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1981 ANNUAL DISTRICT REPORT FOREST INSECT AND DISEASE SURVEY, NEWFOUNDLAND

by: L.J. Clarke, E.C. Banfield, W.J. Sutton, D.M. Stone, D.S. O'Brien, K.E. Pardy and G.C. Carew

NEWFOUNDLAND FOREST RESEARCH CENTRE
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ABSTRACT

This report gives a detailed account of the major forest insects and diseases of Newfoundland and Labrador in 1981 and tabulates the other noteworthy pests of the region.

RÉSUMÉ

Ce rapport donne un exposé détaille des principaux insectes et maladies des forêts de Terre-Neuve et due Labrador en 1981. Il liste les autres agents nuisibles qui sont importants pour la region.

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INTRODUCTION

The Forest Insect and Disease Survey reports the status of forest pests on the forests of the Island and Labrador annually. The current destructive pests are detailed and the less important are listed in tabular form. Survey personnel collected 661 insect and 105 disease samples in the twelve ranger districts (Fig. 1), and 20 from visits to property owners in the urban centres. Spruce budworm larval populations were monitored in ranger districts (Table 1), tree damage assessed and 807 branch samples were collected to forecast budworm defoliation in 1982.

The Biological Survey Project was continued at Badger, Pasadena and Goose Bay in 1981. Students, employed through the Canadian Employment and Immigration Commission, Employment Development Branch, monitored insect light traps and mounted adult insects for use at the Newfoundland Forest Research Centre. Several species of insects collected from this survey are new records. It is planned to continue this program in different areas of the Province in 1982.

Approximately 525 hours were flown in fixed-wing aircraft and helicopters by rangers in sampling insect defoliation and damage and forecasting 1982 outbreaks. Permanent sample plots were remeasured for damage assessment. Insect development and phenology plots were checked weekly to monitor spruce budworm development and measure shoot elongation (Table 2). Shrew populations were checked in late October in established plots across the Island.

Special collections of spruce budworm larvae were made for the Forest Pest Management Institute, Drs. G.T. Harvey and P.T. Dang, blackheaded budworm for Dr. T.G. Gray, European spruce sawfly larvae for Dr. L.P. Magasi and weevils for Dr. W.E. Stewart.

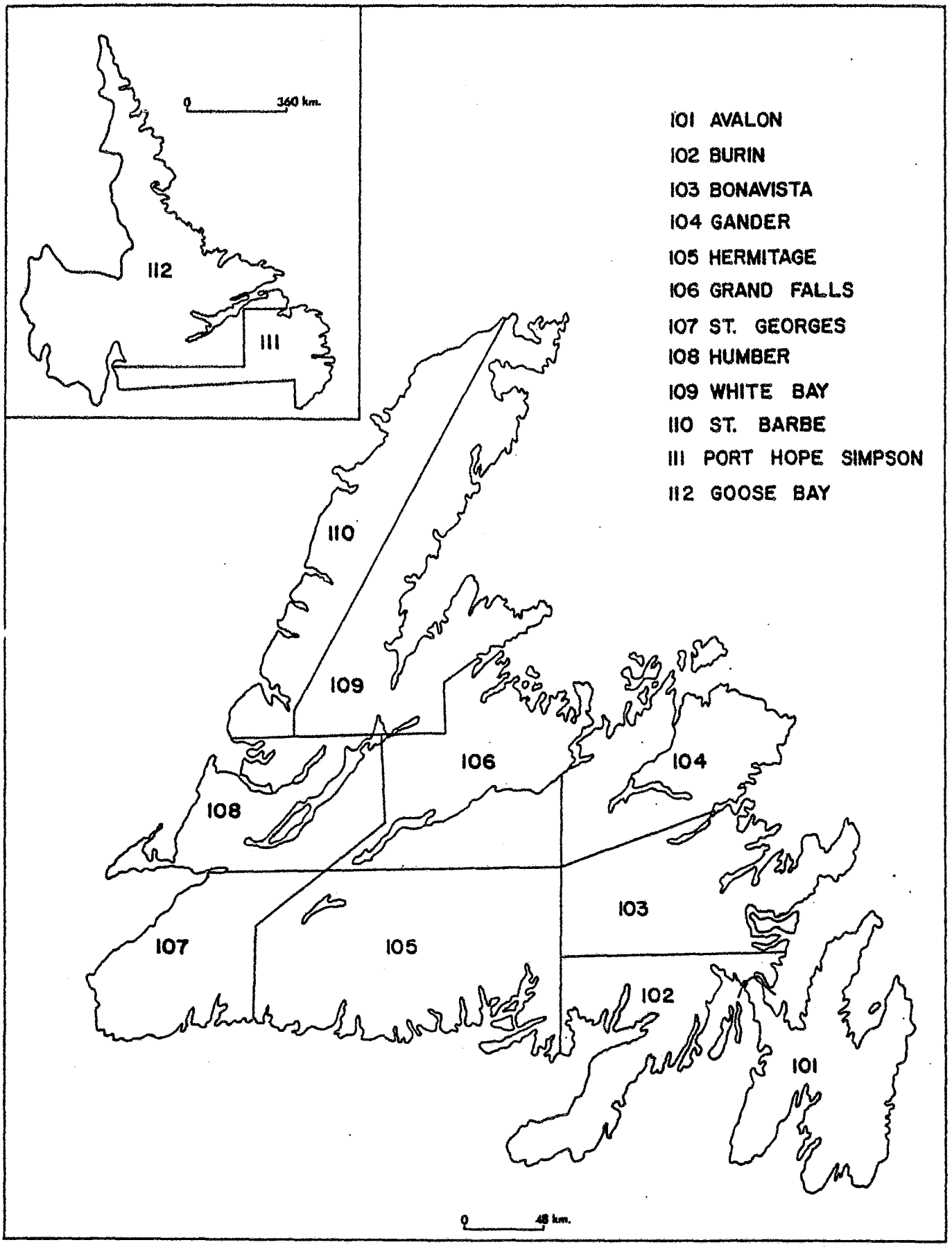

Fig. 1. Forest Insect and Disease Survey Districts.

Table 1. Average number of spruce budworm larvae collected in three regions of Newfoundland and in Labrador from 1977 to 1981.

	Beating samples[1]										Branch samples							
	No. of trees sampled (locations)[2]					Avg. no. larvae per tree sample					No. branches sampled				Avg. no. larvae per branch			
Region	'77	'78	'79	'80	'81	'77	'78	'79	'80	'81	'78	'79	'80	'81	'78	'79	'80	'81
Western	521	441	331	255	308	42	13	22	28	16	460	343	82	149	3.8	5.6	16	11.2
Central	135	172	157	143	129	144	26	43	69	22	69	87	181	140	14.1	22.1	8	6.3
Eastern	628	259	38	108	59	57	25	86	88	10	179	204	52	-	8.1	13.0	14	-
Island	1284 (343)	872 (227)	526 (289)	506 (178)	496 (158)	60	19	33	52	17	708 (223)	634 (330)	315 (118)	289 (99)	6.0	10.2	10.9	8.8
Labrador	50 (17)	4 (2)	51 (17)	- -	- -	29	6	0	-	-	-	-	-	-	-	-	-	-
Total	1334	876	577	506	496	59	19	30	52	10	-	-	-	289	-	-	-	8.8

[1]The 2 m x 3 m beating sheet and 1 m x 1 m beating tray.

[2]No. of locations sampled in parentheses.

Table 2. Development of spruce budworm and balsam fir shoots in 1978, 1979, 1980 and 1981 in Newfoundland.

		DATES OF AVERAGE GROWTH								LARVAL DEVELOPMENT					
		Terminal				North lateral				Approx. dates of peak population					
		Bud	% of total			Bud	% of total			L_2 in					
Location	Year	burst	25%	50%	Total	burst	25%	50%	Total	buds	L_3	L_4	L_5	L_6	Pupation
Bottom Brook	1981	May 25	June 18	July 1	July 28	May 25	June 12	June 23	July 24	June 4	June 10	June 22	July 1	July 8	-
	1980	June 8	June 28	July 9	Aug. 8	June 8	June 24	July 7	July 31	June 11	June 23	July 2	July 9	July 17	-
	1979	-	June 10	June 20	July 24	-	June 6	June 12	July 24	-	-	-	-	June 20	50% July 4
	1978	June 11	June 24	July 5	Aug. 4	June 11	June 20	June 27	July 30	June 12	June 14	June 24	July 2	July 10	-
Logging School Road	1981	May 30	June 23	July 23	July 27	May 30	June 15	June 25	July 21	-	-	-	-	-	-
	1980	June 14	July 4	July 15	Aug. 8	June 14	June 26	July 6	Aug. 8	-	-	-	-	-	-
	1979	May 21	June 12	June 23	July 23	-	June 6	June 12	July 10	-	-	-	-	-	-
	1978	June 13	June 24	July 6	Aug. 2	June 13	June 21	June 29	July 21	-	June 17	June 24	July 3	July 10	-
South Brook Valley	1981	May 22	June 15	June 26	July 28	May 22	June 4	June 13	July 20	June 4	June 9	June 16	June 22	July 2	95% July 14
	1980	June 6	June 28	July 10	Aug. 5	June 6	June 20	June 29	July 30	June 9	June 18	June 25	July 4	July 13	20% July 16
	1979	May 21	----------	----------	DEFOLIATED	----------	----------	----------	----------	May 24	-	June 7	-	June 21	95% July 3
	1978	June 6	June 14	June 21	July 19	June 5	June 11	June 16	July 11	June 10	June 12	June 19	June 29	July 4	100% July 12
Goose Arm Road	1981	-	June 15	July 1	July 31	-	June 4	June 16	July 24	-	-	-	-	-	-
Sheffield Lake	1981	May 22	June 13	June 20	July 27	May 22	June 4	June 12	July 15	-	-	-	-	-	-
	1979	-	June 9	June 30	July 13	-	June 3	June 9	July 3	-	-	-	-	-	-
	1978	June 6	June 21	July 1	July 24	June 7	June 13	June 21	July 14	-	-	June 26	July 4	-	July 11
Black River, Baie Verte Road	1981	June 4	June 18	June 30	July 27	June 4	June 9	June 16	July 15	-	-	-	-	-	-
	1979	May 25	June 11	June 23	July 17	May 23	June 5	June 14	July 5	-	June 5	June 9	June 20	June 26	100% July 9
Buchans Road, 8.4 km from Badger	1981	May 22	June 12	June 22	July 24	May 28	-	June 12	July 15	June 5	June 12	-	June 19	July 2	90% July 9
	1980	June 6	June 27	July 12	Aug. 1	June 6	-	June 23	July 23	June 11	June 16	June 27	July 4	July 11	100% July 17
0.4 km E. Soulis Brook	1981	May 23	June 12	June 23	July 23	May 23	-	June 12	July 17	June 5	June 12	-	June 19	June 29	July 13
	1980	June 5	June 23	June 28	July 23	June 5	-	June 22	July 23	June 12	June 20	June 27	July 3	July 11	90% July 22
Average	1981	May 24	June 16	June 27	July 27	May 26	June 8	June 16	July 19	June 5	June 11	-	June 23	July 3	July 11
	1980	June 8	June 28	July 10	Aug. 5	June 8	-	June 20	July 30	June 11	June 19	June 28	July 5	July 13	-
	1979	May 23	June 10	June 21	July 19	May 23	June 7	June 12	July 11	May 24	June 5	June 8	June 15	June 22	July 5
	1978	June 10	June 21	July 1	July 28	June 5	June 16	June 23	July 19	June 11	June 16	June 24	July 1	July 7	July 12

Rangers also instructed provincial technicians in the methods of assessing the spruce budworm damage as part of the annual inventory of forests on the Island. Lectures on insects and diseases were also given to graduating students from the College of Trades and Technology.

The cooperation of the Provincial Department of Forest Resources and Lands, providing technicians, casual workers, inventory maps and figures and aircraft time in the spruce budworm damage assessment, the forestry industry for providing inventory figures and the National Parks for providing spruce budworm samples was greatly appreciated.

A generally mild winter, with lower than normal snow accumulation, was followed by a warm and dry May. Mostly wet, cool conditions prevailed during June and a three-day period of freezing temperature occurred in mid-June followed by very heavy rain. July and August temperatures and precipitation was near normal. Monthly maximum and minimum temperatures and total monthly precipitation in June, July and August for the Province for the past 9 years are summarized in Table 3.

The spruce budworm continued to be the most destructive pest in the forests of Newfoundland. The balsam woolly aphid, blackheaded budworm, yellowheaded spruce sawfly, European spruce sawfly, European pine sawfly, balsam twig aphid, spruce beetle, larch beetle and larch sawfly populations increased and caused some defoliation to forest stands. The birch casebearer, large aspen tortrix and satin moth were the major pests of hardwoods and caused severe defoliation in the Province. Other hardwood defoliators such as the birch leafminer, mountain ash sawfly, aspen leaf rollers, leaf miners, uglynest caterpillar and the fall webworm were found in light to moderate infestations.

Scleroderris canker was one of the most destructive disease organisms. Armillaria root rot, witches' broom of black spruce, broom rusts, needle rusts, needle casts and cone and seed diseases were also surveyed. Dothichiza canker of lombardy poplar was the most important hardwood disease.

IMPORTANT FOREST INSECTS

Spruce Budworm, Choristoneura fumiferana (Clem.) - The area of moderate and severe budworm defoliation forecast for 1981 was 800 000 ha. However, moderate to severe defoliation occurred on about 380 000 ha (Table 4), extending in a broken pattern from the Codroy Valley in the southwestern part of the Island to the Avalon Peninsula (Fig. 2). Three new localized infestations occurred in western Newfoundland at River Brook, Codroy Pond and in the South Brook Valley, one on the Burin Peninsula in eastern Newfoundland and two in Labrador at Goose Point and Beaver River. Survival of overwintering larvae was normal and budworm development was ahead of last year by about two weeks. A three-day period of below freezing temperatures occurred in mid-June followed by very heavy rain

Table 3. Temperatures and total precipitation for Newfoundland 1973-1981.

Year	Location	Temperature (°C) May Min.	May Max.	June Min.	June Max.	July Min.	July Max.	August Min.	August Max.	Precipitation (cm) May	June	July	August
1973	St. John's	-2	19	-1	24	9	29	6	26	12.24	15.88	6.60	19.15
1974	"	-2	14	-1	28	1	26	5	24	10.87	6.12	9.12	14.40
1975	"	-2	22	0	26	2	29	5	27	22.02	11.18	1.93	14.53
1976	"	-2	22	0	28	-1	27	1	28	4.09	10.65	7.76	5.48
1977	"	-4	18	2	28	7	27	7	28	7.60	9.53	8.30	5.44
1978	"	-6	19	-1	26	7	26	4	29	4.77	5.72	8.31	4.96
1979	"	-2	23	-1	26	5	27	7	30	8.89	6.14	6.17	12.89
1980	"	-5	19	2	25	5	27	4	24	17.23	12.40	10.93	21.67
1981	"	-2	23	-1	25	4	28	5	28	10.71	14.28	13.33	10.60
1973	Gander	-2	22	-1	28	8	29	5	24	9.83	14.63	5.92	16.21
1974	"	-3	14	-2	28	1	26	4	27	7.11	10.64	5.05	5.26
1975	"	-4	21	-2	25	5	34	5	29	17.93	2.44	6.20	6.03
1976	"	-3	25	-1	30	3	29	4	33	3.91	8.52	7.07	1.94
1977	"	-2	21	2	28	6	28	6	29	9.96	4.71	10.00	8.25
1978	"	-5	24	-2	27	7	29	4	29	3.94	5.84	7.00	5.59
1979	"	1	27	3	28	5	31	8	30	6.97	3.01	8.38	10.35
1980	"	-5	21	1	27	7	28	4	27	14.91	12.75	13.18	18.67
1981	"	-1	23	2	23	5	30	6	29	12.59	8.09	5.86	10.00
1973	Deer Lake	-3	23	-3	27	3	31	3	28	6.65	15.29	8.69	13.28
1974	"	-4	14	-4	31	0	29	-1	31	3.56	2.21	8.99	6.27
1975	"	-6	22	-3	27	1	33	0	31	6.60	4.72	3.71	8.10
1976	"	-5	28	0	29	4	32	-2	33	7.18	5.60	3.02	4.88
1977	"	-7	24	-2	29	4	29	-3	29	7.54	4.64	2.05	8.49
1978	"	-5	21	-3	28	3	31	0	28	3.86	7.52	10.24	6.09
1979	"	0	26	-1	30	2	30	2	30	5.33	3.61	11.58	7.83
1980	"	-6	22	-3	28	-1	29	0	26	5.84	8.68	14.32	14.03
1981	"	-3	22	-2	27	2	29	1	27	7.84	10.34	7.86	10.88
1973	Goose Bay	-7	23	-1	31	6	33	2	28	3.33	11.30	12.06	6.53
1974	"	-5	14	-1	33	1	31	1	30	3.83	5.94	6.20	8.38
1975	"	-8	16	-1	27	4	37	2	27	1.93	7.62	6.83	6.17
1976	"	-4	21	-1	27	4	29	0	33	2.96	2.00	9.40	14.25
1977	"	-6	18	-1	31	5	32	6	30	11.61	5.80	9.63	10.69
1978	"	-7	26	-4	29	3	30	4	27	5.68	15.85	9.07	9.54
1979	"	-1	32	1	33	2	33	2	29	8.30	10.91	14.11	14.58
1980	"	-4	28	-4	28	3	31	7	30	10.82	19.22	11.03	4.87
1981	"	-6	26	-1	28	5	33	4	29	7.50	13.29	16.06	9.43

Table 4. Area (ha) of defoliation caused by the spruce budworm in productive forests of Newfoundland in 1981.

Management unit no.	Defoliation class[1]			Total
	Light	Moderate	Severe	
1-A	-	-	601	601
2	1081	2097	18004	21182
3	-	-	1499	1499
4	2024	-	13361	15385
5	751	5399	23430	29580
6	777	1583	27820	30180
7	-	-	21128	21128
8	-	-	14270	14270
9	1221	1058	41407	43686
10	697	102	5758	6557
11	3271	2290	30599	36160
12	290	1006	18665	19961
14	7034	1530	97367	105931
15	1597	378	24596	26571
16	1978	-	18943	20921
18	-	-	6047	6047
TNNP	-	-	442	442
	20721	15443	363937	400101

[1]Light: 1% to 25%
Moderate: 26% to 75%
Severe: 76% to 100%

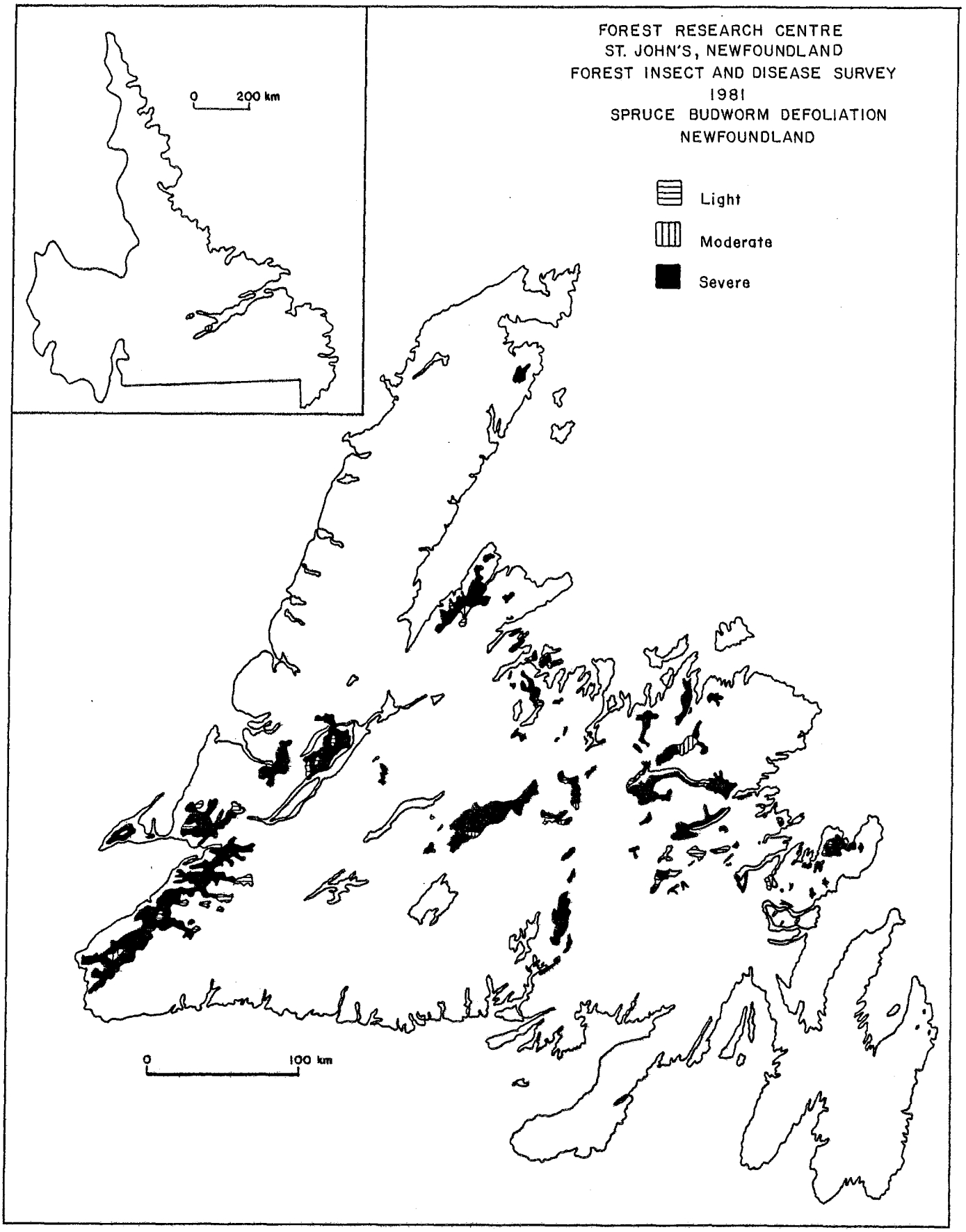

Fig. 2. Areas of spruce budworm defoliation in Newfoundland in 1981.

disrupting larval feeding. Field collections in late June and early July showed a drop of about 80% in larval numbers. Dead larvae did not remain on the branches and cause of death was undetermined. Larval collections also showed that about 35 to 45% of the larvae reared in the laboratory emerged as adults, 8% were parasitized, 8% diseased and 30 to 40% died of unknown causes. Not one natural control factor can be singled out as a dominant reason for the general collapse of the budworm population in 1981. However, a combination of two successive years of cool and wet June months, late frost and heavy rainfalls in mid-June probably caused the high larval mortality.

Damage assessment surveys were conducted in merchantable and sub-merchantable stands where tree mortality was evident to determine the area and volume in various damage categories (Table 5, Figs. 3,4,5, 6, & 7). Data for damaged stands salvaged or destroyed by fire were also tabulated. The area of merchantable stands with dead trees did not expand from the 427 500 ha listed in 1980, but the proportion of tree mortality increased in these areas. The total volume of dead trees was estimated at 18 454 000 m^3 (Table 6), an increase of about 1 348 000 m^3 from 1980. Severely damaged (Category D) areas in productive forest totalled 118 000 ha (Table 7), a decrease from 427 000 ha in 1980. The total area of severely damaged sub-merchantable stands containing tree mortality increased from 62 590 ha in 1980 to 77 252 ha in 1981 (Table 8).

Egg-mass and overwintering larval surveys were conducted in over 800 sample points across the Island and in Labrador. Based on these surveys the area of moderate and severe defoliation is forecast to decrease significantly in 1982. There are only six small areas totalling 21 000 ha where moderate to severe defoliation may be expected (Table 9). These areas are: the Codroy Valley, near Crabbes River and Gallants in western Newfoundland; Hunts Pond near Gander Lake; Triton Brook and Twillick Brook near Bay d'Espoir. Light to moderate defoliation is forecast for several areas between the Codroy Valley and Grand Lake; on the western half of the Baie Verte Peninsula; along the Noel Paul River; Twin Lakes; Bay d'Espoir and on the Bonavista Peninsula. No defoliation is forecast for Labrador in 1982.

Spruce budworm damage hazard areas were delineated based on the egg-mass and overwintering larval surveys, the severity of current and previous years defoliation and tree vigor. The moderate to high hazard is forecast in about 71 000 ha (Table 9).

Population levels indicated by the number of egg-masses per 10 m^2 of foliage are expected to be about 129 in the moderate defoliation

Table 5. Area and volume of productive, merchantable stands where tree mortality caused by spruce budworm was evident in Newfoundland in 1981.

Prov. manag. unit	Owner	Area and Volume Affected											
		A(Dead)				B(Moribund)				C(Very Severe)			
		Area (ha)	Total vol (m^3)	Dead vol (m^3)	Dying vol (m^3)	Area (ha)	Total vol (m^3)	Dead vol (m^3)	Dying vol (m^3)	Area (ha)	Total vol (m^3)	Dead vol (m^3)	Dying vol (m^3)
1	Crown	2556	178900	125200	-	1423	99700	19200	25200	1915	134000	300	54100
2	Crown	866	73500	38700	12900	4391	329100	80300	48100	6834	557300	59600	83200
4	Crown	-	-	-	-	140	13400	5300	1300	-	-	-	-
4	Bowater	97	9900	5400	-	-	-	-	-	-	-	-	-
4	Price	12771	1536870	1115031	14947	3982	396611	154975	46583	736	55203	3346	4141
5	Crown	4067	462224	282092	41959	833	73904	23115	31871	152	12201	905	90
5	Bowater	1152	128319	84984	11496	1050	107617	28200	2071	-	-	-	-
5	Price	1957	232017	167011	18961	440	47117	18700	4235	-	-	-	-
6	Bowater	9236	1028778	586253	296272	11435	1002637	282985	88411	277	29943	7529	5012
6	Price	732	91389	56204	6152	2196	313914	85154	58794	403	48904	3815	771
7	Crown	37156	1111785	785049	80325	3375	227386	86602	24315	751	63158	16551	5537
8	Crown	7923	825263	523306	58410	4902	445857	151515	27377	3962	288518	39568	26865
8	Bowater	1742	233557	164682	20573	407	30909	11634	1432	28	1803	510	181
8	Price	39	4500	3200	400	-	-	-	-	-	-	-	-
9	Crown	5405	618401	495948	-	7321	671863	202171	60298	1440	76119	8673	12356
9	Bowater	6998	792082	619499	47305	11138	1135444	298234	59903	2322	232113	19417	26734
9	Price	861	91167	59997	11300	1521	129126	30666	10337	662	83108	9397	572
10	Crown	2719	276640	143119	102537	85	8706	3256	1121	-	-	-	-
10	Price	5186	529011	340143	82486	8749	744296	242029	81718	141	12229	5244	2049
11	Price	10928	1076036	660972	32972	1406	147652	45799	4605	1751	186016	21527	5915
12	Crown	2	201	136	-	452	56200	18000	4500	-	-	-	-
12	Price	7162	755929	558775	53751	2305	220552	55995	7715	554	47115	9958	3284
13	Price	2266	245814	150665	-	1285	143918	42868	-	540	55306	10588	8255
14	Crown	21209	2026136	1415008	238362	9192	980181	343175	121464	2618	250618	45612	22555
14	Bowater	15306	1549382	1195325	111063	9113	1071138	297831	92672	3478	393543	32129	74136
14	Private	354	37025	26529	7818	1281	91504	32615	8171	1458	126801	10605	3990
15	Crown	4978	415979	285737	33082	1020	97036	53592	18040	-	-	-	-
15	Bowaters	21956	2261604	1757067	169193	10012	1095545	373139	84093	2938	308706	35668	9841
15	Private	393	42600	34800	-	-	-	-	-	-	-	-	-

Cont'd ...

Table 5. Concluded

Prov. manag. unit	Owner	Area and Volume Affected											
		A(Dead)				B(Moribund)				C(Very Severe)			
		Area (ha)	Total vol (m^3)	Dead vol (m^3)	Dying vol (m^3)	Area (ha)	Total vol (m^3)	Dead vol (m^3)	Dying vol (m^3)	Area (ha)	Total vol (m^3)	Dead vol (m^3)	Dying vol (m^3)
16	Crown	1377	140744	97278	-	650	66023	18220	1596	1376	154107	20893	482
16	Bowater	2297	228573	145665	-	1117	113441	48388	2862	-	-	-	-
17	Crown	350	32399	21175	6727	100	7215	3390	1054	-	-	-	-
17	Bowater	989	80447	59774	-	1452	202407	46293	482	-	-	-	-
17	Price	12	1205	819	-	2	201	137	60	-	-	-	-
18	Crown	1062	118200	71100	3800	1219	142400	55300	7300	380	49700	4000	-
18	Bowater	-	-	-	-	535	68800	20900	-	-	-	-	-
	GMNP	3506	335500	176700	34500	3262	332000	86400	7500	1721	175200	26300	-
	TNNP	927	91400	59400	-	1526	126300	26100	13600	1725	170100	17000	17000
Total	Crown	89670	6280372	4283848	578102	35103	3218971	1063136	373536	19428	1585721	196102	205185
	Bowater	59863	6312641	4618619	655902	46259	4827938	1407603	331926	9043	966108	95253	115904
	Price	41902	4563939	3112817	220969	21886	2143387	676323	214047	4787	488381	63874	24987
	GMNP	3506	335500	176700	34500	3262	332000	86400	7500	1721	175200	26300	-
	TNNP	927	91400	59400	-	1526	126300	26100	13600	1725	170100	17000	17000
	Private	747	79625	61329	7818	1281	91504	32615	8171	1458	126801	10605	3990
	Island	196537	17663477	12312713	1497291	109317	10740100	3292178	948780	38162	3512311	409135	367066

A - Dead: 50% or more of total volume of the stand dead.

B - Moribund: 20% to 49% of total volume dead or more than 50% of total volume dying (dying = 80% or more total defoliation).

C - Very severely damaged: 5% to 19% of total volume dead or less than 50% of total volume dying.

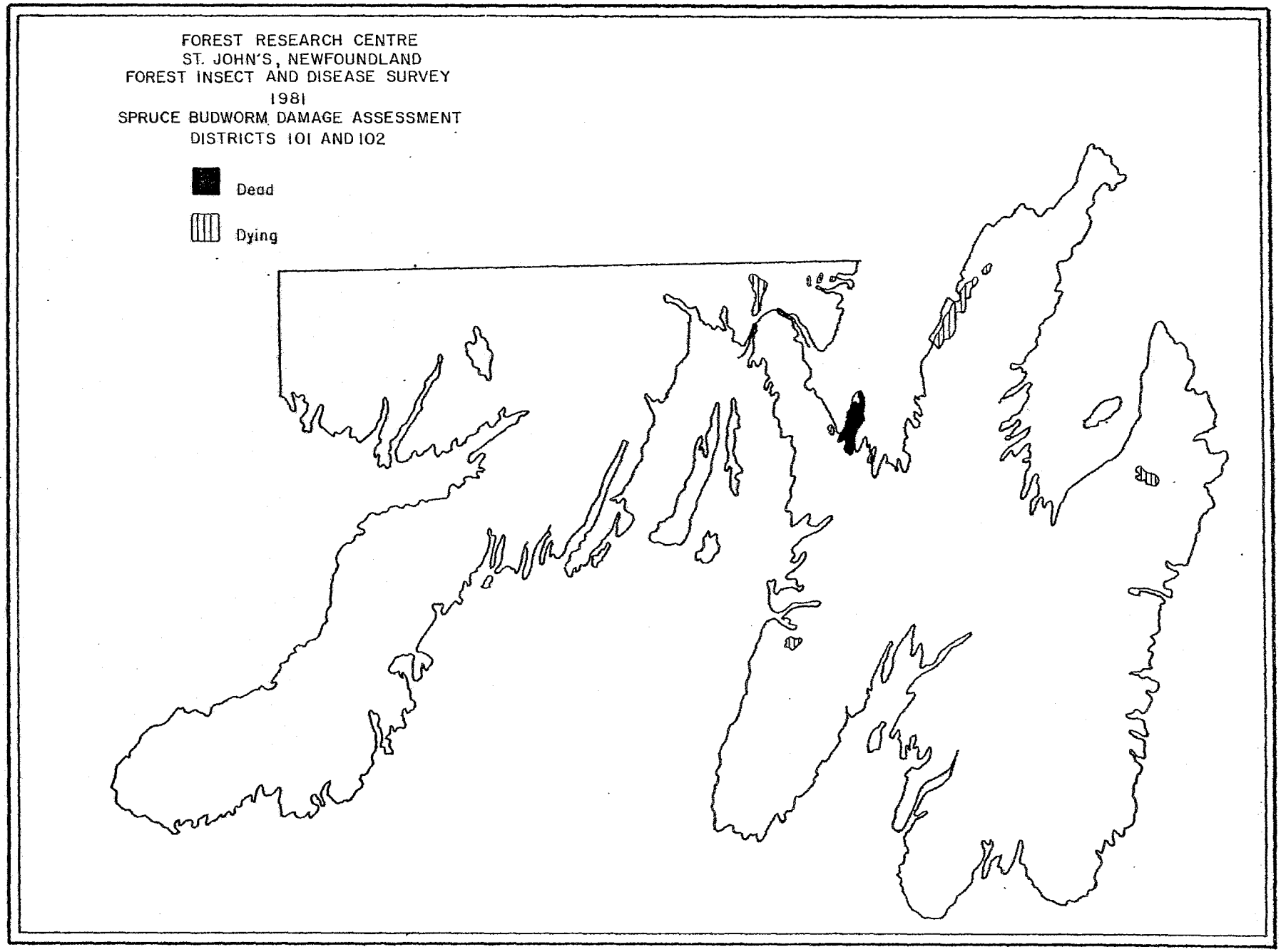
FOREST RESEARCH CENTRE
ST. JOHN'S, NEWFOUNDLAND
FOREST INSECT AND DISEASE SURVEY
1981
SPRUCE BUDWORM DAMAGE ASSESSMENT
DISTRICTS 101 AND 102
Dead
Dying

FIG. 3

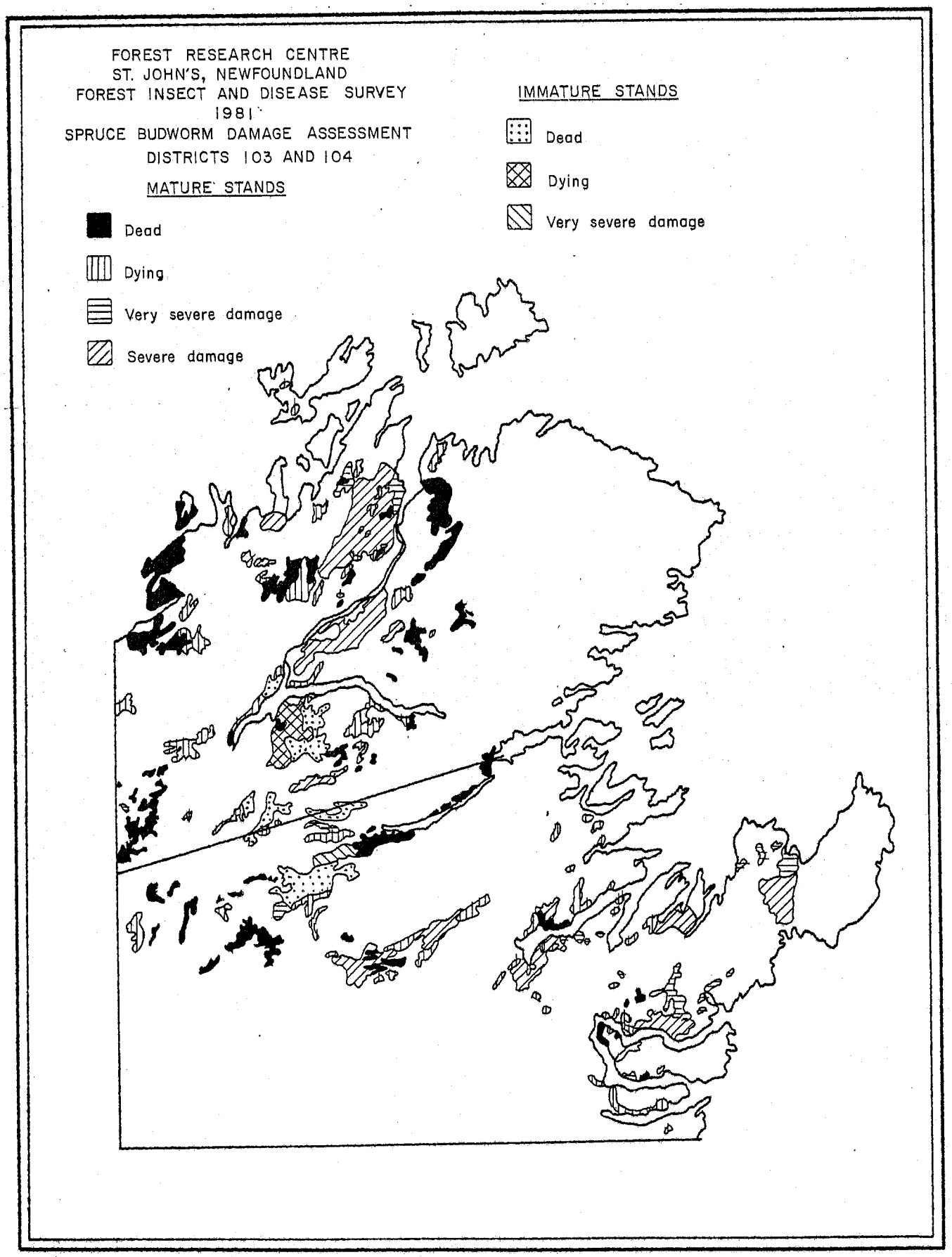
FOREST RESEARCH CENTRE
ST. JOHN'S, NEWFOUNDLAND
FOREST INSECT AND DISEASE SURVEY
1981
SPRUCE BUDWORM DAMAGE ASSESSMENT
DISTRICTS 103 AND 104
MATURE STANDS
Dead
Dying
Very severe damage
Severe damage
IMMATURE STANDS
Dead
Dying
Very severe damage

FIG. 4

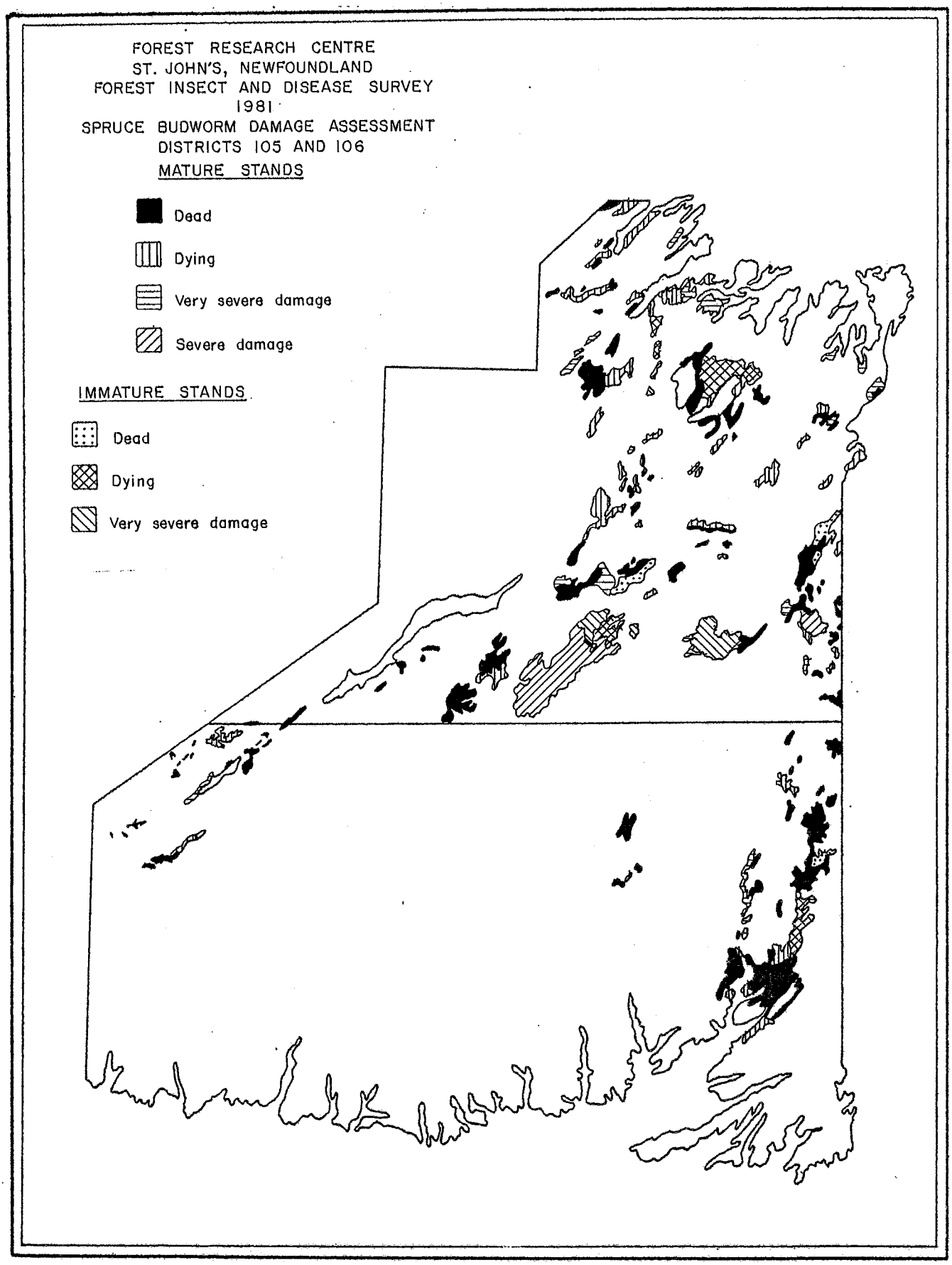
FOREST RESEARCH CENTRE
ST. JOHN'S, NEWFOUNDLAND
FOREST INSECT AND DISEASE SURVEY
1981
SPRUCE BUDWORM DAMAGE ASSESSMENT
DISTRICTS 105 AND 106
MATURE STANDS
Dead
Dying
Very severe damage
Severe damage
IMMATURE STANDS
Dead
Dying
Very severe damage

FIG. 5

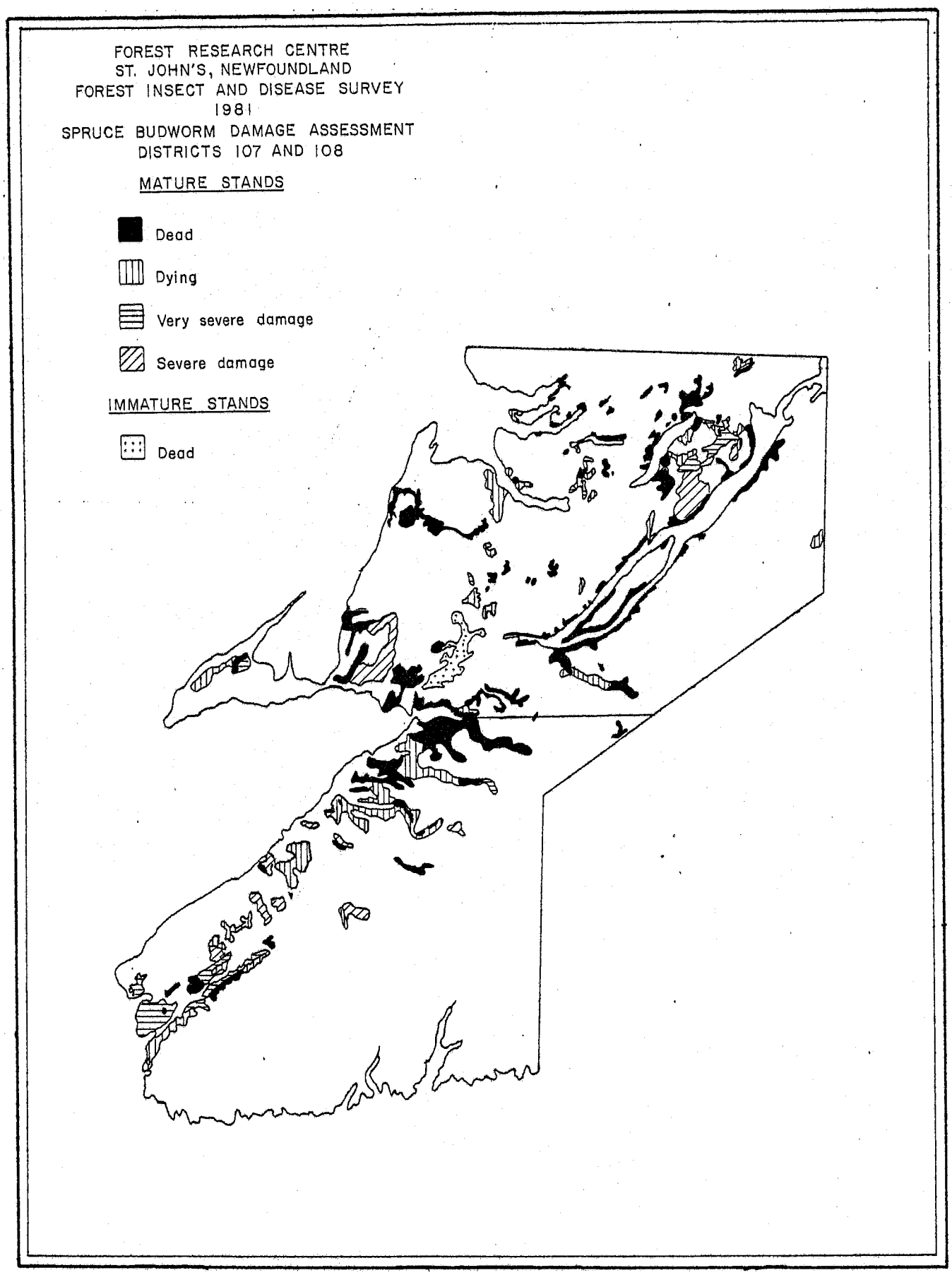
FOREST RESEARCH CENTRE
ST. JOHN'S, NEWFOUNDLAND
FOREST INSECT AND DISEASE SURVEY
1981
SPRUCE BUDWORM DAMAGE ASSESSMENT
DISTRICTS 107 AND 108
MATURE STANDS
Dead
Dying
Very severe damage
Severe damage
IMMATURE STANDS
Dead

FIG. 6

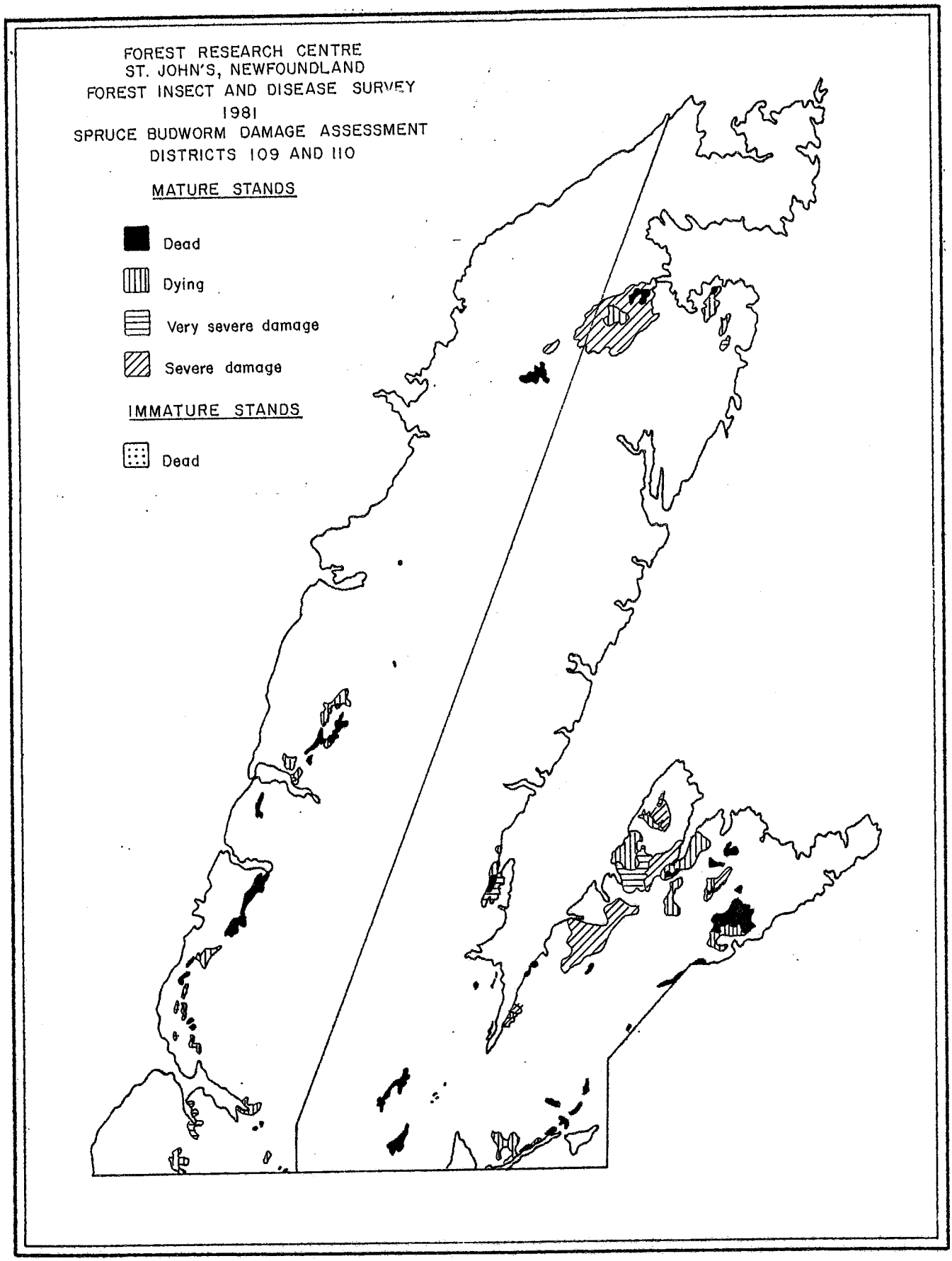
FOREST RESEARCH CENTRE
ST. JOHN'S, NEWFOUNDLAND
FOREST INSECT AND DISEASE SURVEY
1981
SPRUCE BUDWORM DAMAGE ASSESSMENT
DISTRICTS 109 AND 110
MATURE STANDS
Dead
Dying
Very severe damage
Severe damage
IMMATURE STANDS
Dead

FIG. 7

Table 6. Area and volume of productive merchantable stands where tree mortality caused by the spruce budworm had occurred up to 1981.

	Damage category[1]			
	A(Dead)	B(Moribund)	C(Very severe)	Total
		Existing stands[2]		
Total area ha	196 537	109 317	38 162	344 016
Dead vol. m^3	12 312 713	3 292 178	409 702	16 014 026
Dying vol. m^3	1 497 291	948 780	367 066	2 813 137
Total vol. m^3	17 663 477	10 740 100	3 512 311	31 915 888
		Salvaged, burned and recovered stands		
Total area ha	31 716	30 047	21 701	83 464
Dead vol. m^3	1 683 201	634 250	121 971	2 439 422
Dying vol. m^3	248 616	198 265	83 696	548 187
Total vol. m^3	3 349 873	2 777 943	2 042 605	8 170 421
		Existing, salvaged, burnt and recovered stands		
Total area ha	228 253	139 364	59 863	427 480
Dead vol. m^3	13 995 914	3 926 428	531 106	18 453 448
Dying vol. m^3	1 745 907	1 147 045	450 762	3 343 714
Total vol. m^3	21 013 350	13 518 043	5 554 916	40 086 309
% Dead of total vol.	67	29	10	46
% Dying of total vol.	8	8	8	8
% Dead and dying of total vol.	75	37	18	54

[1] A (dead): 50% or more of total volume of stand dead.

B (moribund): 20% to 49% of total volume of stand dead or more than 49% of total volume dying. Dying = More than 75% total defoliation.

C (very severe): 5% to 19% of total volume dead or 5% to 49% of total volume dying.

[2] Data contains some budworm-killed stands listed on inventory maps as "Not Sufficiently Restocked".

Table 7. Area of productive forests severely damaged ("D") by the spruce budworm in Newfoundland in 1981.

Management unit no.	Area (ha)
2	14 124
4	6 916
5	9 114
6	1 235
8	17 168
9	12 540
11	9 341
12	15 293
14	11 916
15	5 256
18	14 157
TNNP	737
	117 797

Table 8. Areas (ha) of productive sub-merchantable stands where tree mortality was evident in 1981

Prov. manag. unit	Ownership	Areas by damage category[1] a	b	c	Total
2	Crown	0	0	673	673
4	Bowater	2	0	0	2
4	Price	11700	2997	750	15447
5	Crown	0	709	0	709
5	Bowater	280	78	0	358
5	Price	66	62	0	128
6	Bowater	3208	3978	332	7518
6	Price	3106	658	24	3788
7	Crown	2324	1845	0	4169
8	Crown	494	158	108	760
8	Bowater	0	274	0	274
8	Price	0	77	0	77
9	Crown	31	730	0	761
9	Bowater	1074	2641	2009	5724
9	Price	0	0	0	0
10	Crown	0	997	0	997
10	Price	686	5528	0	6214
11	Price	5207	2904	2231	10342
12	Price	188	0	78	266
14	Crown	2375	2584	751	5710
14	Bowater	5201	2720	567	8488
14	Private	117	429	1002	1548
15	Crown	232	0	0	232
15	Bowater	1552	149	245	1946
16	Bowater	77	0	0	77
17	Crown	140	511	0	651
17	Price	0	0	0	0
18	Crown	93	69	188	350
18	Bowater	0	43	0	43
Total	Crown	5689	7603	1720	15012
	Bowater	11394	9883	3153	24430
	Price	20953	12226	3083	36262
	GMNP	0	0	0	0
	TNNP	0	0	0	0
	Private	117	429	1002	1548
	Abitibi	0	0	0	0
Total	Island	38153	30141	8958	77252

[1] a - 50% or more of total stems in stand dead.
b - 20% to 49% of total stems dead or more than 50% of total stems dying (dying = 90% or more total defoliation).
c - 5% to 19% of total stems dead or less than 50% of total stems dying.

Table 9. Areas of moderate to severe defoliation and moderate to high hazard forecast in productive forests for 1982.

Management unit no.	Ownership	Moderate to severe defoliation(ha)	Moderate to high hazard(ha)
2	Crown	-	4704
4	Price	1514	-
6	Bowater	1058	136
6	Price	136	735
7	Crown	661	2966
7	Bowater	2944	2944
9	Bowater	-	8499
11	Price	-	2213
12	Price	-	3312
14	Crown	3824	22407
14	Bowater	9344	12199
15	Bowater	1197	11156
All	Crown	4485	30077
	Bowater	14543	34934
	Price	1650	6260
Total Island		20678	71271

category and 440 in the severe (Table 10). Egg-mass numbers in these two defoliation categories decreased in comparison to those recorded in 1980.

Eastern Hemlock Looper, Lambdina fiscellaria fiscellaria (Guen.) - Population levels collapsed in 1981 in the infestation near the headwaters of Salmon River and Main Brook on the Northern Peninsula. A high incidence of a fungal disease caused by Entomophthora sp. occurred in the population along with a viral disease. A high proportion of egg mortality also occurred in 1981. The total infested area was about 10 100 ha and the volume of dead and dying stands was estimated at 195 400 m^3.

The average number of larvae per tree sample and number of collections for the Island are as follows:

Year	No. of collections	No. of larvae per tree sample		
		Min.	Avg.	Max.
1981	27	0.3	0.7	8.0

Spruce Coneworm, Dioryctria reniculelloides M & M - The infestation of this pest first reported in 1976, collapsed in 1981. Damage of black spruce cone crops during the infestation was severe and extended from Hall's Bay to Terra Nova. Only low numbers were collected during the summer near Gull Pond, Jumpers Brook and Gambo.

Year	No. of collections	No. of larvae per tree sample		
		Min.	Avg.	Max.
1981	6	0.3	1.0	1.3

Blackheaded Budworm, Acleris variana (Fern.) - Population levels of this budworm have increased this year and infestations were reported near Gallants in western Newfoundland and from the headwaters of Salmon River on the Northern Peninsula. Budworm numbers have been low in the Province for the past several years. Past history of this budworm shows that parasites play an important role in terminating these outbreaks without serious tree mortality. The number of larvae per tree sample and collections are shown below.

Year	No. of collections	No. of larvae per tree sample		
		Min.	Avg.	Max.
1981	28	0.3	1.1	8.0

Table 10. Summary of spruce budworm egg-mass numbers per 10 m^2 of foliage for sample points with moderate and severe defoliation forecast in Newfoundland from 1978 to 1981.

Year	Moderate defoliation forecast*		Severe defoliation forecast*	
	No. sample points	Avg. EM/10 m^2	No. sample points	Avg. EM/10 m^2
1981	4	129	4	440
1980	49	149	123	437
1979	65	149	149	438
1978	72	154	124	491

*Class limits for defoliation forecast based on egg-masses per 10 m^2 of foliage:

Defoliation forecast	
Nil	0%
Light	1% to 25%
Moderate	26% to 75%
Severe	76% to 100%

Balsam Woolly Aphid, Adelges piceae (Ratz.) - Since it was first recorded in 1949 the aphid has caused severe damage in many balsam fir stands, primarily in those situated in low lying areas (between sea level and 270 m). In 1967 the overall outbreak decreased and only isolated patches of infestation remained, mainly in central and eastern Newfoundland.

In 1980 the Forest Insect and Disease Survey conducted surveys throughout the Island to assess increasing aphid populations and tree damage. A total of 52 locations were sampled from the Codroy Valley to Swift Current. The highest numbers causing new "gout" were found at South Branch River, Bottom Brook, Trout Brook, South Brook Valley, Loon Bay, Dildo Run Provincial Park, Cobblers Brook, Aspey Brook, and Swift Current.

In 1981 the aphid survey was conducted on the west coast of the Island. The highest population levels and damage were found near Highlands River, Robinsons, Dribble Brook, Bottom Brook, Wild Cove (Bay of Islands), Cooks Brook and South Brook Valley. High populations found at some of these locations for the second consecutive year indicates that a new outbreak is developing.

In 1981 a report on infested trees was also received from a forest improvement (thinned) area on the Gander Bay Road. No samples were collected in this stand and therefore population levels could not be determined.

Yellowheaded Spruce Sawfly, Pikonema alaskensis Roh. - Population levels of this insect increased in 1981 and caused severe defoliation of immature stands of black spruce in the Pamehac Brook and Rattling Brook areas. Approximately one hectare was defoliated near Pamehac Brook and about 50 ha in the Rattling Brook area.

Year	No. of collections	No. of larvae per tree sample		
		Min.	Avg.	Max.
1981	7	0.3	6.1	40.0

European Spruce Sawfly, Gilpinia hercyniae Htg. - An increase in population levels was detected from collections between St. Georges and Deer Lake in western Newfoundland. The sawfly is not expected to cause serious damage of spruce stands because of a virus disease introduced to the Island in the 1940's. This disease is still considered a valuable control factor in reducing sawfly numbers.

Year	No. of collections	No. of larvae per tree sample		
		Min.	Avg.	Max.
1981	27	0.3	2.5	13.0

Spruce Beetle, Dendroctonus rufipennis Kby. - This insect continued to cause damage and tree mortality in several white spruce stands weakened by spruce budworm defoliation throughout western Newfoundland. Dead and dying trees were recorded at South Branch, Stag Lake Road, on the north and south sides of Bay of Islands, Goose Arm, Pasadena and in the Bonne Bay area. The volume of dead trees was estimated at about 6 615 m^3.

Larch Sawfly, Pristiphora erichsonii (Htg.) - High population levels caused severe defoliation of larch stands between the Codroy Valley and St. Georges, Deer Lake and Kittys Brook, along the south side of Red Indian Lake, near Millertown, Miguels Brook on the Bay d'Espoir Road and near Cochrane Pond. Population levels are forecast to be high again in 1982. Population levels of the introduced shrew, Sorex cinereus cinereus Kerr., also increased in the sawfly infested areas and averaged 13.0 per ha compared to 5.0 per ha in areas not infested by the sawfly. Trapping results for the last five years in four shrew plots are shown in Table 11. The number of larval collections per tree sample were as follows:

Year	No. of collections	No. of larvae per tree sample		
		Min.	Avg.	Max.
1981	19	1.3	74.0	200.0

Larch Beetle, Dendroctonus simplex Lec. - Infestations of this beetle continued throughout most of the Island with the most conspicuous damage in the Codroy Valley, along the Trans Canada Highway throughout central Newfoundland, and along Thorburn Road, near St. John's. In 1981 new infestations occurred on the Avalon Peninsula causing extensive tree mortality in an area from Bay Bulls Pond to Windsor Lake and west to the Salmonier Valley. A survey of the damaged stands showed a dead volume of 18 435 m^3 throughout the Island.

European Pine Sawfly, Neodiprion sertifier (Geoff.) - This accidentally introduced pest, first discovered near Windsor Lake on the Avalon Peninsula in 1974, continued to defoliate ornamental pines in Pippy Park in St. John's. Tree mortality in a pine plantation near Windsor Lake was estimated at 90%. Larval and pupal parasites were released as a biological control measure. The larval parasite, Lophyroplectus luteator (Thunb.) was released each year from 1978 to 1981. The parasite has since been recovered. The pupal parasite, Pleolophus basizonus (Grav.) however, released yearly from 1977 to 1980 was recovered in 1979 planted cocoons and again in 1981 from a few collected cocoons and is considered to be established in Newfoundland.

Table 11. Estimated number of shrews per hectare in Newfoundland 1977-81.

Location	Oct. 1977	Oct. 1978	Oct. 1979	Oct. 1980	Oct. 1981
St. Georges	-	6.45	6.45	10.77	12.69
Halls Bay	-	13.99	4.30	3.24	4.83
Terra Nova	8.13	10.77	6.48	5.39	7.53
Paddy's Pond	7.34	5.39	9.69	4.30	2.15

Birch Casebearer, Coleophora serratella (L.) - Generally light defoliation occurred throughout western and central Newfoundland, except for a few areas with moderate defoliation near River Brook, Journois Brook, Northwest Gander River and Bay d'Espoir. Severe defoliation was recorded from Port Blandford to Clarenville and most of the Avalon Peninsula. There were no recoveries of two species of parasites released in 1974 and 1975.

Year	No. of collections	No. of larvae per tree sample		
		Min.	Avg.	Max.
1981	58	0.7	7.7	35.0

Satin Moth, Leucoma salicis (L.) - High population levels occurred along Fischell's River in western Newfoundland where severe defoliation of balsam poplar stands has occurred for the second consecutive year. Infestations on the Avalon Peninsula were light and only a few reports were received from owners of ornamental trees in St. John's and neighbouring towns.

Year	No. of collections	No. of larvae per tree sample		
		Min.	Avg.	Max.
1981	1	34	11.3	34

Mountain Ash Sawfly, Pristiphora geniculata (Htg.) - High population levels caused severe defoliation throughout Newfoundland over the past three years. The most severe defoliation occurred on the Avalon Peninsula where mountain ash is a common ornamental tree. In 1981, Olesicampe sp. No. 5, a larval parasite of European origin was introduced from Quebec and released in Pippy Park to help control the infestation.

Year	No. of collections	No. of larvae per tree sample		
		Min.	Avg.	Max.
1981	19	4	48.9	150

Gypsy Moth, Lymantria dispar (Linn.) - This destructive forest insect does not occur in Newfoundland but its accidental introduction is a distinct possibility and it is being monitored through pheromone traps in cooperation with Agriculture Canada. In 1980 one male moth was caught in Corner Brook. The insect cannot be considered established until egg-masses are found in the Province.

OTHER NOTEWORTHY INSECTS

Species	Host(s)	Locality	Average per tree	No. of collections
Acleris emagrana Fabr. A leafroller	W	Square Pond	0.3	1
Agriotes sp. A click beetle	bF	Frenchman's Pond Rd.	0.7	1
Anoplodera tibialis Lec. Longhorned beetle	bF	Burgeo Road	0.3	1
Anoplonyx luteipes (Cress.) Marlatt's larch sawfly	tL	Flat Bay Rd., Stag Lake Park, 9.5 km S. of N.W. Gander River (Bay d'Espoir Rd.)	0.8	3
Archips myricanus McD. A leafroller	Spiraea Sweet gale	Harbour Main Rd. Fischells River	31.1	3
Archips rosanus (Linn.) European leafroller	White oak, black ash, ash, W, tA, Sal	St. Judes, Square Pond Prov. Park, Northern Arm, Pasadena Nursery	4.5	10
Cephalcia fascipennis (Cress.) Webspinning sawfly	wS	Pynn's Brook	0.5	1
Choristoneura conflictana (Wlk.) Large aspen tortrix	tA	Gillams, Square Pond Prov. Park, Bishop's Falls, Churchill Falls Rd.	0.8	4
Choristoneura rosaceana (Harr.) Obliquebanded leafroller	tA, black ash	Pasadena Nursery, Badger	0.3	2
Chrysomela falsa Brown Willow leaf beetle	W	23 km in Churchill Rd.	6.7	1
Cinara sp. An aphid	bS	Sir Richard Squires Park	15.0	1

Cont'd ...

Species	Host(s)	Locality	Average per tree	No. of collections
Ctenicera triundulata (Rand.) Threespotted click bettle	bS	5.7 km S. of Lewisporte	0.3	1
Dendroctonus simplex L. Eastern larch beetle	tL	Holyrood	3.0	1
Depressaria pastinacella (Dup.) Parsnip webworm	Wild parsnip	Barachois Brk. Rd., Flat Bay Brk. (TCH.), South Brook Valley	9.0	3
Dimorphopteryx sp. A sawfly	wB	Camp 33 Rd. (4 km from TCH.)	1.0	1
Epinotia similana (Hbn.) A leafroller	Sal	Lady Pond Rd.	3.0	1
Epinotia solandriana L. A leafroller	wB	Logging School Rd., Cox's Cove, 21 km on Sops Arm Rd., Milltown, Holyrood Pd., Paddys Pd.	1.7	6
Eriophyes sp. Leaf mites	aMo, wB	Butterpot Park, 2 km N. of Reidville Jct., 7.1 km E. of Glenburnie, Sir. Richard Squires Park, Mary March Park, Birchy Bay, Bernards Brk.	26.0	7
Eucordylea atrupictella Dietz. Spruce micro moth	tL	9.5 km S. of N.W. Gander River	0.3	1
Eupithecia sp. Brown spruce looper	tL, bF	9.5 km S. of N.W. Gander River, Square Pond Park, Birchy Bay, Kings Cove, Cards Hr., Districts 107 & 108	0.5	20
Eusphalerum sp. A love beetle	Wild parsnip	Nelson Pond Rd.	27.8	2

Cont'd ...

OTHER NOTEWORTHY INSECTS - Continued

Species	Host(s)	Locality	Average per tree	No. of collections
Fenusa dohrnii (Tischb.) European alder leafminer	Sal	South Brook Valley	5.3	1
Fenusa pusilla (Lep.) Birch leafminer	wB	Aspen Brook, 8 km W. of Badger, Districts 107, 108 & 112	24.1	15
Feralia jocosa (Guen.) Redmarked caterpillar	wS, bF, bS, tL	Portland Creek, Indian River Park, Kings Pt., Birchy Bay, Campbellton, Millertown Jct. Rd., N.W. Gander River at Bay d'Espoir Rd., Lloyds River at Burgeo Rd., 54.3 km fr. TCH (Burgeo Rd.), Districts 107 & 108	0.6	33
Hedia variegana (Hbn.) Green budworm	aMo	Newtown	4.0	1
Hemichroa crocea F. Striped alder sawfly	Sal	Bottle Pond Road (old TCH), Camp 33 Rd., 4 km fr. TCH	18.5	2
Hylobius sp. Root collar weevil	bF	Watsons Brk. Rd. (2 km fr. TCH) Riverhead	0.3	2
Ichthyura apicalis Wlk. Redmarked tent maker	W	TCH (0.2 km E. of River Brook)	0.3	1
Mindarus abietinus Koch Balsam twig aphid	bF	Monroe, Millville, Bottom Brk. Rd., 2 km N. of Reidville Jct., St. Pauls, Bakers Brk., Sheffield Lake Rd., Portland Creek, District 106	10.3	15
Monochamus scutellatus (Say) Whitespotted sawyer	bF	Barachois Brk. Rd. (12 km fr. Camp 180 Rd.)	1.0	1
Nadata igbbosa (J.E. Smith) Green oak caterpillar	W, bPo	River Brook	0.5	2

Cont'd ...

Species	Host(s)	Locality	Average per tree	No. of collections
Nematus limbatus (Cress.) Willow sawfly	W	District 108	40.1	7
Nematus sp. A willow sawfly	W	Goose Bay, Millertown Jct. Rd.	1.0	3
Neodiprion abietis complex Balsam fir sawfly	bF	Barry Brk., River Brk., South Brk.	1.2	3
Neurotoma inconspicua (Nort.) Plum webspinning sawfly	Pch	Blue Gulch Pond Rd. (3 km fr. Pasadena)	7.0	1
Nycteola cinerana N. & D. Poplar leaftier	W	Pasadena Field Station	2.0	1
Nyctobia limitaria (Wlk.) Green balsam looper	bF	Indian River Park, Nicky's Nose Cove, Eastport, 10 km E. of Lethbridge, Lockston Park, Codroy Pond, Humber Village, Gillams, Barry Brk., Pynn's Brk., Loch Lomond, Square Pd. Park, Jonathans Pd. Park, District 105	0.4	17
Orgyia antiqua (L.) Rusty tussock moth	wB,bF W, Sal	Barachois Pond Prov. Park, District 108	1.1	12
Otiorhynchus singularis (L.) Claycoloured root weevil	bF	Topsail Pond Rd., Holyrood, Markland Rd. (10 km S. of Whitbourne)	1.3	3
Otiorhynchus sulcatus (F.) Black vine weevil	wB	Conne River Pond	0.3	1
Papaipema pterisii Bird. A stalk borer	Wild parsnip	South Brook (11 km fr. TCH)	0.5	1
Papilio brevicauda Saund.	Wild parsnip	South Brook Valley (13.5 km fr. TCH)	1.0	1

Cont'd ...

Species	Host(s)	Locality	Average per tree	No. of collections
Phyllocnistis populiella Chamb. Aspen leafminer	bPo, tA	Goose Bay, Churchill Rd., 39 km in Churchill Falls Rd., River Brook, Gillams, Indian River Park, Seal Cove & Wild Cove Rds.	6.5	11
Pikonema dimmockii (Cress.) Greenheaded spruce sawfly	wS,bS	Aspen Brook, Glenburnie, Lewisporte, Miguels Lake, Districts 105, 107 & 108	1.0	19
Pissodes dubius Rand. Balsam bark weevil	wS	Pasadena Field Station	0.3	2
Podabrus sp. A soldier beetle	bF	Cormack, 4.7 km N. of jct. Advocate Mines, Logging School Road (11 km fr. TCH)	0.4	3
Pontania sp. A willow sawfly	W, tA	Goose Bay, Happy Valley, 23 km in Churchill Road	3.4	3
Pristiphora lena Kinc. Little spruce sawfly	bS,wS	Robinsons River Rd. (5.5 km fr. TCH), entrance to Stag Lake Prov. Park	1.3	2
Pseudexertera oregonana Wlshm. Early aspen leaf curler	tA	Saltons Brk., T.N.N.P. Headquarters, Baie Verte Jct., Crescent Lake, South Brk., Birchy Basin Dam, Jonathans Pond, District 106	0.8	14
Pyrrha exprimens (Wlk.) Variable caterpillar	bPo	River Brook	0.3	1
Rheumaptera bastata (Linn.) Spearmarked black moth	wB,W Sal	District 108	2.8	9
Rhyacionia buoliana (Schiff.) European pine shoot moth	Scots pine	Pasadena Nursery	2.7	1

Cont'd ...

Species	Host(s)	Locality	Average per tree	No. of collections
Scoliopteryx libatrix (Linn.) Willow scalloped owlet	W	Goose Bay	0.3	1
Semiothisa signaria dispuncta (Wlk.) A looper	wS	N.W. side of Goose River	1.0	1
Semiothisa sp. A looper	bS,bF, wS,tL	Southwest Brk., Grand Lake Rd., Botwood Phillips Hd., Conne River Pd., N.W. Gander River, Gayside Jct., Camp 33 Rd., Blue Gulch Pd. Rd., Goose Arm, Kippens, Lloyds River, Beachside	0.4	13
Solenobia walshella Clem. A bagworm	bF	Eastport, Birchy Bay, Gayside Jct., Chapel Island	4.0	4
Syneta sp. A leaf beetle	bF	Milltown, Cormack, Riverhead	0.4	3
Syngrapha epigaea (Grt.) A cutworm	Pch	1 km S.W. of Phillips Head	1.0	1
Syngrapha sp. A cutworm	wS	Pasadena Field Station, Camp 33 Rd. (3.5 km fr. Grand Lk.)	1.0	2
Zeiraphera canadensis Mut. & Free. Spruce bud moth	wS,bS	Jct. Pt. Leamington & Northern Arm Rds., Gallants Rd., Grand Lake Brook	3.6	3
Zeiraphera fortunana Kft. Yellow spruce budworm	wS	Gillams, 2 km N.E. Gallants, Pinchgut Lk. Rd., Grand Lk. Brk.	2.0	4

IMPORTANT FOREST DISEASES

Scleroderris Canker, caused by the fungus Gremmeniella abietina (Lagerb.) Morelet - The European race of this fungus was found in several areas in St. John's, Mount Pearl and the Goulds on ornamental trees of red, Scots and black Austrian pines. A severe outbreak was also found in a 1.62 ha experimental softwood plantation on the Bauline Line near Torbay, about 14 km from the nearest infection in St. John's. Virtually all the red pine trees in the plantation showed dieback symptoms, severe reddening of needles and about 30% tree mortality. Surveys of all pine stands on the Avalon and several trees in the Salmonier Valley was conducted but failed to show the presence of the disease.

Witches' Broom of Black Spruce, Arceuthobium pusillum Peck. - This disease caused by eastern dwarf mistletoe continued its spread eastward from western Newfoundland. In 1980 it was found along Red Indian Lake and on a few trees near Deer Lake.

Cone and Seed Pests

Inland Spruce Cone Rust, caused by Chrysomyxa pirolata Wint. - This cone rust has been found at eight widely scattered locations in eastern and central parts of the Island and four locations in eastern Labrador since it was first recorded in 1979. It was most conspicuous in young regenerating stands of black spruce growing on moist sites. Although damage was light to moderate, its potential to cause serious cone damage should not be underestimated especially in areas designated for seed collection.

Armillaria Root Rot, Armillaria mellea (Vahl. ex Fr.) Kummer - Preliminary investigations on the distribution and severity of the root rot in balsam fir stands damaged by spruce budworm in central and western Newfoundland have shown that the incidence and intensity of the disease increased with the severity of the budworm damage from light to moderate, and then from severe to dead damage category.

Broom Rust of Balsam Fir, Melampsorella caryophyllacearum Schroet., and of Black Spruce, Chrysomyxa arctostaphyli Diet.- Broom rust of balsam fir was common throughout the Island and occurred in small patches both in regeneration and mature stands. Broom rust of black spruce occurred mainly in the Halls Bay and along the Badger-Buchans roads. It was also found in the Northwest River and in the Goose Bay areas.

Needle Rusts of Conifers - Needle rust of balsam fir, Pucciniastrum epilobii Otth. and of black spruce, Chrysomyxa ledicola Lagerh. and C. empetri Schroet. Needle rust of balsam fir was common on forest as well as ornamental trees in western and eastern areas of the Island. It

was most severe in the Holyrood Pond Park and on the Bauline Line Road. This disease was more abundant on black spruce on the Avalon Peninsula and on the ornamental trees of Colorado blue spruce in and around St. John's, affecting up to 100% of the new foliage.

Blister Rust of White Pine, Cronartium ribicola Fisch. - Moderate to severe infection of this rust continued in white pine in the Gambo-Terra Nova area. Tree mortality was common on young trees throughout both watersheds.

Dothichiza Canker of Lombardy Poplar, Dothichiza populea Sacc. and Briard - This disease continued to cause tree and branch mortality in many urban areas of the Island. It caused mortality of shoots and branches on ornamental trees in the east end of St. John's. Some of the dead trees were removed along streets in the Corner Brook West area during the past two years.

Shoot and Leaf Blight of Trembling Aspen, Venturia macularis (Fr.) E. Muell & von Arx - Low to moderate incidence of this disease occurred in many aspen regenerating stands in central and western Newfoundland, and in Goose Bay, Labrador.

Leaf Rust of Trembling Aspen, Melampsora abietis-canadensis Ludwig ex Arth. - Severe outbreaks of this leaf rust occurred in Newfoundland near Swift Current on the Burin Peninsula and at South Pond, Halls Bay. About 80% of the aspen regeneration and 90% of the foliage was affected near Swift Current.

Frost Damage - Late frost occurred in the middle of June throughout most of the Island and caused light to moderate damage of balsam fir shoots and several hardwood species. Severe damage of young balsam fir was recorded in many areas of central and eastern areas. The most conspicuous being in the Northwest Gander River and Twillick Brook areas.

Winter Drying - Low to moderate incidence of winter drying of balsam fir occurred in scattered patches throughout the Island. It was most conspicuous near Sally's Cove, Daniels Harbour, St. Pauls and Roddickton areas.

OTHER NOTEWORTHY DISEASES

Organism and Disease	Host(s)	Locality	Remarks
Apiosporina collinsii (Schw.) Höhn. Witches' broom	Serviceberry Wild raisin	7 km N.W. of Baie Verte, 1 km S.W. of Phillips Hd.	Low to high incidence.
Ciborinia whetzelii (Seav.) Seav. Ink spot	Aspen, trembling	Indian River Prov. Park, Churchill Rd. (km 2), 7.4 km on Bear Cove Rd.	Low to high incidence, 70% on Bear Cove Rd.
Coleosporium asterum (Diet.) Syd. Needle rust	Pine, jack	Tilton Barrens	High incidence.
Cucurbitaria pithyophila (Fr.) Petrak Stem girdle	Pine, white	4 km E. of TCH (Bottom Brook Road)	Low incidence (20% foliage on 2 trees).
Isthmiella faullii (Darker) Darker Needle cast	Fir, balsam	Holyrood Pond Prov. Park	Low incidence
Kabatiella apocrypta (Ell. & Ev.) Arx Large leaf spot	Maple, mountain, red	Pasadena Nursery, Barachois Pond Prov. Park, Notre Dame Jct. Prov. Park, Stag Lake	Low incidence.
Lichens	Spruce, white	Pasadena Field Stn.	Low incidence.
Lophodermium pinastri (Schrad. ex Hook.) Chev. Needle cast	Pine, jack Scots	Tilton Barrens, Salmonier Line	Moderate to high incidence.
Mycosphaerella sp. Leaf spot	Fireweed	South Brook Valley (13.5 km fr. TCH)	Moderate inciden
Phyllosticta minima (Berk. & Curt.) Underw. & Earle Purple eye spot	Maple, red	Gambo, Campbellton, Birchy Bay, Phillips Head, Burgeo Rd. and TCH Jct., Corner Brook, Barachois Pond Prov. Park	Low to moderate incidence.
Rehmiellopsis balsameae Waterman Tip blight	Fir, balsam	Black River (Baie Verte Rd.)	Low incidence.

Cont'd ...

OTHER NOTEWORTHY DISEASES - Concluded

Organism and Disease	Host(s)	Locality	Remarks
Septoria betulae (Lib.) West. Leaf spot	Birch, white	South Brook Valley, Barachois Pond Prov. Park	Low incidence.
Taphrina cerasi (Fckl.) Sadeb. Witches' broom	Cherry, pin	Woodstock Jct.	Moderate incidence.
Taphrina carnea Johans. Leaf blister	Birch, yellow	Jct. St. Andrews and Loch Lomond Roads, Kippens, Barachois Pond Prov. Park	Low to moderate incidence.

TREE PEST EXTENSION SERVICE

Forest Insect and Disease Survey technicians were responsible for providing technical information to federal, provincial and municipal agencies, and the general public on the care and protection of forests, rural and urban and ornamental trees and shrubs. A total of 108 inquiries were received from citizens at the Forest Research Centre. From these calls 133 pamphlets and 4 letters were mailed and 25 visits were made to property owners. Forestry Notes of insect and disease pests were also distributed to schools, trade colleges and other institutions to be used for teaching purposes.

COMMON INSECTS

Birch Casebearer - Severe defoliation to birch trees was prevalent in Conception Bay South, Portugal Cove and St. John's. No tree mortality was recorded.

European Pine Sawfly - This introduced pest continued to defoliate stands of pine at Windsor Lake and near Confederation Building in St. John's. At Windsor Lake the population has dispersed to the west side of the lake as many trees are dying on the original site. The larval parasite Lophyroplectus luteator (Thunb.) was again released near Confederation Building. Recoveries of the introduced cocoon parasite Pleolophus basizonus (Grav.) were made in 1981.

Mountain-ash sawfly - High numbers of this sawfly and noticeable defoliation was recorded from Mount Pearl, Torbay and St. John's. The parasite Olesicampe sp. No. 5 was released for the first time at Oxen Pond Botanic Park. This release site was chosen because of the high density of the host population in the area.

OTHER NOTEWORTHY INSECTS

Species	Host(s)	Locality
Archips sp. Leaf rollers	Maple	St. John's
Choristoneura fumiferana (Clem.) Spruce budworm	bF	Three Island Pond, St. John's, Wedgewood Park
Croesus latitarsus Nort. Dusky birch sawfly	wB	Topsail
Cryptorhynchus lapathi (L.) Poplar and willow borer	Poplar	Clarenville
Dermestes lardarius L. Larder beetle	Household pest	Wooddale, St. John's
Fenusa ulmi Sund. Elm leafminer	Elm	St. John's
Harpipteryx xylostella (Linn.) European honeysuckle leafroller	Honeysuckle	Kelligrews
Leucoma salicis (Linn.) Satin moth	tA	Western Bay
Pristiphora erichsonii (Htg.) Larch sawfly	tL	St. John's
Tipula paludosa Meigen European crane fly	Grass	Milltown

COMMON DISEASES

Scleroderris Canker of Pines - New infections of Scleroderris Canker were found in three more areas. On Factory Lane, in St. John's, eight Austrian pine showed symptoms of the disease. A very severe outbreak of the disease occurred in a 1.62 ha softwood plantation near Torbay. Red pine trees showed severe reddening of needles and approximately 90% of the shoots had dieback. Many of the trees later died. An infected Austrian pine was also found at Amherst Heights in St. John's.

Armillaria Root Rot - Armillaria root rot was found on ornamental trees of Scots pine, Sitka spruce, American mountain-ash and Canada yew in St. John's. It was in an early state of infection in the spruce but had already killed the pine, mountain-ash and yew.

Needle Rust of Spruce - The most common disease was the needle rust of spruce caused by Chrysomyxa ledicola. It was present on black, blue and white spruces in many areas throughout the Island. Its incidence varied from a low of 10% to a high of 100% and affected only the current year's foliage.

Heat Injury - Heat injury was present on silver and lombardy poplars, sugar and red maples, and horse chestnut in St. John's. The incidence was low, affecting only a few trees.

OTHER NOTEWORTHY DISEASES

Organism and Disease	Host(s)	Locality	Remarks
Chrysomyxa arctostaphyli Diet. Broom rust	Black spruce	Clarenville	Low incidence. Only on one tree and it had two brooms.
Coccomyces hiemalis Higgins Shot hole	Pin cherry	Paradise	Common.
Cytospora salicis (Cda.) Rabh. Dieback and canker	Willow	Mount Pearl	Trace. One tree showed dieback.
Dothichiza populea Sacc. & Briard Dieback and canker	Lombardy poplar	St. John's	All the 7 trees showed dieback symptoms.
Isthmiella crepidiformis (Darker) Darker Needle cast	Black spruce	Roddickton	Common.
Marssonina brunnea (Ell. & Ev.) Sacc. Leaf spot	Lombardy poplar	St. John's	46 of 60 trees had the disease and up to 15% of foliage was affected.
Nectria cinnabarina (Tode ex Fr.) Fr. Canker and dieback	Hybrid rose, Sycamore maple	St. John's	Canker along the main shoot of a living rose plant, and a large stem canker on the maple.
Phyllosticta sp. Leaf spot	Lombardy poplar	St. John's	Severe symptoms to a height of 3.5 metres.
Taphrina aurea Pers. ex Fr. Yellow leaf blister	Lombardy poplar	St. John's	Less than 1% of foliage affected on 30 of 60 trees.
Taphrina cerasi (Fckl.) Sadeb. Taphrina witches' broom	Pin cherry	Paradise	Common.

Cont'd ...

OTHER NOTEWORTHY DISEASES - Concluded

Organism and Disease	Host(s)	Locality	Remarks
Chemical - Herbicide	Balsam fir	Mobile	Trees exposed to herbicide/insecticide resulted in the wilting of leaves.
- Insecticide	Trembling aspen & silver poplar	St. John's	
Lichens	Balsam fir	Roddickton	Common.
Physical injury	Lombardy poplar	St. John's	Young poplar trees were improperly braced, causing some to break at the stem.

APPENDIX I

Appendix I. Results of spruce budworm egg-mass and overwintering larval surveys.

Plot no.	Unit 1 Plot location	No. branches sampled	Cumulative totals (no. egg-masses per 10 m^2 foliage)	Code 1981 defoliation*	Egg-mass category**	Overwintering larval category***
1011	Cape Broyle	3	0	1	Nil	
1012	Lamanche	3	0	1	Nil	
1013	Witless Bay Line	3	0	1	Nil	
1014	Bay Bulls Big Pond	3	0	1	Nil	
1015	Maddox Cove	3	0	1	Nil	
1016	Blackhead	3	0	1	Nil	
1017	Blackhead	3	0	1	Nil	
1018	Logy Bay Road	3	0	1	Nil	
1019	Outer Cove	3	0	1	Nil	
10110	Flatrock	3	0	1	Nil	
10111	Pouch Cove	3	0	1	Nil	
10112	Pouch Cove	3	0	1	Nil	
10113	Bauline Line	3	0	1	Nil	
10114	Portugal Cove	3	0	1	Nil	
10115	Cochrane Pond	3	0	1	Nil	
10116	Paddy's Pond	3	0	4	Nil	
10117	Foxtrap turnoff	3	0	1	Nil	
10118	Butterpot Prov. Park.	3	0	1	Nil	
10119	Holyrood	3	0	1	Nil	
10120	Salmonier Line	3	0	1	Nil	
10121	Gushues Pond Prov. Park	3	0	1	Nil	
10122	Mahers	3	0	1	Nil	
10123	Whitbourne	3	0	1	Nil	
10124	Dildo South	3	0	1	Nil	
10125	Hopeall	3	0	1	Nil	
10126	Whiteway	3	0	1	Nil	
10127	Carbonear	3	0	1	Nil	
10128	Hearts Delight	3	0	1	Nil	
10129	Cavendish	3	0	1	Nil	
10130	Hearts Desire	3	0	1	Nil	
10131	New Perlican	3	0	1	Nil	
10132	Long Hr. Turnoff	3	0	1	Nil	
10133	Fairhaven Turnoff	3	0	1	Nil	
10134	Thornlea	3	0	1	Nil	
10135	Jacks Pd. Prov. Park	3	0	1	Nil	
10136	Long Hr.	3	0	1	Nil	
10137	Fox Hr.	3	0	1	Nil	
10138	Dunville	3	0	1	Nil	
10139	7.5 km W. of Placentia Jct.	3	0	1	Nil	
10140	7.5 km E. of Dunville	3	0	1	Nil	

Cont'd ...

Appendix I. Continued

Plot no.	Unit 1 Plot location	No. branches sampled	Cumulative totals (no. egg-masses per 10 m^2 foliage)	Code 1981 defoliation*	Egg-mass category**	Overwintering larval category***
10141	Northeast Arm	3	0	1	Nil	
10142	Southeast Placentia	3	0	1	Nil	
10143	St. Catherines	3	0	1	Nil	
10144	Father Duffy's Well	3	0	1	Nil	
	Average per branch		0			
	Unit 2					
1021	Shoal Hr.	3	0	1	Nil	
1022	Georges Pond	3	0	1	Nil	
1023	Georges Pond	3	0	1	Nil	
1024	Port Blandford	3	30	3	L	
1025	Bunyans Cove Road	3	0	3	Nil	
1025A	Georges Pond	3	0	2	Nil	
1027	Bunyans Cove	3	0	7	Nil	
1028	Harchet Cove	3	0	1	Nil	
1029	St. Jones Within	3	0	1	Nil	
10210	Adeytown	3	0	1	Nil	
10211	Weybridge	3	0	1	Nil	
10212	Lady Cove	3	0	1	Nil	
10213	Clarenville	3	0	1	Nil	
10214	Clarenville	3	0	1	Nil	
10215	Snooks Hr.	3	0	1	Nil	
10216	Britannia	3	0	3	Nil	
10217	Random Island Causeway	3	0	10	Nil	
10218	Barton	3	0	1	Nil	
10219	Waterville	3	0	1	Nil	
10220	Morleys Siding	3	0	4	Nil	
10221	Big Pond	3	0	1	Nil	
10222	Lady Pond	3	0	1	Nil	
10223	Lady Pond	3	49	7	L	
10224	Popes Hr. Head	3	0	2	Nil	
10225	Midday Pond	3	0	1	Nil	
10226	Matthews Pond	3	0	4	Nil	
10227	Charleston	6	0	1	Nil	
10228	Ocean Pond	3	41	1	L	
10229	Saddle Back Pd.	3	0	1	Nil	
10230	Trouty	3	0	1	Nil	
10232	Musgravetown	3	0	4	Nil	
10233	Lethbridge	3	36	1	L	
10234	Portland	3	0	1	Nil	L
10235	Wintertown	3	44	1	L	

Cont'd ...

Appendix I. Continued

Plot no.	Unit 1 Plot location	No. branches sampled	Cumulative totals (no. egg-masses per 10 m^2 foliage)	Code 1981 defoliation*	Egg-mass category**	Overwintering larval category***
10237	Sweet Bay	3	0	2	Nil	
10238	Princeton	3	0	1	Nil	
10239	Blue Gull Pond	3	0	1	Nil	
10240	Port Rexton	3	0	1	Nil	L
10241	Cannings Cove	3	62	5	L	
10242	Indian Arm	3	0	1	Nil	L
10244	Lockston Prov. Park	3	0	1	Nil	
10245	Plate Cove	6	86	1	L	
10247	Kings Cove Road	3	27	1	L	
10248	Stock Cove	3	0	7	Nil	
10249	Knights Cove	3	0	1	Nil	
10250	Blackhead Bay	3	0	1	Nil	
10251	Burnt Point	3	0	1	Nil	
10252	Upper Amherst Cove	3	0	1	Nil	
10253	Blackhead Bay	3	0	5	Nil	
10254	Catalina	3	0	1	Nil	
10255	Port Union	3	0	1	Nil	
102200	Adeytown	3	0	1	Nil	
102201	Southwest Brook	3	0	3	Nil	L
	Average per branch		2.3			
	Unit 4					
3041	Little Gander Pond	3	42	1	L	
3042	S.W. Gander River	3	0	1	Nil	
3043	Kepenkeck Lake	3	0	1	Nil	
3044	Larrys Pond	3	0	2	Nil	
3045	Kepenkeck Lake	3	0	1	Nil	
3046	Lake St. John	3	0	5	Nil	L
3047	Lake St. John	3	72	1	L	
3048	N.W. River	3	0	1	Nil	
3049	Mollyquajeck Lake	3	0	1	Nil	
30410	Deer Pond	3	0	1	Nil	
30411	Deer Pond	3	0	1	Nil	
30412	Triton Brook	3	453	8	M	
30413	Dead Wolf Pond	3	161	2	L	
30414	Mint Brook	3	0	1	Nil	
30415	Riverhead Brook	3	0	1	Nil	

Cont'd ...

Appendix I. Continued

Plot no.	Unit 4 Plot location	No. branches sampled	Cumulative totals (no. egg-masses per 10 m^2 foliage)	Code 1981 defoliation*	Egg-mass category**	Overwintering larval category***
30416	Triton Brook	3	0	1	Nil	
30417	Triton Brook	3	83	1	L	
30418	Gambo Pd.	3	0	1	Nil	
30419	Saunders Pond	3	0	1	Nil	
30420	Newton Lake	3	0	4	Nil	
30421	S.W. Pond	3	0	1	Nil	
30422	Deer Pond	3	0	1	Nil	
30423	Newton Lake	3	0	3	Nil	
30424	Deer Pond	3	0	2	Nil	
	Average per branch		11.2			
	Unit 5					
1051	Chain Pond	3	0	1	Nil	
1052	Terra Nova Road	3	0	2	Nil	
1053	" " "	3	54	1	L	
1054	Glovertown	3	0	1	Nil	
1055	Terra Nova River	3	0	7	Nil	
1056	Gambo	3	0	1	Nil	
1057	Square Pond	3	0	1	Nil	
1058	Gander Lake	3	0	1	Nil	
1059	Gambo	3	72	1	L	
10510	Hare Bay	3	0	1	Nil	
10511	Benton	3	66	2	L	
10512	Soulis Pond	3	0	8	Nil	
10513	S.W. Pond	3	0	1	Nil	
10514	Deadman's Pond	3	66	2	Nil	
10516	Appleton	3	0	1	Nil	
10517	Gander Lake	3	0	1	Nil	
10518	Little Hr. Rd.	3	0	1	Nil	
10521	Soulis Pond	3	0	1	Nil	
20522	Joe Batts Brk.	3	0	1	Nil	
20523	Jonathans Pond	3	0	1	Nil	
30524	Jonathans Brk.	3	0	2	Nil	
30525	Island Pond Brk.	3	0	1	Nil	
30526	Weirs Pond Brk.	3	0	1	Nil	
30528	Jonathans Pond	3	0	1	Nil	
30529	Indian Bay Pond	3	0	1	Nil	

Cont'd ...

Appendix I. Continued

Plot no.	Unit 5 Plot location	No. branches sampled	Cumulative totals (no. egg-masses per 10 m^2 foliage)	Code 1981 defoliation*	Egg-mass category**	Over-wintering larval category***
30530	Indian Bay Pond	3	0	1	Nil	
20531	Island Pond Brk.	3	0	1	Nil	
30533	Indian Bay Pond	3	0	1	Nil	
20534	Gander Bay Road	3	0	1	Nil	
20535	Weirs Pond	3	0	1	Nil	
10536	Weirs Pond	3	0	1	Nil	
10537	Gander Bay Causeway	3	0	1	Nil	
10538	Island Pond	3	0	1	Nil	
10539	Main Pt.	3	0	1	Nil	
10540	5 km E. of Main Pt.	3	0	1	Nil	
10541	10 km E. of Carmanville	3	0	1	Nil	
10542	Frederickton	3	0	1	Nil	
10543	Carmanville	3	0	1	Nil	
10544	Carmanville	3	0	1	Nil	
205200	Jonathans Pond	3	0	2	Nil	
205201	Barrys Ponds	3	0	1	Nil	
	Average per branch		2.1			
	Unit 6					
2061	N.W. Gander River	3	0	1	Nil	
2062	N.W. Gander River	3	0	1	Nil	
2063	Third Berry Hill Pd.	3	0	1	Nil	
2064	Great Gull River	3	0	1	Nil	
2065	Great Gull River	3	0	1	Nil	
2066	S.W. Gander River	3	0	1	Nil	
2067	N.W. Gander River	3	0	1	Nil	
2068	Caribou Lake	3	0	1	Nil	
2069	Dead Wolf Brk.	3	0	1	Nil	
20610	Clarkes Brk.	3	0	1	Nil	
20611	Careless Brk.	3	0	1	Nil	
20612	Mt. Peyton	3	0	1	Nil	
20613	Lewis Brk.	3	0	1	Nil	
20614	Hunts Pds.	1	833	1	S	
20615	Rodney Pd.	3	0	1	Nil	
30616	Gander Lake	3	0	1	Nil	
20617	Templemans Lake	3	0	1	Nil	
20618	Norris Arm	3	0	3	Nil	

Cont'd ...

Appendix I. Continued

Plot no.	Unit 6 Plot location	No. branches sampled	Cumulative totals (no. egg-masses per 10 m^2 foliage)	Code 1981 defoliation*	Egg-mass category**	Overwintering larval category***
30619	Salmon Pond	3	0	1	Nil	
30620	S.W. Gander River	3	0	3	Nil	
20621	Gander Lake	3	0	6	Nil	
20622	N.W. Gander River	3	0	1	Nil	
20623	S.W. Gander River	3	0	1	Nil	
20624	S.W. Gander River	3	0	1	Nil	
20625	S.W. Gander River	3	0	1	Nil	
20626	Little Dead Wolf Pond	3	0	3	Nil	
20627	Little Dead Wolf Pond	3	0	2	Nil	
20628	Gander Lake	3	0	2	Nil	
20629	Gander Lake	3	0	5	Nil	
	Average per branch		9.8			
	Unit 7					
1071	Bay d'Espoir	3	0	1	Nil	L
1072	Swanger Cove	3	0	1	Nil	
1073	Milltown	3	0	1	Nil	
1075	River Pond	3	0	8	Nil	
1076	St. Josephs	3	0	1	Nil	
1077	Bay d'Espoir	3	0	1	Nil	
1078	St. Beronicas	3	0	1	Nil	
10710	Conne River	3	0	1	Nil	
10711	River Pond Park	3	63	9	L	
10713	Long Pond	3	0	1	Nil	
10714	Camp Boggy	3	0	1	Nil	
10715	Head Bay d'Espoir	3	20	1	Nil	
10716	Long Pond	3	0	1	Nil	
10717	Bay d'Espoir	3	0	1	Nil	
10718	Conne River	3	0	1	Nil	L
10719	Hr. Breton Road	3	0	1	Nil	
10720	Head Bay d'Espoir	3	35	1	L	
10721	Long Pond	3	0	1	Nil	
10722	Bernards Brook	3	0	1	Nil	L
10723	Twillick Brook	1	340	4	S	
10724	Long Pond	3	0	1	Nil	
10725	Conne River	3	0	7	Nil	
10726	Long Pond	3	0	1	Nil	

Cont'd ...

Appendix I. Continued

Plot no.	Unit 7 Plot location	No. branches sampled	Cumulative totals (no. egg-masses per 10 m^2 foliage)	Code 1981 defoliation*	Egg-mass category**	Overwintering larval category***
10727	Conne River	3	0	1	Nil	
10728	Conne River Pond	3	0	3	Nil	
10729	Conne River Pond	3	0	9	Nil	
10730	Long Pond	3	0	1	Nil	
10731	Matthews Pond	3	0	1	Nil	
10732	Berry Hill Pond	3	277	1	L	
10733	Berry Hill Pond	3	0	9	Nil	
107201	Conne River	3	0	3	Nil	
	Average per branch		6.1			
	Unit 8					
1081	Alderburn	3	0	1	Nil	
1082	Salmon Pond	3	0	1	Nil	
1083	Northern Arm	3	0	1	Nil	
1085	Exploits Bay	3	0	1	Nil	
1086	Norris Arm	3	0	1	Nil	
1087	Northern Arm	3	0	2	Nil	
1088	Phillips Head	3	0	1	Nil	
1089	Laurenceton	3	0	1	Nil	
10811	Browns Arm	3	0	1	Nil	
10812	Lewisporte	3	0	1	Nil	
10813	Pt. Leamington	3	0	1	Nil	
10814	Pt. Leamington	3	0	1	Nil	
10815	Point of Bay	3	0	1	Nil	
10816	Lewisporte	2	0	1	Nil	
10818	West Arm	3	0	1	Nil	
10819	Pt. Leamington	3	0	1	Nil	
10820	Ritters Arm	3	0	1	Nil	
10821	Laurence Hr.	3	0	1	Nil	
10823	Salmon Pond	3	0	1	Nil	
20824	Gander River	3	0	1	Nil	
20825	Indian Arm Pond	3	0	1	Nil	
20826	Indian Arm Pond	3	0	1	Nil	
10829	Burnt Lake	3	0	1	Nil	
20830	Loon Bay	3	0	1	Nil	
10831	10 Mile Lake	3	0	1	Nil	
10832	10 Mile Lake	3	0	1	Nil	

Cont'd ...

Appendix I. Continued

Plot no.	Unit 8 Plot location	No. branches sampled	Cumulative totals (no. egg-masses per 10 m^2 foliage)	Code 1981 defoliation*	Egg-mass category**	Overwintering larval category***
10833	Burnt Lake	3	0	1	Nil	
20834	Gander River	3	0	1	Nil	
10835	Michaels Hr.	3	0	1	Nil	
10836	Campbellton	3	0	1	Nil	
10837	Campbellton	3	0	1	Nil	
10839	Loon Bay	3	0	1	Nil	
10841	Burnt Lake	3	0	1	Nil	
10843	Gander Bay	3	0	1	Nil	
10844	Newstead	3	0	1	Nil	
10846	Birchy Bay	3	0	1	Nil	
10847	Duder Lake	3	0	1	Nil	
10848	Gander Bay	3	0	1	Nil	
10849	Boyds Cove	3	0	1	Nil	
10851	Boyds Cove	3	0	1	Nil	
10852	Chapel Island	3	0	1	Nil	
10853	Summerford	3	0	1	Nil	
10854	Summerford	3	0	1	Nil	
10855	Bridgeport	3	0	1	Nil	
10856	Chanceport	3	0	1	Nil	
108200	10 Mile Lake	3	0	1	Nil	
108202	Mill Pond	3	0	1	Nil	
	Average per branch		0			
	Unit 9					
2091	Little Joe Glodes Pond	3	0	1	Nil	
1092	Skull Hill	3	0	1	Nil	
2094	Little Sandy Pond	3	0	1	Nil	
2095	South Brook	3	0	1	Nil	
2098	Three Corner Pond	3	0	1	Nil	
2099	South Brook	3	0	1	Nil	
20911	South of Three Corner Pond	3	0	1	Nil	
20912	Burnt Pond	3	0	1	Nil	
20913	Birchy Lake	3	0	1	Nil	
20918	Rocky Pond	3	0	1	Nil	
20919	Rocky Pond	3	0	1	Nil	
20920	Sandy Lake	3	0	1	Nil	

Cont'd ...

Appendix I. Continued

Plot no.	Unit 9 Plot location	No. branches sampled	Cumulative totals (no. egg-masses per 10 m^2 foliage)	Code 1981 defoliation*	Egg-mass category**	Overwintering larval category***
20921	Sandy Lake	3	0	1	Nil	
20922	Birchy Lake	3	69	1	L	
20923	Birchy Lake	3	0	1	Nil	
20931	South Pond	3	0	1	Nil	
20932	Rocky Pond	3	0	1	Nil	
20933	North Twin Lake	3	0	1	Nil	
20934	Badger Bay	3	0	1	Nil	
10935	Seal Cove	3	0	1	Nil	
20936	Hampden	3	0	1	Nil	
20937	Lake Buck	3	0	1	Nil	
20938	Gillards Lake	3	0	1	Nil	
30939	Baie Verte Prov. Park	3	0	1	Nil	
30940	Baie Verte Prov. Park	3	0	1	Nil	
20941	South Brk.	3	0	1	Nil	
20943	Kippens Pd.	3	0	1	Nil	
10944	Sops Lake	3	0	1	Nil	
20945	Hampden	3	0	1	Nil	
20946	Hampden	3	0	1	Nil	
30947	Baie Verte Jct.	3	0	1	Nil	
30948	Indian Pond	3	0	1	Nil	
30949	Indian Brk.	3	0	1	Nil	
10951	Springdale	3	0	1	Nil	
20952	Cresent Lake	3	0	1	Nil	
10953	Cresent Lake	3	0	1	Nil	
10954	Cresent Lake	3	0	1	Nil	
20955	Hampden	3	0	1	Nil	
20956	Black Lake	3	0	1	Nil	
20957	Black Lake	6	0	1	Nil	
30958	Gull Pond	3	0	1	Nil	
30959	Springdale	3	0	1	Nil	
30961	Springdale	3	0	1	Nil	
30962	Kings Point	3	0	1	Nil	
10963	Davis Pond	3	0	2	Nil	
10964	Springdale	3	0	1	Nil	
20965	Hampden	3	0	1	Nil	
20966	Black Lake	3	0	1	Nil	
30967	Gull Pond	3	0	1	Nil	
10968	Kings Point	3	0	1	Nil	
10969	Southwest Arm	3	0	1	Nil	
10970	Kings Point	3	0	1	Nil	
10971	Springdale	3	0	1	Nil	

Cont'd ...

Appendix I. Continued

Plot no.	Unit 9 Plot location	No. branches sampled	Cumulative totals (no. egg-masses per 10 m^2 foliage)	Code 1981 defoliation*	Egg-mass category**	Overwintering larval category**
20972	Wild Cove Pond	3	0	1	Nil	
10973	Gull Lake	3	0	1	Nil	
10974	Southwest Arm	3	0	1	Nil	
10975	Middle Arm	3	0	1	Nil	
10976	Southwest Arm	3	0	1	Nil	
20977	Pumbly Cove	3	0	1	Nil	
20978	Pumbly Cove	3	0	1	Nil	
20979	Wild Cove Pond	3	0	1	Nil	
10980	Middle Arm	3	0	1	Nil	
10981	Cross Country Pond	3	0	1	Nil	
10983	Middle Arm	3	0	1	Nil	
20984	Westport	3	0	1	Nil	
20985	Gull Pond	3	0	7	Nil	
20986	Western Arm	3	0	1	Nil	
20987	Gull Pond	3	0	1	Nil	
20988	West Brook	3	0	1	Nil	
20989	Burlington	3	0	1	Nil	
10991	Burlington Road	3	0	1	Nil	
20992	Bear Cove	3	0	1	Nil	
20993	Middle Arm	3	67	1	L	
20994	Baie Verte	3	0	1	Nil	
20995	Baie Verte	3	132	2	L	
20996	Baie Verte	3	62	1	L	
20997	Burlington	3	0	1	Nil	
209100	Baie Verte	3	0	1	Nil	
209101	Seal Cove	3	0	1	Nil	L
209102	Wild Cove	3	0	1	Nil	L
209103	Baie Verte	3	0	1	Nil	
209104	Baie Verte	3	82	1	L	
209106	South Brk.	3	0	1	Nil	
109107	Mings Bight	3	0	1	Nil	
109108	Side Pond	3	104	3	L	
209109	Beaver Pond	3	0	1	Nil	
209110	Seal Cove	3	0	4	Nil	
209111	Wild Cove	3	0	1	Nil	
209112	Baie Verte	3	0	1	Nil	
209113	Baie Verte	3	0	1	Nil	
209114	Baie Verte	3	0	1	Nil	
209115	Mings Bight	3	0	1	Nil	
209116	Baie Verte	3	0	1	Nil	
209117	Baie Verte	3	139	1	L	
209118	Baie Verte	3	0	1	Nil	L
209119	Baie Verte	3	0	1	Nil	

Cont'd ...

Appendix I. Continued

Plot no.	Unit 9 Plot location	No. branches sampled	Cumulative totals (no. egg-masses per 10 m^2 foliage)	Code 1981 defoliation*	Egg-mass category**	Over-wintering larval category***
209120	Baie Verte	3	0	1	Nil	
109121	Fleur de Lys	3	0	1	Nil	
	Average per branch		6.6			
	Unit 10					
3101	Badger	3	0	1	Nil	
1102	Lake Bond	3	0	1	Nil	
3103	Joes Lake	3	0	1	Nil	
3104	Joes Lake	3	0	1	Nil	
3107	Joes Lake	3	0	1	Nil	
3108	Crooked Lake	3	0	1	Nil	
3109	Crooked Lake	3	0	1	Nil	
31011	Aspen Brook	3	0	1	Nil	
31012	Red Cliff	3	0	1	Nil	
31013	Leech Brook	3	0	1	Nil	
31014	Middleton Lake	3	52	1	L	
31016	Hodges Hills	3	0	1	Nil	
31017	New Bay Pond	3	0	1	Nil	
31019	Peters River	3	0	1	Nil	
31020	New Bay Pond	3	0	1	Nil	
31021	Mary Ann Lake	3	0	1	Nil	
31022	Hodges Hills	3	0	1	Nil	
31023	New Bay Pond	3	0	1	Nil	
31024	South Twin Lake	3	0	1	Nil	
31026	Mary Ann Lake	3	0	1	Nil	
31027	Mary Ann Lake	3	0	1	Nil	
31028	Frozen Ocean Lake	3	0	1	Nil	
31029	New Bay Pond	3	0	1	Nil	
31030	Twin Lakes	3	0	1	Nil	L
31031	S. Twin Lake	3	0	1	Nil	
31032	S. Twin Lake	3	0	1	Nil	
31033	Twin Lakes	3	45	1	L	
31034	Twin Lakes	3	0	1	Nil	
31035	New Bay Pond	3	0	1	Nil	
31036	New Bay Pond	3	0	1	Nil	
31038	Twin Lakes	3	67	1	L	
31040	Mark's Lake	3	0	1	Nil	

Cont'd ...

Appendix I. Continued

Plot no.	Unit 10 Plot location	No. branches sampled	Cumulative totals (no. egg-masses per 10 m^2 foliage)	Code 1981 defoliation*	Egg-mass category**	Overwintering larval category*
31041	S. Twin Lake	3	0	1	Nil	
31043	Mill Pond	3	0	1	Nil	
31044	N. Twin Lake	3	0	1	Nil	
31045	Twin Lakes	3	0	1	Nil	
31046	S. Twin Lakes	3	0	1	Nil	
	Average per branch		1.5			
	Unit 11					
3112	Noel Paul	3	0	1	Nil	
3114	E. of Noel Paul	3	0	1	Nil	L
3115	West Brook	3	0	1	Nil	
3118	S. of Tom Joe Brook	3	0	1	Nil	
31110	N. of Sandy Lake	3	0	1	Nil	
31111	Badger Lookout	3	0	1	Nil	
31113	Tom Joe Brook	3	0	1	Nil	
31114	Tom Joe Brook	3	0	1	Nil	
31115	West Brook	3	0	1	Nil	
31116	West Brook	3	114	9	L	
31117	Pamehac Bk.	3	0	1	Nil	
31118	Pamehac Bk.	3	0	1	Nil	
31119	Rattling Bk.	3	0	1	Nil	
31120	Rattling Bk.	3	0	3	Nil	
31121	Miguels Bk.	3	0	1	Nil	
31122	Miguels Hill	3	0	1	Nil	
31123	Rattling Bk.	3	0	1	Nil	
31124	Ratting Bk.	3	0	1	Nil	
31125	Miguels Lake	3	0	1	Nil	
31126	W. of Miguels Hill	3	0	1	Nil	
31127	Rattling Bk.	3	0	1	Nil	
31128	W. of Webber Pond	3	0	1	Nil	
31129	Sandy Bk.	3	0	1	Nil	
31130	Diversion Lake	3	0	1	Nil	
31131	Stony Bk.	3	0	1	Nil	
31132	Rattling Bk. (Bay d'Espoir Rd.)	3	0	1	Nil	L
31133	Diversion Lake	3	0	1	Nil	
31134	Tote Hill	3	41	1	L	
31136	Exploits Rv.	3	0	1	Nil	

Cont'd ...

Appendix I. Continued

Plot no.	Unit 11 Plot location	No. branches sampled	Cumulative totals (no. egg-masses per 10 m^2 foliage)	Code 1981 defoliation*	Egg-mass category**	Over-wintering larval category***
31137	Lemotte's Lake	3	0	1	Nil	
31139	Bay d'Espoir Rd.	3	0	1	Nil	
31140	Burnt Lake	3	0	1	Nil	
31141	Jumpers Bk.	3	0	1	Nil	
31142	Norris Arm	3	0	1	Nil	
31143	Norris Arm	3	0	1	Nil	
311200	Noel Paul Bk.	3	0	1	Nil	L
311201	Noel Paul Bk.	3	0	1	Nil	
	Average per branch		1.4			
	Unit 12					
3121	Victoria River	3	0	1	Nil	
3122	Wilding Lake	3	0	1	Nil	
3123	Wilding Lake	3	0	1	Nil	
3124	Roebucks	3	0	1	Nil	
3125	Victoria River	3	0	1	Nil	
3126	Rogersen Lake	3	0	1	Nil	
3127	Rogersen Lake	3	0	3	Nil	
3128	Rogersen Lake	3	0	1	Nil	
3129	Noel Paul Bk.	3	0	1	Nil	
31210	Noel Paul Bk.	3	120	4	L	
31211	Shanadithit Brook	3	0	1	Nil	
31214	Victoria River	3	0	1	Nil	
31215	Beaver Lake	3	0	1	Nil	
31216	Harpoon Hill	3	0	1	Nil	
31217	Harpoon Hill	3	0	1	Nil	
31218	Harpoon Hill	3	28	1	L	
31219	Tally Pond	3	0	1	Nil	
31221	Halfway Mtn.	3	0	1	Nil	
31222	Harbour Round	3	0	1	Nil	
31223	Harbour Round Pond	3	0	1	Nil	
31224	Bobby's Pond	3	0	1	Nil	
31225	Harpoon Hill	3	0	1	Nil	
31226	Harpoon Bk.	3	0	1	Nil	
31227	Harpoon Bk.	3	0	3	Nil	
31228	Noel Paul	3	0	3	Nil	
31229	Noel Paul	3	56	4	L	

Cont'd ...

Appendix I. Continued

Plot no.	Unit 12 Plot location	No. branches sampled	Cumulative totals (no. egg-masses per 10 m^2 foliage)	Code 1981 defoliation*	Egg-mass category**	Overwintering larval category**
31230	Halfway Mtn.	3	0	1	Nil	
31231	Red Indian Lake	3	0	1	Nil	
31232	Victoria River	3	0	1	Nil	
31233	Hungry Hill	3	0	1	Nil	
31234	Harpoon Brook	3	0	1	Nil	
31236	Noel Paul Brk.	3	155	1	L	
31237	Noel Paul Brk.	3	0	1	Nil	
31238	Noel Paul Brk.	3	49	7	L	
31239	Buchans	3	0	1	Nil	
31240	Millertown Dam	3	0	1	Nil	
31242	Exploits River	3	0	1	Nil	
31243	Noel Paul Bk.	3	0	1	Nil	
31244	Mary March Park	3	0	1	Nil	
31245	Buchans Jct.	3	0	1	Nil	
31246	Millertown-Buchans Rd.	3	0	1	Nil	
31247	Exploits River	3	0	1	Nil	
31249	Little Red Indian Pond	3	33	1	L	
31250	Little Red Indian Pond	3	0	1	Nil	
31251	N. Little Red Indian Pond	3	0	1	Nil	
31253	Millertown Jct.	3	0	1	Nil	
31254	Millertown Hct.	3	0	1	Nil	
31256	Millertown Jct.	3	0	1	Nil	
31257	W. of Gander	3	0	1	Nil	
31259	W. of Gander	3	0	1	Nil	
31260	Badger	3	0	1	Nil	
	Average per branch		2.5			
	Unit 13					
3132	S.W. end Lloyd's Lake	3	0	1	Nil	
3134	Portage Lake	3	0	1	Nil	
3135	Lloyd's Lake	3	0	1	Nil	
3136	Tulk's Bk.	3	0	1	Nil	
3137	Long Lake	3	0	1	Nil	
	Average per branch		0			

Cont'd ...

Appendix I. Continued

Plot no.	Unit 14 Plot location	No. branches sampled	Cumulative totals (no. egg-masses per 10 m^2 foliage)	Code 1981 defoliation*	Egg-mass category**	Overwintering larval category***
1141	Mummichog Prov. Park	3	28	1	L	
1142	St. Andrews	3	29	1	L	
1143	Searston	3	19	1	L	
1144	Loch Lomond Rd.	3	202	8	L	
1145	Tompkins	3	89	1	L	
1146	Brooms Brk.	3	0	7	Nil	
2147	Brooms Brk.	3	0	2	Nil	
2148	Doyles	3	0	1	Nil	
2149	Chicnic	3	123	7	L	L
21410	Codroy River	3	0	7	Nil	
21411	South Branch	6	381	6	L	
21412	Brooms Brk.	3	0	1	Nil	
21413	Codroy River	3	194	2	L	
21414	North Branch	3	903	8	S	
21415	Coal Brk.	3	416	10	M	
21416	North Branch	3	161	6	L	
21417	South Branch River	3	0	1	Nil	L
21418	North Branch River	3	501	7	M	
21419	Codroy Pond	3	133	5	L	
21420	North Branch River	3	77	1	L	
21421	Codroy Pond	3	0	1	Nil	L
21422	Highlands River	3	0	1	Nil	
21423	Crabbes River	3	0	2	Nil	
21424	Crabbes River	3	247	1	L	
21425	Crabbes River	3	0	1	Nil	
21426	Lochleven	3	27	10	L	
21427	River Brook	3	185	1	L	S
21428	Crabbes River	3	11	1	L	
21429	Camp 180 Rd.	3	0	1	Nil	
21430	Camp 180 Rd.	3	0	1	Nil	
11431	Barachois Brk.	3	0	1	Nil	
11432	Robinson's River	3	0	1	Nil	
11433	St. Fintans Jct.	3	675	6	S	
11434	Jeffreys	3	26	1	L	
11435	Mitchells Pond	3	0	1	Nil	L
11436	Robinson's River	3	0	1	Nil	
11437	Robinson's River	6	0	1	Nil	
21438	Barachois Brk.	3	0	1	Nil	
21439	Robinson's River	3	0	1	Nil	
11440	Robinson's River	3	0	1	Nil	

Cont'd ...

Appendix I. Continued

Plot no.	Unit 14 Plot location	No. branches sampled	Cumulative totals (no. egg-masses per 10 m^2 foliage)	Code 1981 defoliation*	Egg-mass category**	Overwintering larval category***
11441	Robinsons (TCH)	3	0	1	Nil	
11442	Robinsons (TCH)	3	14	10	L	
11443	Fischells River	3	37	1	L	
21444	Middle Brk.	6	109	1	L	
21445	Barry Brook	3	37	5	L	L
21446	Fischells River	3	76	1	L	
11447	Fischells River	3	0	6	Nil	L
11448	Fischells River	3	222	3	L	
11449	Flat Bay	3	0	1	Nil	
11450	Steel Mtn.	3	0	7	Nil	
11451	Steel Mtn.	3	0	1	Nil	
11452	Steel Mtn.	3	0	1	Nil	
11453	Flat Bay Brk.	3	0	1	Nil	
11454	Flat Bay Brk.	3	99	5	L	
11456	Little Barachois	3	302	4	L	
11457	Carters Road Jct.	3	135	7	L	
21458	Birchy Brk.	3	0	8	Nil	
21459	Mattis Pt.	3	0	2	Nil	
21460	Barachois Park	3	0	1	Nil	
21461	Barachois Brk.	3	0	1	Nil	
11462	Southwest Brk.	3	0	1	Nil	
21463	Burgeo Road	3	0	1	Nil	
11464	Barachois Brk.	3	0	1	Nil	
21465	Burgeo Road	3	0	1	Nil	
21470	Port au Port Penn.	3	0	8	Nil	
11471	Marches Pt.	3	0	1	Nil	
11472	Port au Port Penn.	3	233	7	L	
11473	Sheaves Cove	3	0	3	Nil	
11474	Port au Port Penn.	3	0	1	Nil	
11475	Campbells Creek	3	0	1	Nil	
11476	Felix Cove	3	0	1	Nil	
21477	Gull Pond	3	0	1	Nil	
21478	Harry's River	3	0	1	Nil	
21479	Bottom Brk. Road	3	0	1	Nil	
11480	Burgeo Road	3	0	1	Nil	
21481	Burgeo Road	3	0	1	Nil	
21482	Bottom Brk.	3	0	1	Nil	
21483	Bottom Brk.	3	0	1	Nil	
11485	Little Grand Lake	3	0	1	Nil	
11486	Little Grand Lake	3	0	2	Nil	
11487	Port au Port Penn.	3	0	8	Nil	L

Cont'd ...

Appendix I. Continued

Plot no.	Unit 14 Plot location	No. branches sampled	Cumulative totals (no. egg-masses per 10 m^2 foliage)	Code 1981 defoliation*	Egg-mass category**	Overwintering larval category***
11488	Port au Port Penn.	3	34	8	L	
11489	Piccadilly Park	3	23	1	L	
11490	Point au Mal	3	0	1	Nil	
11491	Romaines Brk.	3	24	6	L	
21492	Cold Brk.	3	213	9	L	
11493	Blanche Brk.	3	0	1	Nil	
21494	Black Duck	3	0	1	Nil	
21495	Landowns Pd.	3	0	1	Nil	
21496	Whites Road	3	0	1	Nil	
214100	Little Grand Lake	3	0	1	Nil	L
214101	Little Grand Lake	3	21	1	L	
214102	Bottle Pond Road	3	0	1	Nil	
214103	Bottle Pond Road	3	0	1	Nil	
214104	Grand Lake	3	0	1	Nil	
214106	Little Grand Lake	3	0	1	Nil	
214107	Fox Island River	3	33	1	Nil	
114108	Fox Island River	3	0	2	Nil	
114109	Little River	3	0	3	Nil	
214110	Fox Island River	3	0	2	Nil	
214111	Fox Island River	3	0	7	Nil	
114112	Romaines Brk.	3	0	2	Nil	
114113	Phillips Brk.	3	0	1	Nil	
	Average per branch		56.9			
	Unit 15					
2151	Serpentine River	3	0	1	Nil	
2152	Clarkes Brk.	3	0	1	Nil	
1153	Serpentine River	3	0	1	Nil	
2154	Serpentine Lake	3	0	1	Nil	
2156	Clarkes Brk.	3	0	1	Nil	
2157	Serpentine Lake	3	0	1	Nil	
2158	Serpentine Lake	3	0	1	Nil	
2159	Serpentine Lake	3	0	1	Nil	
21510	Serpentine Lake	3	0	1	Nil	
21511	Serpentine Lake	3	0	1	Nil	
21512	Stag Lake Rd.	3	0	1	Nil	
21513	Stag Lake Rd.	3	0	1	Nil	

Cont'd ...

Appendix I. Continued

Plot no.	Unit 15 Plot location	No. branches sampled	Cumulative totals (no. egg-masses per 10 m^2 foliage)	Code 1981 defoliation*	Egg-mass category**	Overwintering larval category*
11514	Fox Pond	3	0	1	Nil	
21515	Fox Pond	3	0	1	Nil	
21517	Pinchgut Lake	3	0	1	Nil	
21518	West North Bk.	3	0	1	Nil	
21519	Gallants	3	0	1	Nil	
21520	Spruce Brook	3	0	1	Nil	
21521	George's Bk.	3	0	1	Nil	
21523	Grand Lk. Bk.	3	38	1	L	
21524	Gallants	3	53	1	L	M
11525	Summerside	3	0	1	Nil	
11526	Irishtown	3	0	1	Nil	
21527	Steady Brook	3	0	1	Nil	
21528	Grand Lake	3	0	1	Nil	
21529	Grand Lake	3	174	1	M	
21530	Island Pond	3	0	1	Nil	
21531	Grand Lake	3	0	7	Nil	
21532	Grand Lake	3	0	1	Nil	
21533	Grand Lake	3	0	1	Nil	
21534	Corner Brook	3	0	1	Nil	
21535	Steady Bk.	3	0	1	Nil	
21536	Eastern Lake	3	0	1	Nil	
21539	Northern Harbour	3	21	1	L	
21540	Grand Lake	3	0	1	Nil	
21541	Stag Lake Rd.	3	0	1	Nil	
21542	Pinchgut Lake	3	0	1	Nil	
21543	Pinchgut Lake	3	0	1	Nil	
21544	Corner Brook Lake	3	0	1	Nil	
21546	Corner Brook Lake	3	0	1	Nil	
21547	Grand Lake	3	0	1	Nil	
21548	Glover Island	3	0	1	Nil	
21550	Pinchgut Lake Rd.	3	0	1	Nil	
21552	Corner Brook Lake	3	0	1	Nil	
21553	Pinchgut Lake Rd.	3	0	1	Nil	
21554	Glover Island	3	0	1	Nil	
21556	Grand Lake	3	0	1	Nil	
21557	Little Grand Lake	3	0	1	Nil	
21558	Lomond	3	0	1	Nil	
21559	Bonne Bay Little Pond	3	0	1	Nil	
21560	Trout River	3	0	1	Nil	
21562	Bonne Bay Pond	3	0	1	Nil	
21564	Bonne Bay Pond	3	0	1	Nil	
21566	North Lake	3	0	1	Nil	

Cont'd ...

Appendix I. Continued

Plot no.	Unit 15 Plot location	No. branches sampled	Cumulative totals (no. egg-masses per 10 m^2 foliage)	Code 1981 defoliation*	Egg-mass category**	Overwintering larval category***
21567	Goose Arm Rd.	3	15	1	L	
21568	Goose Arm Rd.	6	0	1	Nil	
21569	Nicholsville	3	0	1	Nil	
21570	Goose Arm	3	0	1	Nil	
21571	Goose Arm	3	0	1	Nil	
21572	Old Man's Pond	3	0	1	Nil	
21575	Goose Arm Rd.	3	0	1	Nil	L
21576	Snug Harbour	6	22	1	L	
21577	Deer Lake	3	70	2	L	
21578	Deer Lake	3	0	1	Nil	
21579	Humber Canal	3	0	1	Nil	
21580	Grand Lake	3	0	1	Nil	
21581	Frenchman's Pond	3	0	1	Nil	
21582	Old Man's Pond	3	0	1	Nil	
21583	Old Man's Pond	3	0	1	Nil	
21584	Old Man's Pond	3	0	1	Nil	
21586	Deer Lake	3	0	1	Nil	
21587	Pynn's Bk.	3	0	1	Nil	
21588	Little Harbour	3	0	1	Nil	
21589	Pynn's Bk.	3	290	3	L	
21590	Deer Lake	3	0	1	Nil	
21591	Glide Lake	3	183	7	L	
21592	Glide Lake	3	0	1	Nil	
21593	Glide Lake	3	0	1	"	L
21594	Glide Lake	3	32	6	L	
21595	Glide Lake	3	0	1	Nil	L
21596	Hind's Bk.	3	0	1	Nil	
21597	Hughes Bk.	3	40	1	L	
21598	Hughes Bk.	3	29	2	L	
21599	Hughes Bk.	3	0	2	Nil	L
215100	Balls Pond	3	33	1	L	
215103	Pasadena	3	0	1	Nil	
215104	Pasadena	3	0	1	Nil	
215105	Blue Gulch Pond	3	0	1	Nil	
215106	Old Woman Head	6	0	1	Nil	
215107	Cox's Cove	6	0	1	Nil	
215108	Frenchman's Cove	3	0	1	Nil	
215109	Frenchman's Cove	3	0	1	Nil	
215110	Benoit's Cove	3	0	1	Nil	

Cont'd ...

Appendix I. Continued

Plot no.	Unit 15 Plot location	No. branches sampled	Cumulative totals (no. egg-masses per 10 m^2 foliage)	Code 1981 defoliation*	Egg-mass category**	Overwintering larval category***
215111	McIvers	3	0	1	Nil	
215113	Gillams Cove	3	0	1	Nil	
215200	Bonne Bay	3	0	1	Nil	
	Average per branch		3.5			
	Unit 16					
1162	Adies Lake	3	0	1	Nil	
2163	Bonne Bay Big Pond	3	0	1	Nil	
2164	Adies Lake	3	0	1	Nil	
2165	Adies Lake	3	0	1	Nil	
2166	Adies Lake	3	0	1	Nil	
2167	Upper Humber	3	0	1	Nil	
2168	Upper Humber	3	0	1	Nil	
2169	Birchy Lake	3	0	1	Nil	
21610	Birchy Lake	3	0	1	Nil	
21611	Sop's Arm	3	0	1	Nil	
21612	Upper Humber	3	0	1	Nil	
21613	Main River	3	0	1	Nil	
21614	Main River	3	0	1	Nil	
21615	St. Paul's Big Pond	3	0	1	Nil	
21616	St. Paul's Big Pond	3	0	1	Nil	
21617	Main River	3	0	1	Nil	
11618	Sop's Arm	3	0	1	Nil	
11619	Coney Arm	3	0	1	Nil	
	Average per branch		0			
	Unit 17					
1171	Parsons Pond	3	0	1	Nil	
1172	Parsons Pond	3	0	1	Nil	
1173	Parsons Pond	3	0	1	Nil	
1174	Portland Creek	3	0	1	Nil	
1175	Bellburns	3	0	1	Nil	

Cont'd ...

Appendix I. Continued

Plot no.	Unit 17 Plot location	No. branches sampled	Cumulative totals (no. egg-masses per 10 m^2 foliage)	Code 1981 defoliation*	Egg-mass category**	Overwintering larval category***
2176	Brian's Pond	3	0	1	Nil	
2177	Western Blue Pond	3	0	1	Nil	
21712	Eastern Blue Pond	3	0	1	Nil	
21713	Western Bk. Pond	3	0	1	Nil	
21715	Western Bk. Pond	3	0	1	Nil	
21718	Leg Pond	3	0	1	Nil	
21720	Leg Pond	3	0	1	Nil	
21721	Leg Pond	3	0	1	Nil	
21722	Leg Pond	3	0	8	Nil	
21725	Leg Pond	3	0	1	Nil	
	Average per branch		0			
	Unit 18					
3181	Cloud River	3	0	1	Nil	
2182	Cloud River	3	0	1	Nil	
2186	Roddickton	3	0	1	Nil	
2187	Roddickton	3	0	1	Nil	
2188	Coles Pond	3	0	1	Nil	
2189	Conche	3	0	1	Nil	
21810	Ten Mile Lake	3	0	1	Nil	
21811	Ten Mile Lake	3	0	1	Nil	
21812	Ten Mile Lake	3	0	1	Nil	
21813	Round Pond	3	0	1	Nil	
21814	Salmon Pond	3	0	1	Nil	
21815	Round Pond	3	0	5	Nil	
21816	Salmon Pond	3	0	1	Nil	
21817	Salmon River	3	0	1	Nil	
21819	Main Bk.	3	0	1	Nil	
21820	Salmon River	3	0	1	Nil	
21821	Salmon River	3	0	1	L	
21822	Salmon River	3	0	1	Nil	
21823	Round Pond	3	0	1	Nil	
11824	Hare Bay	3	0	1	Nil	
21825	Main Bk.	3	0	1	Nil	
21826	Main Bk.	3	0	1	Nil	
11827	Main Bk.	3	0	1	Nil	
21828	Main Bk.	3	0	1	Nil	
11829	Tom Rose's Pond	3	0	1	Nil	

Cont'd ...

Appendix I. Continued

Plot no.	Unit 18 Plot location	No. branches sampled	Cumulative totals (no. egg-masses per 10 m^2 foliage)	Code 1981 defoliation*	Egg-mass category**	Overwintering larval category***
11830	Burnt Village	3	0	1	Nil	
11831	Main Bk.	3	0	1	Nil	
21832	Tom Rose's Pond	3	0	1	Nil	
11833	Coles Pond	3	0	1	Nil	
	Average per branch		0			
	Labrador					
1	Beaver River	6	0	1	Nil	
2	Beaver River	3	0	2	Nil	
3	Beaver River	3	0	5	Nil	
4	Beaver River	3	0	1	Nil	
5	Susan River	3	0	2	Nil	
6	Goose River	3	0	1	Nil	
7	Gosling Lake	3	0	1	Nil	
8	Groves Pt.	3	0	1	Nil	
9	Terrington Basin	3	0	3	Nil	
10	Mud Lake	3	0	3	Nil	
	Average per branch		0			
	Gros Morne National Park					
0201	Trout River Pond	3	0	1	Nil	
0202	Glenburnie	3	0	1	Nil	
0203	Middle Brook	3	0	1	Nil	
0206	S.E. Brook	3	0	1	Nil	
0209	East Arm	3	0	2	Nil	
02010	Deer Brook	3	0	2	Nil	
02011	Rocky Hr.	3	0	2	Nil	
02012	Deer Pond	3	0	2	Nil	
02013	Green Pt.	3	0	2	Nil	
02014	Western Brook Pond	3	0	3	Nil	
02015	Western Brook Pond	3	0	3	Nil	

Cont'd ...

Appendix I. Continued

Plot no.	Plot location	No. branches sampled	Cumulative totals (no. egg-masses per 10 m^2 foliage)	Code 1981 defoliation*	Egg-mass category**	Over-wintering larval category***
	Gros Morne National Park					
02016	St. Pauls Inlet	3	0	3	Nil	
02017	St. Pauls Inlet	3	0	2	Nil	
02018	St. Pauls Inlet	3	0	6	Nil	
02019	Long Pond	3	0	2	Nil	
02020	Belldowns Pt.	3	0	2	Nil	
02021	Belldowns Pt.	3	0	1	Nil	
	Average per branch		0			
	Terra Nova National Park					
0211	South Boundary	3	0	1	Nil	
0212	Dunphy's Rd.	3	0	2	Nil	
0213	Tidewater	3	0	5	Nil	
0214	Yudle Pond	3	0	2	Nil	
0215	Terra Nova Road	3	0	1	Nil	
0216	Blue Hill Road	3	0	8	Nil	
0217	Bread Cove Brook	3	0	1	Nil	
0218	Platter's Beach	3	0	5	Nil	
0219	Bread Cove	3	0	2	Nil	
02110	Grassy Cove	3	0	4	Nil	
02111	Chandlers Rounds	3	0	2	Nil	
02112	Park Hr.	3	0	1	Nil	
02113	Ochre Hill	3	0	1	Nil	
02114	Rocky Pond	3	0	10	Nil	
02115	Newman Sound	3	0	2	Nil	
02116	Park Headquarters	3	0	1	Nil	
02117	Newman Sound	3	0	4	Nil	
02118	Newman Sound	3	0	1	Nil	
02119	Newman Sound	3	0	5	Nil	
02120	Newman Sound	3	0	1	Nil	
02121	Blue Hill Road	3	0	8	Nil	
02122	5 km E. Traytown Jct.	3	0	1	Nil	
	Average per branch		0			

Cont'd ...

Appendix I - Concluded

*Defoliation		**Egg-mass category	*** Overwintering larval category	
L = Light	= 0-25%	L = Light	L = Low	= 1-108
M = Moderate	= 26-75%	M = Moderate	M = Medium	= 109-323
S = Severe	= 76-100%	S = Severe	H = High	= 324+