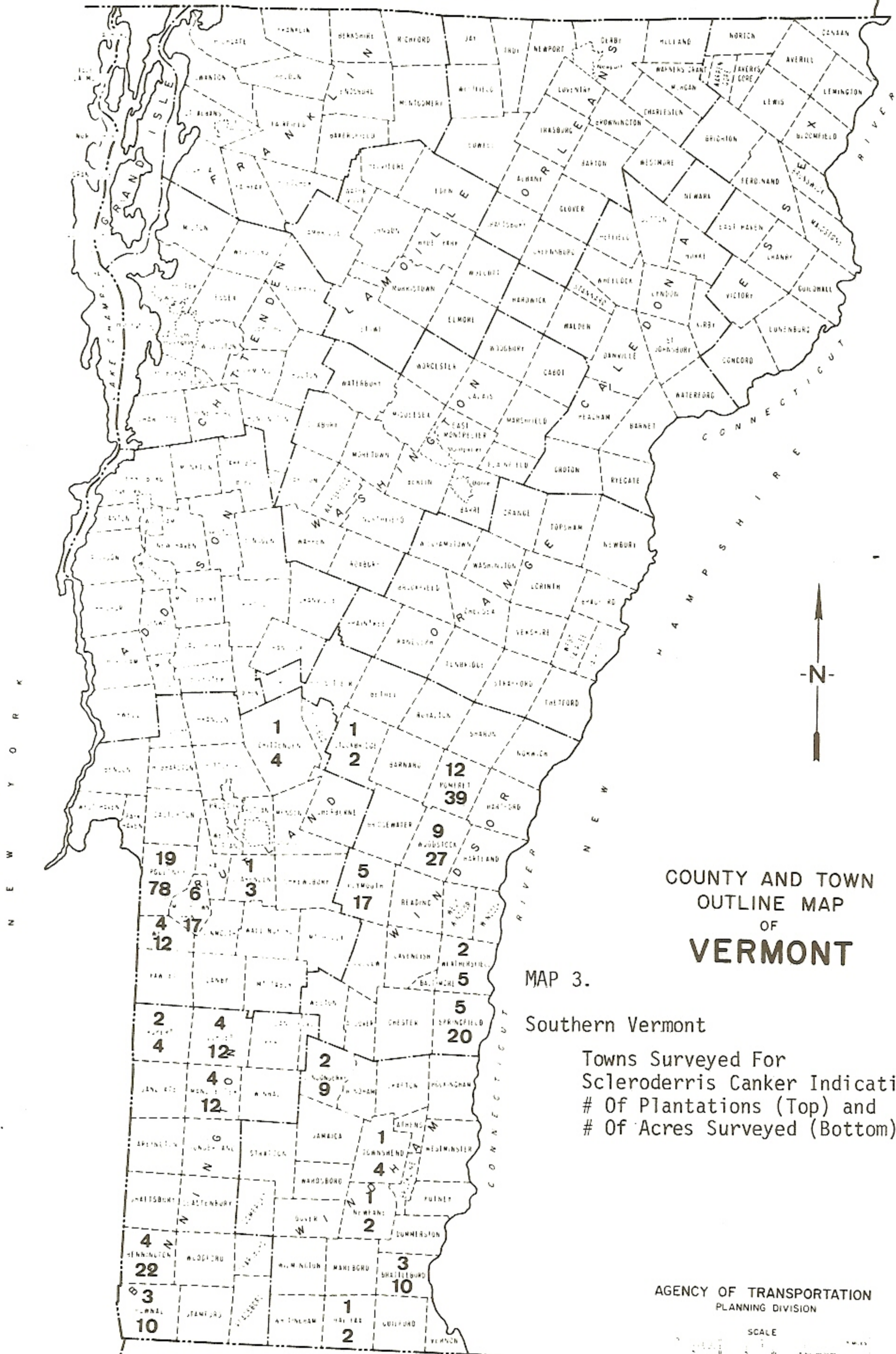
- Scleroderris Canker  
1985 Quarantine Area
- Positive Infection
- Towns found to be infected  
for the first time in 1985

Total # Towns Infected = 62  
 Total # Plantations Currently Infected = 122  
 Total # Plantations Ever Infected = 128

VERMONT DEPARTMENT OF HIGHWAYS  
HIGHWAY PLANNING DIVISION







COUNTY AND TOWN  
OUTLINE MAP  
OF  
**VERMONT**

MAP 3.

Southern Vermont

Towns Surveyed For  
Scleroderris Canker Indicating  
# Of Plantations (Top) and  
# Of Acres Surveyed (Bottom)

AGENCY OF TRANSPORTATION  
PLANNING DIVISION

SCALE

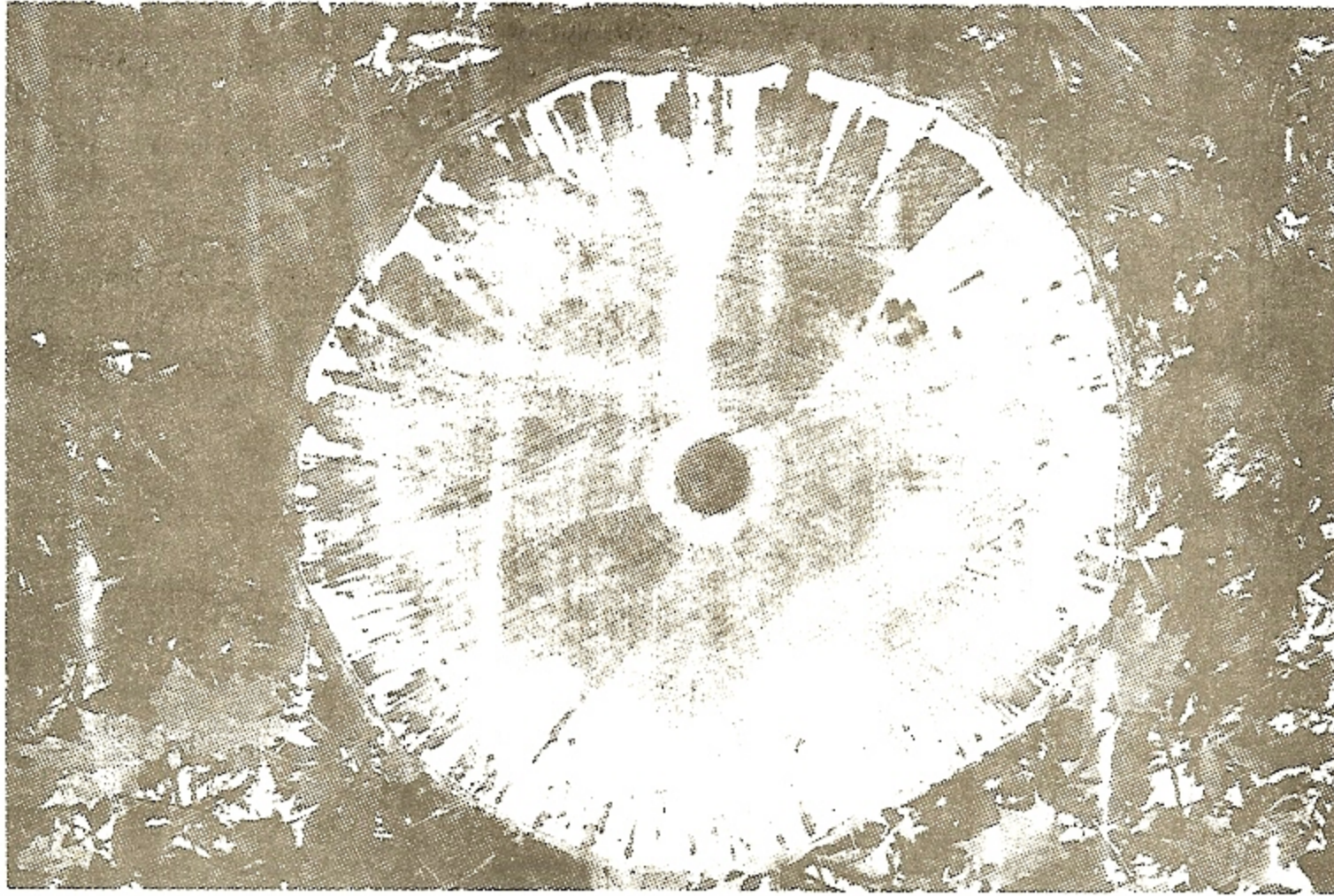
JANUARY, 1979

OTHER STEM DISEASES

<u>DISEASE</u>	<u>HOST(S)</u>	<u>LOCALITY</u>	<u>REMARKS</u>
Beech Bark Disease <u>Cryptococcus fagisuga</u> and <u>Nectria coccinea</u> var. <u>faginata</u>	Beech	Throughout	Large increase in scale populations in some locations, including monitoring plots in Bennington and Rutland Counties. Report available on resistance trial: Marlboro.
Brown Rot <u>Monilinia fructicola</u>	Sour Cherry	Wilmington	Ornamental
Cytospora Canker <u>Cytospora kunzei</u>	Blue Spruce Norway Spruce White Spruce	Widespread	Common on ornamentals
Dutch Elm Disease <u>Ceratocystis ulmi</u>	American Elm	Throughout	Increased infection, dieback & mortality, especially on small elms.
Fireblight <u>Erwinia amylovora</u>	Mountain Ash Flowering Crab Cherry	Widespread	Scattered damage to ornamentals
Hypoxyton Canker <u>Hypoxyton pruinaum</u>	Quaking Aspen	Throughout	Common problem in aspen stands.
Oak Wilt <u>Ceratocystis fagacearum</u>	Red Oaks		No suspected infection centers observed during statewide aerial surveys.

OTHER STEM DISEASES (Cont.)

<u>DISEASE</u>	<u>HOST(S)</u>	<u>LOCALITY</u>	<u>REMARKS</u>
Sapstreak Disease <u>Ceratocystis</u> <u>coerulescens</u>	Sugar Maple	Corinth	One wounded sugarbush tree affected( Figures 5 & 6) I.D. confirmed by Dr. Bergdahl, UVM.
Scleroderris Canker <u>Gremmeniella</u> <u>abietina</u>			See narrative.
Verticillium Wilt <u>Verticillium</u> <u>albo-atrum</u>	Sugar Maple	Milton	Light damage.
White Pine Blister Rust <u>Cronartium</u> <u>ribicola</u>	White Pine	Widespread	Significant increase in fruiting cankers in So. Vermont. Elsewhere, continued heavy damage as in 1984. Causing some losses in young Christmas tree plantations.
Woodgate Gall Rust <u>Endocronartium</u> <u>harknessii</u>	Scots Pine	Scattered	Some moderate to heavy damage to Christmas trees.



Figures 5 and 6. Sapstreak Disease of sugar maple. This disease enters through wounds and can kill trees rather quickly. Major symptoms are brown streaking with green-margined fingers (above) and leaves half of normal size (below).



Leaves from sapstreak infected tree (left) compared to normal leaves (right).

FOLIAGE DISEASES

Fir-fern rust of balsam fir, caused principally by Uredinopsis mirabilis, caused widespread light to moderate defoliation of balsam fir Christmas trees in northern Vermont, but there was not the heavy damage reported in some plantations in 1983 and 84. Long term control is best obtained by eliminating sensitive fern, which serves as the alternate host for the fungus. After experimental fungicide tests conducted by Dr. Dale Bergdahl at the University of Vermont, Bayleton 25 is now registered for spraying on fir foliage to prevent infection. Eight ounces of Bayleton 25 per 50 gallons of water, plus a spreader-sticker, can give adequate control if applied when new shoots average two to three inches in length. A one page handout on control of this disease is available from our department.

OTHER FOLIAGE DISEASES

<u>DISEASE</u>	<u>HOSTS(S)</u>	<u>LOCALITY</u>	<u>REMARKS</u>
Anthracnose <u>Gloeosporium</u> spp.	Sugar Maple	Addison Caledonia Orleans Counties	Scattered light damage, especially on well- drained or shallow soils.
Cedar-Apple Rust <u>Gymnosporangium</u> <u>juniperi-virginianae</u>	E. Red Cedar Apple	Franklin Chittenden & Addison Cos.	Scattered, light damage.
Lophodermium Needlecast <u>Lophodermium</u> <u>pinastri</u>	Scots Pine	Widespread	Mostly light damage to Christmas trees.
Naemacyclus Needlecast <u>Naemacyclus</u> <u>niveus</u>	Scots Pine	Barre Springfield	Light on Christmas trees.
Rhabdocline Needlecast <u>Rhabdocline</u> <u>pseudotsugae</u>	Douglas Fir	Essex Wolcott	Light-moderate damage.

OTHER FOLIAGE DISEASES (Cont.)

<u>DISEASE</u>	<u>HOSTS</u>	<u>LOCALITY</u>	<u>REMARKS</u>
Rhizosphaera Needlecast			Not observed.
<u>Rhizosphaera</u> <u>kalkhoffi</u>			
Swiss Needlecast	Douglas Fir	Essex	Light damage.
<u>Phaeocryptopus</u> <u>gaumani</u>			

ROOT ROTS

<u>DISEASE</u>	<u>HOST(S)</u>	<u>LOCALITY</u>	<u>REMARKS</u>
Annosus Root Rot	Red Pine	Chelsea Chester	New infection centers.
<u>Heterobasidion</u> <u>annosum</u>			
Shoestring Root Rot	Many	Widespread	Continues to be associated with tree decline, including red spruce and sugar-bush maples.
<u>Armillaria</u> <u>mellea</u>			

## DISEASES, DECLINES AND ENVIRONMENTAL DISEASES

Ash Dieback continues to be observed and appears to be increasing in some locations, especially at upper elevations, and where pockets of ash occur. Mortality has been high in some Rutland County stands. Ash should be thinned with the leaves on to accurately evaluate tree vigor.

Birch Decline was more noticeable than usual in some locations, especially in the Camel's Hump area.

Droughty Sites were associated with increased sugar maple chlorosis in late summer throughout the southern Vermont region. Associated symptoms were premature autumn color and/or leaf fall. All size classes were affected.

Frost Damage may have occurred after a hard freeze on May 9. Symptoms are similar to thrips injury.

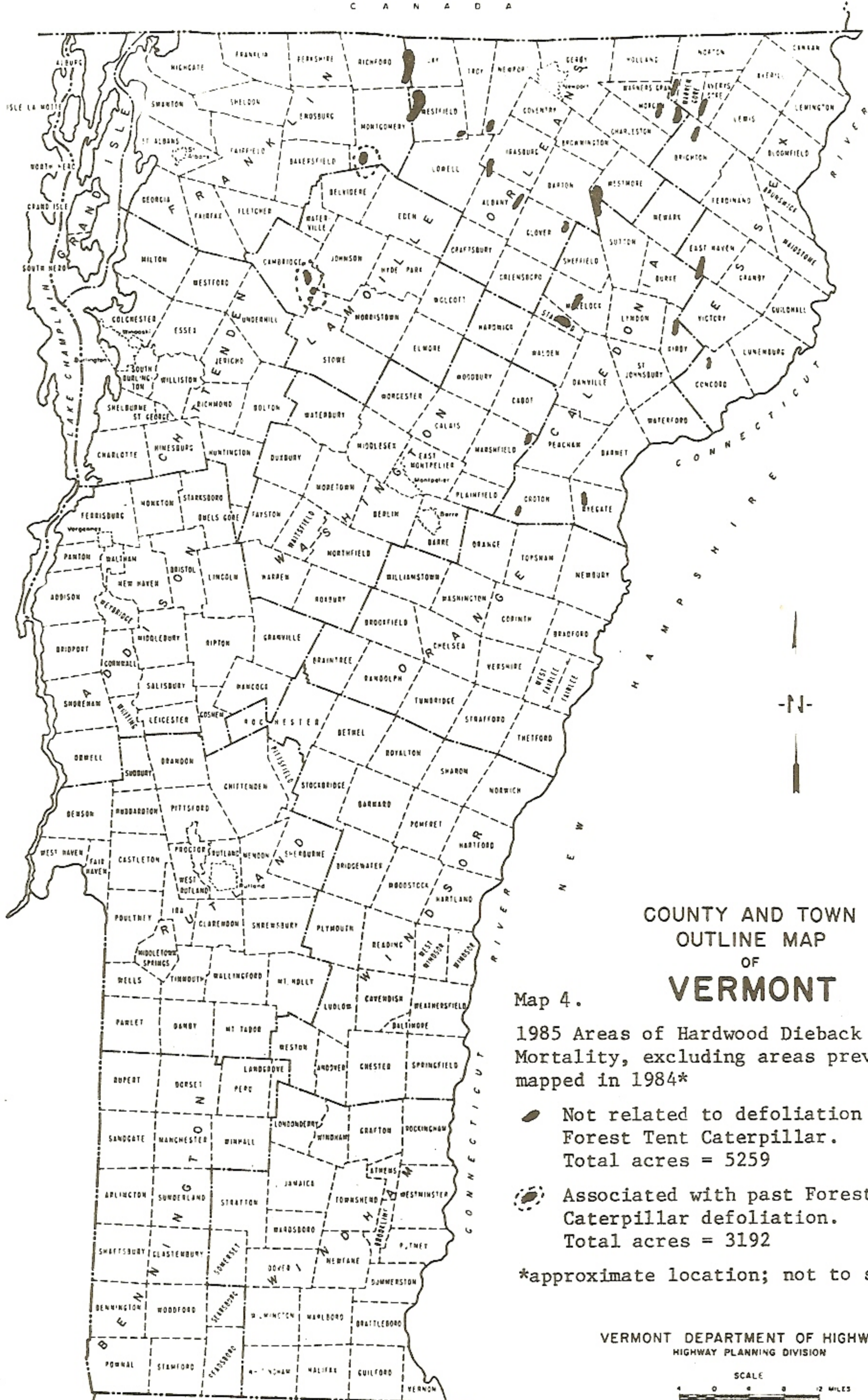
Larch Decline continues to some extent, especially in areas of previously heavy mortality. Five hundred and forty-four acres of mostly light mortality was mapped in the Northeast Kingdom during the annual aerial survey. Some larch stands that were affected by decline have been eliminated. Others have remained free of decline.

Maple Decline increased this year, especially in the northern counties. Aerial surveys revealed 5,259 acres of hardwood decline, much of this maple, which is unrelated to forest tent caterpillar defoliation (Table 5, Map 4). An additional 3,192 acres of decline in areas previously defoliated was detected for the first time this year. Cause of the increased dieback and mortality is largely unknown, but recent research by Bob Gregory at the Aiken Forest Service Laboratory in Burlington indicates that trees utilize a lot more food reserves in response to abnormally cold winters than before realized. Since the most decline is in areas with the coldest winter temperatures, it may be related to the abnormally cold open-winter of 1980-81.

Table 5. 1985 Hardwood Decline not related to Forest Tent Caterpillar defoliation.

County	Acres of Dieback and Mortality*			
	Light	Moderate	Heavy	Total
Caledonia	554	0	0	554
Essex	225	1014	0	1239
Franklin	1466	0	0	1466
Orleans	2000	0	0	2000
TOTAL	4245	1014	0	5259

\* Light mortality = 1-10 percent, scattered or patchy  
Moderate mortality = 11-25 percent, scattered  
Heavy mortality = over 25 percent



COUNTY AND TOWN  
OUTLINE MAP  
OF  
**VERMONT**

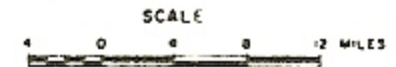
Map 4.

1985 Areas of Hardwood Dieback and Mortality, excluding areas previously mapped in 1984\*

- Not related to defoliation by Forest Tent Caterpillar.  
Total acres = 5259
- Associated with past Forest Tent Caterpillar defoliation.  
Total acres = 3192

\*approximate location; not to scale

VERMONT DEPARTMENT OF HIGHWAYS  
HIGHWAY PLANNING DIVISION



JUNE, 1969



A statewide decline survey of 54 sugarbushes that had been surveyed in 1977 was conducted this summer to determine any changes in sugar maple condition since then. Also, statewide aerial photography of about 170 points was obtained this summer to determine the overall extent of hardwood decline, with photo-interpretation scheduled for this winter and ground surveys in 1986.

Needle Blight from unknown cause was observed in a red and Norway spruce plantation in Mt. Holly.

Red Spruce Decline remains common in high elevation sites as well as in certain well-drained lower elevation stands. Aerial survey in northern Vermont revealed 1453 acres of upper elevation spruce decline this year (Table 6, Map 5).

Table 6. 1985 Red Spruce Mortality

County	Acres of Mortality*			Total
	Light	Moderate	Heavy	
Caledonia	25	0	0	25
Essex	50	212	0	262
Franklin	0	548	0	548
Lamoille	0	175	0	175
Orleans	1	442	0	443
TOTAL	76	1377	0	1453

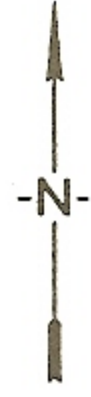
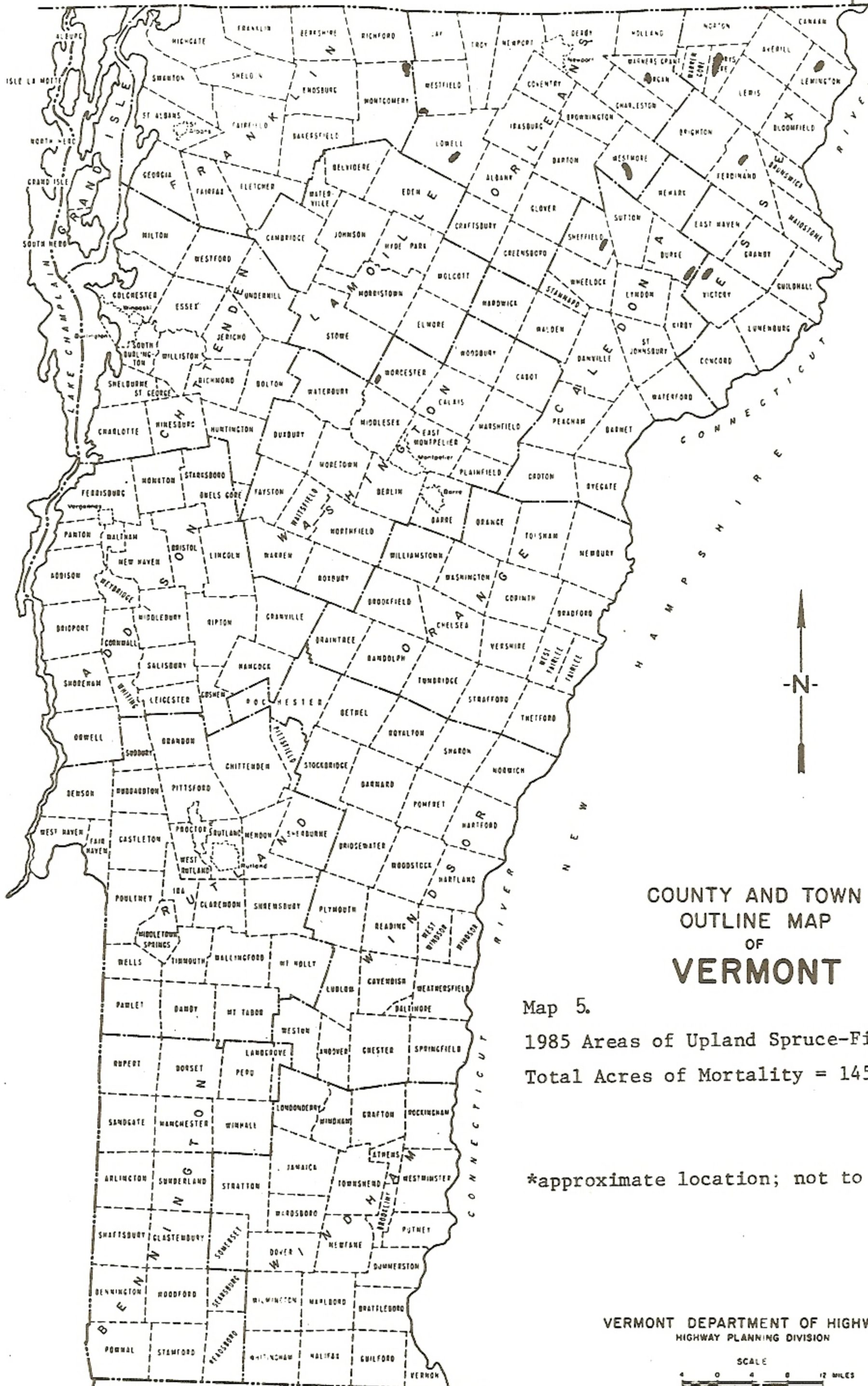
\*Light Mortality = 1-10 percent, scattered or patchy  
 Moderate mortality = 11-25 percent, scattered  
 Heavy mortality = over 25 percent

Permanent spruce decline monitoring plots were established throughout the state by the U. S. Forest Service this year to follow tree condition over time. Spruce decline was also mapped throughout the Green Mountain National Forest using 100% photo coverage. Details may be obtained from the U. S. F. S. State and Private Forestry in Durham, N. H.

Salt Injury was particularly severe along mountain access roadways. Softwood species are most heavily damaged.

Spring Fire led to late August dieback symptoms on 15 acres in Danby. The high intensity wildfire completely killed all understory species. Ambrosia beetles attacked overstory trees within days of the fire. Significant mortality is expected.

Wet Feet during flooding led to noticeable tree decline this year. Some fir mortality was found in such areas and is probably related to the flood of June, 1984. Most species affected, however, are non-commercial. Pockets of mortality in Fraser and Balsam Fir Christmas tree plantations in Bennington and Windsor Counties were also due to wet feet, probably during previous springs.

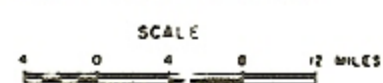


COUNTY AND TOWN  
OUTLINE MAP  
OF  
**VERMONT**

Map 5.  
1985 Areas of Upland Spruce-Fir Mortality\*  
Total Acres of Mortality = 1453

\*approximate location; not to scale

VERMONT DEPARTMENT OF HIGHWAYS  
HIGHWAY PLANNING DIVISION



JUNE, 1969

Windburn caused decline symptoms continue to develop on red maple, beech, yellow birch and black cherry in areas of Glastonbury and Shaftsbury which were affected in 1982. Some decline may be linked to subsequent thinning and harvest operations.

White Pine Needle Blight caused widespread, scattered heavy browning of current needles on individual susceptible white pines this year for the third year in a row. Damage was heavier than in 1984 in most areas. The blight is thought to be initiated by ozone pollution combined with certain weather conditions during needle elongation. Mortality on a three acre site in Arlington may be linked to this syndrome.

ANIMAL DAMAGE

<u>ANIMAL</u>	<u>SPECIES DAMAGED</u>	<u>LOCALITY</u>	<u>REMARKS</u>
Beaver	All	Rutland, Franklin, Bennington, Chittenden & Addison Cos.	Population increase due to low pelt prices. Aerial surveys indicate increased dieback and mortality from flooding of drainages by active colonies
Deer	Christmas trees	Scattered	Some moderate to heavy browse damage.
Deer	Regeneration	Throughout	Less damage than in previous years.
Mouse	Christmas trees	Scattered	Light damage.
Porcupine	Many	Scattered	Damage increasing in N.E. Kingdom and in southern Vermont.
Rabbit	Scots Pine	North Hero	90% loss of a plantation.
Squirrel	Maple tubing	Widespread	Moderate to heavy damage to tubing in sugarbushes where softwoods are present.
Squirrel	Norway Spruce	Washington Co.	Feeding damage to 50% of spruces in Jones State Forest.

