

ENVIRONMENTAL IMPACT STUDIES OF SPRUCE BUDWORM
(*CHORISTONEURA FUMIFERANA CLEMENS*) CONTROL PROGRAMMES
IN NEW BRUNSWICK IN 1976

by

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RESUME

On a étudié les effets immédiats et à court terme d'épandages expérimentaux de pesticides sur certains organismes non nuisibles. Le phosphamidon utilisé contre les larves à des doses supérieures à 0,140 kg d'ingrédient actif (IA) par hectare s'est avéré nocif pour les petits oiseaux forestiers, mais ne l'a pas été lorsqu'il a été appliqué à plusieurs reprises contre les adultes de la tordeuse des bourgeons de l'épinette, à des doses de 0,070 kg IA/ha. Les organismes aquatiques des ruisseaux et les petits mammifères indigènes n'ont pas souffert de ces applications. Les diverses doses d'acéphate et de carbaryl contre les larves n'ont pas eu d'effet sur les oiseaux. Appliqué contre les ravageurs adultes, l'aminocarbe n'a pas tué d'oiseaux ni eu d'effets mesurables sur les organismes benthiques d'un cours d'eau contrôlé.

Quatre parcelles expérimentales, traitées à l'aide de deux applications à raison de 0.210 kg IA/ha de fénitrothion ont été contrôlées. Les populations d'oiseaux au temps de l'accouplement n'ont pas été touchées, mais on a observé des variations de la répartition des classes d'âge et du rapport mâles/femelles de *Clethrionomys gapperi* (Vigors). Les organismes benthiques d'un ruisseau traité au fénitrothion ont été touchés par la première application, après la deuxième application, le nombre d'organismes benthiques ont augmentés.

ABSTRACT

Immediate and short-term consequences of trials upon selected non-target organisms were studied. Phosphamidon employed as a larvacide at dosage rates in excess of 0.140 kg AI/ha proved to be harmful to the small forest bird complex but did not affect this group when applied as a budworm adulticide in multiple applications of 0.070 kg AI/ha. Aquatic organisms in streams and native small mammals were not affected by the phosphamidon trials. Acephate and carbaryl did not affect birds when applied as a larvacide at varying dosage rates. Aminocarb applied as an adulticide did not cause any mortality to the avian complex or affect benthic organisms in a test stream.

Four operational blocks treated with two applications of fenitrothion at the emitted dosage rate of 0.210 kg AI/ha were monitored. Breeding bird populations were not affected but variations in age class structure and sex ratio of *Clethrionomys gapperi* (Vigors) were recorded. Benthic organisms in a fenitrothion treated stream decreased after the first application but showed partial recovery after the second application.

INTRODUCTION

Vast areas of spruce-fir forests in eastern North America continue to be severely infested by the spruce budworm, *C. fumiferana* Clem. At the present time, fleets of single and multi-engined aircraft using chemical insecticides at prescribed dosage rates offer the only practical method of reducing budworm populations and prolonging the life of infested stands (Fettes and Buckner, 1972). Public concern over the untoward effects to non-target organisms of the forest ecosystem increases as new products, dosage rates and pesticide combinations are introduced into the spray regime. This report presents the results of studies carried out in New Brunswick to determine immediate effects and short-term impact of a series of trials employing several chemical insecticides at varying dosage rates upon breeding bird and small mammal populations and benthic organisms in treated streams.

METHODS

Birds: Forest songbird populations were assessed on 4 hectare plots located in treated and untreated areas employing singing male techniques similar to those described by Kendeigh (1944) and Buckner and Turnock (1965). All singing and sighted birds were recorded on plot maps while slowly traversing along parallel lines established at 40 meter intervals along the length of the plot. Pre-treatment surveys commenced approximately 5 days prior to the application and continued daily throughout the experimental period, terminating approximately 5 days after the last application. On the day of each application, plot searches were carried out to recover any sick or dead bird for insecticide residue analysis.

Aquatic organisms: Surber samplers (Surber, 1936) were used to collect benthic organisms from 0.093 m² portions of stream bottom in treated and untreated areas. Three or four samples were collected from each stream on each sampling date. Starting near the bottom of a riffle area, samples were taken at approximately 10 meter intervals working upstream. Samples were collected from the same area of the stream bottom before and after treatments. All samples were preserved (10% formalin solution) and returned to the laboratory for sorting, identification and data assessment.

Small mammals: Normally, small mammal populations (shrews, mice and voles) have reached their lowest population densities at the time when the majority of forest insect control programmes are being carried out. It is generally impossible to trap enough specimens at this time of year to assess pesticide effects. In light of this, trapping was carried out approximately six weeks after the last insecticide application when small mammal populations should be higher because of reproductive activity in the spring. Trapping was carried out on a plot 10 chains (20 meters) long by 5 chains wide with traps located at 1 chain intervals in grid fashion. All animals were identified as to species, age, sex and breeding condition recorded. All adult female animals were dissected and the presence of embryos and placental scars (indicating the recent birth of a litter) were recorded.

Residues in foliage: Foliage from conifers growing in open areas on the phosphamidon experimental plots was collected shortly after each application. One hundred grams of needles and twigs were preserved in residue free ethyl acetate and returned to the C.C.R.I. laboratory for gas-liquid chromatographic analysis by the Pesticide Chemistry Section.

SPRAY REGIME

A total of 7 operational and experimental budworm efficacy trials were monitored for impact upon such non-target components as breeding bird populations, small mammals and aquatic invertebrates. The spray regime of the insecticides studies are presented in Table 1.

Table 1
Spray regime of insecticides monitored in spruce budworm
C. fumiferana efficacy trials in New Brunswick in 1976

Insecticide and Use	Plot No.	Dosage Rate	Date of Application
Phosphamidon, larvacide (experimental)	1,2,3 and 4	0.210 kg/ha	May 13
	5,6,7 and 8	0.280 kg/ha	May 13
	1 and 2	0.210 kg/ha	May 30
	5 and 6	0.140 kg/ha	May 30
Phosphamidon, adulticide (experimental)	block 1,		
	plots 1 and 2	0.070 kg/ha	July 4
	block 2, plots 3 and 4		July 6
Acephate, larvacide (experimental)	plot 1	0.560 kg/ha	June 9
	plot 2	0.280 kg/ha	June 9
	plot 2	0.280 kg/ha	June 16
Carbaryl, larvicide (experimental)	plot 1	1.121 kg/ha	June 9
	plot 2	0.560 kg/ha	June 9
	plot 2	0.560 kg/ha	June 15
Aminocarb, adulticide (experimental)	block 4,	0.070 kg/ha	July 5
	plot 5		July 7
			July 9
Aminocarb, adulticide (experimental)	block 5, plot 6	0.070 kg/ha	July 5 July 7
Fenitrothion, larvacide (operational)	1492	0.210 kg/ha	May 20, May 26
	1493	0.210 kg/ha	May 21, May 26
	1494	0.210 kg/ha	May 21, May 26
	1495	0.210 kg/ha	May 21, May 26

RESULTS

Phosphamidon

Insecticide residues in conifer foliage: Residues in conifer foliage from the budworm larvacide trials carried out in the Chipman area indicate an uneven deposit pattern (Table 2). On the final application, phosphamidon was not recovered from plot 1 and very light residues were collected from plot 2 after an application of 0.210 kg AI/ha. Substantial residues were found in foliage from plots 3 and 4 (0.210 kg AI/ha) and 5 and 6 (0.280 kg AI/ha). Plots 7 and 8 were treated with an application of 0.280 kg AI/ha but phosphamidon residues were not recovered from foliage samples. Very low residue levels were recovered from conifer foliage following the second application of 0.210 kg AI/ha to plots 1 and 2 and 0.140 kg AI/ha to plots 5 and 6.

Table 2

Phosphamidon residues analyzed from conifer foliage collected from spruce budworm (*C. fumiferana* Clem.) larva suppression trials, Chipman, New Brunswick 1976.

Date	Treatment No.	Plot No.	Time relative to treatment (hrs.)		Phosphamidon dosage emitted (kg AI/ha)	Phosphamidon residues (ppm)		
						Trans	Cis	Total
May 10 first		control	pre-spray		nil	N.D.	T	T
13 first		1	post 2.5		0.210	N.D.	N.D.	N.D.
13 first		2	post 2.5		0.210	0.11	0.20	0.31
13 first		3	post 2.0		0.210	1.28	3.84	5.12
13 first		4	post 2.0		0.210	2.11	4.79	6.90
13 first		5	post 0.3		0.280	1.32	2.97	4.29
13 first		6	post 0.3		0.280	1.78	3.39	5.17
13 first		7	post 1.0		0.280	N.D.	N.D.	N.D.
13 first		8	post 1.2		0.280	N.D.	N.D.	N.D.
29 second		1	pre spray	first spray (0.210)		N.D.	N.D.	N.D.
30 second		1	post 3.0		0.210	N.D.	0.02	0.02
30 second		2	post 3.0		0.210	N.D.	N.D.	N.D.
30 second		5	post 2.0		0.140	N.D.	0.02	0.02
30 second		6	post 2.0		0.140	0.02	0.05	0.07
31 second		control	post 24.0		nil	N.D.	N.D.	N.D.

Phosphamidon residues were analyzed from conifer foliage collected from aduIticide plots treated with sequential applications of 0.070 kg AI/ha on July 4th, 6th and 9th. The residues recovered represent a good deposit of the formulated spray and indicates a fairly even distribution over the trial plots (Table 3).

Table 3
Phosphamidon residues analyzed from foliage collected
from spruce budworm *C. fumiferana* Clem. adult suppression trials
Acadia Forest Experiment Station, New Brunswick
July, 1976

Plot No.	Date of treatment	Time foliage sampled relative to treatment (hours)	Emitted dosage rate (kg AI/ha)	Phosphamidon residues (ppm)
Plot 1		pre-spray sample	nil	N.D.
Plot 2		pre-spray sample	nil	N.D.
Plot 3		pre-spray sample	nil	N.D.
Plot 4		pre-spray sample	nil	N.D.
		1st application		
Plot 1	July 4	18	0.070	0.37
Plot 2	July 4	18	0.070	0.68
Plot 3	July 4	18	0.070	1.36
Plot 4	July 4	18	0.070	0.41
		2nd application		
Control Plot	July 6	5	nil	N.D.
Plot 1	July 6	6	0.070	0.62
Plot 2	July 6	8	0.070	0.66
Plot 3	July 6	4	0.070	0.19
Plot 4	July 6	4	0.070	0.27
		3rd application		
Plot 1	July 9	18	0.070	0.76
Plot 2	July 9	18	0.070	0.30
Plot 3	July 9	18	0.070	0.61
Plot 4	July 9	18	0.070	0.61

N.D. - Not detectable.

Birds, 1st application, larvacide trials: Bird populations on treatment plot 1 were not affected by the initial treatment (Appendix, Table 2) and territories of the ruby-crowned kinglet, *Regulus calendula* Linnaeus remained occupied throughout the post treatment census period (Fig. 2). This is consistent with the lack of phosphamidon residues in foliage samples collected in the plot (Table 2). Overall bird populations were depressed on treatment plot 2 (0.210 kg AI/ha). Populations of white-throated sparrows, *Zonotrichia albicollis* (Gmelin), dark-eyed juncos, *Junco hyemalis* (Linnaeus) and ruby-crowned kinglets, *R. calendula* L. all showed declines (Appendix, Table 3). At the time of the trials it was reported that the bottom half of the treatment plot (that portion closest to the road) may have been missed by the spray aircraft. Examination of the kinglet territories indicate an impact to those birds residing in the top half of the plot while territories remained occupied in the portion closest to the road (Fig. 3). This situation would suggest an uneven deposit (or portions remaining not treated) and the low residue levels recorded from foliage collected suggest this (Table 2). Bird population on treatment plot 3 (0.210 kg AI/ha) were reduced by approximately 50% (Appendix, Table 4) and kinglet populations were completely eliminated following the treatment (Fig. 4). The residue level in foliage of 5.12 ppm represents a heavy deposit on this plot (Dr. K.M.S.Sundaram, pers. com.). Treatment plot 4 (0.210 kg AI/ha) suffered population reductions similar to plot 3 (Appendix, Table 5) with kinglets recorded only on the morning after the evening the insecticide was applied (Fig. 5). The residue in foliage of 6.90 ppm represents a heavy deposit on the plot. On treatment plot 5 (0.280 kg AI/ha) a reduction in bird activity was recorded the morning following the treatment

(Appendix, Table 6). Kinglet populations were reduced to zero (Fig. 6). Populations on plot 6 (0.280 kg AI/ha) remained fairly stable throughout the post spray census (Appendix, Table 7) as compared to an increasing population (due to migration) recorded on the untreated control plot (Appendix, Table 1). While overall populations were not seriously affected, ruby-crowned kinglet populations were reduced and 4 pre-treatment territories remained unoccupied throughout the post treatment census period (Fig. 7). A high phosphamidon residue of 5.17 ppm was recorded in foliage from plot 6. Bird populations on treatment plot 7 (0.280 kg AI/ha) were not affected and the 2 kinglet territories remained occupied throughout the census period (Appendix Table 8, Fig. 8). Bird populations on treatment plot 8 (Appendix Table 9) were not seriously affected but did not increase at the same rate as the untreated control plot. Ruby-crowned kinglet populations were reduced but indications are that mortality may have been light as birds were observed wandering through the plot after treatment, although only one territory remained occupied throughout the census period (Fig. 9).

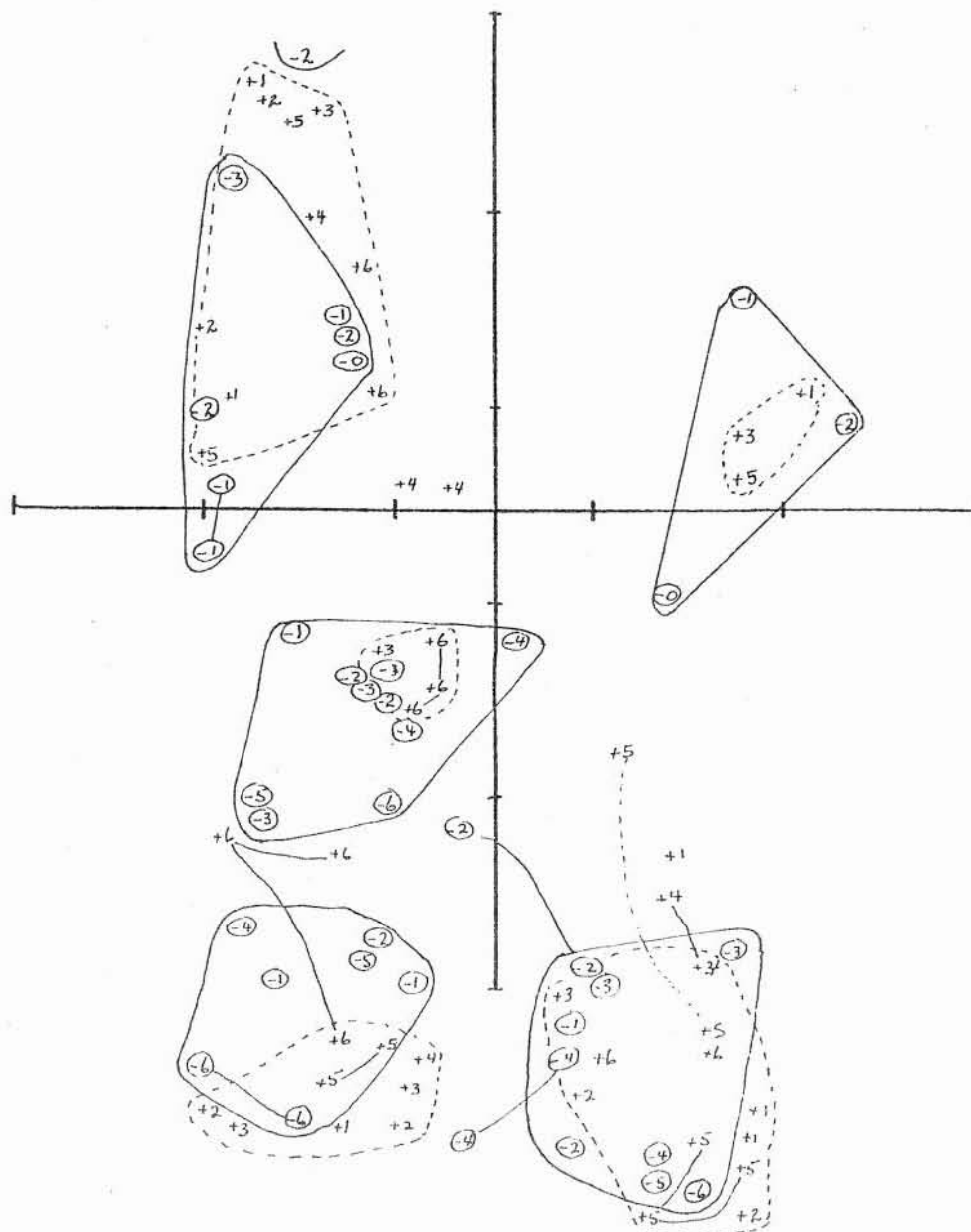



Fig. 1 Pre and post spray territories of the ruby-crowned kinglet, *R. calendula* (Linnaeus) on the untreated control plot. Chipman, New Brunswick

 Pre-spray territory
 Post-spray territory
 Scale = 2 chains (40 meters)

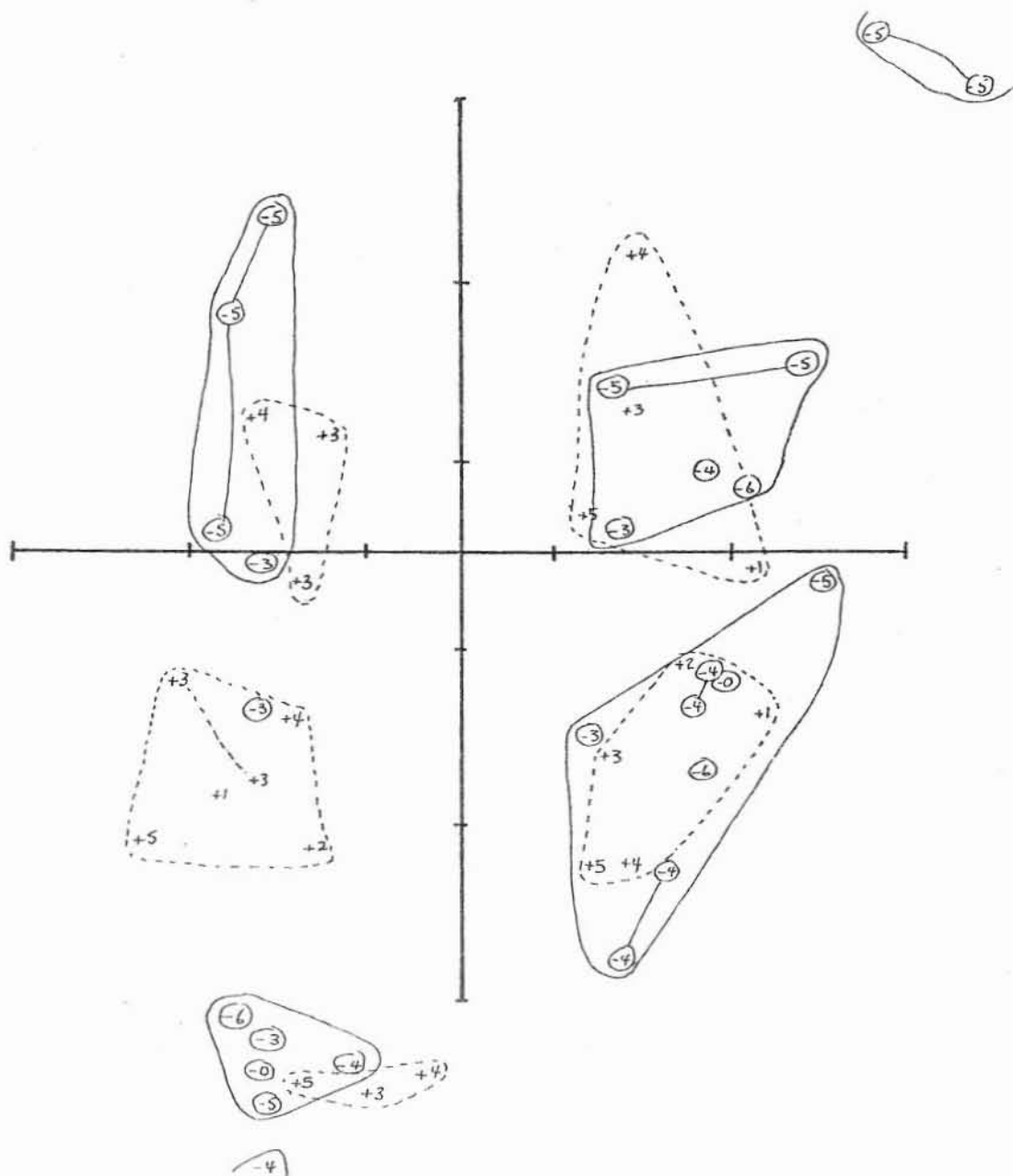


Fig. 2 Pre and post spray territories of the ruby-crowned kinglet, *R. calendula* (Linnaeus) on treatment plot I. (0.210 kg AI/ha) Chipman, New Brunswick, 1976.

— Pre-spray territory
 --- Post-spray territory
 ————— Scale = 2 chains (40 meters)

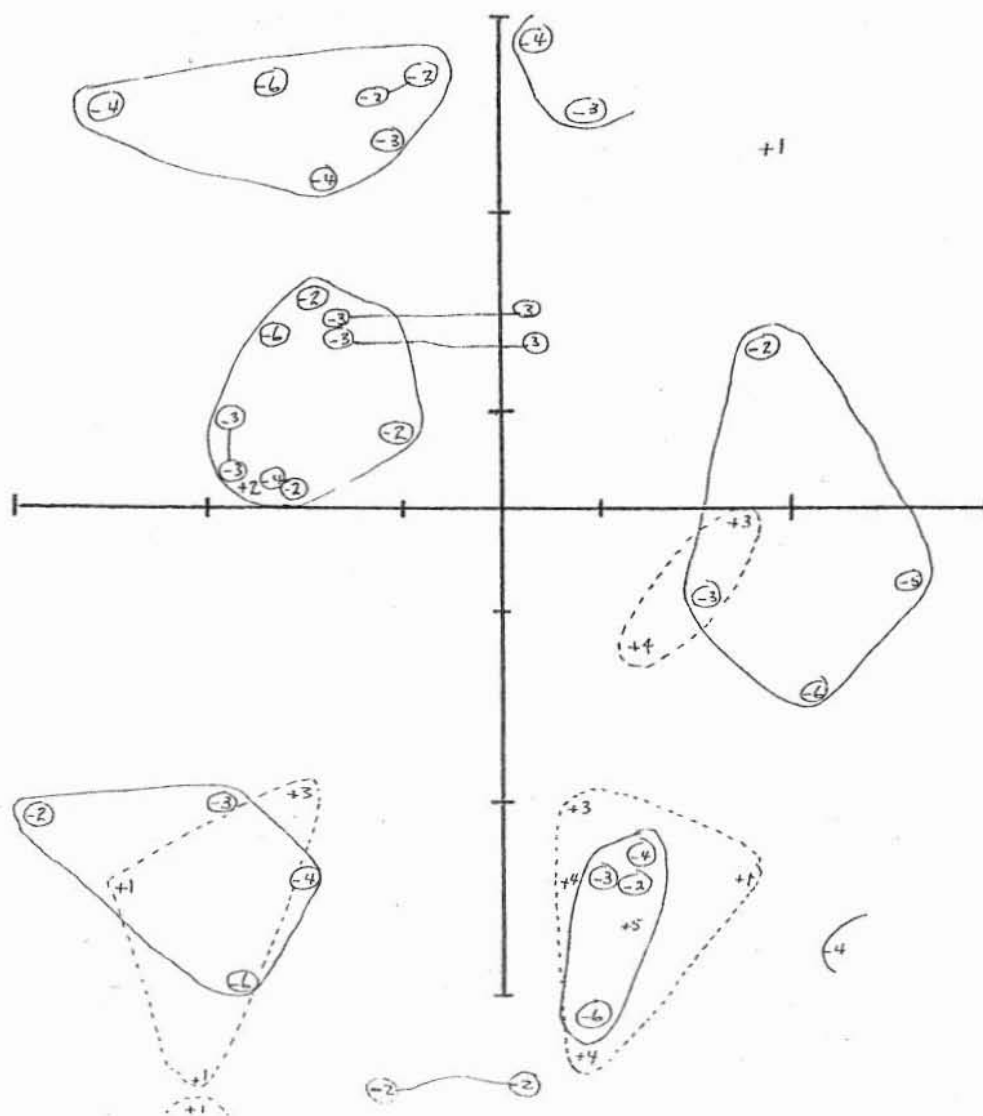




Fig. 3 Pre and post spray territories of the ruby-crowned kinglet, *R. calendula* (Linnaeus) on treatment plot 2 (0.210 kg AI/ha). Chipman, New Brunswick

 Pre-spray territory
 Post-spray territory
 Scale = 2 chains (40 meters)

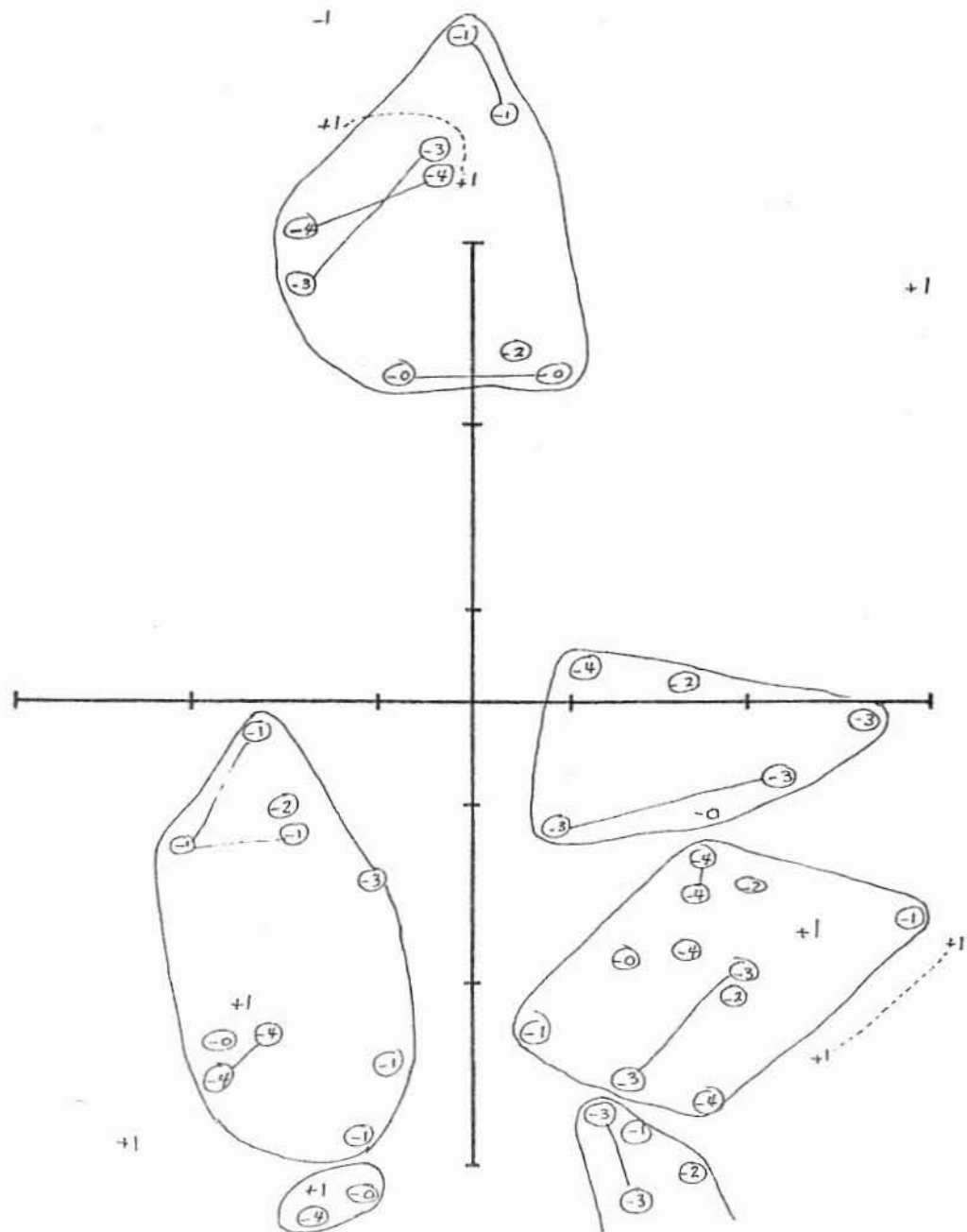


Fig. 5 Pre and post spray territories of the ruby-crowned kinglet, *R. calendula* (Linnaeus) on treatment plot 4 (0.210 kg AI/ha). Chipman, New Brunswick, 1976.

————— Pre-spray territory
 - - - - - Post-spray territory
 ————— Scale = 2 chains (40 meters)

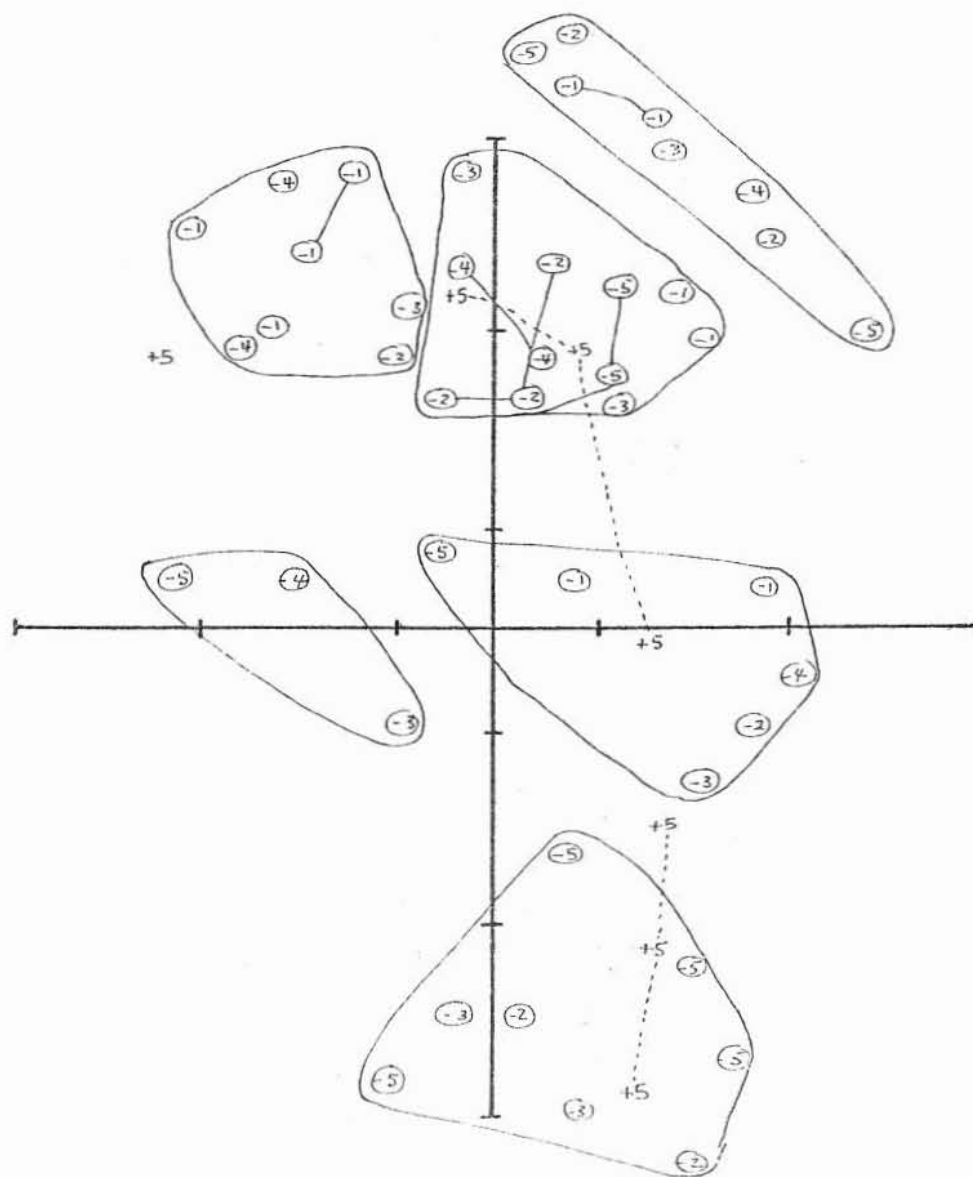


Fig. 6 Pre and post spray territories of the ruby-crowned kinglet, *R. calendula* (Linnaeus) on treatment plot 5 (0.280 kg AI/ha). Chipman, New Brunswick, 1976

— Pre-spray territory
 - - - Post-spray territory
 ————— Scale = 2 chains (40 meters)

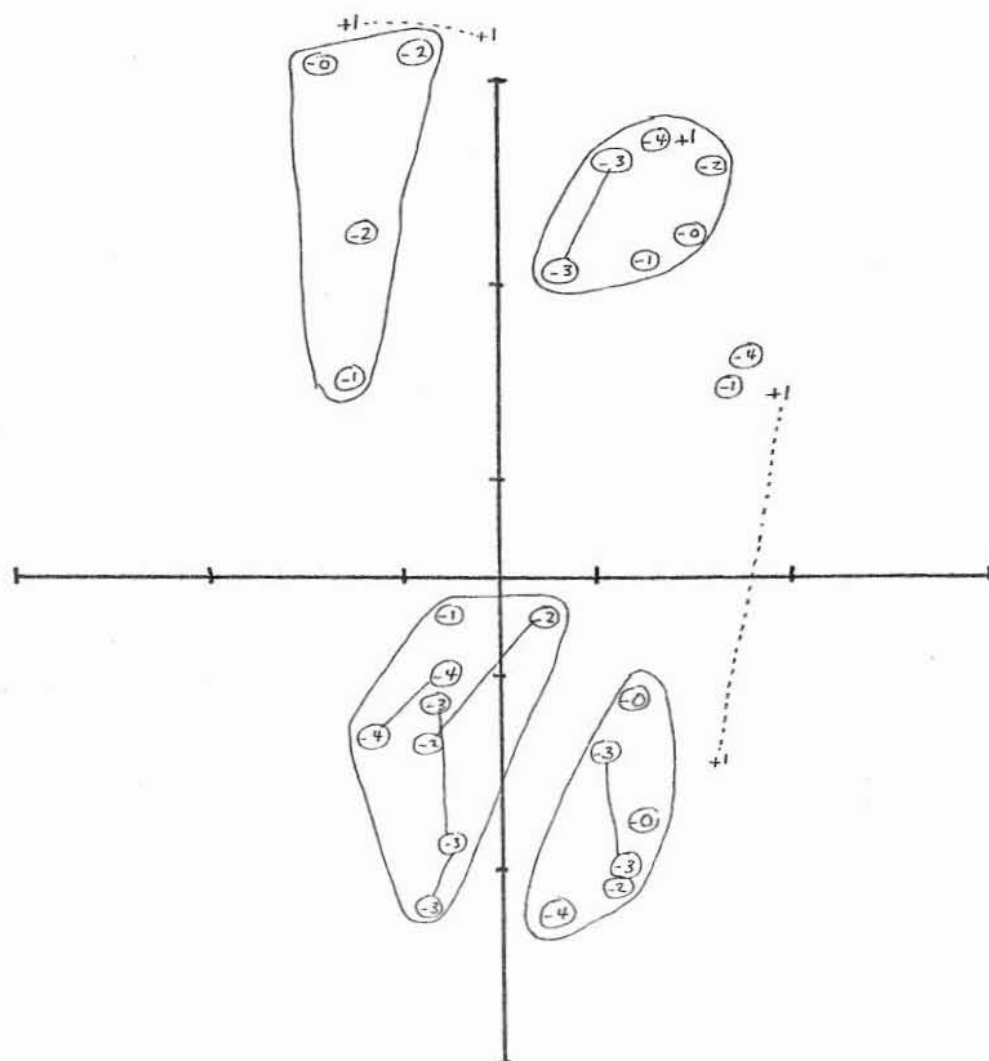


Fig. 7 Pre and post spray territories of the ruby-crowned kinglet, *R. calendula* (Linnaeus) in treatment plot 6 (0.280 kg AI/ha). Chipman, New Brunswick, 1976.

————— Pre-spray territory
 - - - - - Post-spray territory
 ───────── Scale = 2 chains (40 meters)

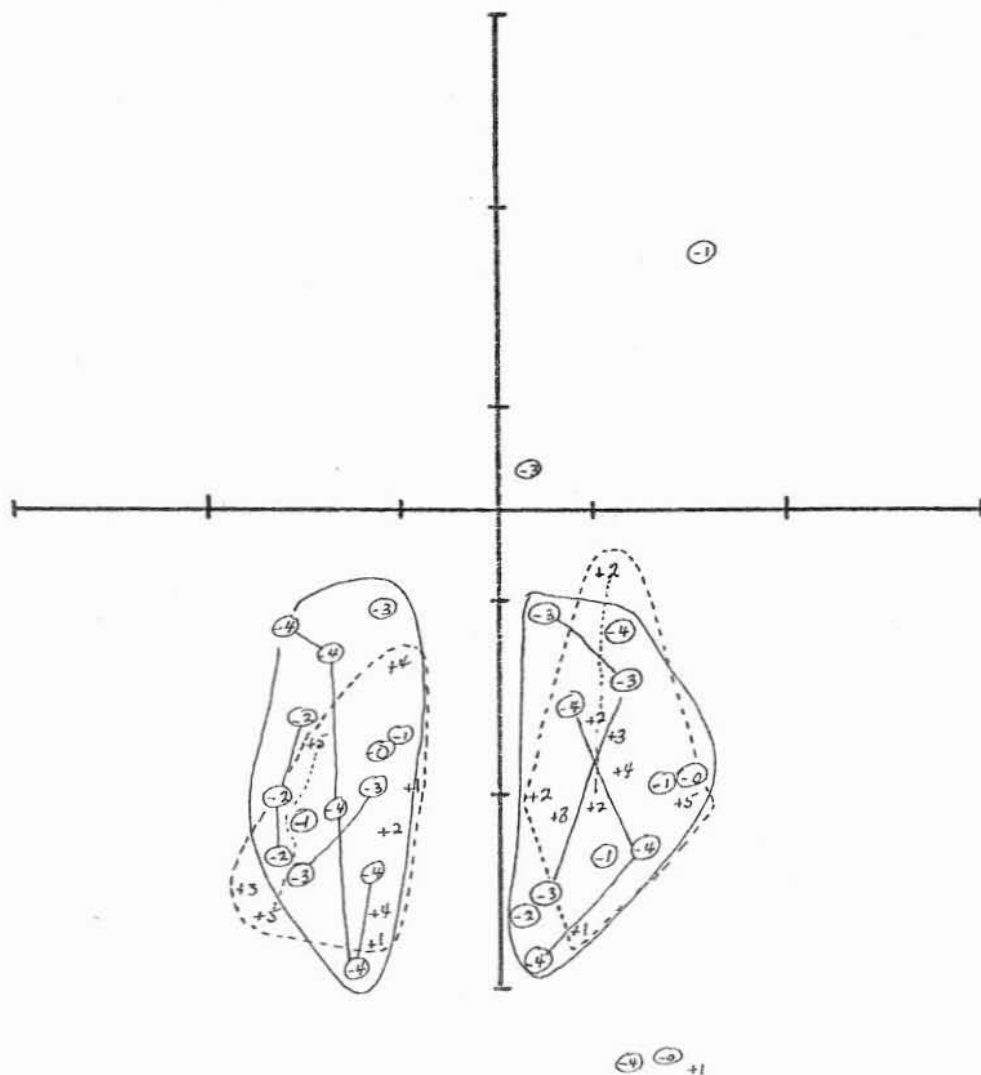


Fig. 8 Pre and post spray territories of the ruby-crowned kinglet, *R. Calendula* (Linnaeus) on treatment plot 7 (0.280 kg AI/ha). Chipman, New Brunswick

—— Pre-spray territory
 - - - - Post-spray territory
 ───────── Scale = 2 chains (40 meters)

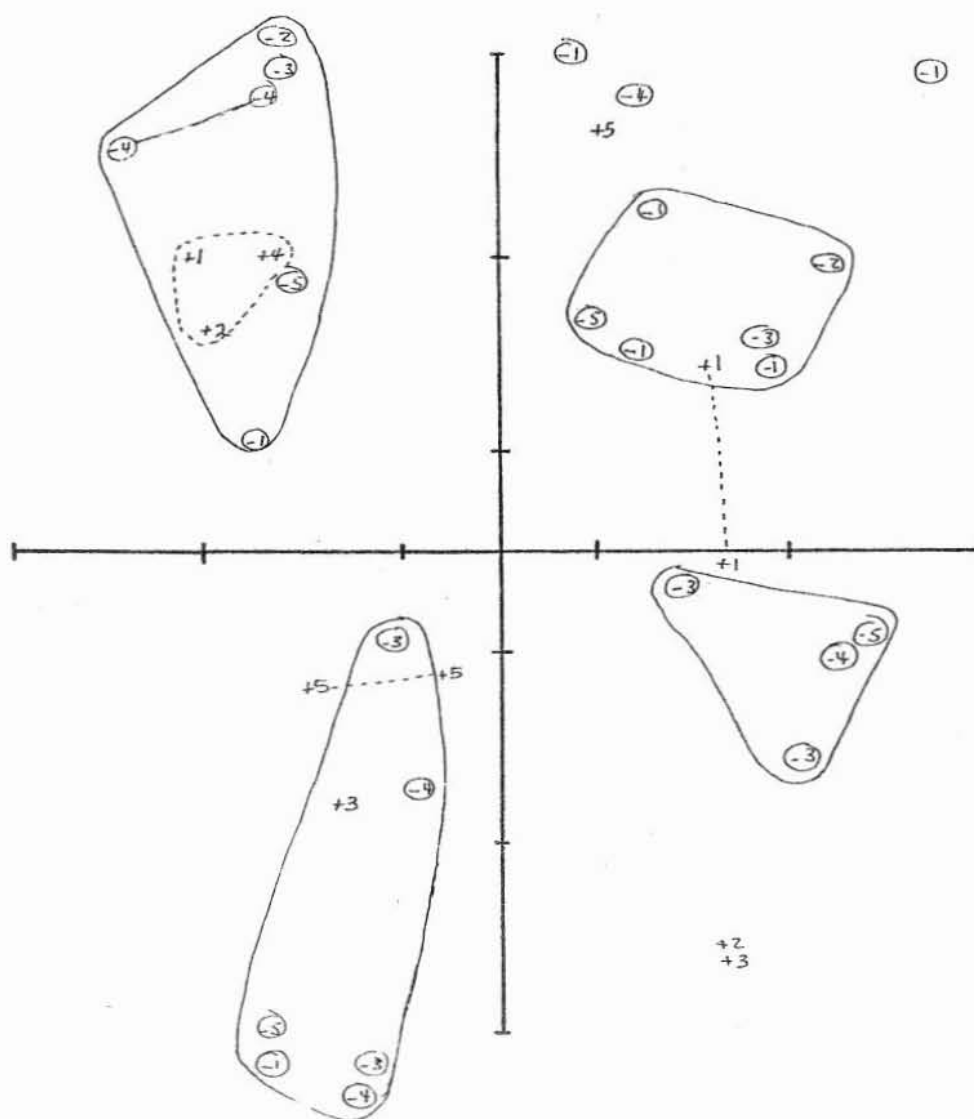


Fig. 9 Pre and post spray territories of the ruby-crowned kinglet, *R. calendula* (Linnaeus) on treatment plot 8 (0.280 kg AI/ha). Chipman, New Brunswick, 1976

— Pre-spray territory
 - - - Post-spray territory
 ————— Scale = 2 chains (40 meters)

Birds, 2nd application, larvacide trials: On May 30th, treatment plots 1, 2, 5 and 6 received a second application of phosphamidon. Many species of the warbler group (Family Parulidae) had by this time migrated into the experimental area. The pre-spray census for this set of trials could only be carried out for two days. On plot 1, populations of Tennessee warblers, *Vermivora peregrina* (Wilson) declined (Appendix, Table 11), but Ruby-crowned kinglets while not as active as during the previous treatment (May 13th) could still be identified in their territories (Fig. 11), and do not appear to have been affected by this application. On treatment plot 2 where kinglets had been eliminated on the top half of the plot by the first application, no fill-in had taken place by the time of the 2nd application (Appendix, Table 12). The 2nd application did not affect the territories identified on that portion of the plot nearest to the road (Fig. 12). Bird populations were not affected on either treatment plot 5 or plot 6 (Appendix, Tables 13 and 14). Kinglet territories on plot 5 remained intact (Fig. 13) while those on plot 6 never recovered from the first application on May 13th (Fig. 14). The relative lack of serious effects attributable to the 2nd application of phosphamidon correlates well with the light deposit evident from residue levels found in foliage (Table 3).

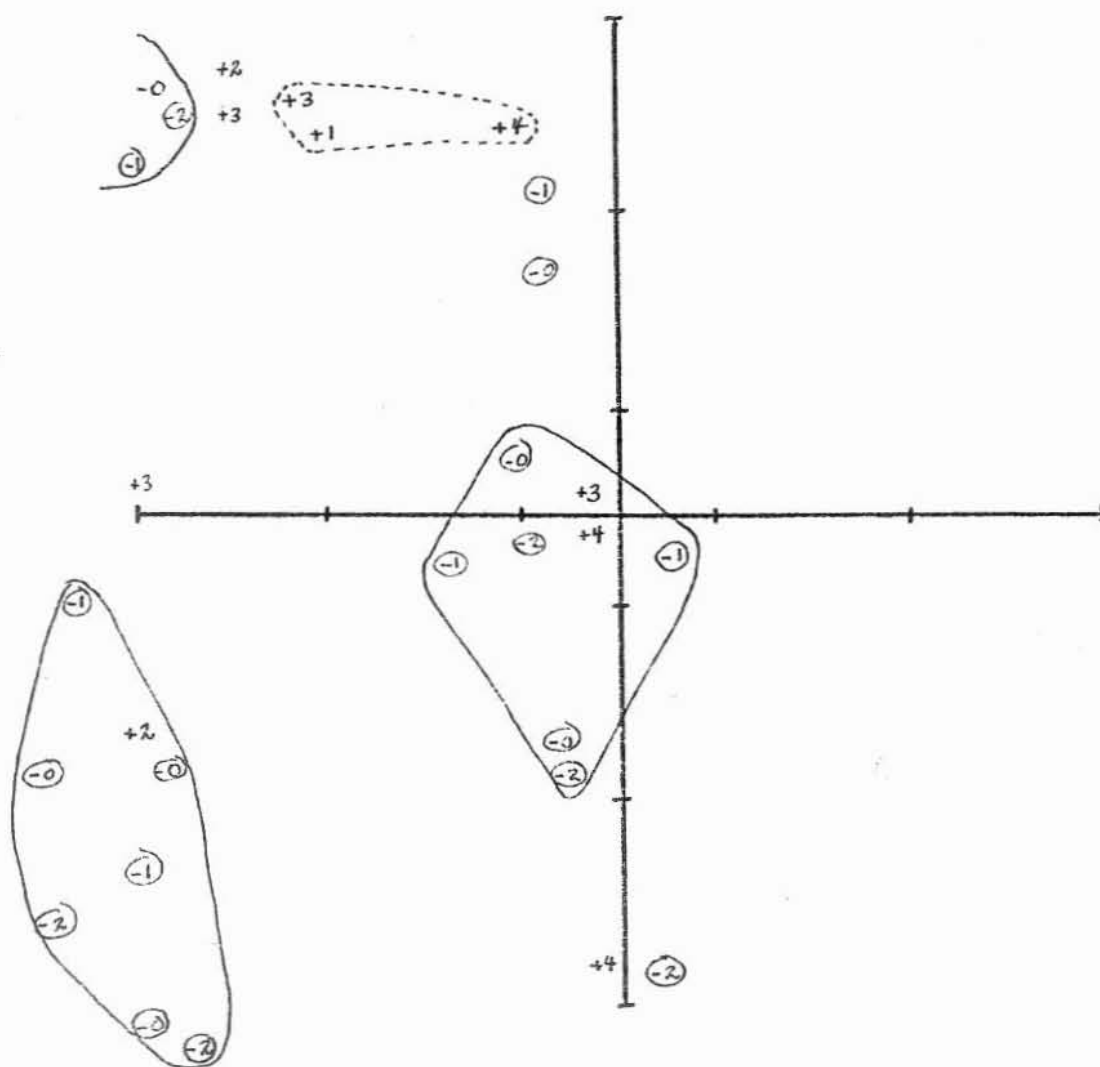


Fig. 10 Pre and post spray territories of the ruby-crowned kinglet, *R. calendula* (Linnaeus) on the untreated control plot (2nd application), Chipman, New Brunswick, 1976.

_____ Pre-spray territory
 - - - - - Post-spray territory
 ───────── Scale = 2 chains (40 meters)

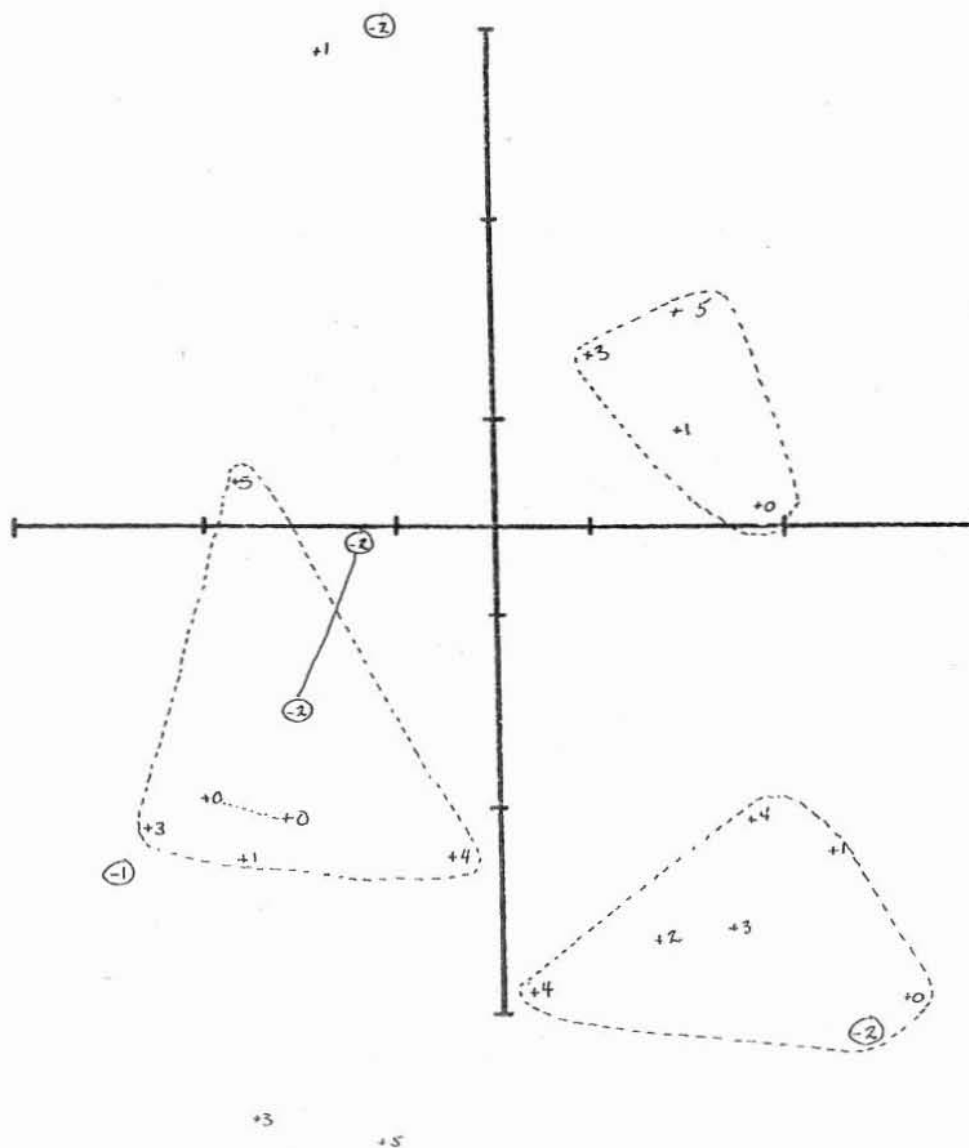


Fig. 11 Pre and post spray territories of the ruby-crowned kinglet, *R. calendula* (Linnaeus) on treatment plot I (0.210 kg AI/ha 2nd application). Chipman, New Brunswick, 1976.

——— Pre-spray territory
 - - - - - Post-spray territory
 ───────── Scale = 2 chains (40 meters)

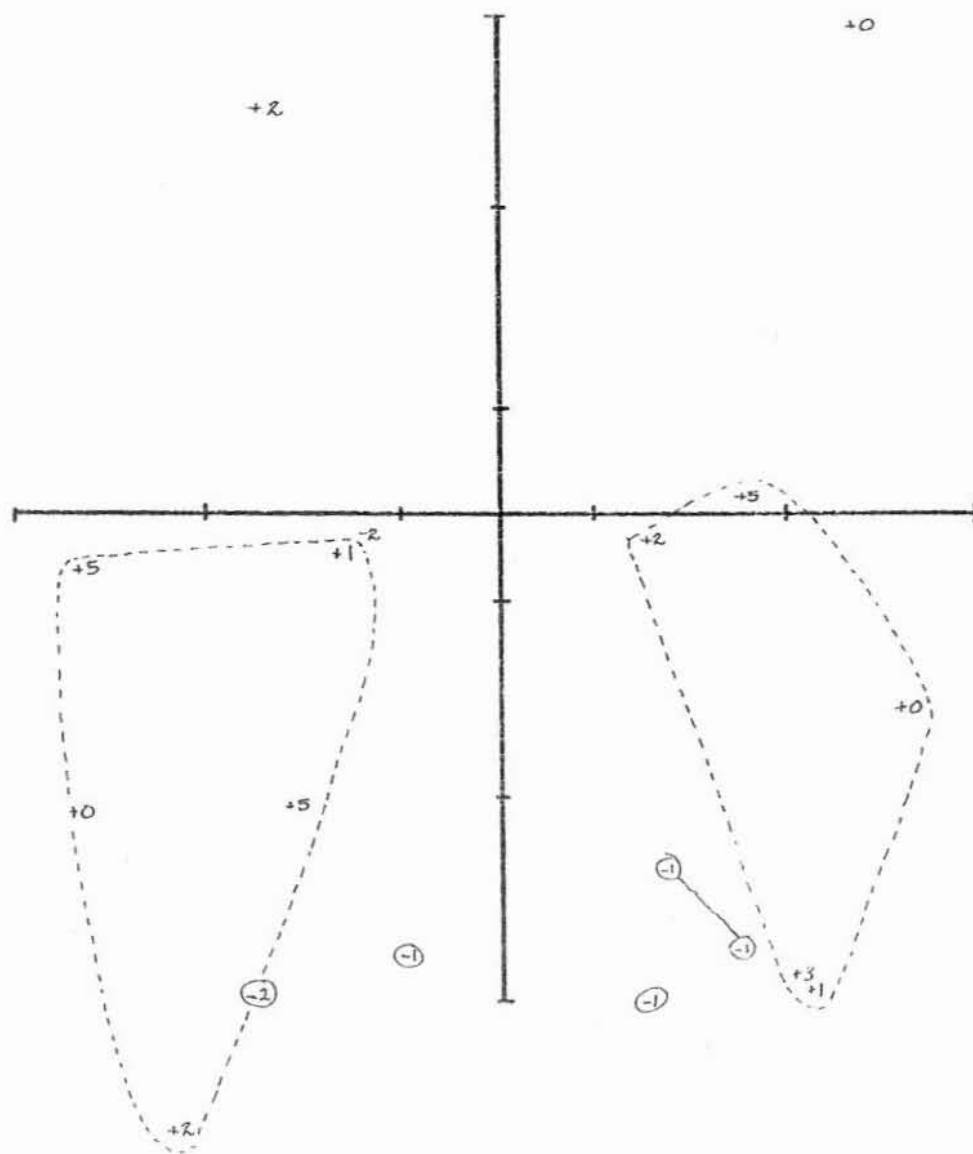


Fig. 12 Pre and post spray territories of the ruby-crowned kinglet, *R. calendula* (Linnaeus) on treatment plot 2 (0.210 kg AI/ha 2nd application). Chipman, New Brunswick, 1976.

— Pre-spray territory
 - - - Post-spray territory
 ————— Scale = 2 chains (40 meters)

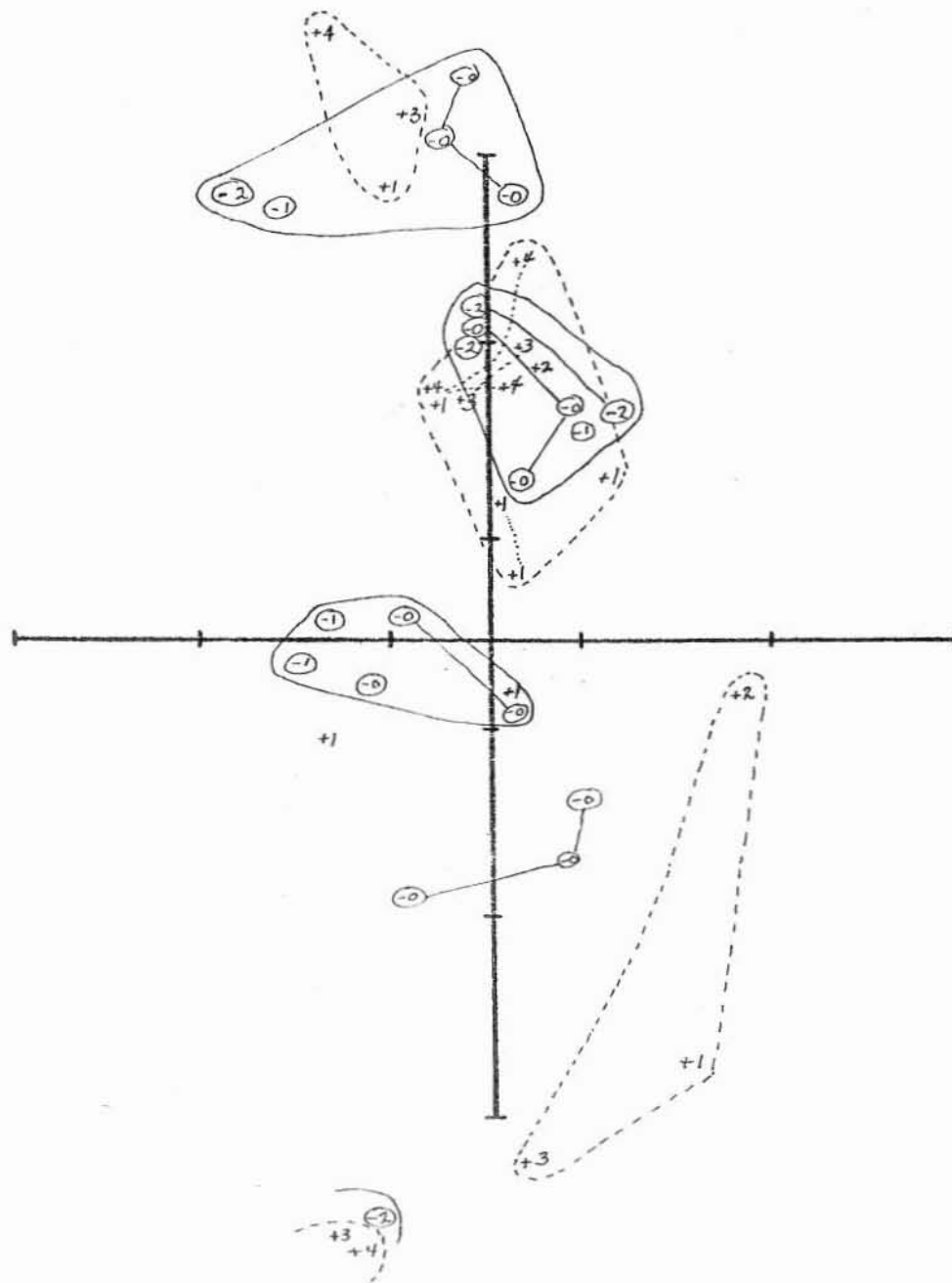



Fig. 13 Pre and post spray territories of the ruby-crowned kinglet, *R. calendula* (Linnaeus) on treatment plot 5 (0.140 kg AI/ha 2nd application). Chipman, New Brunswick, 1976.

 Pre-spray territory
 Post-spray territory
 Scale = 2 chains (40 meters)

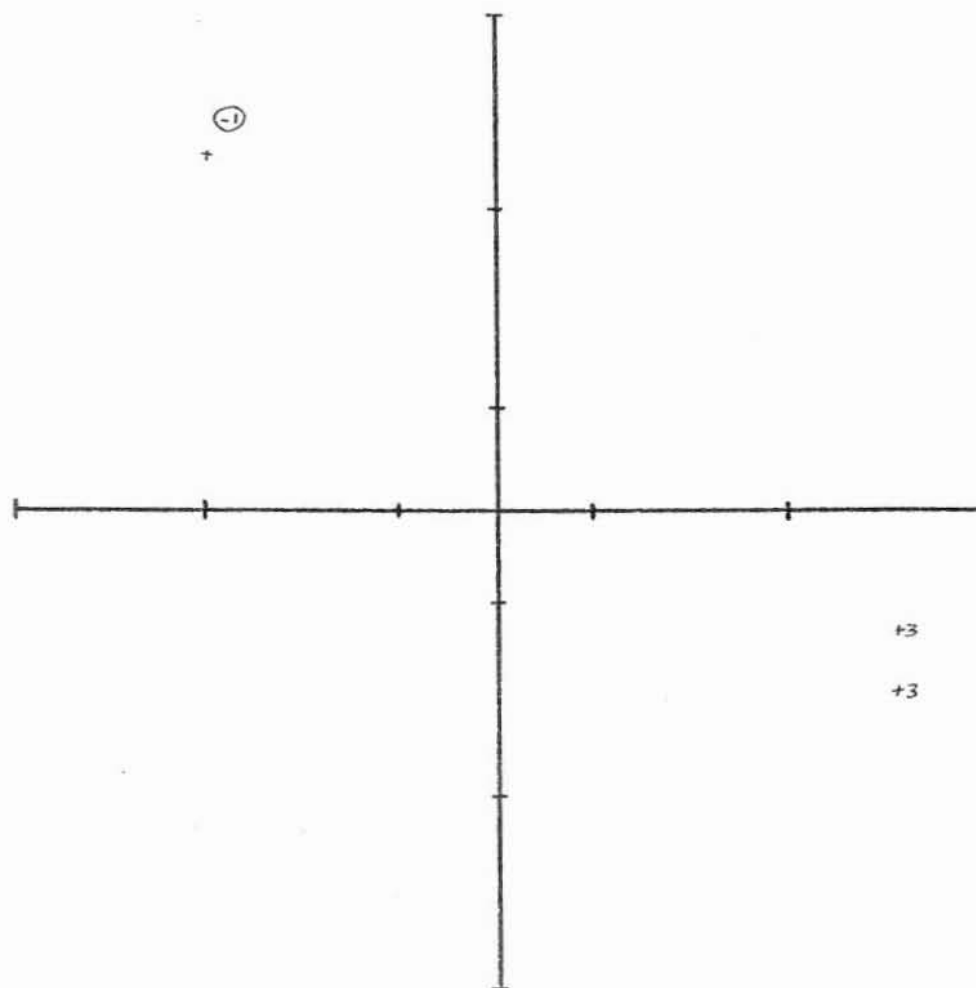


Fig. 14 Pre and post spray territories of the ruby-crowned kinglet, *R. calendula* (Linnaeus) on treatment plot 6 (0.140 kg AI/ha 2nd application). Chipman, New Brunswick, 1976.

—— Pre-spray territory
----- Post-spray territory
————— Scale = 2 chains (40 meters)

All bird plots were resurveyed between June 19th and 22nd (Appendix, Tables 15 to 23) to determine whether ruby-crowned kinglets had returned to those plots which had suffered losses during the phosphamidon larvacide trials. Populations and activity of kinglets on most of the treated plots followed the gradual decline seen on the control plot between the time they were last treated until when resurveyed (Table 4). Populations on plot 3 showed substantial recovery from the heavy reduction caused by the early larvacide application. Populations on plot 5 also showed some recovery which occurred between the first and second larvacide applications. Kinglets on plots 2,4,6 and 8 did not appear to recover from reductions caused by the treatments.

Table 4

Ruby-crowned Kinglet (*R. calendula* Linnaeus) populations
on phosphamidon experimental plots
Chipman, New Brunswick, 1976

Plot No.	1st application		2nd application		Post trial Survey
	pre-spray	post-spray	pre-spray	post-spray	
Untreated Control Plot	6.2	6.0	3.5	3.8	3.0
1	4.0	4.0	2.0	3.0	2.0
2	5.8	2.6	2.5	1.8	1.0
3	7.0	0.4			3.5
4	7.2	1.8			0.5
5	8.2	0.6	3.0	3.2	2.5
6	4.0	0.8	0.5	0.6	0.5
7	4.2	2.8			2.0
8	4.8	1.8			1.5

Phosphamidon

Stream fauna, larvacide trials:

McAllister Brook, a fairly small (4m wide) shallow (mean depth 20 cm, maximum depth 60 cm) stream flowing into the Gasperean River north of Chipman, N.B., was monitored to study the effects of double applications of 0.210 kg/ha phosphamidon. Surber samples were taken from a riffle area with a predominantly sand bottom interspersed with rocks and stones. The creek was lined with alders and balsam fir which gave a closed canopy over the stream. The untreated stream was somewhat larger (8 m wide) and deeper (mean depth 30 cm, maximum depth 75 cm) with grassy shorelines and no overhead forest canopy, but had similar substrate to treatment stream. Water levels and stream flow in the control stream decreased to a greater extent than in the treatment stream over the study period.

McAllister Brook was treated with phosphamidon on 13 May and 30 May. Aquatic insect populations in the stream remained relatively constant over the treatment period (Table 5). Fluctuations in the numbers of stoneflies (Plecoptera) and midge larvae (Diptera:Chironomidae) were well within the range of population changes among these groups in the untreated stream (Table 6). There was no evidence of impact by phosphamidon on aquatic invertebrates.

Table 5

Bottom fauna populations expressed as mean numbers and standard deviations
per 0.093m² from a phosphamidon treated (2 x 0.210 kg AI/ha) stream

Chipman, New Brunswick, 6 May to 1 June, 1976

Number of days before or after treatment	-7	+3	+19 (+2 second application)
Water temperature	8°C	12°C	10°C
Number of samples	4	4	4
Ephemeroptera:Heptageniidae	0.3 ± 0.5	0.0	0.0
Baetidae	6.3 ± 1.7	9.8 ± 9.9	8.3 ± 5.4
Plecoptera	9.5 ± 9.7	21.8 ± 17.7	5.3 ± 7.3
Trichoptera	8.0 ± 5.8	8.5 ± 5.7	9.3 ± 5.5
Lepidoptera:Pyralidae	0.3 ± 0.5	0.0	0.0
Coleoptera:Elmidae	0.3 ± 0.5	0.0	0.3 ± 0.5
Diptera:Tipulidae	0.8 ± 0.9	0.8 ± 0.9	0.5 ± 1.0
Simuliidae	5.0 ± 6.4	1.0 ± 0.8	5.0 ± 6.3
Chironomidae	10.8 ± 12.6	5.8 ± 1.5	7.3 ± 12.5
Heleidae	0.0	0.0	0.3 ± 0.5
Rhagionidae	1.0 ± 2.0	0.5 ± 0.6	0.8 ± 0.9
Nematoda	0.3 ± 0.5	0.0	0.0
Oligochaeta	5.3 ± 9.8	2.0 ± 2.4	0.0
Totals	47.5 ± 31.9	52.5 ± 24.8	36.8 ± 36.5

Table 6

Bottom fauna populations expressed as mean numbers and standard deviations
per 0.093m² from an untreated stream.

Chipman, New Brunswick, 9 May to 31 May, 1976.

Number of days before or after treatment	-4	+3	+18 (+1 second application)
Water temperature	10°C	8.5°C	12°C
Number of samples	4	4	4
Ephemeroptera:Heptageniidae	0.5 ± 0.6	0.0	0.0
Baetidae	18.0 ± 19.4	2.8 ± 4.2	20.0 ± 22.7
Plecoptera	2.0 ± 3.3	13.7 ± 15.5	1.5 ± 1.2
Trichoptera	25.8 ± 13.6	8.0 ± 8.1	3.0 ± 2.1
Lepidoptera:Pyralidae	0.0	0.0	0.3 ± 0.5
Coleoptera:Elmidae	34.5 ± 32.5	0.0	17.5 ± 16.3
Diptera:Tipulidae	1.5 ± 1.7	1.8 ± 2.3	1.5 ± 1.2
Simuliidae	0.3 ± 0.5	0.0	1.5 ± 1.7
Chironomidae	47.8 ± 44.2	20.5 ± 12.7	25.3 ± 9.6
Heleidae	0.3 ± 0.5	0.8 ± 1.5	1.8 ± 2.8
Rhagionidae	1.3 ± 0.9	0.3 ± 0.5	0.3 ± 0.5
Tabanidae	0.5 ± 0.6	3.8 ± 2.8	0.0
Acari	0.8 ± 0.9	0.0	0.3 ± 0.5
Nematoda	0.3 ± 0.5	0.5 ± 1.0	0.3 ± 0.5
Oligochaeta	15.3 ± 17.7	14.8 ± 11.1	0.0
Gastropoda:Ancylidae	0.0	0.0	0.3 ± 0.5
Totals	148.5 ± 89.2	67.0 ± 46.5	73.3 ± 40.1

Small mammals, larvacide trials: Small mammal populations were assessed on an untreated control plot, on plot 6 which received an application of 0.280 kg AI/ha (May 13th) followed by an application of 0.140 kg AI/ha and on plot 4 which received a single application of phosphamidon (0.210 kg AI/ha) and a double application of fenitrothion (0.210 kg AI/ha each). A total of 186 animals were trapped, 66 from the untreated control plot, 73 from plot 6 and 47 from plot 4. The red-backed vole *Clethrionomys gapperi* (Vigors) was the most abundant species (152 animals) followed by the meadow vole, *Microtus pennsylvanicus* (Ord) (23 animals), the woodland jumping mouse, *Napaeozapus insignis* (Miller) (7), the deer mouse, *Peromyscus maniculatus* (Wagner) (3) and the masked shrew, *Sorex cinereus* (Kerr) (1) (Table 7).

A large proportion of the animals trapped were sub-adults, 44% on the untreated check plot, 51% on plot 6 and 21% on plot 4. The sub-adult population would have been nestlings at the time of the phosphamidon trials. Dissection of the adult female animals showed a high incidence of pregnancy or animals containing placental scars indicating the recent birth of a litter, 75% on the untreated check plot, 100% on plot 6 and 100% on plot 4.

The high percentage of sub-adult animals and adult females in breeding condition indicate that the phosphamidon trials did not affect the small mammal complex of the area.

Table 7

Small mammal population assessment on 3 plots in the phosphamidon experimental area, Chipman, New Brunswick, 1976

Plot number and pesticide treatment	Small mammal species	males			females				Total animals	
		sub adult	adult	total	sub adult	pregnant	placental scars	not pregnant		total
Plot 1	<i>Clethrionomys gapperi</i>	11	12	23	8	4	4	3	19	42
Untreated control	<i>Microtus pennsylvanicus</i>	3	4	7	3	8	2	1	11	18
plot	<i>Napaeozapus insignis</i>	2	0	2	2	0	0	2	4	6
										66
Plot 6	<i>Clethrionomys gapperi</i>	23	19	42	13	7	7	0	27	69
Phosphamidon (dou-	<i>Napaeozapus insignis</i>	0	0	0	0	0	1	0	1	1
ble application	<i>Peromyscus maniculatus</i>	1	0	1	1	1	0	0	2	3
										73
Plot 4	<i>Clethrionomys gapperi</i>	6	20	26	4	5	6	0	15	41
Phosphamidon (sing-	<i>Microtus pennsylvanicus</i>	0	3	3	0	1	1	0	2	5
le application)										
Fenitrothion (dou-	<i>Sorex cinereus</i>	1	0	1	0	0	0	0	0	1
ble application)										
										47

Birds, adulticide trials: Bird activity at the time of the phosphamidon adulticide (July 4 to 9) had declined from a peak level around in mid-June. Ruby-crowned kinglet activity on all the plots remained relatively constant or showed declines expected for the time of season (Appendix, Tables 24 to 28). Other species recorded in numbers such as Swainson's thrush *Hylocichla ustulata* (Nuttall), ovenbird *Seiurus aurocapillus* (Linnaeus) and white-throated sparrow *Z. albicollis* (Gmelin) were also not affected by this series of treatments. Plot searches failed to recover any dead birds, nor were any birds exhibiting irate behaviour suggesting insecticide intoxication observed.

Aquatic fauna, adulticide trials: Burpee Mill Stream was sampled within a block which received three consecutive applications of phosphamidon at two day intervals. The portion of stream sampled is fairly wide (6 m), deep (mean depth 50 cm, maximum depth 1 m) and fast flowing and is lined with alders but otherwise open to the sky. The bottom is sandy with regularly placed stones and rocks. Peter Brook, the untreated control stream, was smaller (3 m wide) but very similar in every other respect to the treated stream.

Considerable variability was evident in bottom fauna populations sampled in the two streams around the time of the phosphamidon treatments (Tables 8 and 9). There is no evidence that the treatments had any serious effects on stream bottom fauna and all groups of aquatic insects were present at close to pre-treatment levels after the last phosphamidon application.

Table 8

Bottom fauna populations expressed as mean numbers and standard deviations
per 0.093m² from an untreated stream

Acadia Forest Experimental Station, New Brunswick, 2 July to 10 July, 1976

Number of days before or after treatment	-1	+3	+7 (+1 third application)
Water temperature	-	15°C	15°C
Number of samples	3 (combined)	3 (combined)	3
Ephemeroptera:Heptageniidae	0.3	2.0	10.0 ± 7.9
Baetidae	0.3	0.0	0.0 ±
Odonata:Zygoptera	0.0	0.0	0.3 ± 0.5
Plecoptera	2.0	4.0	3.0 ± 4.3
Megaloptera:Corydalidae	0.0	0.3	0.0
Trichoptera	1.3	1.0	2.0 ± 2.0
Coleoptera:Elmidae	0.0	1.0	1.7 ± 2.8
Diptera:Chironomidae	1.0	1.0	2.7 ± 0.5
Heleidae	0.0	0.0	0.3 ± 0.5
Rhagionidae	0.3	0.0	0.0
Oligochaeta	1.3	3.7	0.7 ± 1.1
Totals	6.7	13.0	20.7 ± 17.2

Table 9
Bottom fauna populations expressed as mean numbers and standard deviations
per 0.093m² from a phosphamidon treated (3 X 0.070 kg AI/ha) stream

Acadia Forest Experimental Station, New Brunswick, 29 June to 11 July, 1976

Number of days before or after treatment	-4	+6 (+3 second application)	+7 (+1 third application)	+8 (+2 third application)
Water temperature	-	12°C	15°C	15°C
Number of samples	3 (combined)	3	3	3
phemeroptera: Heptageniidae	1.3	0.0	0.3 ± 0.5	0.0
Baetidae	5.3	3.0 ± 3.0	4.0 ± 3.4	5.0 ± 3.0
donata: Zygoptera	0.0	0.7 ± 0.6	0.3 ± 0.5	0.0
lecoptera	1.0	0.0	0.3 ± 0.5	1.3 ± 2.3
emiptera: Veliidae	1.7	0.0	0.0	0.3 ± 0.5
richoptera	4.3	1.0 ± 1.7	8.3 ± 4.5	2.3 ± 2.1
oleoptera: Elmidae	0.7	0.3 ± 0.5	1.7 ± 2.1	1.3 ± 1.5
Psephenidae	0.3	0.0	0.0	0.0
iptera: Tipulidae	0.0	0.3 ± 0.5	0.0	0.0
Simuliidae	0.0	0.0	0.3 ± 0.5	0.0
Chironomidae	3.0	1.7 ± 2.8	2.7 ± 3.1	2.0 ± 2.6
Rhagionidae	0.0	0.3 ± 0.5	0.0	0.0
opoda	0.0	0.3 ± 0.5	0.3 ± 0.5	0.3 ± 0.5
matoda	0.7	0.3 ± 0.5	0.0	0.3 ± 0.5
igochaeta	1.3	0.0	0.0	0.0
Totals	19.7	8.0 ± 10.4	18.3 ± 13.1	13.0 ± 17.8

Acephate

Birds, larvacide trials: On June 10th, acephate treatment plots received an application of insecticide at the emitted dosage rates of 0.560 kg/ha (8 oz/ac) and 0.280 kg/ha (4 oz/ac) respectively. Overall bird population activity (songs and sightings) had declined noticeably 2 days prior to treatment (Fig. 15) and remained relatively stable immediately following the application (Appendix, Tables 29, 30 and 31). Activity on plot 1 commenced to increase the day after treatment paralleling that recorded on the untreated control plot, while populations on plot 2 remained relatively constant throughout the 1st post-spray period. Plot 2 received a second application of 0.280 kg/ha on June 16 which did not affect the resident bird population.

Carbaryl

Birds, larvacide trials: Carbaryl was applied to plots 1 and 2 on June 9th at emitted dosage rates of 1.121 kg AI/ha and 0.560 kg AI/ha respectively. Plot 2 received an additional treatment of 0.560 kg AI/ha on June 15th. Population activity had declined on all plots prior to the first treatment (Fig. 16). Activity remained low throughout the post spray census period while activity on the untreated check plot increased (Appendix, Tables 32, 33 and 34). Bird activity on plot 2 remained close to pre treatment levels following the 1st treatment. Activity on plot 2 declined following 2nd treatment paralleling activity on the untreated plot except for a short period of increased activity recorded 2 days following the treatment.

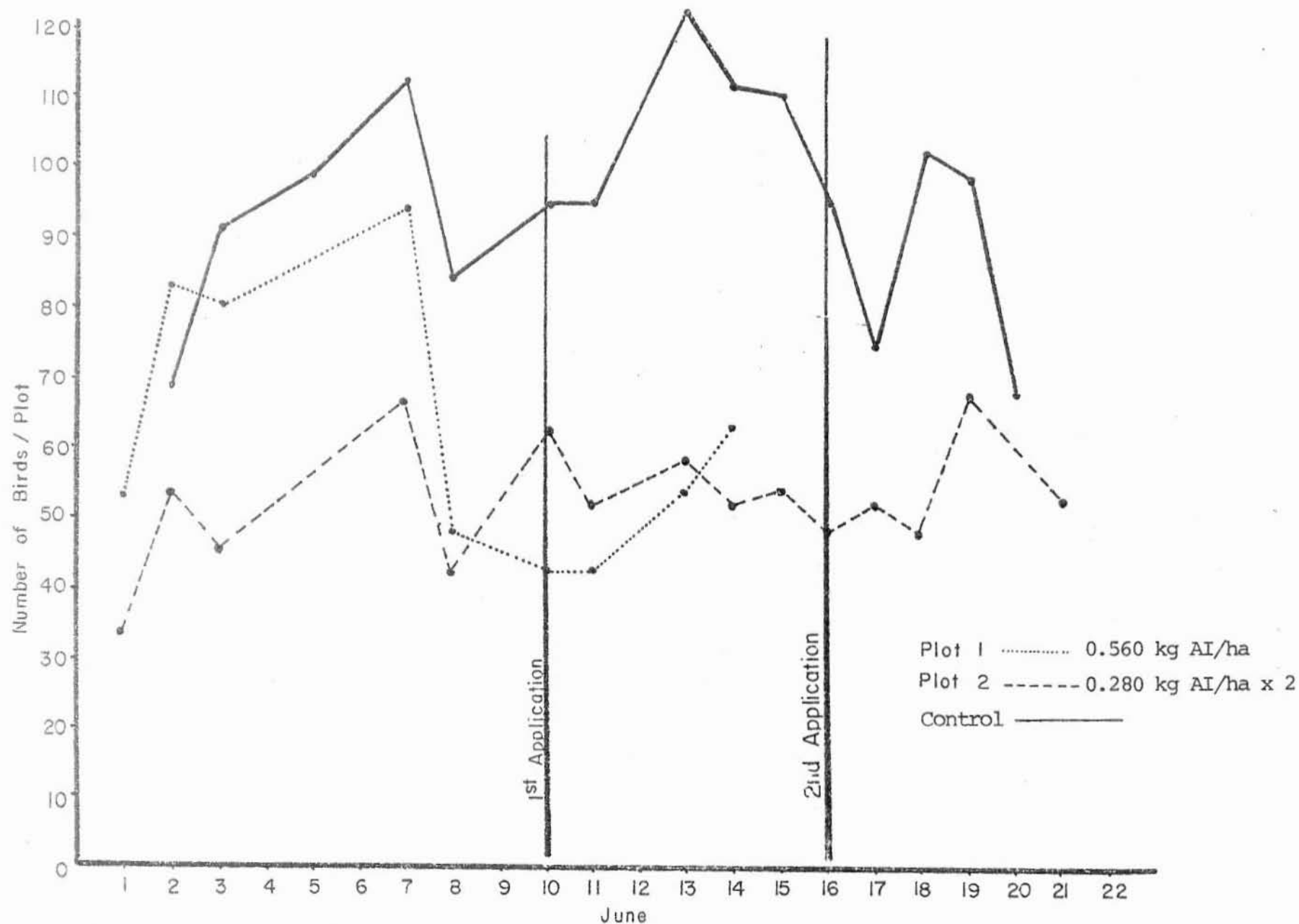


Fig. 15 Bird population activity on three plots throughout the acephate efficacy trials near Stanley, New Brunswick, June 1976.

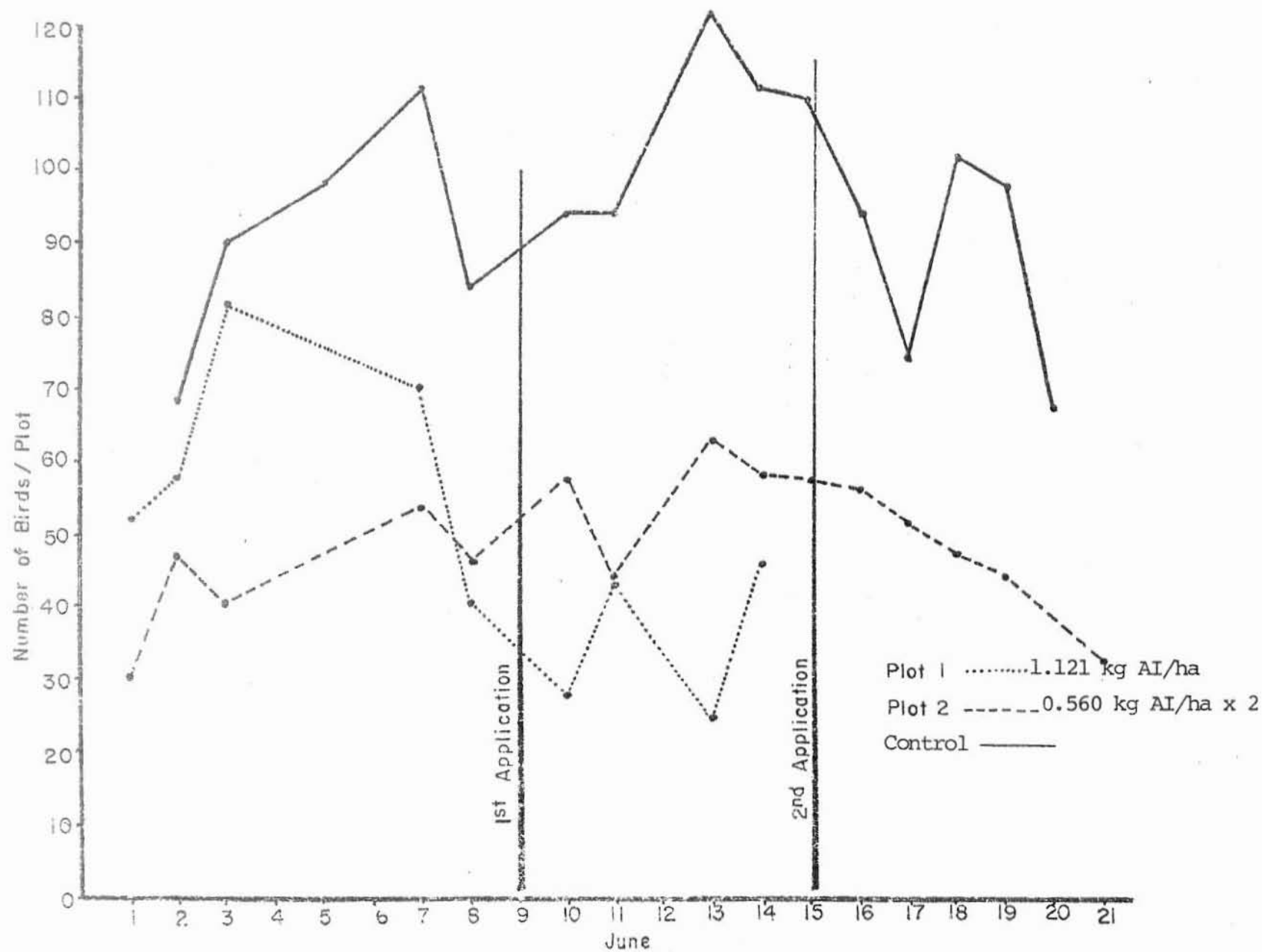


Fig. 16 Bird population activity on three plots throughout the carbaryl efficacy trials near Stanley, New Brunswick, June, 1976.

Aquatic fauna, adulticide: Benthic invertebrates were monitored in a small (2m wide), shallow (mean depth 25 cm) fast flowing stream within the aminocarb plot which received two applications of 0.070 kg AI/ha three days apart. The stream was partly closed to the sky by alders lining the banks. The bottom was sandy interspersed with algae covered rocks. Logging activity upstream of the sample area appeared to affect water quality in the stream, particularly around the last sample date when heavy rains washed disturbed soil and logging debris into the stream. Peter Brook, the untreated control stream for the phosphamidon adulticide, was used as the control for the aminocarb treated stream (Table 10).

Bottom fauna populations showed no effects of the two aminocarb treatments when sampled up to two days after the second treatment (Table 11). The final sample taken five days after the second treatment had much smaller numbers of aquatic insects than earlier samples. This is believed to be because of deleterious effects of upstream logging mentioned earlier.

Table 10

Bottom fauna populations expressed as mean numbers and standard deviations
per 0.093m² from an untreated stream

Acadia Forest Experimental Station, New Brunswick, 2 July to 10 July, 1976

Number of days before or after treatment	-2	+2	+6 (+3 second application)
Water temperature	-	15°C	15°C
Number of samples	3 (combined)	3 (combined)	3
Ephemeroptera:Heptageniidae	0.3	2.0	10.0 ± 7.9
Baetidae	0.3	0.0	0.0
Odonata:Zygoptera	0.0	0.0	0.3 ± 0.5
Plecoptera	2.0	4.0	3.0 ± 4.3
Megaloptera:Corydalinae	0.0	0.3	0.0
Trichoptera	1.3	1.0	2.0 ± 2.0
Coleoptera:Elmidae	0.0	1.0	1.7 ± 2.8
Diptera:Chironomidae	1.0	1.0	2.7 ± 0.5
Heleidae	0.0	0.0	0.3 ± 0.5
Rhagionidae	0.3	0.0	0.0
Oligochaeta	1.3	3.7	0.7 ± 1.1
Totals	6.7	13.0	20.7 ± 17.2

Table 11

Bottom fauna populations expressed as mean numbers and standard deviations
per 0.093m² from an aminocarb treated (2 X 0.07 kg AI/ha) stream

Acadia Forest Experimental Station, New Brunswick, 29 June to 12 July, 1976

Number of days before or after treatment	-2	+1	+4 (+2 second application)	+7 (+5 second application)
Water temperature	15°C	10°C	-	-
Number of samples	3 (combined)	3 (combined)	3	3
Ephemeroptera: Heptageniidae	0.0	0.3	0.0	0.0
Baetidae	0.3	0.3	1.3 ± 0.5	0.7 ± 0.5
Odonata: Zygoptera	0.0	0.0	0.3 ± 0.5	0.0
Plecoptera	2.3	2.0	2.3 ± 3.2	0.0
Megaloptera: Corydalidae	0.7	0.7	0.3 ± 0.5	0.0
Trichoptera	2.0	7.7	0.3 ± 0.5	2.7 ± 3.7
Lepidoptera: Pyralidae	1.3	0.0	0.0	0.0
Coleoptera: Dytiscidae	0.0	0.0	0.3 ± 0.5	0.0
Elmidae	0.0	0.0	1.3 ± 1.5	0.0
Diptera: Tipulidae	0.3	0.0	0.0	0.0
Simuliidae	0.0	0.7	3.7 ± 2.3	0.3 ± 0.5
Chironomidae	1.0	3.3	17.7 ± 11.5	0.3 ± 0.5
Heleidae	0.0	0.3	0.0	0.0
Rhagionidae	0.0	0.3	1.7 ± 2.8	0.0
Acari	0.0	0.0	0.7 ± 0.5	0.0
Oligochaeta	1.0	2.7	3.0 ± 2.6	0.7 ± 1.1
Totals	9.0	18.3	33.0 ± 11.1	4.7 ± 3.5

Fenitrothion

Birds, operational larvicide blocks: Breeding bird census plots were established in 4 operational treatment blocks and in an untreated control area. The untreated control plot was destroyed just prior to the first treatment. Overall bird populations and activity on plots in treatment blocks 1493, 1494 and 1495 was not reduced following either application (Appendix, Tables 39, 40 and 41). Populations of ruby-crowned kinglets were not affected. A slight decrease in populations on plot 1492 were recorded following the first application (Appendix, Table 38). Kinglet numbers declined as did those of the black-throated blue warbler, *Dendroica caerulescens* (Gmelin) and white-throated sparrow *Z. albicollis* (Gmelin). No such reductions occurred following the second treatment.

Aquatic fauna, operational larvicide blocks: Baltimore Stream, a stream flowing through fenitrothion spray block 1494, was sampled about 100 m upstream from where it flows into Maquapit Lake. It was treated with 0.210 kg AI/ha applications of fenitrothion on the morning of May 21 and the evening of May 26. At the point sampled, the stream was 8 m wide with a mean depth of 15 cm and a deep (1 m) trench in mid-channel. The bottom was gravel with large rocks and there was no overhead forest canopy. The untreated control stream for this stream was the same one used as a control for the phosphamidon larvicide trials.

There was little change in bottom fauna populations in the control stream over the period of fenitrothion applications (Table 12). The first fenitrothion treatment caused a considerable decrease in aquatic insect populations (Table 13), particularly stonefly nymphs (Plecoptera), mayfly nymphs (Ephemeroptera) and caddisfly larvae (Trichoptera). There was no further reductions attributable to the second fenitrothion treatment and some

signs of recovery were evident, possibly due to resettling of disturbed insects from drift.

Table 12

Bottom fauna populations expressed as mean numbers and standard deviations
per 0.093m² from an untreated stream

Minto, New Brunswick, 20 May to 30 May, 1976

Number of days before or after treatment	-1	+8 (+3 second application)
Water temperature	9.5°C	12°C
Number of samples	4	4
Ephemeroptera:Heptageniidae	1.3 ± 1.2	0.0
Baetidae	18.5 ± 10.8	20.0 ± 22.7
Plecoptera	2.5 ± 2.3	1.5 ± 1.2
Trichoptera	13.3 ± 3.7	3.0 ± 2.1
Lepidoptera:Pyralidae	0.3 ± 0.5	0.3 ± 0.5
Coleoptera:Elmidae	27.8 ± 16.6	17.5 ± 16.3
Diptera:Tipulidae	2.8 ± 2.2	1.5 ± 1.2
Simuliidae	0.3 ± 0.5	1.5 ± 1.7
Chironomidae	23.8 ± 10.3	25.3 ± 9.6
Heleidae	0.0	1.8 ± 2.8
Rhagionidae	1.3 ± 1.2	0.3 ± 0.5
Tabanidae	0.8 ± 0.9	0.0
Acari	0.3 ± 0.5	0.3 ± 0.5
Nematoda	0.0	0.3 ± 0.5
Oligochaeta	1.0 ± 1.4	0.0
Gastropoda:Ancylidae	0.3 ± 0.5	0.3 ± 0.5
Pelecypoda:Sphaeridae	0.3 ± 0.5	0.0
Totals	94.0 ± 31.7	73.3 ± 40.1

Table 13

Bottom fauna populations expressed on mean numbers and standard deviations
per 0.093m² from a fenitrothion treated (2 x 0.210 kg AI/ha) stream

Minto, New Brunswick, 20 May to 29 May, 1976.

Number of days before or after treatment	-1	+2	+8 (+3 second application)
Water temperature	9°C	9°C	-
Number of samples	4	4	4
Collembola	0.0	0.3 ± 0.5	0.0
Ephemeroptera:Heptageniidae	1.5 ± 1.7	0.0	1.0 ± 1.5
Baetidae	2.5 ± 2.3	0.0	1.0 ± 1.5
Plecoptera	12.3 ± 20.5	0.3 ± 0.5	3.3 ± 1.8
Trichoptera	4.3 ± 3.3	0.3 ± 0.5	1.0 ± 1.5
Coleoptera:Elmidae	3.8 ± 2.2	1.0 ± 0.8	0.0
Diptera:Tipulidae	2.8 ± 4.1	0.0	1.0 ± 1.5
Simuliidae	3.0 ± 1.4	0.0	1.0 ± 1.5
Chironomidae	0.0	0.8 ± 0.9	2.3 ± 1.7
Phagionidae	0.3 ± 0.5	0.0	0.3 ± 0.5
Tabanidae	0.3 ± 0.5	0.0	0.0
Amphipoda	0.0	0.0	0.0
Oligochaeta	6.5 ± 9.7	0.5 ± 0.6	0.3 ± 0.5
Totals	37.0 ± 34.2	3.3 ± 2.1	11.3 ± 6.2

Small mammals, operational larvicide blocks: Small mammal populations varied considerably between the untreated control plot and the fenitrothion treated plot (Table 14). Overall population density was considerably lower on the treated plot as compared to the check plot. Differences in the male to female ratio and age class composition are also evident. The difference in age class ratio is also somewhat evident in the plot treated with phosphamidon and 2 applications of fenitrothion (Table 7). The data collected from these trials would indicate that the application of fenitrothion could be a factor in the variations recorded between the various populations, however a much larger sample size would be required for confirmation at the level of impact indicated.

Table 14

Small mammal population assessment on 2 plots in the fenitrothion operational area, Princeville, area, New Brunswick,
1976.

[illegible]

SUMMARY

Phosphamidon, when applied as a larvacide in excess of 0.140 kg AI/ha caused reductions in populations of small forest songbirds, particularly the ruby-crowned kinglet, *R. calendula* L. Small mammal populations and aquatic organisms were not affected. Adulticide trials using sequential applications of phosphamidon at emitted dosage rates of 0.070 kg AI/ha did not affect bird and aquatic invertebrate populations.

Larvacide trials employing acephate at emitted dosage rates of 0.280 kg AI/ha (twice) and 0.560 kg AI/ha or carbaryl at emitted dosage rates of 0.560 kg AI/ha (2 applications) and 1.121 kg AI/ha did not harm bird populations. Operational sprays of fenitrothion (2 x 0.210 kg AI/ha) in blocks 1492, 1493, 1494 and 1495 did not affect bird populations. Small mammal populations trapped in the fenitrothion area show a discrepancy in the sub-adult-adult ratio between samples collected from the treated and untreated plots. The relatively few "young of the year" recorded on the treated plot could have resulted from the two applications of fenitrothion or merely be a result of the small sample size obtained. The data obtained from this operation is inconclusive and additional studies are warranted. Aquatic invertebrates were adversely affected by the first application.

Aminocarb employed as an adulticide had no significant effects on bird or aquatic insect populations.

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APPENDIX

Forest bird population censuses in insecticide
treated and untreated plots in
New Brunswick, 1976

Table 1
Forest bird population census
phosphamidon untreated check plot
Chipman, New Brunswick
May 1976

Family	Species	Pre-spray days						Post-spray days					
		May	May	May	May	May	Daily ave	May	May	May	May	May	Daily ave
		9	10	11	12	13		14	15	16	17	18	
		-4	-3	-2	-1	0		+1	+2	+3	+4	+5	
Tetraonidae	Ruffed Grouse	1	0	1	1	2	1.0	1	1	2	0	0	0.8
Scolopacidae	American Woodcock	0	1	0	0	0	0.2	0	0	0	0	0	0.0
	Common Snipe	0	0	0	1	0	0.2	0	0	0	0	0	0.0
Columbidae	Mourning Dove	0	0	1	0	0	0.2	0	0	0	0	0	0.0
Picidae	Common Flicker	0	1	4	0	0	1.0	1	4	1	1	3	2.0
	Yellow-bellied Sapsucker	3	8	5	5	6	5.4	9	4	3	5	2	4.6
	Downy Woodpecker	0	1	0	0	1	0.4	1	0	1	1	1	0.8
Tyrannidae	Least Flycatcher	0	0	0	0	0	0.0	1	1	1	2	1	1.2
Corvidae	Gray Jay	0	1	0	0	0	0.2	0	0	0	0	0	0.0
	Blue Jay	0	0	2	1	1	0.8	2	2	0	1	0	1.0
Paridae	Black-capped Chickadee	0	0	3	2	0	1.0	1	0	0	2	0	0.6
	Boreal Chickadee	0	0	0	0	0	0.0	0	0	1	0	0	0.2
Turdidae	American Robin	1	5	4	7	7	4.8	3	4	4	3	3	3.4
	Wood Thrush	0	0	0	0	0	0.0	2	2	1	0	0	1.0
	Hermit Thrush	2	1	0	0	1	0.8	0	0	1	2	2	1.0
	Swainson's Thrush	0	0	0	0	0	0.0	0	0	0	1	0	0.2
	Veery	0	0	0	0	0	0.0	0	6	2	7	1	3.2

Table 1 Cont'd

Family	Species	Pre-spray days					Daily ave	Post-spray days					Daily ave
		May 9 -4	May 10 -3	May 11 -2	May 12 -1	May 13 -0		May 14 +1	May 15 +2	May 16 +3	May 17 +4	May 18 +5	
Icteridae	Wilson's Warbler	0	0	0	0	0	0.0	0	0	0	0	2	0.4
	Canada Warbler	0	0	0	0	0	0.0	0	0	1	0	0	0.2
	American Redstart	0	0	0	0	0	0.0	1	0	0	3	1	1.0
	Red-winged Blackbird	0	1	1	1	5	1.6	2	1	4	1	0	1.6
	Common Grackle	0	0	0	0	0	0.0	0	0	4	0	0	0.8
	Brown-headed Cowbird	0	2	2	0	0	0.8	0	1	1	1	2	1.0
Fringillidae	Rose-breasted Grosbeak	0	0	0	0	0	0.0	1	0	2	1	1	1.0
	Evening Grosbeak	0	0	0	0	2	0.4	8	0	0	0	1	
	Purple Finch	3	3	1	3	3	2.6	3	8	3	3	1	3.6
	Pine Grosbeak	0	0	0	0	0	0.0	1	0	0	0	0	0.2
	Pine Siskin	0	0	1	0	0	0.2	0	0	0	1	0	0.2
	Dark-eyed Junco	0	2	2	2	0	1.2	2	1	2	1	2	1.6
	Chipping Sparrow	0	0	1	0	0	0.2	0	0	0	0	0	0.0
	White-throated Sparrow	8	14	7	9	8	9.2	10	8	11	4	10	8.6
	Swamp Sparrow	1	1	1	1	1	1.0	1	0	1	0	2	0.8
	Song Sparrow	2	5	4	3	3	3.4	4	3	5	2	5	3.8
Totals:		27	40	59	43	33	40.4	56	87	67	75	73	71.6

Table 1 Cont'd

Family	Species	Pre-spray days					Daily ave	Post-spray days					Daily ave
		May 9 -4	May 10 -3	May 11 -2	May 12 -1	May 13 -0		May 14 +1	May 15 +2	May 16 +3	May 17 +4	May 18 +5	
Sylviidae	Golden-crowned Kinglet	0	1	1	1	1	0.8	3	1	1	1	1	1.4
	Ruby-crowned Kinglet	5	8	8	7	3	6.2	6	5	6	7	6	6.0
Vireonidae	Solitary Vireo	0	0	2	2	1	1.0	0	1	1	1	3	1.2
Parulidae	Black and white Warbler	0	0	1	0	0	0.2	0	0	1	1	0	0.4
	Tennessee Warbler	0	0	0	0	0	0.0	0	10	2	3	1	3.2
	Nashville Warbler	0	0	0	3	2	1.0	4	4	3	1	6	3.6
	Parula Warbler	0	0	0	0	0	0.0	1	4	0	0	0	1.0
	Magnolia Warbler	0	0	0	0	0	0.0	0	0	2	0	1	0.6
	Cape May Warbler	0	0	0	0	0	0.0	0	3	3	0	1	1.4
	Black-throated Blue Warbler	0	0	0	0	0	0.0	0	0	1	0	0	0.2
	Myrtle Warbler	1	3	5	6	1	3.2	4	5	2	2	3	3.2
	Black-throated Green Warbler	0	0	1	0	0	0.2	0	0	1	0	0	0.2
	Chestnut-sided Warbler	0	0	0	0	0	0.0	0	0	0	5	3	1.6
	Bay-breasted Warbler	0	0	0	0	0	0.0	0	0	0	1	0	0.2
	Ovenbird	0	0	1	5	3	1.8	4	6	7	7	6	6.0
	Northern Waterthrush	0	0	0	0	0	0.0	1	1	1	1	1	1.0
	Yellowthroat	0	0	0	0	0	0.0	0	1	2	3	1	1.4

Table 2
Forest bird population census
Phosphamidon treatment plot I
Chipman, New Brunswick
May 1976

Family	Species	Pre-spray days						Post-spray days					
		May 7	May 8	May 9	May 10	May 13	Daily ave	May 14	May 15	May 16	May 17	May 18	Daily ave
		-6	-5	-4	-3	-9		+1	+2	+3	+4	+5	
Tetraonidae	Ruffed Grouse	0	0	1	0	1	0.4	1	0	1	0	0	0.4
Alcedinidae	Belted Kingfisher	0	0	0	1	0	0.2	0	0	0	0	0	0.0
Picidae	Common Flicker	0	0	0	4	0	0.8	2	1	1	0	2	1.2
	Pileated Woodpecker	0	0	2	0	0	0.4	0	1	0	0	0	0.2
	Yellow-bellied Sapsucker	2	1	0	0	1	0.8	4	0	4	0	1	1.8
	Black-backed Three toed Woodpecker	0	0	0	1	0	0.2	0	0	0	0	0	0.0
Paridae	Black-capped Chickadee	0	0	0	0	0	0.0	2	2	4	0	0	1.6
	Boreal Chickadee	0	0	0	0	0	0.0	0	0	2	1	0	0.6
Sittidae	White-breasted Nuthatch	0	0	0	0	0	0.0	1	0	0	0	0	0.2
Troglodytidae	Winter Wren	1	0	0	0	0	0.2	1	0	1	0	0	0.4
Turdidae	American Robin	0	0	0	0	0	0.0	0	0	1	0	0	0.2
	Hermit Thrush	1	0	3	1	0	1.0	0	0	0	0	1	0.2
Sylviidae	Golden-crowned Kinglet	0	0	0	0	0	0.0	0	1	0	0	0	0.2
	Ruby-crowned Kinglet	3	5	5	5	2	4.0	3	1	7	5	4	4.0
Vireonidae	Solitary Vireo	0	0	0	0	1	0.2	0	0	0	0	0	0.0

Table 2 Cont'd

Family	Species	Pre-spray days						Post-spray days					
		May 7	May 8	May 9	May 10	May 13	Daily ave	May 14	May 15	May 16	May 17	May 18	Daily ave
		-6	-5	-4	-3	-9		+1	+2	+3	+4	+5	
Parulidae	Black and white Warbler	0	0	0	3	0	0.6	5	0	0	0	0	1.0
	Parula Warbler	0	0	0	0	0	0.0	0	0	0	0	1	0.2
	Magnolia Warbler	0	0	0	0	0	0.0	0	0	2	2	2	1.2
	Cape May Warbler	0	0	0	0	0	0.0	1	0	0	0	0	0.2
	Myrtle Warbler	0	0	0	0	1	0.2	0	1	3	1	3	1.6
	Black-throated Green Warbler	0	0	0	0	0	0.0	0	0	4	1	0	1.0
	Ovenbird	0	0	0	0	2	0.4	0	1	4	4	2	2.2
Icteridae	Common Grackle	0	0	0	1	0	0.2	0	0	0	0	0	0.0
Fringillidae	Evening Grosbeak	0	0	0	1	0	0.2	1	0	0	0	0	0.2
	Purple Finch	0	0	0	0	1	0.2	4	0	0	1	0	1.0
	Dark-eyed Junco	0	0	0	0	1	0.2	0	0	0	0	0	0.0
	White-throated Sparrow	1	3	4	7	7	4.4	7	6	3	4	5	5.0
Totals:		8	9	15	24	17	14.6	32	14	37	19	21	24.6

Table 3
Forest bird population census
Phosphamidon treatment plot 2
Chipman, New Brunswick
May 1976

Family	Species	Pre-spray days						Post-spray days					
		May 7	May 8	May 9	May 10	May 11	Daily ave	May 14	May 15	May 16	May 17	May 18	Daily ave
		-6	-5	-4	-3	-2		+1	+2	+3	+4	+5	
Tetraonidae	Ruffed Grouse	0	0	0	1	1	0.4	0	0	2	0	0	0.4
Picidae	Common Flicker	0	0	0	0	2	0.4	2	1	2	1	0	1.2
	Yellow-bellied Sapsucker	2	2	3	5	2	2.8	0	2	0	2	0	0.8
Tyrannidae	Eastern Phoebe	0	0	0	0	0	0.0	1	0	0	0	0	0.2
Corvidae	Gray Jay	0	0	0	0	0	0.0	1	0	0	1	0	0.4
	Blue Jay	0	0	0	0	0	0.0	1	0	0	0	0	0.2
Paridae	Boreal Chickadee	0	1	0	0	1	0.4	1	0	0	0	0	0.2
Certhidae	Brown Creeper	0	0	0	0	1	0.2	0	0	0	0	0	0.0
Troglodytidae	Winter Wren	0	0	0	0	1	0.2	3	0	1	1	0	1.0
Turdidae	American Robin	2	0	0	0	0	0.4	1	0	0	1	0	0.4
	Hermit Thrush	0	0	0	1	1	0.4	1	0	1	1	1	0.8
Sylviidae	Golden-crowned kinglet	2	1	2	1	1	1.4	2	0	0	0	0	0.4
	Ruby-crowned kinglet	5	1	7	8	8	5.8	5	1	3	3	1	2.6
Vireonidae	Solitary Vireo	0	0	0	0	1	0.2	0	0	0	0	0	0.0
Parulidae	Black and white warbler	0	0	0	0	0	0.0	1	0	0	0	0	0.4

Table 3 Cont'd

Family	Species	Pre-spray days					Post-spray days					Daily ave
		May 7	May 8	May 9	May 10	May 11	May 14	May 15	May 16	May 17	May 18	
		-6	-5	-4	-3	-2	+1	+2	+3	+4	+5	
	Parula Warbler	0	0	0	0	0	0	0	0	2	0	0.4
	Magnolia Warbler	0	0	0	0	0	0	0	1	0	0	0.2
	Blackburnian Warbler	0	0	0	0	0	0	0	0	1	0	0.2
	Myrtle Warbler	0	0	0	0	2	1	0	0	0	0	0.2
	Black-throated Green Warbler	0	0	0	0	1	1	0	1	4	0	1.2
	Chestnut-sided Warbler	0	0	0	0	0	0	0	1	0	0	0.2
	Ovenbird	0	0	0	0	0	1	2	4	5	2	2.8
Icteridae	Common Grackle	0	0	1	0	0	0	0	0	0	0	0.0
Fringillidae	Purple Finch	3	0	1	0	1	0	0	0	2	0	0.4
	Dark-eyed Junco	1	0	0	1	0	2	0	0	0	0	0.4
	White-throated Sparrow	2	6	10	4	4	1	1	2	2	1	1.4
Totals:		17	11	24	21	27	25	7	18	26	5	16.2

Table 4
Forest bird population census
phosphamidon treatment plot 3
Chipman, New Brunswick
May 1976

Family	Species	Pre-spray days						Post-spray days					
		May	May	May	May	May	Daily ave	May	May	May	May	May	Daily ave
		7	8	9	10	11		14	15	16	17	19	
		-6	-5	-4	-3	-2		+1	+2	+3	+4	+6	
Picidae	Common Flicker	0	0	0	1	1	0.4	0	1	0	1	0	0.4
	Yellow-bellied Sapsucker	0	3	2	0	0	1.0	0	0	0	2	1	0.6
	Hairy Woodpecker	0	0	0	1	0	0.2	0	0	0	0	1	0.2
Corvidae	Gray Jay	0	0	0	0	0	0.0	1	0	0	0	1	0.4
Paridae	Boreal Chickadee	0	0	0	0	1	0.2	0	0	0	0	0	0.0
Turdidae	American Robin	1	1	0	0	0	0.4	0	0	0	0	1	0.2
	Hermit Thrush	4	0	2	2	1	1.8	0	0	0	1	0	0.2
	Veery	0	0	1	0	0	0.2	0	0	0	0	0	0.0
Sylviidae	Golden-crowned Kinglet	2	4	11	1	0	3.6	1	0	0	2	0	0.6
	Ruby-crowned Kinglet	8	6	7	6	8	7.0	1	0	0	0	1	0.4
Vireonidae	Solitary Vireo	0	0	0	0	0	0.0	2	0	0	0	0	0.4
Parulidae	Black and white Warbler	0	0	0	0	0	0.0	1	0	0	0	0	0.2
	Tennessee Warbler	0	0	0	0	0	0.0	4	0	0	2	0	1.2
	Nashville Warbler	0	0	0	0	0	0.0	0	0	0	1	0	0.2
	Magnolia Warbler	0	0	0	0	0	0.0	0	0	1	0	3	0.8

Table 4 Cont'd

Family	Species	Pre-spray days						Post-spray days					
		May	May	May	May	May	Daily ave	May	May	May	May	May	Daily ave
		7	8	9	10	11		14	15	16	17	19	
		-6	-5	-4	-3	-2		+1	+2	+3	+4	+6	
	Myrtle Warbler	2	0	1	0	0	0.6	0	0	1	1	0	0.4
	Yellowthroat	0	0	0	0	0	0.0	0	0	0	4	3	1.4
	Ovenbird	0	0	0	0	0	0.0	0	0	2	3	4	1.8
Icteridae	Bobolink	0	0	0	0	0	0.0	0	0	0	1	0	0.2
Fringillidae	Purple Finch	2	0	0	0	2	0.8	2	0	0	2	0	0.8
	Dark-eyed Junco	1	0	1	5	3	2.0	3	0	0	0	0	0.6
	White-throated Sparrow	4	2	8	5	7	5.2	2	1	3	2	1	1.8
Totals:		24	16	33	21	23	23.4	17	2	7	22	16	12.8

Table 5
Forest bird population census
Phosphamidon treatment plot 4
Chipman, New Brunswick
May 1976

Family	Species	Pre-spray days					Daily ave	Post-spray days					Daily ave
		May 9 -4	May 10 -3	May 11 -2	May 12 -1	May 13 -0		May 14 +1	May 15 +2	May 16 +3	May 17 +4	May 19 +6	
Tetraonidae	Ruffed Grouse	1	1	0	1	1	0.8	2	0	2	2	1	1.4
Picidae	Common Flicker	4	1	2	1	1	1.8	0	0	0	0	0	0.0
	Yellow-bellied Sapsucker	0	2	4	4	2	2.4	0	0	0	1	0	0.2
Corvidae	Gray Jay	0	0	0	0	0	0.0	1	0	0	0	0	0.2
Paridae	Black-capped Chickadee	0	0	0	1	0	0.2	0	0	0	0	0	0.0
Sittidae	Red-breasted Nuthatch	0	1	0	0	0	0.2	0	0	0	0	0	0.0
Certhiidae	Brown Creeper	2	3	0	0	0	0.0	1	0	0	0	0	0.2
Troglodytidae	Winter Wren	1	1	2	3	0	1.4	1	0	1	1	0	0.6
Turdidae	American Robin	0	0	0	2	1	0.6	3	0	2	3	0	1.6
	Hermit Thrush	0	0	0	0	0	0.0	2	0	0	0	1	0.6
Sylviidae	Golden-crowned Kinglet	1	0	0	0	0	0.2	0	0	0	0	0	0.0
	Ruby-crowned Kinglet	9	8	6	8	5	7.2	8	0	0	0	0	1.8
Vireonidae	Solitary Vireo	3	2	0	3	2	2.0	1	0	0	0	0	0.2
Parulidae	Black and white Warbler	0	0	3	0	0	0.6	0	0	0	0	0	0.0
	Nashville Warbler	0	0	1	0	0	0.2	0	0	0	0	0	0.0

Table 5 Cont'd

Family	Species	Pre-spray days					Daily ave	Post-spray days					Daily ave
		May 9	May 10	May 11	May 12	May 13		May 14	May 15	May 16	May 17	May 19	
		-4	-3	-2	-1	-0		+1	+2	+3	+4	+6	
	Parula Warbler	0	0	0	0	0	0.0	0	0	0	1	1	0.4
	Magnolia Warbler	0	0	0	0	0	0.0	0	0	0	1	2	0.6
	Myrtle Warbler	2	0	2	2	3	1.8	0	2	1	2	2	1.4
	Black-throated Green Warbler	0	0	0	0	0	0.0	0	0	0	1	3	0.8
	Blackburnian Warbler	0	0	0	0	0	0.0	0	0	0	0	1	0.2
	Ovenbird	0	0	0	0	0	0.0	2	0	2	5	4	2.6
Icteridae	Brown-headed Cowbird	0	0	3	0	0	0.6	0	0	0	0	1	0.2
Fringillidae	Evening Grosbeak	0	0	3	0	0	0.6	0	0	0	0	0	0.0
	Purple Finch	0	15	6	5	0	5.2	1	0	1	5	4	2.2
	Dark-eyed Junco	8	0	1	7	1	3.4	0	2	0	0	0	0.4
	White-throated Sparrow	5	6	6	8	6	6.2	9	3	0	3	3	3.6
Totals:		36	40	39	45	22	36.4	31	7	9	25	23	19.0

Table 6
Forest bird population census
Phosphamidon treatment plot 5
Chipman, New Brunswick
May 1976

Family	Species	Pre-spray days					Daily ave	Post-spray days					Daily ave
		May 9 -4	May 10 -3	May 11 -2	May 12 -1	May 13 0		May 14 +1	May 15 +2	May 16 +3	May 17 +4	May 18 +5	
Alcedinidae	Belted Kingfisher	0	0	0	1	0	0.2	0	0	0	0	0	0.0
Picidae	Common Flicker	0	0	0	0	0	0.0	1	1	0	0	1	0.6
	Pileated Woodpecker	0	0	0	0	0	0.0	0	0	1	0	1	0.4
	Yellow-bellied Sapsucker	1	1	4	6	2	2.8	1	1	0	1	0	0.6
	Hairy Woodpecker	0	0	0	1	0	0.2	0	0	0	0	0	0.0
Corvidae	Gray Jay	0	1	0	0	0	0.2	0	0	0	2	2	0.8
	Blue Jay	1	0	0	0	6	1.4	0	0	0	1	1	0.4
Paridae	Black-capped Chickadee	0	0	0	0	1	0.2	0	1	0	0	0	0.2
Certhiidae	Brown Creeper	0	0	0	0	4	0.8	0	0	0	0	0	0.0
Troglodytidae	Winter Wren	0	0	0	0	0	0.0	1	3	2	3	1	2.0
Turdidae	American Robin	0	1	0	0	1	0.4	0	1	0	0	1	0.2
	Hermit Thrush	0	0	0	2	2	0.8	0	0	0	0	4	0.8
Sylviidae	Golden-crowned Kinglet	0	0	0	3	3	1.2	1	0	2	0	0	0.6
	Ruby-crowned Kinglet	8	6	7	9	11	8.2	0	0	0	0	3	0.6
Vireonidae	Solitary Vireo	0	0	0	0	0	0.0	0	0	0	0	2	0.4

Table 6 Cont'd

Family	Species	Pre-spray days					Daily ave	Post-spray days					Daily ave
		May 9 -4	May 10 -3	May 11 -2	May 12 -1	May 13 -0		May 14 +1	May 15 +2	May 16 +3	May 17 +4	May 18 +5	
Parulidae	Tennessee Warbler	0	0	0	0	0	0.0	0	0	0	1	0	0.2
	Nashville Warbler	0	0	0	0	0	0.0	2	0	0	0	2	0.8
	Magnolia Warbler	0	0	0	0	0	0.0	0	1	0	0	0	0.2
	Cape May Warbler	0	0	0	0	0	0.0	0	0	0	0	2	0.4
	Myrtle Warbler	0	1	2	4	4	2.2	1	1	2	1	2	1.4
	Black-throated Green Warbler	0	0	0	0	0	0.0	0	0	0	0	1	0.2
	Blackburnian Warbler	0	0	0	0	0	0.0	0	0	0	0	1	0.2
	Northern Waterthrush	0	0	0	0	0	0.0	0	0	2	1	2	1.0
	Ovenbird	0	0	0	3	3	1.2	3	3	2	4	3	3.0
Icteridae	Red-winged Blackbird	0	0	0	0	7	1.4	0	0	0	0	0	0.0
	Common Grackle	0	0	0	0	4	0.8	0	0	0	0	0	0.0
	Brown-headed Cowbird	2	1	0	0	2	1.0	0	2	0	0	0	0.4
Fringillidae	Rose-breasted Grosbeak	0	0	0	0	0	0.0	0	2	0	0	0	0.4
	Purple Finch	0	1	0	1	9	2.2	1	1	1	4	1	1.6
	Dark-eyed Junco	0	0	0	0	0	0.0	0	0	0	0	2	0.4
	White-throated Sparrow	4	7	7	9	6	6.2	7	4	2	5	0	3.6
	Song Sparrow	0	0	0	0	0	0.0	0	1	0	0	1	0.4
Totals:		16	19	20	39	65	31.8	18	22	14	23	33	22.0

Table 7

Forest bird population census
Phosphamidon treatment Plot 6
Chipman, New Brunswick
May 1976

Family	Species	Pre-spray days					Daily ave	Post-spray days					Daily ave
		May 9	May 10	May 11	May 12	May 13		May 14	May 15	May 16	May 17	May 19	
		-4	-3	-2	-1	-0		+1	+2	+3	+4	+6	
Tetraonidae	Ruffed Grouse	0	1	1	1	1	0.8	1	1	0	1	1	0.8
Picidae	Common Flicker	0	0	1	0	0	0.2	0	0	1	0	0	0.2
	Pileated Woodpecker	0	0	1	0	1	0.4	0	0	0	0	1	0.2
	Yellow-bellied Sapsucker	5	2	5	3	3	3.6	0	3	1	2	1	1.4
	Downy Woodpecker	0	0	1	0	0	0.2	0	0	0	0	0	0.0
Corvidae	Gray Jay	0	0	0	0	0	0.0	0	0	2	0	2	0.8
Paridae	Black-capped Chickadee	1	1	0	0	0	0.4	1	0	0	0	1	0.4
	Boreal Chickadee	1	0	0	0	0	0.4	0	0	0	0	0	0.0
Sittidae	Red-breasted Nuthatch	0	0	1	0	0	0.2	1	0	0	0	0	0.2
Certhiidae	Brown Creeper	0	0	0	0	0	0.0	0	0	0	1	0	0.2
Troglodytidae	Winter Wren	1	2	2	2	1	1.6	2	0	1	1	1	1.0
Turdidae	American Robin	1	0	0	0	3	0.8	1	0	1	0	0	0.4
	Hermit Thrush	2	2	2	1	1	1.6	0	2	3	0	1	1.2
Sylviidae	Golden-crowned Kinglet	2	2	0	0	2	1.2	2	0	0	0	0	0.4
	Ruby-crowned Kinglet	4	3	4	5	4	4.0	3	0	0	0	1	0.8
Vireonidae	Solitary Vireo	0	0	0	0	2	0.4	3	1	1	1	5	2.2

Table 7 Cont'd

Family	Species	Pre-spray days					Daily ave	Post-spray days					Daily ave
		May 9 -4	May 10 -3	May 11 -2	May 12 -1	May 13 -0		May 14 +1	May 15 +2	May 16 +3	May 17 +4	May 19 +6	
Parulidae	Black and white Warbler	0	0	0	0	0	0.0	0	0	0	0	1	0.2
	Tennessee Warbler	0	0	0	0	0	0.0	0	0	0	0	1	0.2
	Nashville Warbler	0	0	0	0	0	0.0	0	0	0	0	3	0.6
	Parula Warbler	0	0	0	0	0	0.0	1	0	3	1	1	1.2
	Magnolia Warbler	0	0	0	0	1	0.2	1	1	0	1	2	1.0
	Cape May Warbler	0	0	0	0	0	0.0	0	0	0	0	1	0.2
	Black-throated Blue Warbler	0	0	0	0	0	0.0	0	0	0	0	1	0.2
	Myrtle Warbler	2	1	6	2	1	2.4	3	0	0	3	0	1.2
	Black-throated Green Warbler	0	0	0	0	2	0.4	1	4	2	4	1	2.4
	Blackburnian Warbler	0	0	0	0	0	0.0	1	1	0	2	1	1.0
	Ovenbird	0	0	0	0	1	0.2	3	3	2	3	6	3.2
	Canada Warbler	0	0	0	0	0	0.0	0	0	0	1	0	0.2
Fringillidae	Evening Grosbeak	0	1	0	0	0	0.2	4	0	0	0	0	0.8
	Purple Finch	4	6	4	0	4	3.6	3	4	3	3	4	3.4
	Pine Grosbeak	0	0	0	0	0	0.0	1	0	0	0	0	0.2
	Pine Siskin	0	0	0	0	0	0.0	1	0	1	0	0	0.4

Table 7 Cont'd

Family	Species	Pre-spray days					Daily ave	Post-spray days					Daily ave
		May 9	May 10	May 11	May 12	May 13		May 14	May 15	May 16	May 17	May 19	
		-4	-3	-2	-1	-0		+1	+2	+3	+	+6	
	Dark-eyed Junco	0	0	0	0	0	0.0	1	0	2	1	0	0.8
	White-throated Sparrow	5	6	8	8	6	5.6	6	10	4	6	7	5.6
Totals:		28	27	36	22	34	29.4	40	30	27	31	43	34.2

Table 8
Forest bird population census
Phosphamidon treatment plot 2
Chipman New Brunswick
May 9 - 18, 1976

Family	Species	Pre-spray days					Post-spray days					Daily ave
		May 9	May 10	May 11	May 12	May 13	May 14	May 15	May 16	May 17	May 18	
		-4	-3	-2	-1	-0	+1	+2	+3	+4	+5	
Tetraonidae	Ruffed Grouse	0	1	0	0	1	0	0	0	0	0	0.0
Trochilidae	Ruby-throated Hummingbird	0	0	0	0	0	1	0	0	0	0	0.2
Alcedinidae	Belted Kingfisher	0	1	0	0	0	0	0	0	0	0	0.0
Picidae	Common Flicker	0	0	0	0	1	0	0	0	0	1	0.2
	Pileated Woodpecker	1	0	0	0	0	0	0	0	1	0	0.2
	Yellow-bellied Sapsucker	2	5	2	6	3	8	3	5	3	1	4.0
	Hairy Woodpecker	0	1	0	0	0	0	1	0	0	1	0.4
	Downy Woodpecker	1	1	0	1	0	0	0	0	0	0	0.0
Corvidae	Blue Jay	0	1	0	0	0	0	0	1	0	0	0.2
	Raven	0	0	0	1	1	0	0	0	0	0	0.0
Paridae	Black-capped Chickadee	0	3	0	1	1	0	0	1	0	0	0.2
Certhiidae	Brown Creeper	1	0	0	0	0	0	0	0	0	0	0.0
Troglodytidae	Winter Wren	1	0	0	2	1	1	1	1	2	2	1.4
Turdidae	American Robin	0	0	0	0	0	0	1	1	0	0	0.4
	Hermit Thrush	0	2	1	2	0	2	2	0	0	2	1.2
Sylviidae	Ruby-crowned Kinglet	4	5	2	6	4	4	1	3	3	3	2.8
Bombycillidae	Cedar Waxwing	0	0	0	0	0	1	0	0	0	0	0.2
Vireonidae	Solitary Vireo	0	0	1	1	1	4	3	0	1	0	2.6

Table 8 cont'd

Family	Species	Pre-spray days					Post-spray days					Daily ave
		May 9 -4	May 10 -3	May 11 -2	May 12 -1	May 13 -0	May 14 +1	May 15 +2	May 16 +3	May 17 +4	May 18 +5	
Parulidae	Black & White Warbler	-										
	Tennessee Warbler	0	0	0	1	0	0	0	0	0	1	0.2
	Nashville Warbler	0	0	0	0	0	0	0	0	0	1	0.2
	Parula Warbler	0	0	0	0	0	0	0	1	3	2	0.6
	Magnolia Warbler	0	0	0	0	0	0	0	1	3	2	1.2
	Black-throated Blue Warbler	0	0	0	3	0	1	0	2	3	4	1.0
	Myrtle Warbler	3	2	4	1	3	1	1	0	0	0	2.0
	Black-throated Green Warbler	0	1	0	2	2	1	1	0	0	0	0.4
	Blackburnian Warbler	0	0	0	0	0	2	3	0	3	2	2.0
	Ovenbird	0	0	0	1	1	0	1	0	3	1	1.0
	American Redstart	0	0	0	0	0	1	2	4	4	5	3.2
		0	0	0	0	0	0	0	0	3	2	1.0
Icteridae	Brown-headed Cowbird	0	6	0	0	0	1	0	0	0	0	0.2
Fringillidae	Rose-breasted Grosbeak	0	0	0	0	0	0	0	1	1	5	1.4
	Evening Grosbeak	0	6	0	0	0	3	10	16	3	0	6.4
	Purple Finch	5	5	5	3	2	3	5	11	3	2	4.8
	Dark-eyed Junco	0	0	0	1	0	0	0	1	2	0	0.6
	White-throated Sparrow	5	6	10	6	6	8	8	11	4	8	7.8
Totals		23	46	25	38	27	42	42	62	46	45	47.4

Table 9.
Forest bird population census
Phosphamidon treatment plot 8
Chipman, New Brunswick
May 1976

Family	Species	Pre-spray days						Post-spray days					
		May	May	May	May	May	Daily ave	May	May	May	May	May	Daily ave
		9	10	11	12	13		14	15	16	17	18	
		-4	-3	-2	-1	0		+1	+2	+3	+4	+5	
Tetraonidae	Ruffed Grouse	0	0	1	0	0	0.2	0	0	1	0	0	0.2
Picidae	Common Flicker	0	0	0	1	1	0.4	0	1	0	0	0	0.2
	Pileated Wood- pecker	0	0	0	0	0	0.0	0	0	2	0	0	0.4
	Yellow-bellied sapsucker	2	3	3	2	3	2.6	1	2	3	3	2	2.2
	Hairy Woodpecker	0	1	0	0	0	0.2	1	0	0	0	0	0.2
	Downy Woodpecker	0	0	0	0	0	0.0	0	0	0	0	1	0.2
Corvidae	Gray Jay	0	0	0	0	0	0.0	0	0	2	0	0	0.4
	Blue Jay	0	0	0	0	0	0.0	0	0	1	0	0	0.2
Paridae	Black-capped chickadee	1	0	1	2	0	0.8	0	0	0	0	2	0.4
Troglodytidae	Winter Wren	0	0	2	0	0	0.4	0	0	1	0	0	0.2
Turdidae	American Robin	0	0	0	0	2	0.4	1	0	0	0	0	0.2
	Hermit Thrush	0	0	0	0	3	0.6	0	0	0	0	0	0.0
Sylviidae	Ruby-crowned Kinglet	4	5	5	2	8	4.8	2	2	2	1	2	1.8
Vireonidae	Solitary Vireo	1	1	0	0	0	0.4	0	0	0	1	1	0.4
Parulidae	Black and white Warbler	0	0	0	0	0	0.0	0	0	0	2	0	0.4

Table 9

Cont'd

Family	Species	Pre-spray days						Post-spray days					
		May	May	May	May	May	Daily	May	May	May	May	May	Daily
		9	10	11	12	13	ave	14	15	16	17	18	ave
		-4	-3	-2	-1	-0		+1	+2	+3	+4	+5	
	Nashville Warbler	0	0	0	0	0	0.0	0	0	0	1	0	0.2
	Parula Warbler	0	0	0	0	0	0.0	0	1	2	2	2	1.4
	Magnolia Warbler	0	0	0	0	0	0.0	0	1	0	3	1	1.0
	Black-throated Blue Warbler	0	0	0	0	0	0.0	0	0	2	1	1	0.8
	Myrtle Warbler	2	3	2	2	0	1.8	2	2	2	0	0	1.2
	Black-throated Green Warbler	0	1	1	2	9	2.6	4	1	2	3	4	2.8
	Blackburnian Warbler	0	0	0	0	0	0.0	0	0	1	1	2	0.8
	Ovenbird	0	0	0	1	3	0.8	4	2	3	4	3	3.2
	American Redstart	0	0	0	0	0	0.0	0	0	0	1	0	0.2
Fringillidae	Rose-breasted Grosbeak	0	0	0	0	0	0.0	0	0	0	1	1	0.4
	Evening Grosbeak	0	0	0	0	3	0.6	0	0	0	4	0	0.8
	Purple Finch	0	1	2	4	14	4.2	1	5	6	1	4	3.4
	Dark-eyed Junco	0	0	0	0	0	0.0	0	1	0	0	0	0.2
	White-throated Sparrow	2	3	6	3	11	5.0	5	3	4	7	6	5.0
Totals:		12	18	23	19	57	25.8	21	21	34	36	32	28.8

Table 10
Forest bird population census
Phosphamidon Untreated Check Plot (2nd application)
Chipman, New Brunswick
May 28 - June 3, 1976

Family	Species	Pre-spray days, 2nd application			Post-spray days, 2nd application					
		May 28	May 29	Daily ave	May 30	May 31	June 1	June 2	June 3	Daily ave
		-2	-1		+0	+1	+2	+3	+4	
Tetraonidae	Ruffed Grouse	1	0	0.5	0	1	1	1	0	0.6
Scolopacidae	American Woodcock	0	0	0.0	0	1	0	0	0	0.2
	Common Snipe	1	0	0.5	0	0	0	0	0	0.0
Trochilidae	Ruby-throated Hummingbird	0	1	0.5	2	0	1	1	0	0.8
Picidae	Common Flicker	0	0	0.0	1	0	2	0	0	0.6
	Yellow-bellied Sapsucker	4	4	4.0	0	2	2	1	1	1.2
	Hairy Woodpecker	1	0	0.5	0	1	0	0	0	0.2
	Downey Woodpecker	1	1	1.0	0	0	0	0	0	0.0
Tyrannidae	Least Flycatcher	3	0	1.5	2	2	0	2	2	1.6
Corvidae	Gray Jay	1	0	0.5	0	0	0	0	0	0.0
	Common Raven	1	0	0.5	0	0	0	2	0	0.4
Paridae	Black-capped Chickadee	0	1	0.5	0	0	0	1	3	0.8
Sittidae	Red-breasted Nuthatch	1	0	0.5	0	0	0	1	0	0.2
Mimidae	Catbird	0	0	0.0	0	0	0	1	0	0.2
Turdidae	American Robin	5	4	4.5	2	4	2	5	5	3.6
	Hermit Thrush	2	3	2.5	4	2	3	1	1	2.2

Table 10 cont'd

Family	Species	Pre-spray days, 2nd application			Post-spray days, 2nd application					
		May 28	May 29	Daily ave	May 30	May 31	June 1	June 2	June 3	Daily ave
		-2	-1		+0	+1	+2	+3	+4	
Sylviidae	Swainson's Thrush	2	3	2.5	1	1	2	1	2	1.4
	Veery	4	8	6.0	5	4	4	4	4	4.2
	Golden-crowned Kinglet	1	2	1.5	1	1	0	1	2	1.0
	Ruby-crowned Kinglet	4	3	3.5	4	5	4	3	3	3.8
Vireonidae	Solitary Vireo	1	1	1.0	2	1	1	1	2	1.4
	Red-eyed Vireo	0	0	0.0	1	0	0	0	0	0.2
	Philadelphia Vireo	0	0	0.0	1	0	0	0	0	0.2
	Warbling Vireo	0	0	0.0	3	0	0	0	0	0.6
Parulidae	Black and white Warbler	1	0	0.5	0	0	0	0	0	0.0
	Tennessee Warbler	2	0	1.0	2	1	2	2	0	1.4
	Nashville Warbler	0	0	0.0	1	1	0	0	0	0.4
	Parula Warbler	0	0	0.0	0	0	0	1	0	0.2
	Magnolia Warbler	1	2	1.5	3	2	3	2	4	2.3
	Cape May Warbler	1	1	1.0	1	2	0	0	0	0.6
	Myrtle Warbler	2	2	2.0	3	1	0	1	1	1.2
	Black-throated green Warbler	0	1	0.5	0	1	0	0	0	0.2
	Blackburnian Warbler	0	1	0.5	0	0	0	0	0	0.0

Table 10 cont'd

Family	Species	Pre-spray days, 2nd application			Post-spray days, 2nd application					
		May 28 -2	May 29 -1	Daily ave	May 30 +0	May 31 +1	June 1 +2	June 2 +3	June 3 +4	Daily ave
	Chestnut-sided Warbler	2	2	2.0	3	3	2	2	2	2.4
	Bay-breasted Warbler	1	2	1.5	1	1	0	2	0	0.8
	Blackpoll Warbler	1	0	0.5	0	0	0	0	0	0.0
	Palm Warbler	0	0	0.0	0	0	0	1	1	0.4
	Ovenbird	6	6	6.0	5	5	5	5	4	4.8
	Northern Waterthrush	0	1	0.5	1	1	1	2	2	1.4
	Yellowthroat	2	4	3.0	2	4	2	2	4	2.8
	Wilson's Warbler	3	2	2.5	1	2	1	1	1	1.2
	Canada Warbler	2	1	1.5	0	1	2	2	2	1.4
	American Redstart	2	1	1.5	2	2	1	3	3	2.2
Icteridae	Red-winged Blackbird	1	4	2.5	1	3	0	1	1	1.2
	Common Crackle	4	4	4.0	0	0	0	0	4	0.8
	Brown-headed Cowbird	1	1	1.0	0	0	0	1	0	0.2
Thraupidae	Scarlet Tanager	0	1	0.5	1	0	0	0	0	0.2
Fringillidae	Rose-breasted Grosbeak	4	3	3.5	2	3	0	2	2	1.8
	Evening Grosbeak	0	0	0.0	0	0	0	1	0	0.2
	Purple Finch	2	1	1.5	0	1	1	1	0	0.6
	Pine Siskin	0	1	0.5	0	0	0	0	0	0.0
	Dark-eyed Junco	2	2	2.0	2	1	2	0	0	1.0
	Chipping Sparrow	1	0	0.5	1	0	0	0	0	0.2
	White-throated Sparrow	5	6	5.5	0	2	4	6	3	4.8
	Lincoln's Sparrow	0	1	0.5	1	0	0	0	1	0.4
	Swamp Sparrow	1	2	1.5	1	1	1	0	0	0.6
	Song Sparrow	5	3	4.0	3	2	4	2	3	2.8
Total		88	86	85.5	75	65	53	66	63	64.4

Table 11
Forest bird population census
Phosphamidon Treatment Plot I, (2nd application)
Chipman, New Brunswick
May 28 - June 3, 1976

Family	Species	Pre-spray days, 2nd application			Post-spray days, 2nd application					
		May 28	May 29	Daily ave	May 30	May 31	June 1	June 2	June 3	Daily ave
		-2	-1		+0	+1	+2	+3	+4	
Picidae	Common Flicker	0	1	0.5	0	0	0	0	0	0.0
	Yellow-bellied Sapsucker	1	1	1.0	0	2	1	0	1	0.8
Tyrannidae	Olive-sided Flycatcher	0	0	0.0	0	0	0	0	1	0.2
Paridae	Blackcapped Chickadee	0	0	0.0	0	0	0	0	1	0.2
	Boreal Chickadee	0	1	0.5	1	0	0	0	0	0.2
Sittidae	Red-breasted Nuthatch	0	0	0.0	0	3	0	0	1	0.8
Certhiidae	Brown Creeper	1	0	0.5	0	0	0	0	0	0.0
Troglodytidae	Winter Wren	0	0	0.0	0	0	0	0	1	0.2
Turdidae	American Robin	1	0	0.5	0	0	0	1	0	0.2
	Hermit Thrush	1	2	1.5	1	0	1	1	0	0.6
	Swainson's Thrush	0	1	0.5	2	2	0	1	0	1.0
Sylviidae	Golden-crowned Kinglet	0	0	0.0	0	0	0	3	0	0.6
	Ruby-crowned Kinglet	3	1	2.0	3	4	1	4	3	3.0
Vireonidae	Solitary Vireo	1	0	0.5	0	0	0	0	0	0.0
Parulidae	Black and White Warbler	1	0	0.5	0	0	0	2	0	0.4
	Tennessee Warbler	3	3	3.0	3	0	0	0	0	0.6
	Nashville Warbler	1	0	0.5	0	0	0	1	1	0.4
	Parula Warbler	2	1	1.5	1	1	0	0	1	0.6
	Magnolia Warbler	2	2	2.0	7	3	2	4	3	3.8

Table 11 cont'd

Family	Species	Pre-spray days, 2nd application			Post-spray days, 2nd application					
		May 28	May 29	Daily ave	May 30	May 31	June 1	June 2	June 3	Daily ave
		-2	-1		+0	+1	+2	+3	+4	
	Cape May Warbler	1	0	0.5	0	0	2	2	2	1.2
	Black-throated									
	Blue Warbler	0	1	0.5	0	0	0	0	0	0.0
	Myrtle Warbler	1	1	1.0	1	1	0	0	0	0.4
	Black-throated									
	Green Warbler	1	0	0.5	0	0	1	3	2	1.2
	Blackburnian Warbler	0	0	0.0	1	1	0	1	0	0.6
	Bay-breasted Warbler	1	0	0.5	2	2	0	1	0	1.0
	Ovenbird	4	5	4.5	4	4	2	4	3	3.4
	Yellowthroat	0	3	1.5	0	1	1	0	0	0.4
	Canada Warbler	0	0	0.0	1	1	0	0	0	0.4
	American Redstart	1	1	1.0	0	1	0	0	0	0.2
Fringillidae	Purple Finch	2	0	1.0	2	1	0	2	3	1.6
	Pine Siskin	0	1	0.5	0	0	0	0	0	0.0
	American Goldfinch	3	0	1.5	0	0	0	0	0	0.0
	Dark-eyed Junco	0	1	0.5	0	0	0	1	2	0.6
	White-throated Sparrow	2	1	1.5	1	3	0	6	2	2.4
Totals		33	26	29.5	30	30	13	38	29	28.0

Table 12
Forest bird population census
Phosphamidon treatment plot 2 (2nd application)
Chipman, New Brunswick
May 28 - June 3, 1976

Family	Species	Pre-spray days, 2nd application			Post-spray days, 2nd application					
		May 28	May 29	Daily ave	May 30	May 31	June 1	June 2	June 3	Daily ave
		-2	-1		+0	+1	+2	+3	+4	
Trochilidae	Ruby-throated Hummingbird	2	0	1.0	0	1	0	1	0	0.4
Picidae	Common Flicker	0	1	0.5	0	0	0	0	0	0.0
	Yellow-bellied Sapsucker	1	0	0.5	0	0	0	1	1	0.4
Tyrannidae	Olive-sided Flycatcher	1	0	0.5	0	0	0	0	0	0.0
Corvidae	Blue Jay	0	0	0.0	0	1	0	0	0	0.2
Paridae	Black-capped Chickadee	1	0	0.5	0	0	0	0	0	0.0
	Boreal Chickadee	0	0	0.0	2	0	0	0	0	0.4
Sittidae	White-breasted Nuthatch	0	0	0.0	0	0	0	1	0	0.2
	Red-breasted Nuthatch	0	0	0.0	0	0	0	2	1	0.6
Certhidae	Brown Creeper	1	0	0.5	0	0	0	0	0	0.0
Troglodytidae	Winter Wren	0	1	0.5	1	0	0	0	2	0.6
Turdidae	American Robin	0	0	0.0	0	0	0	0	2	0.4
	Hermit Thrush	1	1	2.0	0	1	0	0	0	0.2
	Swainson's Thrush	0	0	0.0	0	0	1	0	0	0.2
Sylviidae	Golden-crowned Kinglet	0	1	0.5	1	0	0	1	0	0.4
	Ruby-crowned Kinglet	2	3	2.5	3	2	3	1	0	1.8

Table 12 Cont'd

Family	Species	Pre-spray days, 2nd application			Post-spray days, 2nd application					Daily ave
		May 28 -2	May 29 -1	Daily ave	May 30 +0	May 31 +1	June 1 +2	June 2 +3	June 3 +4	
Vireonidae	Solitary Vireo	1	2	1.5	1	1	0	2	2	1.2
Parulidae	Black and White Warbler	0	0	0.0	0	1	2	0	0	0.6
	Tennessee Warbler	1	2	1.5	1	5	2	0	3	2.2
	Nashville Warbler	1	1	1.0	2	0	2	1	1	1.2
	Parula Warbler	1	1	1.0	1	0	0	1	1	0.6
	Magnolia Warbler	4	3	3.5	4	6	2	3	2	3.4
	Cape May Warbler	0	0	0.0	0	0	3	2	1	1.2
	Black-throated Blue Warbler	0	0	0.0	0	0	0	0	0	0.0
	Myrtle Warbler	0	0	0.0	0	0	0	1	0	0.2
	Black-throated Green Warbler	3	3	3.0	3	2	2	3	3	2.6
	Blackburnian Warbler	2	1	1.5	1	2	0	1	1	1.0
	Chestnut-sided Warbler	0	0	0.0	0	0	0	0	2	0.4
	Bay-breasted Warbler	2	2	2.0	3	2	0	0	0	1.0
	Ovenbird	5	3	4.0	4	4	1	4	2	3.0
	Yellowthroat	1	2	1.5	1	1	0	0	0	0.4
	American Redstart	1	0	.5	2	0	0	0	0	0.4

Table 12

Cont'd

Family	Species	Pre-spray days, 2nd application			Post-spray days, 2nd application					
		May 28 -2	May 29 -1	Daily ave	May 30 +0	May 31 +1	June 1 +2	June 2 +3	June 3 +4	Daily ave
Fringillidae	Rose-breasted Grosbeak	0	0	0.0	0	1	0	0	0	0.2
	Purple Finch	0	1	0.5	0	2	0	0	0	0.4
	Dark-eyed Junco	0	1	0.5	0	2	1	0	1	0.6
	White-throated Sparrow	4	5	4.5	1	3	3	3	4	2.8
Unidentified Species		0	0	0.0	0	0	0	0	3	0.6
Total:		35	34	34.5	31	37	22	28	33	30.2

Table 13
Forest bird population census
phosphamidon treatment plot 5 (2nd application)
Chipman, New Brunswick
May 28 - June 3, 1976

Family	Species	Pre-spray days, 2nd application			Post-spray days, 2nd application					Daily ave
		May 28	May 29	Daily ave	May 30	May 31	June 1	June 2	June 3	
		-2	-1		+0	+1	+2	+3	+4	
Scolopacidae	Common Snipe	0	0	0.0	0	0	0	1	0	0.2
Picidae	Piliated Woodpecker	1	0	0.5	0	0	0	1	0	0.2
	Yellow-bellied Sapsucker	4	1	2.5	0	1	0	1	1	0.6
Tyrannidae	Yellow-bellied Flycatcher	0	2	1.0	2	1	1	2	2	1.6
Corvidae	Gray Jay	1	0	0.5	0	1	0	2	0	0.6
	Blue Jay	0	1	0.5	1	0	0	0	0	0.2
Paridae	Boreal Chickadee	0	0	0.0	1	0	0	1	0	0.4
Sittidae	Red-breasted Nuthatch	0	0	0.0	1	1	0	0	0	0.4
Troglodytidae	Winter Wren	0	0	0.0	0	2	1	0	1	0.8
Turdidae	American Robin	0	0	0.0	0	2	1	1	0	0.8
	Hermit Thrush	0	0	0.0	2	1	0	2	2	1.4
	Swainson's Thrush	0	1	0.5	1	4	1	2	2	2.0
	Veery	0	0	0.0	0	0	0	2	0	0.4
Sylviidae	Ruby-crowned Kinglet	4	2	3.0	4	3	3	3	3	3.2
Vireonidae	Solitary Vireo	0	0	0.0	2	0	0	0	0	0.4

Table 13

Cont'd

Family	Species	Pre-spray days, 2nd application			Post-spray days, 2nd application					
		May 28	May 29	Daily ave	May 30	May 31	June 1	June 2	June 3	Daily ave
		-2	-1		+0	+1	+2	+3	+4	
Parulidae	Tennessee Warbler	1	5	3.0	4	3	2	3	2	2.8
	Nashville Warbler	0	0	0.0	0	1	0	0	0	0.2
	Parula Warbler	1	0	0.5	1	0	0	0	0	0.2
	Magnolia Warbler	1	4	2.5	4	4	3	3	3	3.4
	Cape-May Warbler	0	1	0.5	1	1	1	1	1	1.0
	Myrtle Warbler	0	0	0.0	0	1	1	0	0	0.4
	Black-throated Green Warbler	1	1	1.0	0	0	0	0	0	0.0
	Blackburnian Warbler	0	0	0.0	0	1	1	1	0	0.6
	Bay-breasted Warbler	0	2	1.0	1	2	0	1	1	1.0
	Ovenbird	4	3	3.5	3	3	3	2	2	2.6
	Northern Waterthrush	2	2	2.0	2	2	0	2	2	1.6
	Canada Warbler	1	0	0.5	0	0	0	1	0	0.2
	American Redstart	0	1	0.5	0	0	0	0	0	0.0
Fringillidae	Rose-breasted Grosbeak	0	0	0.0	1	1	0	0	1	0.6
	Evening Grosbeak	1	0	0.5	0	0	0	0	0	0.0

Table 13 Cont'd

Family	Species	Pre-spray days, 2nd application			Post-spray days, 2nd application					Daily ave
		May 28	May 29	Daily ave	May 30	May 31	June 1	June 2	June 3	
		-2	-1		+0	+1	+2	+3	+4	
	Purple Finch	2	0	1.0	0	2	0	0	1	0.6
	Pine Siskin	1	0	0.5	1	0	0	0	0	0.2
	American Goldfinch	0	0	0.0	0	0	0	1	0	0.2
	Dark-eyed Junco	1	0	0.5	0	1	0	1	1	0.6
	Chipping Sparrow	0	0	0.0	0	1	0	0	0	0.2
	White-throated Sparrow	4	2	3.0	9	3	2	2	4	4.0
Totals:		30	28	29.0	41	42	20	36	29	33.6

Table 14
Forest bird population census
Phosphamidon treatment plot 6, (2nd application)
Chipman, New Brunswick
May 28, - June 3, 1976

Family	Species	Pre-spray days, 2nd application			Post-spray days, 2nd application					
		May 28	May 29	Daily ave	May 30	May 31	June 1	June 2	June 3	Daily ave
		-2	-1		+0	+1	+2	+3	+4	
Tetraonidae	Ruffed Grouse	1	1	1.0	1	1	0	0	0	0.4
Trochilidae	Ruby-throated Hummingbird	1	0	0.5	2	0	0	1	2	1.0
Picidae	Piliated Woodpecker	1	0	0.5	0	1	0	1	1	0.6
	Yellow-bellied sapsucker	2	1	1.5	1	1	0	2	3	1.4
Tyrannidae	Least Flycatcher	0	0	0.0	2	1	0	1	0	0.3
Corvidae	Gray Jay	0	0	0.0	0	2	0	1	0	0.6
	Blue Jay	0	0	0.0	0	0	0	1	0	0.2
Paridae	Black-capped Chickadee	0	1	0.5	0	0	0	0	0	0.0
Sittidae	Red-breasted Nuthatch	0	0	0.0	0	1	0	0	0	0.2
Certhidae	Brown creeper	0	0	0.0	0	1	0	0	0	0.2
Troglodytidae	Winter wren	0	0	0.0	1	1	0	1	1	0.8
Turdidae	Hermit thrush	0	1	0.5	0	0	2	2	3	1.4
	Swainson's thrush	1	0	0.5	1	1	1	0	1	0.8
	Veery	1	0	0.5	0	0	0	0	0	0.0
Sylviidae	Ruby-crowned Kinglet	0	1	0.5	0	1	0	1	1	0.6
Vireonidae	Solitary vireo	2	1	1.5	3	0	0	3	2	1.6

Table 14 cont'd

Family	Species	Pre-spray days, 2nd application			Post-spray days, 2nd application					
		May 28 -2	May 29 -1	Daily ave	May 30 +0	May 31 +1	June 1 +2	June 2 +3	June 3 +4	Daily ave
Parulidae	Tennessee Warbler	2	1	1.5	1	0	1	1	2	1.0
	Parula Warbler	1	1	1.0	1	0	0	1	1	0.6
	Magnolia Warbler	3	5	4.0	5	4	2	5	1	3.4
	Cape-May Warbler	0	0	0.0	1	0	0	0	0	0.2
	Black-throated Blue	0	1	0.5	2	0	0	1	0	0.6
	Myrtle Warbler	0	0	0.0	2	0	0	0	0	0.4
	Black-throated Green Warbler	1	0	0.5	3	4	0	3	3	2.6
	Blackburnian Warbler	1	1	1.0	1	1	0	2	1	1.0
	Bay-breasted Warbler	2	0	1.0	2	2	0	2	1	1.4
	Ovenbird	1	3	2.0	4	4	3	3	4	3.6
	Yellowthroat	0	0	0.0	0	1	0	0	0	0.2
	Canada Warbler	2	2	2.0	2	2	1	1	1	1.4
Thraupidae	Scarlet tanager	1	0	0.5	0	0	0	1	0	0.2
Fringillidae	Rose-breasted Grosbeak	1	1	1.0	2	5	0	4	4	3.0
	Purple Finch	2	1	1.5	2	1	1	1	2	1.4
	Dark-eyed Junco	1	0	0.5	0	0	0	0	0	0.0
	White-throated Sparrow	2	5	3.5	4	2	2	9	6	4.6
Totals		29	27	28.0	43	37	13	48	40	36.2

Table 15
Forest bird population census
Phosphamidon Untreated Check Plot
Chipman, New Brunswick
June 19 and 21, 1976

Family	Species	June 19	June 21	Daily ave	Family	Species	June 19	June 21	Daily ave
Picidae	Common Flicker	5	1	3.0	Parulidae	Bay-breasted	1	0	0.5
	Yellow-bellied				cont'd	Warbler	5	2	3.5
	Sapsucker	1	0	0.5		Ovenbird	1	2	1.5
Tyrannidae	Alder Flycatcher	0	1	0.5		Yellowthroat	2	3	2.5
	Least Flycatcher	1	2	1.5		Wilson's Warbler	1	1	1.0
Corvidae	Blue Jay	2	0	1.0		Canada Warbler	6	3	4.5
	Common Raven	0	1	0.5		American Redstart	1	0	0.5
Turdidae	American Robin	1	2	1.5	Icteridae	Brown-headed Cowbird	1	0	0.5
	Hermit Thrush	2	1	1.5	Thraupidae	Scarlet Tanager	1	0	0.5
	Swainson's Thrush	1	2	1.5	Fringillidae	Rose-breasted	1	2	1.5
	Veery	6	5	5.5		Grosbeak	1	0	0.5
Sylviidae	Golden-crowned	1	0	0.5		Pine Siskin	0	4	2.0
	Kinglet	3	3	3.0		Dark-eyed	0	1	0.5
	Ruby-crowned					Junco	3	2	2.5
	Kinglet	2	2	2.0		Chipping Sparrow	3	2	2.5
Vireonidae	Solitary Vireo	1	0	0.5		White-throated	0	1	0.5
	Red-eyed Vireo	0	1	0.5		Sparrow	3	2	2.5
Parulidae	Tennessee Warbler	1	1	1.0		Song Sparrow	0	1	0.5
	Nashville Warbler	2	1	1.5		Swamp Sparrow			
	Myrtle Warbler	2	4	3.0	Totals:		57	50	53.5
	Chestnut-sided								
	Warbler								

Table 16
Forest bird population census
Phosphamidon treatment plot 1
Chipman, New Brunswick
June 20 and 22, 1976

Family	Species	June 20	June 22	Daily ave	Family	Species	June 20	June 22	Daily ave
Trochilidae	Ruby-throated Hummingbird	1	1	1.0	Parulidae	Cape May Warbler	0	1	0.5
Picidae	Yellow-shafted Flicker	0	2	1.0	cont'd	Black-throated Green Warbler	2	2	2.0
	Yellow-bellied Sapsucker	3	3	3.0		Blackburnian Warbler	0	3	1.5
Tyrannidae	Eastern Wood Pewee	0	1	0.5		Bay-breasted Warbler	4	2	3.0
	Olive-sided Flycatcher	1	1	1.0		Ovenbird	4	0	2.0
Paridae	Boreal Chickadee	1	0	0.5		Yellowthroat	1	1	1.0
Certhiidae	Brown Creeper	1	1	1.0		Canada Warbler	2	2	2.0
Troglodytidae	Winter Wren	1	1	1.0		American Redstart	2	2	2.0
Turdidae	American Robin	3	2	2.5	Fringillidae	Pine Siskin	4	2	3.0
	Hermit Thrush	3	0	1.5		Dark-eyed Junco	1	0	0.5
	Swainson's Thrush	1	2	1.5		White-throated Sparrow	3	7	5.0
Sylviidae	Ruby-crowned Kinglet	1	3	2.0					
Parulidae	Black and White Warbler	1	0	0.5	Totals:		46	44	45.0
	Tennessee Warbler	4	1	2.5					
	Parula Warbler	1	1	1.0					
	Magnolia Warbler	1	3	2.0					

Table 17
 Forest bird population census
 Phosphamidon treatment plot 2
 Chipman, New Brunswick
 June 20 and 22, 1976

Family	Species	June 20	June 22	Daily average
Trochilidae	Ruby-throated Hummingbird	1	1	1.0
Picidae	Yellow-bellied Sapsucker	3	1	2.0
Tyrannidae	Yellow-bellied Flycatcher	1	1	1.0
Turdidae	American Robin	1	1	1.0
	Hermit Thrush	2	1	1.5
	Swainson's Thrush	1	2	1.5
Sylviidae	Ruby-crowned Kinglet	0	2	1.0
Parulidae	Black and White Warbler	2	2	2.0
	Tennessee Warbler	1	1	1.0
	Nashville Warbler	1	1	1.0
	Parula Warbler	1	2	1.5
	Magnolia Warbler	3	2	2.5
	Myrtle Warbler	1	0	0.5
	Black-throated Green Warbler	3	1	2.0
	Blackburnian Warbler	2	2	2.0
	Bay-breasted Warbler	4	2	3.0
	Ovenbird	1	2	1.5
	Canada Warbler	2	1	1.5
Fringillidae	White-throated Sparrow	2	1	1.5
Totals:		32	26	29.0

Table 18
Forest bird population census
Phosphamidon treatment plot 3
Chipman, New Brunswick
June 20 and 22, 1976

Family	Species	June 20	June 22	Daily ave	Family	Species	June 20	June 22	Daily ave
Accipitridae	Marsh Hawk	0	1	0.5	Parulidae	Yellowthroat	2	1	1.5
Picidae	Yellow-bellied Sapsucker	0	1	0.5	cont'd	Canada Warbler	1	1	1.0
Tyrannidae	Yellow-bellied Flycatcher	1	0	0.5		American Redstart	0	1	0.5
Corvidae	Gray Jay	0	3	1.5	Fringillidae	Rose-breasted Grosbeak	1	0	0.5
Turdidae	Hermit Thrush	2	2	2.0		Purple Finch	2	0	1.0
	Swainson's Thrush	3	1	2.0		Pine Siskin	1	0	0.5
Sylviidae	Golden-crowned Kinglet	2	0	1.0		White-winged Crossbill	0	4	2.0
	Ruby-crowned Kinglet	4	3	3.5		Dark-eyed Junco	2	0	1.0
Vireonidae	Solitary Vireo	0	2	1.0		White-throated Sparrow	1	4	2.5
Parulidae	Tennessee Warbler	2	0	1.0		Lincoln's Sparrow	1	0	0.5
	Nashville Warbler	1	1	1.0					
	Magnolia Warbler	4	0	2.0	Totals:		36	34	35.0
	Cape May Warbler	1	3	2.0					
	Blackburnian Warbler	0	3	1.5					
	Bay-breasted Warbler	2	1	1.5					
	Ovenbird	3	2	2.5					

Table 19
Forest bird population census
Phosphamidon treatment plot 4
Chipman, New Brunswick
June 20 and 22, 1976

Family	Species	June 20	June 22	Daily ave	Family	Species	June 20	June 22	Daily ave
Tyrannidae	Yellow-bellied Flycatcher	2	0	1.0	Parulidae	Ovenbird	2	3	2.5
	Eastern Wood Pewee	1	0	0.5	cont'd	Canada Warbler	1	1	1.0
Paridae	Black-capped Chickadee	1	0	0.5		American Redstart	2	3	2.5
Sittidae	Red-breasted Nuthatch	0	3	1.5	Fringillidae	Rose-breasted Grosbeak	2	0	1.0
Troglodytidae	Winter Wren	1	0	0.5		Evening Grosbeak	0	2	1.0
Turdidae	Hermit Thrush	0	1	0.5		Purple Finch	0	1	0.5
	Swainson's Thrush	2	1	1.5		Pine Grosbeak	1	0	0.5
Sylviidae	Ruby-crowned Kinglet	1	0	0.5		Pine Siskin	0	1	0.5
Vireonidae	Solitary Vireo	2	1	1.5		Dark-eyed Junco	0	1	0.5
Parulidae	Tennessee Warbler	5	4	4.5		White-throated Sparrow	5	3	4.0
	Nashville Warbler	2	0	1.0					
	Magnolia Warbler	3	1	2.0	Totals:		36	32	34.0
	Cape May Warbler	1	1	1.0					
	Myrtle Warbler	0	2	1.0					
	Blackburnian Warbler	2	2	2.0					
	Bay-breasted Warbler	0	1	0.5					

Table 20
 Forest bird population census
 Phosphamidon treatment plot 5
 Chipman, New Brunswick
 June 19 and 21, 1976

Family	Species	June 19	June 21	Daily average
Tyrannidae	Yellow-bellied Flycatcher	1	1	1.0
Turdidae	American Robin	1	1	1.0
	Swainson's Thrush	0	1	0.5
Sylviidae	Golden-crowned Kinglet	1	1	1.0
	Ruby-crowned Kinglet	3	2	2.5
Parulidae	Tennessee Warbler	2	2	2.0
	Parula Warbler	1	0	0.5
	Magnolia Warbler	1	1	1.0
	Cape May Warbler	1	0	0.5
	Myrtle Warbler	1	0	0.5
	Bay-breasted Warbler	2	0	1.0
	Ovenbird	2	2	2.0
	Northern Waterthrush	2	0	1.0
	Canada Warbler	0	1	0.5
	Rose-breasted Grosbeak	2	0	1.0
Fringillidae	Purple Finch	0	1	0.5
	Dark-eyed Junco	1	1	1.0
	White-throated Sparrow	2	3	2.5
Totals:		23	17	20.0

Table 21
Forest bird population census
Phosphamidon treatment plot 6
Chipman, New Brunswick
June 19 and 21, 1976

Family	Species	June 19	June 21	Daily average
Picidae	Pileated Woodpecker	1	0	0.5
	Yellow-bellied Sapsucker	2	1	1.5
Troglodytidae	Winter Wren	3	1	2.0
Turdidae	Swainson's Thrush	3	1	2.0
Sylviidae	Ruby-crowned Kinglet	1	0	0.5
Parulidae	Magnolia Warbler	1	1	1.0
	Cape May Warbler	1	0	0.5
	Black-throated Blue Warbler	0	1	0.5
	Black-throated Green Warbler	2	2	2.0
	Blackburnian Warbler	1	1	1.0
	Bay-breasted Warbler	1	1	1.0
	Ovenbird	4	3	3.5
	Canada Warbler	1	1	1.0
Fringillidae	Rose-breasted Grosbeak	4	2	3.0
	Purple Finch	1	1	1.0
	White-throated Sparrow	2	2	2.0
Totals:		28	18	23.0

Table 22
Forest bird population census
Phosphamidon treatment plot 7
Chipman, New Brunswick
June 19 and 21, 1976

Family	Species	June 19	June 21	Daily average
Picidae	Yellow-bellied Sapsucker	2	0	1.0
Tyrannidae	Least Flycatcher	2	1	1.5
Turdidae	Hermit Thrush	1	2	1.5
	Swainson's Thrush	5	4	4.5
Sylviidae	Ruby-crowned Kinglet	2	2	2.0
Vireonidae	Red-eyed Vireo	1	1	1.0
Parulidae	Parula Warbler	2	2	2.0
	Cape May Warbler	1	1	1.0
	Myrtle Warbler	0	1	0.5
	Black-throated Green Warbler	3	2	2.5
	Blackburnian Warbler	1	1	1.0
	Bay-breasted Warbler	0	1	0.5
	Ovenbird	2	1	1.5
	Canada Warbler	1	1	1.0
	American Redstart	3	2	2.5
	Rose-breasted Grosbeak	3	2	2.5
Fringillidae	Purple Finch	1	1	1.0
	White-winged Crossbill	2	2	2.0
	White-throated Sparrow	6	0	3.0
Totals:		38	27	32.5

Table 23
 Forest bird population census
 Phosphamidon treatment plot 8
 Chipman, New Brunswick
 June 19 and 21, 1976

Family	Species	June 19	June 21	Daily average
Picidae	Pileated Woodpecker	1	0	0.5
	Yellow-bellied Sapsucker	1	0	0.5
Turdidae	Swainson's Thrush	6	1	3.5
Sylviidae	Ruby-crowned Kinglet	2	1	1.5
Parulidae	Parula Warbler	2	1	1.5
	Magnolia Warbler	2	0	1.0
	Black-throated Green Warbler	2	1	1.5
	Bay-breasted Warbler	3	2	2.5
	Ovenbird	5	2	3.5
	Canada Warbler	1	1	1.0
	American Redstart	4	3	3.5
Fringillidae	Rose-breasted Grosbeak	1	1	1.0
	Purple Finch	0	1	0.5
	White-throated Sparrow	3	3	3.0
Totals:		33	17	25.0

Table 24
Forest bird population census
phosphamidon adulticide untreated check plot
Acadia Forest Experiment Station
New Brunswick, 1976

Family	Species	Pre-spray days						Post-spray days										Daily ave
		June 28	June 29	June 30	July 3	July 4	Daily ave	July 5	July 6	July 7	July 8	July 9	July 10	July 11	July 12	July 13		
		-6	-5	-4	-1	-0		+1	+2	+0	+1	+2	+1	+2	+3	+4		
Strigidae	Barred Owl	0	0	0	0	0	0.0	0	0	0	0	1	0	0	0	0	0.1	
Trochilidae	Ruby-throated Hummingbird	1	1	1	0	1	0.8	1	2	1	2	2	1	0	0	0	1.0	
Picidae	Common Flicker	1	0	1	1	0	0.6	0	2	2	0	0	0	0	1	0	0.4	
	Yellow-bellied Sapsucker	5	3	5	2	2	3.4	4	3	4	2	3	6	5	5	1	3.6	
	Hairy Woodpecker	0	0	0	0	0	0.0	0	0	0	0	1	4	0	1	0	0.6	
	Black-backed Three toed Woodpecker	0	0	0	0	0	0.0	1	0	0	0	0	0	0	0	0	0.1	
Tyrannidae	Yellow-bellied Flycatcher	10	8	2	3	4	5.4	4	2	4	4	2	2	4	4	4	3.3	
Corvidae	Gray Jay	0	0	0	1	1	0.4	0	0	0	0	0	0	0	0	0	0.0	
	Blue Jay	1	0	0	0	0	0.2	4	0	0	0	1	0	1	0	0	0.6	
Paridae	Black-capped Chickadee	0	0	1	0	0	0.2	0	0	0	1	1	0	0	0	0	0.2	
Sittidae	Red-breasted Nuthatch	1	1	0	0	1	0.6	0	0	0	0	1	1	1	1	0	0.4	
Troglodytidae	Winter Wren	2	0	0	2	2	1.2	0	2	2	2	2	2	2	2	2	1.7	
Turdidae	American Robin	1	0	2	0	1	0.8	1	1	0	2	1	2	4	1	1	1.4	
	Hermit Thrush	0	4	2	2	2	2.0	0	4	1	0	2	0	2	1	2	1.3	
	Swainson's Thrush	10	13	10	10	8	10.2	12	13	14	8	6	10	9	9	1	9.1	
Sylviidae	Golden-crowned Kinglet	3	2	2	2	3	2.4	0	3	2	1	1	4	0	2	1	1.5	
	Ruby-crowned Kinglet	2	0	0	2	2	1.2	1	0	0	2	0	0	0	0	2	0.5	

Table 24 Cont'd

Family	Species	Pre-spray days						Post-spray days									
		June	June	June	July	July	Daily ave	July	July	July	July	July	July	July	July	July	Daily ave
		28	29	30	3	4		5	6	7	8	9	10	11	12	13	
		-6	-5	-4	-1	-0		+1	+2	+0	+1	+2	+1	+2	+3	+4	
Thraupidae	Scarlet Tanager	2	0	2	0	0	0.8	0	0	2	2	0	0	0	2	0	0.6
Fringillidae	Rose-breasted Grosbeak	0	2	2	2	0	1.2	2	2	2	2	2	0	0	0	0	1.1
	Evening Grosbeak	0	0	0	0	0	0.0	0	0	0	0	0	6	0	0	3	1.0
	Purple Finch	2	0	0	0	2	0.8	0	0	0	0	0	0	0	1	0	0.1
	Pine Siskin	0	0	0	0	0	0.0	0	0	0	0	0	1	0	0	0	0.1
	American Goldfinch	0	0	0	0	0	0.0	0	0	0	0	0	0	0	6	0	0.6
	White-winged Crossbill	8	3	0	7	6	4.8	0	0	12	8	4	6	10	1	0	4.5
	Dark-eyed Junco	7	4	4	7	6	5.6	0	6	2	1	3	6	2	3	0	2.5
	White-throated Sparrow	12	6	12	16	9	11.0	8	10	9	7	10	8	7	7	8	8.2
	Lincoln's Sparrow	0	2	2	2	2	1.6	2	2	2	2	4	4	4	4	2	2.8
Totals:		143	111	115	114	116	119.8	104	115	118	102	98	134	99	103	62	103.9

Table 24

Cont'd

Family	Species	Pre-spray days					Post-spray days										Daily ave
		June 28	June 29	June 30	July 3	July 4	Daily ave	July 5	July 6	July 7	July 8	July 9	July 10	July 11	July 12	July 13	
		-6	-5	-4	-1	-0		+1	+2	+0	+1	+2	+1	+2	+3	+4	
Vireonidae	Solitary Vireo	4	4	2	0	0	2.0	0	4	2	2	0	2	0	0	0	1.1
	Red-eyed Vireo	2	0	0	0	0	0.4	0	0	0	0	0	0	0	0	0	0.0
Parulidae	Black and white Warbler	4	2	2	2	2	2.4	3	2	3	2	1	0	2	2	0	1.6
	Tennessee Warbler	2	8	7	9	9	7.0	9	5	9	7	7	4	2	5	5	5.8
	Nashville Warbler	10	4	4	4	6	5.6	4	8	6	4	4	4	6	4	0	4.4
	Parula Warbler	0	2	2	0	0	0.8	0	0	0	2	0	2	2	2	0	0.8
	Magnolia Warbler	10	6	4	2	8	6.0	6	6	4	4	4	6	4	5	4	4.7
	Cape May Warbler	2	2	2	2	3	2.2	2	4	4	2	2	4	3	2	1	2.6
	Myrthe Warbler	2	2	2	2	2	2.0	4	2	2	4	4	4	4	4	1	3.2
	Black-throated Green Warbler	4	2	6	6	0	3.6	4	2	3	2	0	3	2	2	2	2.2
	Blackburnian Warbler	2	0	2	0	0	0.8	0	0	0	0	0	2	0	2	2	0.6
	Bay-breasted Warbler	6	6	6	5	6	5.8	8	4	6	4	5	4	7	5	4	5.2
	Ovenbird	11	10	10	9	10	10.0	8	9	12	8	8	12	6	6	10	8.7
	Mourning Warbler	2	0	0	0	2	0.8	0	0	0	0	0	0	0	0	0	0.0
	Yellowthroat	3	2	4	2	6	3.4	4	3	2	4	4	9	3	4	0	3.6
	Wilson's Warbler	0	0	0	0	0	0.0	0	0	0	0	0	2	0	0	2	0.4
	Canada Warbler	2	2	2	4	3	2.6	4	6	2	3	6	5	2	5	2	3.8
	American Redstart	9	10	12	8	7	9.2	8	8	4	8	6	8	5	4	2	5.8

Table 25
Forest bird population census
phosphamidon adulticide treatment block I, plot I
Acadia Forest Experiment Station
New Brunswick, 1976

Family	Species	Pre-spray days						Post-spray days								
		June	June	June	July	July	Daily ave	July	July	July	July	July	July	July	July	Daily ave
		28	29	30	3	4		5	6	7	8	9	10	11	12	
		-6	-5	-4	-1	-0		+1	+2	+1	+2	+3	+1	+2	+3	
Trochilidae	Ruby-throated Hummingbird	0	0	0	1	0	0.2	0	0	0	0	0	0	0	0	0.0
Picidae	Yellow-bellied Sapsucker	0	2	0	2	2	1.2	2	2	3	2	0	2	2	2	1.9
	Common Flicker	2	0	2	2	0	1.2	2	0	0	0	0	0	2	0	0.5
Tyrannidae	Least Flycatcher	6	4	4	0	0	2.8	6	6	0	6	6	10	8	4	5.8
Corvidae	Gray Jay	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0	0.0
	Common Raven	0	0	0	0	0	0.0	0	0	0	0	0	0	2	0	0.3
	Common Crow	0	0	0	0	0	0.0	0	0	0	0	0	0	1	0	0.1
Paridae	Black-capped Chickadee	0	0	0	0	0	0.0	0	0	0	2	0	2	2	0	0.8
Sittidae	Red-breasted Nuthatch	0	0	0	0	0	0.0	0	0	2	0	0	0	0	0	0.3
Troglodytidae	Winter Wren	0	0	0	0	0	0.0	0	0	2	0	0	0	0	0	0.3
Turdidae	American Robin	2	2	0	4	2	2.0	2	3	0	1	2	3	3	2	2.0
	Hermit Thrush	6	0	4	2	0	2.4	4	4	0	0	0	2	2	0	1.5
	Swainson's Thrush	4	2	10	4	4	4.8	4	6	4	6	8	10	11	9	7.3
	Veery	6	4	4	4	4	4.4	6	4	4	8	6	8	4	4	5.5
Sylviidae	Ruby-crowned Kinglet	0	0	0	0	2	0.4	2	2	0	2	2	0	2	2	1.5
Vireonidae	Solitary Vireo	0	2	2	2	0	1.2	2	2	2	2	2	2	2	0	1.8
	Red-eyed Vireo	2	4	4	2	2	2.8	3	2	2	2	0	0	0	0	1.1

Table 25 Cont'd

Family	Species	Pre-spray days					Post-spray days									Daily ave
		June 28	June 29	June 30	July 3	July 4	Daily ave	July 5	July 6	July 7	July 8	July 9	July 10	July 11	July 12	
		-6	-5	-4	-1	-0		+1	+2	+0	+1	+2	+1	+2	+3	
Parulidae	Black and White Warbler	0	0	6	0	0	1.2	0	0	2	2	0	2	0	0	0.8
	Tennessee Warbler	0	0	1	2	2	1.0	4	2	0	0	0	0	1	0	0.9
	Nashville Warbler	2	0	0	0	0	0.4	0	0	0	0	0	0	0	0	0.0
	Parula Warbler	0	2	4	2	2	2.0	4	4	2	2	4	2	2	2	2.8
	Magnolia Warbler	0	0	0	2	0	0.4	2	4	3	4	4	6	2	2	3.4
	Cape May Warbler	0	0	0	0	2	0.4	2	0	0	0	0	0	0	0	0.3
	Myrtle Warbler	2	2	2	0	0	1.2	2	0	0	0	4	4	2	0	1.5
	Black-throated Green Warbler	4	2	2	4	2	2.8	2	4	2	2	2	2	2	2	2.3
	Blackburnian Warbler	0	0	2	0	0	0.4	0	0	0	0	0	0	0	0	0.0
	Bay-breasted Warbler	10	10	12	10	13	11.0	16	0	14	10	11	15	10	13	11.1
	Ovenbird	4	6	8	8	8	6.8	12	8	8	8	8	10	4	6	8.0
	Northern Waterthrush	4	2	2	4	2	2.8	0	0	2	2	0	4	2	0	1.3
	Yellowthroat	0	0	0	0	0	0.0	0	0	0	2	2	2	2	0	0.5
	Canada Warbler	2	0	0	2	2	1.2	0	2	0	0	2	4	2	2	1.5
	American Redstart	10	12	10	14	16	11.4	15	9	10	12	12	12	11	12	11.6
Tingitidae	Rose-breasted Grosbeak	0	2	0	0	0	0.4	2	0	0	0	0	0	0	2	0.5
	Evening Grosbeak	0	2	4	0	0	1.2	0	0	0	0	0	0	0	0	0.0

Table 25 Cont'd

Family	Species	Pre-spray days						Post-spray days								
		June	June	June	July	July	Daily ave	July	July	July	July	July	July	July	July	Daily ave
		28	29	30	3	4		5	6	7	8	9	10	11	12	
		-6	-5	-4	-1	-0		+1	+2	+0	+1	+2	+1	+2	+3	
Fringillidae	Purple Finch	6	2	0	2	2	2.4	3	0	6	4	2	2	2	4	2.9
	White-winged Crossbill	0	0	0	0	0	0.0	0	0	0	0	0	2	2	0	0.5
	Dark-eyed Junco	2	2	4	3	2	2.6	2	2	0	2	7	9	10	9	5.1
	White-throated Sparrow	2	2	2	2	4	2.4	4	4	4	0	4	2	2	2	2.8
Totals:		76	66	89	78	73	76.4	103	70	72	81	88	117	97	79	88.4

Table 26
Forest bird population census
phosphamidon adulticide treatment block I, plot 2
Acadia Forest Experiment Station
New Brunswick, 1976

Family	Species	Pre-spray days						Post-spray days								
		June	June	June	July	July	Daily ave	July	July	July	July	July	July	July	July	Daily ave
		28	29	30	3	4		5	6	7	8	9	10	11	12	
		-6	-5	-4	-1	-0		+1	+2	+1	+2	+3	+1	+2	+3	
Tetraonidae	Spruce Grouse	0	0	0	0	0	0.0	0	0	0	0	0	0	0	1	0.1
Trochilidae	Ruby-throated Hummingbird	0	0	0	0	0	0.0	0	0	0	0	0	1	0	0	0.1
Picidae	Common Flicker	0	0	0	0	2	0.4	0	0	0	0	0	1	0	0	0.1
	Yellow-bellied Sapsucker	0	0	0	0	0	0.0	0	0	0	0	0	1	0	0	0.1
Tyrannidae	Olive-sided Flycatcher	0	0	0	0	0	0.0	2	2	0	0	0	4	0	4	1.5
	Eastern Wood Pewee	0	0	0	0	0	0.0	0	0	0	0	2	0	0	0	0.3
Hirundinidae	Barn Swallow	0	0	0	0	7	1.4	5	2	0	0	0	0	0	0	0.9
Corvidae	Gray Jay	0	0	0	0	0	0.0	0	0	0	1	0	3	0	3	0.9
	Blue Jay	0	0	0	0	0	0.0	0	0	0	0	0	2	0	0	0.3
	Common Raven	0	0	0	0	0	0.0	0	0	0	0	0	0	3	0	0.4
Sittidae	Red-breasted Nuthatch	2	0	0	0	0	0.4	0	0	0	0	0	0	0	0	0.0
Turdidae	American Robin	0	0	0	0	1	0.2	3	4	1	0	0	1	1	1	1.4
	Hermit Thrush	2	0	0	4	0	1.2	5	2	2	2	0	1	2	2	2.0
	Swainson's Thrush	4	4	2	8	4	4.4	8	10	16	11	16	27	19	12	14.9
Sylviidae	Golden-crowned Kinglet	0	4	2	6	6	3.6	2	6	0	0	0	0	0	2	1.3
	Ruby-crowned Kinglet	10	6	4	8	6	6.8	6	6	8	10	8	8	6	8	7.5
Vireonidae	Red-eyed Vireo	0	0	2	0	0	0.4	0	0	0	0	0	0	0	0	0.0
	Solitary Vireo	0	1	0	0	0	0.2	0	0	0	0	0	0	0	0	0.0

Table 26 Cont'd

Family	Species	Pre-spray days					Post-spray days									Daily ave
		June 28	June 29	June 30	July 3	July 4	Daily ave	July 5	July 6	July 7	July 8	July 9	July 10	July 11	July 12	
		-6	-5	-4	-1	-0		+1	+2	+1	+2	+3	+1	+2	+3	
Parulidae	Black and White Warbler	2	0	2	0	0	0.8	0	0	0	0	2	0	0	0	0.3
	Tennessee Warbler	5	1	2	4	6	3.6	10	4	4	0	1	0	0	0	2.4
	Nashville Warbler	0	0	0	2	2	0.8	6	10	8	2	7	6	10	2	6.4
	Magnolia Warbler	6	2	4	6	8	5.2	10	4	8	6	4	6	4	6	6.0
	Cape May Warbler	0	0	4	2	0	1.2	2	0	0	0	0	0	2	0	0.5
	Myrtle Warbler	2	0	2	4	2	2.0	0	0	0	0	3	2	0	0	0.6
	Blackburnian Warbler	2	2	0	4	2	2.0	0	0	2	0	0	0	2	0	0.5
	Bay-breasted Warbler	2	6	0	4	10	4.8	2	0	0	2	0	10	4	2	2.5
	Ovenbird	4	2	8	6	10	6.0	8	10	6	6	16	20	8	14	11.0
	American Redstart	4	8	6	0	12	6.0	0	4	2	2	0	0	0	0	1.0
Tyringillidae	Yellowthroat	10	8	6	18	16	11.6	10	10	4	10	8	14	8	10	9.3
	Rose-breasted Grosbeak	0	0	0	0	2	0.4	0	2	0	0	0	0	0	0	0.3
	Evening Grosbeak	0	0	0	0	2	0.4	0	0	1	0	0	0	0	0	0.1
	Purple Finch	2	0	2	2	0	1.2	2	0	2	4	2	3	0	2	1.9
	White-winged Crossbill	9	0	0	3	11	4.6	15	6	6	4	8	11	6	8	8.0
	Dark-eyed Junco	0	8	2	8	2	4.0	0	2	2	0	0	0	2	0	0.8
Totals:		74	60	60	102	125	84.2	110	92	82	68	85	127	86	97	93.4

Table 27
Forest bird population census
phosphamidon adulticide treatment block 2, plot 3
Acadia Forest Experiment Station
New Brunswick, June 28 - July 12, 1976

Family	Species	Pre-spray days						Post-spray days								
		June	June	June	July	July	Daily ave	July	July	July	July	July	July	July	July	Daily ave
		28	29	30	3	4		5	6	7	8	9	10	11	12	
		-6	-5	-4	-1	-0		+1	+2	+1	+2	+3	+1	+2	+3	
Trochilidae	Ruby-throated Hummingbird	0	0	0	0	0	0.0	0	0	0	0	0	1	0	0	0.1
Colapidae	Common Flicker	0	0	0	0	0	0.0	2	0	0	0	0	0	0	0	0.3
	Yellow-bellied Sapsucker	0	0	0	0	2	0.4	0	0	0	0	1	2	0	0	0.4
	Hairy Woodpecker	0	0	0	0	0	0.0	0	0	0	0	0	2	0	0	0.3
Troglodytidae	Least Flycatcher	6	8	6	2	6	5.6	4	3	7	1	5	5	4	1	3.8
	Eastern Wood Pewee	2	5	2	2	4	3.6	8	6	4	1	2	3	2	2	3.5
	Olive-sided Flycatcher	0	0	0	0	0	0.0	0	2	0	0	0	0	0	2	0.5
Paridae	Boreal Chickadee	0	0	0	0	0	0.0	2	2	0	0	0	0	0	0	0.5
Caprimulgidae	Red-breasted Nuthatch	0	0	0	0	0	0.0	0	0	2	0	0	0	2	0	0.5
Troglodytidae	Winter Wren	0	0	0	2	0	0.4	0	0	0	2	2	0	2	0	0.8
Turdidae	Wood Thrush	0	1	0	0	2	0.6	1	1	1	2	4	2	3	2	2.0
	Hermit Thrush	1	0	0	0	0	0.2	1	0	1	0	1	3	1	2	1.1
	Swainson's Thrush	3	5	4	6	2	4.0	4	4	4	7	4	10	10	2	5.6
Alcedinidae	Golden-crowned Kinglet	2	4	2	0	2	2.0	2	0	2	0	0	0	0	0	0.5
	Ruby-crowned Kinglet	4	2	3	0	0	1.8	0	2	1	0	2	0	0	0	0.6
Procyonidae	Cedar Waxwing	0	0	0	0	0	0.0	0	0	1	0	0	0	0	1	0.3

Table 27

Cont'd

Family	Species	Pre-spray days					Daily ave	Post-spray days								Daily ave
		June 28	June 29	June 30	July 3	July 4		July 5	July 6	July 7	July 8	July 9	July 10	July 11	July 12	
		-6	-5	-4	-1	-0		+1	+2	+1	+2	+3	+1	+2	+3	
Vireonidae	Solitary Vireo	0	0	0	0	0	0.0	0	0	0	0	0	0	2	0	0.3
	Red-eyed Vireo	4	4	2	0	2	2.4	2	4	6	1	2	2	4	1	2.8
Parulidae	Black and White Warbler	2	0	0	0	0	0.4	0	3	0	2	0	0	0	2	0.9
	Tennessee Warbler	0	0	2	0	1	0.6	1	1	1	2	4	4	2	5	2.5
	Nashville Warbler	4	2	2	0	6	2.8	2	4	4	3	2	5	2	1	2.9
	Parula Warbler	0	0	0	0	0	0.0	0	0	0	0	0	0	0	1	0.1
	Magnolia Warbler	6	2	2	2	4	3.2	2	1	6	2	4	2	4	5	3.3
	Cape May Warbler	0	0	0	0	1	0.2	2	3	0	2	2	2	2	2	1.9
	Myrtle Warbler	0	0	2	2	2	1.2	4	2	1	1	2	2	4	1	2.1
	Chestnut-sided Warbler	0	0	0	0	0	0.0	0	2	0	0	0	4	0	0	0.8
	Bay-breasted Warbler	2	2	0	0	2	1.2	1	1	4	4	6	2	1	1	2.8
	Ovenbird	14	10	14	2	10	10.0	18	13	14	12	10	8	12	6	11.6
	Yellowthroat	0	2	2	2	6	2.4	10	3	5	2	6	7	4	2	4.9
	Wilson's Warbler	0	0	0	0	0	0.0	0	0	0	2	0	0	0	0	0.3
	Canada Warbler	2	1	0	0	6	1.8	8	10	4	4	6	4	1	2	4.9
	American Redstart	9	18	16	8	16		20	17	18	11	12	19	20	7	15.5

Table 27

Cont'd

Family	Species	Pre-spray days					Post-spray days									
		June 28	June 29	June 30	July 3	July 4	Daily ave	July 5	July 6	July 7	July 8	July 9	July 10	July 11	July 12	Daily ave
		-6	-5	-4	-1	-0		+1	+2	+1	+2	+3	+1	+2	+3	
Fringillidae	Rose-breasted Grosbeak	0	0	0	0	0	0.0	2	0	3	0	0	0	0	0	0.6
	Evening Grosbeak	8	0	0	0	0	1.6	0	0	0	0	0	0	0	0	0.0
	Purple Finch	8	8	7	0	8	6.2	9	2	4	2	4	9	6	6	5.3
	Dark-eyed Junco	6	7	6	5	5	5.8	4	7	12	6	11	6	11	3	7.5 ¹
	American Goldfinch	0	0	0	0	0	0.0	2	0	0	0	0	0	0	0	0.3 ¹⁰⁰
	White-winged Crossbill	1	0	1	0	2	0.8	8	0	1	1	1	0	3	0	1.8 ¹
	White-throated Sparrow	18	17	13	2	14	12.8	10	14	15	7	14	12	8	3	10.4
	Chipping Sparrow	0	0	0	0	0	0.0	2	0	0	0	0	0	0	0	0.3
Totals:	102	100	86	35	103	85.2	131	107	122	77	107	116	110	60	103.8	

Table 28
Forest bird population census
phosphamidon adulticide treatment block 2, plot 4
Acadia Forest Experiment Station
New Brunswick, June 28 - July 12, 1976

New Brunswick, June 28 - July 12, 1976

Family	Species	Pre-spray days					Daily ave	Post-spray days										Daily ave
		June 28	June 29	June 30	July 3	July 4		July 5	July 6	July 7	July 8	July 9	July 10	July 11	July 12	July 13		
		-6	-5	-4	-1	-0		+1	+2	+1	+2	+3	+1	+2	+3	+4		
Trochilidae	Ruby-throated Hummingbird	0	0	0	0	0	0.0	0	0	0	0	0	1	0	0	0	0.1	
Tyrannidae	Yellow-bellied Flycatcher	4	8	2	3	2	3.8	2	0	2	6	4	4	3	2	5	3.1	
	Eastern Wood Pewee	2	2	2	4	2	2.4	0	0	2	2	2	0	2	2	2	1.3	
Corvidae	Gray Jay	2	0	0	0	1	0.6	1	1	0	1	0	1	0	0	1	0.5	
	Blue Jay	0	0	0	0	1	0.2	0	0	0	0	0	0	0	0	0	0.0	
Sittidae	Red-breasted Nuthatch	0	0	0	0	0	0.0	0	0	0	0	1	1	0	0	0	0.2	
Troglodytidae	Winter Wren	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0	1	0.1	
Turdidae	American Robin	0	2	0	0	0	0.4	0	0	0	1	1	1	1	0	0	0.4	
	Hermit Thrush	6	4	6	2	1	3.8	0	2	4	4	1	2	1	2	2	2.0	
	Swainson's Thrush	6	4	10	6	4	6.0	6	10	14	12	14	12	10	6	5	9.8	
Tylviidae	Golden-crowned Kinglet	4	2	2	3	1	2.4	3	1	3	2	2	2	3	1	3	2.2	
	Ruby-crowned Kinglet	6	6	4	8	6	6.0	6	6	4	6	6	6	4	4	4	5.1	
Caprimulgidae	Cedar Waxwing	0	0	0	0	0	0.0	0	0	0	0	0	3	0	0	0	0.3	
Vireonidae	Solitary Vireo	0	2	0	2	2	1.2	0	2	4	2	0	0	0	0	0	0.8	
	Red-eyed Vireo	0	0	0	0	0	0.0	2	0	0	2	2	0	0	0	0	0.6	
Parulidae	Tennessee Warbler	8	7	2	3	8	5.6	7	2	6	2	5	4	1	4	1	3.5	
	Nashville Warbler	6	6	4	4	2	4.4	4	4	6	6	2	5	4	6	1	4.2	
	Parula Warbler	0	0	0	0	0	0.0	0	2	0	0	0	0	0	0	0	0.2	

Table 28. Cont'd

Family	Species	Pre-spray days						Post-spray days										Daily ave
		June 28	June 29	June 30	July 3	July 4	Daily ave	July 5	July 6	July 7	July 8	July 9	July 10	July 11	July 12	July 13		
		-6	-5	-4	-1	-0		+1	+2	+1	+2	+3	+1	+2	+3	+4		
Turdidae	Magnolia Warbler	5	10	6	6	10	7.4	6	8	6	9	7	10	7	8	8	7.6	
	Cape-May Warbler	4	0	2	0	0	1.2	4	2	2	2	2	2	1	0	1	1.7	
	Black-throated Blue Warbler	0	0	2	0	0	0.4	0	0	0	0	0	0	0	0	0	0.0	
	Myrtle Warbler	1	0	2	0	2	1.0	2	2	2	4	0	2	4	0	0	1.7	
	Black-throated Green Warbler	4	6	8	2	4	4.8	2	4	4	5	6	6	6	4	2	4.3	
	Blackburnian Warbler	4	4	4	2	2	3.2	0	2	2	0	4	4	2	2	2	2.0	
	Bay-breasted Warbler	6	4	4	0	0	2.8	2	2	3	3	4	0	2	1	2	2.1	
	Palm Warbler	2	2	4	2	2	2.4	2	4	4	4	4	3	2	2	0	2.7	
	Ovenbird	6	10	6	14	8	8.8	8	12	14	13	12	11	5	4	6	9.4	
	Yellowthroat	0	6	5	3	6	4.0	6	6	6	6	4	5	4	3	7	5.2	
	Canada Warbler	0	2	2	0	0	0.8	4	1	0	1	0	0	1	2	2	1.2	
	American Redstart	4	4	2	2	0	2.4	2	2	0	0	4	2	0	0	2	1.3	
Corvidae	Red-winged Blackbird	0	0	0	0	0	0.0	0	0	0	0	0	1	1	0	0	0.2	
	Rusty Blackbird	0	0	0	0	0	0.0	0	0	0	0	0	1	0	0	0	0.1	
Troglodytidae	Scarlet Tanager	0	0	0	0	0	0.0	0	0	0	2	2	0	0	0	0	0.4	
Fringillidae	Purple Finch	6	4	0	2	2	2.8	2	2	2	2	3	4	2	2	3	2.4	
	White-winged Crossbill	6	0	10	14	4	6.8	0	6	5	10	5	8	0	5	1	4.4	
	Dark-eyed Junco	2	4	4	4	3	3.4	5	6	1	4	4	4	2	2	3	3.4	

Table 28 Cont'd

Family	Species	Pre-spray days					Post-spray days										Daily ave
		June 28	June 29	June 30	July 3	July 4	Daily ave	July 5	July 6	July 7	July 8	July 9	July 10	July 11	July 12	July 13	
		-6	-5	-4	-1	-0		+1	+2	+1	+2	+3	+1	+2	+3	+4	
	White-throated Sparrow	6	14	12	11	8	10.2	8	8	8	12	12	10	5	6	6	8.3
	Lincoln's Sparrow	0	0	0	0	0	0.0	0	0	0	0	2	2	2	0	0	0.6
Total:		100	113	105	97	91	101.2	84	97	105	123	115	117	75	68	70	94.8

Table 29
Forest bird population census
Untreated check block
Stanley, N.B.
June 1976

Family	Species	Pre-spray treatment 1						Post-spray treatment 1						Post-spray treatment 2					
		June 2	June 3	June 5	June 7	June 8	Daily ave	June 10	June 11	June 13	June 14	June 15	Daily ave	June 16	June 17	June 18	June 19	June 20	Daily ave
		-8	-7	-5	-3	-2		+0	+1	+3	+4	+5		+0	+1	+2	+3	+4	
Caprimulgidae	Ruffed Grouse	0	1	0	0	0	0.2	0	0	1	0	0	0.2	0	0	0	0	0	0.0
Colapidae	Common Flicker	0	0	0	0	1	0.2	0	0	0	0	2	0.4	0	0	0	2	0	0.4
	Yellow-bellied Sapsucker	0	0	0	0	0	0.0	1	0	0	0	0	0.2	0	0	0	0	0	0.0
Troglodytidae	Least Flycatcher	4	5	8	4	6	5.4	4	2	6	4	2	3.6	4	0	0	0	0	0.8
	Eastern Wood Peewee	1	0	0	0	0	0.2	4	2	0	2	0	1.6	0	0	0	0	0	0.0
	Olive-sided Flycatcher	0	0	0	0	0	0.0	0	0	1	0	2	0.6	2	0	0	0	0	0.4
Hirundinidae	Barn Swallow	0	0	0	0	0	0.0	0	4	0	0	0	0.8	0	0	0	0	0	0.0
Cyanidae	Blue Jay	0	1	2	0	0	0.6	2	1	4	3	0	2.0	1	0	0	0	0	0.2
Paridae	Black-capped Chickadee	0	0	0	0	0	0.0	0	7	0	0	0	1.4	4	0	0	0	0	0.8
	Boreal Chickadee	0	0	0	0	0	0.0	0	0	2	0	0	0.4	0	0	0	0	0	0.0
Geothlypidae	Red-breasted Nuthatch	0	2	0	0	0	0.4	0	0	1	0	0	0.2	0	0	2	0	0	0.4
Troglodytidae	Brown Creeper	0	2	2	0	0	0.8	0	0	0	2	0	0.4	0	0	0	0	0	0.0
Paridae	Winter Wren	2	4	2	4	2	2.8	6	2	2	0	4	2.8	4	4	6	8	6	5.6
Troglodytidae	American Robin	2	1	2	3	2	2.0	1	2	5	1	2	2.2	6	2	2	3	2	3.0
	Wood Thrush	2	0	4	2	0	1.6	4	0	0	0	0	0.8	0	0	2	0	0	0.4
	Hermit Thrush	0	0	0	0	0	0.0	0	1	0	0	0	0.2	0	0	0	0	2	0.4
	Swainson's Thrush	3	2	3	3	1	2.4	1	0	9	13	8	6.2	0	4	5	2	1	2.4

Table 29

Cont'd

Family	Species	Pre-spray treatment 1						Post-spray treatment 1						Post-spray treatment 2					
		June 2	June 3	June 5	June 7	June 8	Daily ave	June 10	June 11	June 13	June 14	June 15	Daily ave	June 16	June 17	June 18	June 19	June 20	Daily ave
		-8	-7	-5	-3	-2		+0	+1	+3	+4	+5		+0	+1	+2	+3	+4	
Turdidae	Ovenbird	6	12	6	8	8	8.0	8	12	8	8	6	8.4	6	10	12	8	8	8.8
	Northern Waterthrush	0	2	0	0	0	0.4	0	0	0	0	0	0.0	0	0	0	0	0	0.0
	Mourning Warbler	0	0	0	0	0	0.0	2	0	4	0	0	1.2	2	2	0	2	4	2.0
	Yellowthroat	2	0	0	0	0	0.4	0	0	0	0	2	0.4	2	0	0	0	0	0.4
	Canada Warbler	2	4	2	2	4	2.8	4	4	4	8	4	4.0	2	4	4	4	4	3.6
	American Redstart	4	7	8	11	10	8.0	8	5	13	10	6	8.4	14	7	10	12	10	10.6
Ceryleidae	Common Grackle	0	0	0	0	0	0.0	0	0	0	0	0	0.0	0	0	4	0	0	0.8
	Brown-headed Cowbird	0	0	0	0	0	0.0	2	2	4	4	6	3.6	1	4	2	2	4	2.6
Sylviidae	Rose-breasted Grosbeak	5	2	6	7	7	5.4	5	7	3	8	6	5.8	2	3	6	4	2	3.4
	Evening Grosbeak	0	0	0	0	0	0.0	0	1	0	1	0	0.4	0	0	0	0	0	0.0
	Purple Finch	4	5	2	2	4	3.4	5	6	7	6	2	5.2	0	2	4	4	2	2.4
	Pine Siskin	0	0	0	0	2	0.4	0	0	1	0	0	0.2	0	0	0	0	0	0.0
	American Goldfinch	2	2	0	1	0	1.0	0	0	0	0	0	0.0	0	0	4	0	0	0.8
	Dark-eyed Junco	0	4	3	3	4	2.8	3	1	6	4	4	3.6	2	3	7	9	0	4.2
	Chipping Sparrow	1	0	0	0	0	0.2	0	0	0	0	0	0.0	8	2	0	2	0	2.4
	White-throated Sparrow	6	8	10	13	9	9.2	10	6	10	12	16	10.4	10	6	8	11	4	7.8
Totals:		69	92	99	113	86	91.8	94	94	123	111	110	106.4	95	74	102	98	67	87.2

Table 29 Cont'd

Family	Species	Pre-spray treatment 1						Post-spray treatment 1						Post-spray treatment 2					
		June 2	June 3	June 5	June 7	June 8	Daily ave	June 10	June 11	June 13	June 14	June 15	Daily ave	June 16	June 17	June 18	June 19	June 20	Daily ave
		-8	-7	-5	-3	-2		+0	+1	+3	+4	+5		+0	+1	+2	+3	+4	
Cardinalidae	Veery	1	2	3	4	2	2.4	4	6	4	3	6	4.6	7	3	3	3	2	3.6
Alcedinidae	Golden-crowned Kinglet	0	0	0	2	0	0.4	0	1	2	2	2	1.4	2	4	4	2	2	2.8
	Ruby-crowned Kinglet	0	2	2	4	2	2.0	2	2	0	8	4	3.2	2	2	2	4	2	2.4
Empidonidae	Cedar Waxwing	0	0	0	0	2	0.4	0	0	0	0	0	0.0	0	0	0	0	0	0.0
Vireonidae	Solitary Vireo	2	4	0	0	0	1.2	0	0	0	0	4	0.8	4	2	0	0	0	1.2
	Red-eyed Vireo	0	0	0	0	0	0.0	2	0	0	0	0	0.4	0	0	0	0	0	0.0
Troglodytidae	Black and White Warbler	0	0	2	6	6	2.8	1	2	6	0	0	1.8	0	0	0	2	2	0.8
	Tennessee Warbler	2	2	4	4	2	2.8	0	0	0	0	2	0.4	0	0	0	0	0	0.0
	Nashville Warbler	4	0	0	2	0	1.2	4	2	0	2	6	2.8	0	2	0	4	4	2.0
	Parula Warbler	4	4	6	6	0	4.0	2	6	4	4	4	4.0	0	2	4	0	2	1.6
	Magnolia Warbler	6	9	14	10	6	9.0	5	4	0	2	2	4.2	0	2	2	2	0	1.2
	Black-throated Blue Warbler	2	0	2	4	2	2.0	0	0	4	2	0	1.2	0	0	2	2	2	1.2
	Myrtle Warbler	0	0	4	2	0	1.2	0	2	2	0	4	1.6	0	2	2	0	0	0.8
	Black-throated Green Warbler	0	0	0	0	0	0.0	2	0	2	2	2	1.6	4	0	0	2	0	1.2
	Blackburnian Warbler	2	5	2	4	2	3.0	2	4	0	0	2	1.6	2	2	1	0	2	1.4
	Bay-breasted Warbler	2	0	0	2	2	1.2	0	0	0	0	0	0.0	4	0	4	4	0	2.4

Table 30
Forest bird population census
acephate treatment block 5
Stanley, New Brunswick
1976

Family	Species	Pre-spray days						Post-spray days				
		June 1	June 2	June 3	June 7	June 8	Daily ave	June 10	June 11	June 13	June 14	Daily ave
		-9	-8	-7	-3	-2		+0	+1	+3	+4	
Trochilidae	Ruby-throated Hummingbird	2	4	0	1	0	1.4	2	0	0	0	0.5
Picidae	Yellow-bellied Sapsucker	0	5	0	3	0	1.6	0	0	0	0	0.0
Tyrannidae	Least Flycatcher	2	0	0	0	0	0.4	0	0	0	0	0.0
Corvidae	Raven	1	0	2	2	0	1.0	1	0	2	2	1.3
Paridae	Black-capped Chickadee	1	0	0	0	0	0.2	0	0	0	0	0.0
Sittidae	Red-breasted Nuthatch	0	0	0	2	0	0.4	0	0	0	0	0.0
Troglodytidae	Winter Wren	2	0	4	6	2	2.8	0	2	2	2	1.5
Turdidae	American Robin	0	4	2	0	5	2.2	0	0	2	1	0.8
	Wood Thrush	0	4	4	2	4	2.8	4	2	2	0	2.0
	Swainson's Thrush	0	0	0	3	1	0.8	0	1	0	0	0.3
	Veery	1	2	3	4	2	2.4	4	2	1	2	2.3
Sylviidae	Ruby-crowned Kinglet	0	0	0	0	0	0.0	0	0	0	4	1.0
Vireonidae	Solitary Vireo	2	0	0	2	0	0.8	0	0	0	2	0.5
Parulidae	Black and White Warbler	2	2	2	4	2	2.4	0	4	2	4	2.0
	Tennessee Warbler	8	18	12	12	2	10.4	2	0	4	1	1.2
	Nashville Warbler	0	2	4	0	0	1.2	0	0	0	2	0.5

Table 30 Cont'd

Family	Species	Pre-spray days						Post-spray days					
		June	June	June	June	June	Daily	June	June	June	June	Daily	
		1	2	3	7	8		10	11	13	14		
		-9	-8	-7	-3	-2	ave	+0	+1	+3	+4	ave	
Parulidae cont'd	Parula Warbler	4	2	2	4	2	2.8	2	2	2	4	2.5	
	Magnolia Warbler	5	12	8	8	8	8.2	6	2	4	8	5.0	
	Black-throated Blue Warbler	2	0	0	0	0	0.4	0	0	0	0	0.0	
	Myrtle Warbler	2	0	0	0	0	0.4	0	0	0	0	0.0	
	Black-throated Green Warbler	0	0	0	0	0	0.0	0	2	0	0	0.5	
	Blackburnian Warbler	2	0	2	0	0	0.8	0	0	0	4	1.0	
	Chestnut-sided Warbler	4	0	0	0	0	0.8	0	0	0	0	0.0	
	Bay-breasted Warbler	2	2	0	2	0	1.2	0	0	0	0	0.0	
	Ovenbird	2	4	6	12	4	5.6	8	2	8	4	5.5	
	Northern Waterthrush	4	2	0	4	2	2.4	0	2	0	0	0.5	
	Yellowthroat	0	2	0	0	2	0.8	0	0	0	0	0.0	
	Canada Warbler	1	0	2	2	2	1.4	2	2	8	4	4.0	
	American Redstart	1	2	4	6	1	2.8	6	2	8	6	5.5	
Icteridae	Red-winged Blackbird	0	0	0	0	2	0.4	0	0	0	0	0.0	
	Brown-headed Cowbird	0	0	0	0	0	0.0	0	0	0	2	0.5	

Table 30 Cont'd

Family	Species	Pre-spray days						Post-spray days					
		June	June	June	June	June	Daily	June	June	June	June	Daily	ave
		1	2	3	7	8		10	11	13	14		
		-9	-8	-7	-3	-2	ave	+0	+1	+3	+4	ave	
Fringillidae	Rose-breasted Grosbeak	0	0	2	4	1	1.4	0	3	2	1	1.5	
	Purple Finch	2	4	6	6	3	4.2	6	6	2	4	4.5	
	Pine Siskin	0	2	0	0	0	0.4	0	0	0	2	0.5	
	Dark-eyed Junco	1	0	0	0	0	0.2	0	2	0	0	0.5	
	Chipping Sparrow	0	0	2	0	0	0.4	0	0	0	2	0.5	
	White-throated Sparrow	0	8	3	6	3	4.0	0	7	4	1	3.0	
Unidentified Species		0	3	0	1	0	0.8	1	1	1	0	0.8	
Totals:		53	84	80	96	48	72.2	44	44	54	62	51.0	

Table 31
Forest bird population census
acephate treatment block 2
Stanley, N.B.
June 1976

Family	Species	Pre-spray treatment 1						Post-spray treatment 1						Post-spray treatment 2					
		June 1	June 2	June 3	June 7	June 8	Daily ave	June 10	June 11	June 13	June 14	June 15	Daily ave	June 16	June 17	June 18	June 19	June 21	Daily ave
		-9	-8	-7	-3	-2		0+	+1	+3	+4	+5		+0	+1	+2	+3	+5	
chilidae	Ruby-throated Hummingbird	1	0	3	0	0	0.8	0	0	0	0	0	0.0	0	0	0	0	0	0.0
idae	Hairy Woodpecker	0	0	0	0	0	0.0	0	0	0	2	0	0.4	0	0	0	0	0	0.0
annidae	Least Flycatcher	0	0	0	4	2	1.2	2	2	2	2	2	2.0	2	0	2	2	0	1.2
	Eastern Wood Peewee	0	0	0	0	0	0.0	0	0	0	0	0	0.0	0	2	0	0	0	0.4
idae	Black-capped Chickadee	0	2	1	0	0	0.6	0	0	0	0	0	0.0	0	0	0	0	0	0.0
idae	American Robin	1	2	1	1	1	1.2	0	0	0	0	0	0.0	0	3	2	2	2	1.8
	Hermit Thrush	4	3	0	0	0	1.4	1	2	0	0	2	1.0	0	0	0	0	0	0.0
	Swainson's Thrush	3	2	0	1	0	1.2	2	2	6	5	4	3.8	2	2	5	5	6	4.0
	Veery	0	0	0	0	0	0.0	0	0	0	0	0	0.0	0	0	0	1	0	0.2
viidae	Golden-crowned Kinglet	0	0	0	0	0	0.0	0	0	0	0	0	0.0	0	0	0	0	1	0.2
	Ruby-crowned Kinglet	2	2	0	2	2	1.6	2	2	0	2	4	2.0	0	0	0	4	0	0.8
eonidae	Solitary Vireo	0	2	0	2	0	0.8	0	0	2	2	0	0.8	2	2	0	0	0	0.8
ulidae	Black and White Warbler	0	0	0	0	0	0.0	0	2	4	2	0	1.6	4	2	2	2	2	2.4
	Tennessee Warbler	2	2	1	0	0	1.0	0	0	0	0	0	0.0	0	0	2	0	0	0.4
	Nashville Warbler	0	0	0	0	0	0.0	0	0	0	0	0	0.0	0	0	0	2	2	0.8
	Parula Warbler	0	0	0	4	4	1.6	4	0	4	4	2	2.8	0	4	4	2	6	3.2
	Magnolia Warbler	0	2	1	8	4	3.0	12	6	4	2	2	5.2	4	2	4	4	2	3.2

Table 31

Cont'd

Family	Species	Pre-spray treatment 1						Post-spray treatment 1						Post-spray treatment 2					
		June 1	June 2	June 3	June 7	June 8	Daily ave	June 10	June 11	June 13	June 14	June 15	Daily ave	June 16	June 17	June 18	June 19	June 21	Daily ave
		-9	-8	-7	-3	-2		0+	+1	+3	+4	+5		+1	+2	+3	+4	+6	
	Black-throated Blue Warbler	0	2	2	0	2	1.2	0	0	0	0	2	0.4	0	2	2	2	0	1.2
	Myrtle Warbler	2	0	0	0	0	0.4	0	2	0	2	0	0.8	0	0	0	0	0	0.0
	Black-throated Green Warbler	4	4	4	8	0	4.0	6	4	4	2	4	4.0	2	4	0	2	4	2.4
	Blackburnian Warbler	0	4	2	2	0	1.6	2	2	2	0	0	1.2	0	0	0	2	0	0.4
	Bay-breasted Warbler	0	4	2	6	2	2.8	2	4	2	2	0	2.0	2	4	2	1	0	1.8
	Ovenbird	6	11	11	12	12	10.4	12	12	8	10	12	10.8	8	10	8	14	8	9.6
	Mourning Warbler	0	0	0	0	2	0.4	2	2	2	0	2	1.6	2	0	2	0	2	1.2
	Yellowthroat	0	0	0	0	0	0.0	0	0	2	0	0	0.4	0	0	2	0	0	0.4
	Canada Warbler	0	0	2	0	0	0.4	0	0	0	0	2	0.4	2	0	0	4	0	1.2
	American Redstart	0	0	8	6	7	4.2	2	4	8	6	2	5.4	6	4	6	8	5	5.8
Troglodytidae	Scarlet Tanager	0	4	0	0	0	0.8	0	0	0	0	0	0.0	0	0	0	0	0	0.0
Finchidae	Rose-breasted Grosbeak	0	1	2	2	2	1.4	2	2	0	0	0	0.8	4	4	0	0	3	2.2
	Purple Finch	4	4	2	4	2	3.2	2	2	0	2	1	1.4	0	0	0	2	3	1.0
	Pine Grosbeak	0	0	0	2	0	0.4	0	0	0	0	0	0.0	0	0	0	0	0	0.0
	American Goldfinch	0	0	0	0	0	0.0	0	0	0	0	0	0.0	0	2	0	0	0	0.4
	Dark-eyed Junco	0	0	0	0	0	0.0	3	2	2	1	8	3.0	0	0	0	3	2	1.0

Table 31

Cont'd

Family	Species	Pre-spray treatment 1					Post-spray treatment 1					Post-spray treatment 2							
		June 1	June 2	June 3	June 7	June 8	Daily	June 10	June 11	June 13	June 14	June 15	Daily	June 16	June 17	June 18	June 19	June 21	Daily
		1	2	3	7	8	ave	10	11	13	14	15	ave	16	17	18	19	21	ave
		-9	-8	-7	-3	-2		+0	+1	+3	+4	+5		+1	+2	+3	+4	+6	
	Chipping Sparrow	0	1	2	0	0	0.6	0	0	0	0	0	0.0	2	0	0	0	2	0.8
	White-throated Sparrow	2	3	2	3	0	2.0	6	0	6	5	4	4.2	6	4	4	6	2	4.4
Identified Species		3	0	0	0	0	0.6	0	0	0	0	0	0.0	0	0	0	0	0	0.0
Totals:		34	54	46	67	42	48.6	62	52	58	51	53	55.2	48	51	47	68	52	53.2

Table 32
Forest bird population census
Untreated check block
Stanley, N.B.
June 1976

Family	Species	Pre-spray treatment 1						Post-spray treatment 1						Post-spray treatment 2					
		June 2	June 3	June 5	June 7	June 8	Daily ave	June 10	June 11	June 13	June 14	June 15	Daily ave	June 16	June 17	June 18	June 19	June 20	Daily ave
		-7	-6	-4	-2	-1		+1	+2	+4	+5	+6		+1	+2	+3	+4	+5	
traonidae	Ruffed Grouse	0	1	0	0	0	0.2	0	0	1	0	0	0.2	0	0	0	0	0	0.0
cidae	Common Flicker	0	0	0	0	1	0.2	0	0	0	0	2	0.4	0	0	0	2	0	0.4
	Yellow-bellied Sapsucker	0	0	0	0	0	0.0	1	0	0	0	0	0.2	0	0	0	0	0	0.0
rannidae	Least Flycatcher	4	5	8	4	6	5.4	4	2	6	4	2	3.6	4	0	0	0	0	0.8
	Eastern Wood Peewee	1	0	0	0	0	0.2	4	2	0	2	0	1.6	0	0	0	0	0	0.0
	Olive-sided Flycatcher	0	0	0	0	0	0.0	0	0	1	0	2	0.6	2	0	0	0	0	0.4
rundinidae	Barn Swallow	0	0	0	0	0	0.0	0	4	0	0	0	0.8	0	0	0	0	0	0.0
rvidae	Blue Jay	0	1	2	0	0	0.6	2	1	4	3	0	2.0	1	0	0	0	0	0.2
ridae	Black-capped Chickadee	0	0	0	0	0	0.0	0	7	0	0	0	1.4	4	0	0	0	0	0.8
	Boreal Chickadee	0	0	0	0	0	0.0	0	0	2	0	0	0.4	0	0	0	0	0	0.0
ttidae	Red-breasted Nuthatch	0	2	0	0	0	0.4	0	0	1	0	0	0.2	0	0	2	0	0	0.4
rthiidae	Brown Creeper	0	2	2	0	0	0.8	0	0	0	2	0	0.4	0	0	0	0	0	0.0
oglydytidae	Winter Wren	2	4	2	4	2	2.8	6	2	2	0	4	2.8	4	4	6	8	6	5.6
rdidae	American Robin	2	1	2	3	2	2.0	1	2	5	1	2	2.2	6	2	2	3	2	3.0
	Wood Thrush	2	0	4	2	0	1.6	4	0	0	0	0	0.8	0	0	2	0	0	0.4
	Hermit Thrush	0	0	0	0	0	0.0	0	1	0	0	0	0.2	0	0	0	0	2	0.4
	Swainson's Thrush	3	2	3	3	1	2.4	1	0	2	13	8	6.2	0	4	5	2	1	2.4

Table 32 Cont'd

Family	Species	Pre-spray treatment 1						Post-spray treatment 1						Post-spray treatment 2					
		June 2	June 3	June 5	June 7	June 8	Daily	June 10	June 11	June 13	June 14	June 15	Daily	June 16	June 17	June 18	June 19	June 20	Daily
		-7	-6	-4	-2	-1	ave.	+1	+2	+4	+5	+6	ave.	+1	+2	+3	+4	+5	ave.
Cardinalidae	Veery	1	2	3	4	2	2.4	4	6	4	3	6	4.6	7	3	3	3	2	3.6
Troglodytidae	Golden-crowned Kinglet	0	0	0	2	0	0.4	0	1	2	2	2	1.4	2	4	4	2	2	2.8
	Ruby-crowned Kinglet	0	2	2	4	2	2.0	2	2	0	8	4	3.2	2	2	2	4	2	2.4
Empidonidae	Cedar Waxwing	0	0	0	0	2	0.4	0	0	0	0	0	0.0	0	0	0	0	0	0.0
Vireonidae	Solitary Vireo	2	4	0	0	0	1.2	0	0	0	0	4	0.8	4	2	0	0	0	1.2
	Red-eyed Vireo	0	0	0	0	0	0.0	2	0	0	0	0	0.4	0	0	0	0	0	0.0
Parulidae	Black and White Warbler	0	0	2	6	6	2.8	1	2	6	0	0	1.8	0	0	0	2	2	0.8
	Tennessee Warbler	2	2	4	4	2	2.8	0	0	0	0	2	0.4	0	0	0	0	0	0.0
	Nashville Warbler	4	0	0	2	0	1.2	4	2	0	2	6	2.8	0	2	0	4	4	2.0
	Parula Warbler	4	4	6	6	0	4.0	2	6	4	4	4	4.0	0	2	4	0	2	1.6
	Magnolia Warbler	6	9	14	10	6	9.0	5	4	8	2	2	4.2	0	2	2	2	0	1.2
	Black-throated Blue Warbler	2	0	2	4	2	2.0	0	0	4	2	0	1.2	0	0	2	2	2	1.2
	Myrtle Warbler	0	0	4	2	0	1.2	0	2	2	0	4	1.6	0	2	2	0	0	0.8
	Black-throated Green Warbler	0	0	0	0	0	0.0	2	0	2	2	2	1.6	4	0	0	2	0	1.2
	Blackburnian Warbler	2	5	2	4	2	3.0	2	4	0	0	2	1.6	2	2	1	0	2	1.4
	Bay-breasted Warbler	2	0	0	2	2	1.2	0	0	0	0	0	0.0	4	0	4	4	0	2.4

Table 32

Cont'd

Family	Species	Pre-spray treatment 1						Post-spray treatment 1						Post-spray treatment 2					
		June 2	June 3	June 5	June 7	June 8	Daily ave	June 10	June 11	June 13	June 14	June 15	Daily ave	June 16	June 17	June 18	June 19	June 20	Daily ave
		-7	-6	-4	-2	-1		+1	+2	+4	+5	+6		+1	+2	+3	+4	+5	
Parulidae cont'd	Ovenbird	6	12	6	8	8	8.0	8	12	8	8	6	8.4	6	10	12	8	8	8.8
	Northern Waterthrush	0	2	0	0	0	0.4	0	0	0	0	0	0.0	0	0	0	0	0	0.0
	Mourning Warbler	0	0	0	0	0	0.0	2	0	4	0	0	1.2	2	2	0	2	4	2.0
	Yellowthroat	2	0	0	0	0	0.4	0	0	0	0	2	0.4	2	0	0	0	0	0.4
	Canada Warbler	2	4	2	2	4	2.8	4	4	4	8	4	4.0	2	4	4	4	4	3.6
	American Redstart	4	7	8	11	10	8.0	8	5	13	10	6	8.4	14	7	10	12	10	10.6
Cisticolidae	Common Grackle	0	0	0	0	0	0.0	0	0	0	0	0	0.0	0	0	4	0	0	0.8
	Brown-headed Cowbird	0	0	0	0	0	0.0	2	2	4	4	6	3.6	1	4	2	2	4	2.6
Troglodytidae	Rose-breasted Grosbeak	5	2	6	7	7	5.4	5	7	3	8	6	5.8	2	3	6	4	2	3.4
	Evening Grosbeak	0	0	0	0	0	0.0	0	1	0	1	0	0.4	0	0	0	0	0	0.0
	Purple Finch	4	5	2	2	4	3.4	5	6	7	6	2	5.2	0	2	4	4	2	2.4
	Pine Siskin	0	0	0	0	2	0.4	0	0	1	0	0	0.2	0	0	0	0	0	0.0
	American Goldfinch	2	2	0	1	0	1.0	0	0	0	0	0	0.0	0	0	4	0	0	0.8
	Dark-eyed Junco	0	4	3	3	4	2.8	3	1	6	4	4	3.6	2	3	7	9	0	4.2
	Chipping Sparrow	1	0	0	0	0	0.2	0	0	0	0	0	0.0	8	2	0	2	0	2.4
	White-throated Sparrow	6	8	10	13	9	9.2	10	6	10	12	16	10.4	10	6	8	11	4	7.8
	Totals:	69	92	99	113	86	91.8	94	94	123	111	110	106.4	95	74	102	98	67	87.2

Table 33
Forest bird population census
carbaryl treatment plot 1
Stanley, New Brunswick
June 1976

Family	Species	Pre-spray days						Post-spray days				
		June 1	June 2	June 3	June 7	June 8	Daily ave	June 10	June 11	June 13	June 14	Daily ave
		-8	-7	-6	-2	-1		+1	+2	+4	+5	
Tetraonidae	Ruffed Grouse	2	2	0	0	0	0.8	0	0	2	0	0.5
Picidae	Yellow-bellied Sapsucker	0	2	2	1	0	1.0	0	0	0	0	0.0
	Hairy Woodpecker	0	0	0	0	0	0.0	0	0	0	1	0.3
Tyrannidae	Least Flycatcher	0	4	0	2	0	1.2	0	0	0	0	0.0
Corvidae	Blue Jay	2	0	0	0	0	0.4	0	0	0	0	0.0
Sittidae	Red-breasted Nuthatch	0	0	2	0	0	0.4	2	0	0	0	0.5
Troglodytidae	Winter Wren	4	0	0	2	2	1.6	4	0	0	0	1.0
Turdidae	American Robin	0	0	2	0	2	0.8	0	1	2	4	1.8
	Wood Thrush	0	0	0	0	0	0.0	0	0	2	0	0.5
	Swainson's Thrush	2	2	8	0	1	2.6	2	2	1	4	2.3
Sylviidae	Golden-crowned Kinglet	1	1	0	0	2	0.8	0	0	0	0	0.0
	Ruby-crowned Kinglet	4	8	6	8	4	6.0	4	4	2	2	3.0
Vireonidae	Solitary Vireo	0	4	2	0	2	1.6	0	0	0	0	0.0
Parulidae	Black and White Warbler	0	2	0	0	0	0.4	0	4	2	2	2.0
	Tennessee Warbler	6	8	12	10	4	8.0	4	14	6	4	7.0
	Nashville Warbler	0	0	2	4	0	1.2	2	0	0	0	0.5

Table 33 Cont'd

Family	Species	Pre-spray days					Daily ave	Post-spray days					Daily ave
		June	June	June	June	June		June	June	June	June		
		1	2	3	7	8		10	11	13	14		
		-8	-7	-6	-2	-1		+1	+2	+4	+5		
Parulidae cont'd	Parula Warbler	0	0	0	2	0	0.4	0	0	0	0	0.0	
	Magnolia Warbler	2	4	6	8	4	4.8	0	2	0	0	0.5	
	Cape May Warbler	0	0	0	0	0	0.0	0	0	0	2	0.5	
	Black-throated Green Warbler	2	2	0	0	0	0.8	2	0	0	2	1.0	
	Blackburnian Warbler	0	0	2	0	0	0.4	2	0	0	2	1.0	
	Bay-breasted Warbler	0	4	2	0	0	1.2	0	0	0	0	0.0	
	Ovenbird	6	2	6	6	4	4.8	2	4	4	2	3.0	
	Northern Waterthrush	0	0	2	0	0	0.4	0	0	0	0	0.0	
	Yellowthroat	0	2	0	0	0	0.4	0	0	0	2	0.5	
	Canada Warbler	0	0	0	0	0	0.0	0	2	0	4	1.5	
Fringillidae	American Redstart	4	0	0	0	0	0.8	0	0	0	0	0.0	
	Rose-breasted Grosbeak	2	0	4	1	1	1.6	0	1	0	5	1.5	
	Evening Grosbeak	1	0	0	0	0	0.2	0	0	0	2	0.5	
	Purple Finch	4	4	4	6	2	4.0	0	4	0	2	1.5	
	Pine Siskin	6	0	4	0	0	2.0	0	0	0	0	0.0	

Table 33 Cont'd

Family	Species	Pre-spray days					Post-spray days					
		June	June	June	June	June	June	June	June	June	June	
		1	2	3	7	8	Daily	10	11	13	14	Daily
		-8	-7	-6	-2	-1	ave	+1	+2	+4	+5	ave
	Dark-eyed Junco	0	0	0	4	6	2.0	0	0	0	0	0.0
	Chipping Sparrow	0	0	8	2	0	2.0	0	0	1	2	0.8
	White-throated Sparrow	5	6	6	8	2	5.4	1	4	2	4	2.8
	Unidentified Species	0	0	2	6	4	2.4	2	1	1	0	1.0
	Totals:	53	57	82	70	40	60.4	27	43	25	46	35.3

Table 34
Forest bird population census
carbaryl treatment plot 2
Stanley, N.B.
June 1976

family	Species	Pre-spray treatment 1						Post-spray treatment 1						Post-spray treatment 2					
		June 1	June 2	June 3	June 7	June 8	Daily	June 10	June 11	June 13	June 14	June 15	Daily	June 16	June 17	June 18	June 19	June 21	Daily
		-8	-7	-6	-2	-1	ave	+1	+2	+4	+5	+6	ave	+1	+2	+3	+4	+6	ave
icidae	Hairy Woodpecker	0	0	0	0	1	0.2	0	0	0	0	0	0.0	0	0	0	0	0	0.0
yrannidae	Least Flycatcher	0	6	2	0	0	1.6	0	0	2	2	0	0.8	0	0	2	4	2	1.6
	Eastern Wood Peewee	0	2	0	2	2	1.2	0	0	0	0	2	0.4	0	2	0	2	2	1.2
aridae	Black-capped Chickadee	0	0	0	0	0	0.0	0	0	0	0	0	0.0	2	0	0	0	0	0.4
roglodytidae	Winter Wren	0	0	0	0	2	0.4	0	0	0	0	0	0.0	0	0	0	2	0	0.4
urdidae	American Robin	0	2	0	0	0	0.4	0	0	0	0	0	0.0	0	2	0	0	0	0.4
	Wood Thrush	0	0	0	0	0	0.0	0	0	2	0	0	0.4	0	0	0	1	0	0.2
	Hermit Thrush	0	0	2	0	0	0.4	0	0	0	0	0	0.0	0	0	0	0	0	0.0
	Swainson's Thrush	2	2	2	2	3	2.2	7	6	4	0	5	4.4	6	6	6	5	2	5.0
	Veery	0	0	0	0	0	0.0	0	0	0	3	0	0.6	0	0	0	1	0	0.2
ylviidae	Golden-crowned Kinglet	0	0	0	0	2	0.4	0	0	0	0	0	0.0	2	0	0	0	0	0.4
	Ruby-crowned Kinglet	2	2	0	2	0	1.2	2	0	4	0	2	1.6	2	0	2	2	2	1.6
ireonidae	Solitary Vireo	4	2	4	2	2	2.8	0	0	0	0	0	0.0	0	0	0	0	0	0.0
	Red-eyed Vireo	0	0	0	0	0	0.0	0	0	0	0	4	0.8	0	0	0	0	0	0.0

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Table 34 Cont'd

Family	Species	Prespray treatment 1						Post-spray treatment 1						Post-spray treatment 2					
		June 1	June 2	June 3	June 7	June 8	Daily	June 10	June 11	June 13	June 14	June 15	Daily	June 16	June 17	June 18	June 19	June 21	Daily
		-8	-7	-6	-2	-1	ave	+1	+2	+4	+5	+6	ave	+1	+2	+3	+4	+6	ave
Parulidae	Black and White Warbler	0	0	0	0	0	0.0	0	0	0	2	2	0.8	3	0	0	0	0	0.6
	Tennessee Warbler	2	4	2	4	4	3.2	6	4	6	0	6	4.4	0	0	2	2	2	1.2
	Nashville Warbler	0	0	0	0	0	0.0	2	0	0	0	0	0.4	0	0	0	0	0	0.0
	Parula Warbler	6	0	4	2	0	2.4	2	0	2	6	4	2.8	4	0	0	0	0	0.8
	Magnolia Warbler	0	2	0	2	2	1.2	4	4	0	8	2	3.2	4	2	4	4	2	3.2
	Cape May Warbler	0	0	0	0	0	0.0	0	0	0	0	0	0.0	2	0	2	0	0	0.8
	Black-throated Blue Warbler	0	2	0	0	0	0.4	0	2	0	0	0	0.4	0	0	2	0	0	0.4
	Myrtle Warbler	0	0	2	0	0	0.4	2	0	4	2	2	2.0	2	0	2	2	2	1.6
	Black-throated Green Warbler	4	2	2	4	2	2.8	4	0	0	8	2	2.8	0	2	0	0	0	0.4
	Blackburnian Warbler	0	2	2	2	2	1.6	2	6	2	2	0	2.4	2	8	2	0	2	2.8
	Bay-breasted Warbler	2	0	2	0	0	0.8	0	0	2	6	2	2.0	2	4	2	0	2	2.0
	Ovenbird	4	6	6	8	6	6.0	7	6	8	6	6	6.6	6	10	8	4	4	6.4
	Northern Waterthrush	0	2	0	0	0	0.4	2	2	0	0	0	0.8	0	0	0	0	0	0.0
	Mourning Warbler	0	0	0	0	0	0.0	0	0	0	0	0	0.0	0	2	4	0	0	1.2
	Yellowthroat	0	0	0	0	0	0.0	0	0	2	0	0	0.4	0	0	0	0	0	0.0
	Canada Warbler	0	0	0	2	0	0.4	4	2	3	2	5	4.2	6	4	4	0	0	2.8

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Table 34 Cont'd

Family	Species	Prespray treatment 1						Post-spray treatment 1						Post-spray treatment 2					
		June 1	June 2	June 3	June 7	June 8	Daily ave	June 10	June 11	June 13	June 14	June 15	Daily ave	June 16	June 17	June 18	June 19	June 21	Daily ave
		-8	-7	-6	-2	-1		+1	+2	+4	+5	+6		+1	+2	+3	+4	+6	
Tingitidae	American Redstart	0	2	6	8	10	5.2	6	2	3	2	2	3.0	4	4	2	4	2	3.2
	Rose-breasted Grosbeak	0	0	0	0	2	0.4	4	2	4	3	5	3.6	1	2	0	0	0	0.6
	Evening Grosbeak	0	0	0	0	0	0.0	0	0	0	0	0	0.0	0	0	0	1	0	0.2
	Purple Finch	2	1	0	2	4	1.8	4	4	4	0	0	2.4	2	0	2	0	0	0.8
	Pine Siskin	0	2	0	2	0	0.8	0	0	1	0	0	0.2	0	0	0	0	0	0.0
	American Goldfinch	0	0	0	0	0	0.0	0	0	0	0	0	0.0	0	0	0	0	2	0.4
	Dark-eyed Junco	0	2	2	2	0	1.2	0	0	1	5	3	1.8	3	2	0	7	2	2.8
	White-throated Sparrow	2	4	2	8	2	3.6	0	4	4	2	4	2.8	4	2	2	4	4	3.2
total:		30	47	40	54	46	43.4	58	44	63	59	58	56.4	57	52	48	45	32	46.8

Table 35

Forest bird population census
aminocarb untreated check plot
Ripples, New Brunswick
June 28 - July 12
1976

Family	Species	Pre-spray days						Post-spray days								
		June	June	June	July	July	Daily ave	July	July	July	July	July	July	July	July	Daily ave
		28	29	30	3	4		5	6	7	8	9	10	11	12	
		-7	-6	-5	-2	-1		+0	+1	+0	+1	+2	+0	+1	+2	
Falconidae	Peregrine Falcon	0	0	0	0	0	0.0	1	0	0	0	0	0	0	0	0.1
Strigidae	Saw-Whet Owl	0	0	0	0	1	0.2	0	0	0	0	0	0	0	0	0.0
Caprimulgidae	Common Nighthawk	0	0	0	0	0	0.0	0	0	0	0	1	0	0	0	0.1
Picidae	Yellow-bellied Sapsucker	2	0	0	0	2	0.8	0	1	0	3	2	0	3	2	1.4
Tyrannidae	Olive-sided Flycatcher	0	0	0	2	0	0.4	0	0	0	0	0	0	0	0	0.0
Hirundinidae	Barn Swallow	0	0	0	0	0	0.0	0	0	0	0	0	2	0	0	0.3
Corvidae	Blue Jay	0	1	0	1	0	0.4	0	1	0	0	0	0	0	2	0.4
	Gray Jay	2	0	0	0	0	0.4	1	1	0	1	0	0	4	2	1.1
Paridae	Black-capped Chickadee	0	0	0	0	0	0.0	0	0	0	0	0	4	1	0	0.6
Sittidae	Red-breasted Nuthatch	0	0	0	0	2	0.4	4	0	2	2	2	2	2	2	2.0
Turdidae	American Robin	4	0	1	0	1	1.2	0	1	0	2	1	1	3	1	1.1
	Hermit Thrush	6	2	0	2	0	2.0	4	10	6	2	10	2	2	0	4.5
	Swainson's Thrush	0	4	6	14	6	6.0	8	4	0	8	6	15	16	4	7.6
	Veery	2	0	1	0	0	0.6	0	0	0	0	0	0	0	0	0.0
Syriidae	Golden-crowned Kinglet	0	0	0	2	0	0.4	2	2	0	0	0	2	2	0	1.0
	Ruby-crowned Kinglet	8	4	2	4	2	4.0	3	1	4	2	4	4	6	1	3.8

Table 35 Cont'd

Family	Species	Pre-spray days						Post-spray days								
		June	June	June	July	July	Daily ave	July	July	July	July	July	July	July	July	Daily ave
		28	29	30	3	4		5	6	7	8	9	10	11	12	
		-7	-6	-5	-2	-1		+0	+1	+0	+1	+2	+0	+1	+2	
Vireonidae	Solitary Vireo	0	0	0	0	0	0.0	2	0	0	0	0	0	0	0	0.3
	Red-eyed Vireo	0	0	0	0	0	0.0	0	0	0	0	0	0	0	2	0.3
Parulidae	Tennessee Warbler	0	4	0	2	4	2.0	4	4	2	2	2	0	3	2	2.4
	Nashville Warbler	4	0	0	0	0	0.8	2	0	0	0	0	14	4	2	2.8
	Parula Warbler	0	0	0	0	0	0.0	2	0	0	0	0	0	0	0	0.3
	Magnolia Warbler	4	2	0	0	6	2.4	2	0	8	2	4	2	4	2	3.0
	Cape May Warbler	0	0	0	0	0	0.0	0	0	2	0	0	0	0	0	0.3
	Myrtle Warbler	0	0	2	4	4	2.0	2	0	4	0	2	2	4	2	2.0
	Blackburnian Warbler	0	2	0	2	0	0.8	0	0	0	0	0	0	0	0	0.0
	Bay-breasted Warbler	8	2	2	8	2	4.4	4	4	4	3	2	2	4	2	3.1
	Ovenbird	6	4	6	14	10	8.0	6	8	12	16	8	20	14	12	12.0
	Northern Waterthrush	0	2	0	4	4	2.0	0	0	0	0	2	2	0	0	0.5
	Yellowthroat	4	2	4	0	0	2.0	4	3	0	3	0	4	2	2	2.3
	Canada Warbler	0	2	0	2	2	1.2	0	0	0	0	0	0	0	0	0.0
Fringillidae	Evening Grosbeak	0	2	0	0	0	0.4	2	0	0	2	0	0	0	0	0.5
	Rose-breasted Grosbeak	0	0	0	2	0	0.4	0	0	0	0	0	0	0	0	0.0
	White-winged Crossbill	0	22	0	4	0	5.2	2	2	2	2	2	6	6	4	3.3
	American Goldfinch	0	2	0	0	0	0.4	0	2	0	0	1	0	0	0	0.4

Table 35

Cont'd

Family	Species	Pre-spray days						Post-spray days								
		June 28	June 29	June 30	July 3	July 4	Daily ave	July 5	July 6	July 7	July 8	July 9	July 10	July 11	July 12	Daily ave
		-7	-6	-5	-2	-1		+0	+1	+0	+1	+2	+0	+1	+2	
Fringillidae cont'd	Dark-eyed Junco	8	6	0	2	2	3.6	2	0	3	4	2	4	2	2	2.4
	White-throated Sparrow	6	4	6	18	8	8.4	8	3	4	6	2	3	7	6	4.9
	Purple Finch	2	2	0	4	6	2.8	4	4	4	4	2	0	6	4	3.5
Totals:		66	69	30	91	62	63.6	84	51	57	64	55	91	95	96	69.1

Table 36
Forest bird population census
aminocarb treatment plot 5, block 4
Ripples, New Brunswick
June 28 - July 12
1976

Family	Species	Pre-spray days						Post-spray days								Daily ave
		June 28	June 29	June 30	July 3	July 4	Daily ave	July 5	July 6	July 7	July 8	July 9	July 10	July 11	July 12	
		-7	-6	-5	-2	-1		+0	+1	+0	+1	+2	+0	+1	+2	
Pandionidae	Marsh Hawk	0	0	0	0	1	0.2	0	0	0	0	0	0	0	0	0.0
Trochilidae	Ruby-throated Hummingbird	0	0	0	0	0	0.0	2	0	1	0	0	0	0	1	0.5
Picidae	Common Flicker	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0	0.0
Corvidae	Gray Jay	0	0	2	2	0	0.8	0	2	4	2	5	2	0	0	1.9
Paridae	Boreal Chickadee	0	0	0	2	2	0.8	4	0	2	2	0	0	2	2	1.5
Sittidae	Red-breasted Nuthatch	0	0	0	2	0	0.4	0	0	0	0	0	2	2	0	0.5
Turdidae	American Robin	0	0	2	0	2	0.8	0	0	4	2	1	0	3	2	1.5
	Hermit Thrush	2	4	6	2	4	3.6	0	6	0	4	2	6	2	2	2.8
	Swainson's Thrush	0	0	0	2	2	0.8	2	3	7	8	10	10	11	11	7.8
	Veery	0	0	0	0	0	0.0	0	0	0	0	0	0	0	0	0.0
Sylviidae	Ruby-crowned Kinglet	8	6	6	8	6	6.8	8	6	6	4	4	2	4	4	4.8
	Golden-crowned Kinglet	2	2	2	2	0	1.6	0	2	2	2	0	0	2	2	1.3
Bombycillidae	Cedar Waxwing	0	2	0	2	0	0.8	2	0	0	0	0	0	0	0	0.3
Vireonidae	Red-eyed Vireo	0	0	0	0	0	0.0	2	0	0	2	2	0	0	2	1.0
Parulidae	Tennessee Warbler	0	4	2	0	2	1.6	4	4	2	2	2	0	2	0	2.0
	Nashville Warbler	0	0	0	0	0	0.0	0	0	0	0	2	2	0	0	0.5
	Magnolia Warbler	4	8	6	5	6	5.8	8	8	4	2	4	4	4	8	5.3

Table 36 . Cont'd

Family	Species	Pre-spray days					Post-spray days									
		June 28	June 29	June 30	July 3	July 4	Daily ave	July 5	July 6	July 7	July 8	July 9	July 10	July 11	July 12	Daily ave
		-7	-6	-5	-2	-1		+1	+2	0	+1	+2	+1	+2	+3	
Fringillidae	Cape May Warbler	2	0	0	4	2	1.6	4	0	2	0	2	4	4	0	2.0
	Myrtle Warbler	4	4	2	2	4	3.2	2	2	4	3	2	3	2	1	2.4
	Black-throated Green Warbler	0	0	2	2	2	1.2	0	2	0	0	0	0	2	0	0.5
	Blackburnian Warbler	0	0	0	2	0	0.4	0	1	0	0	0	0	1	0	0.3
	Bay-breasted Warbler	4	6	6	10	10	7.2	10	6	9	7	12	11	11	8	9.3
	Ovenbird	4	8	8	11	6	7.4	10	9	10	8	8	10	12	8	9.4
	Yellowthroat	0	0	0	0	0	0.0	0	0	2	2	2	0	2	0	1.0
	Canada Warbler	0	0	0	0	2	0.4	0	1	3	0	2	2	2	1	1.4
	Purple Finch	2	0	2	0	0	0.8	2	2	2	4	4	4	4	0	2.8
	White-winged Crossbill	0	4	6	11	10	6.2	14	16	15	14	12	8	12	12	12.9
	Dark-eyed Junco	0	2	8	6	4	4.0	2	4	4	8	10	16	13	15	9.0
	White-throated Sparrow	0	4	4	6	6	4.0	4	2	2	3	3	4	4	5	3.4
American Goldfinch	0	0	0	0	0	0.0	1	0	0	0	0	0	0	0	0.1	
Totals:		32	54	64	81	71	60.4	81	76	85	79	89	90	101	84	85.6

Table 37
Forest bird population census
aminocarb treatment plot 6, block 5
Acadia Forest Experiment Station
New Brunswick
June 28 - July 12
1976

Family	Species	Pre-spray days						Post-spray days								
		June 28	June 29	June 30	July 3	July 4	Daily ave	July 5	July 6	July 7	July 8	July 9	July 10	July 11	July 12	Daily ave
		-7	-6	-5	-2	-1		+0	+1	+0	+1	+2	+3	+4	+5	
Trochilidae	Ruby-throated Hummingbird	2	0	2	2	0	1.2	0	0	0	0	0	0	0	0	0.0
Picidae	Common Flicker	0	0	0	0	0	0.0	2	0	0	0	0	0	0	0	0.3
	Hairy Woodpecker	0	0	0	2	0	0.4	0	2	0	0	0	0	1	0	0.4
	Black-backed Three-toed Woodpecker	0	0	0	0	0	0.0	0	0	0	1	1	0	1	0	0.4
	Yellow-bellied Sapsucker	0	0	0	0	0	0.0	0	2	0	0	0	2	1	0	0.6
Tyrannidae	Yellow-bellied Flycatcher	0	0	0	0	0	0.0	0	2	0	0	2	2	0	2	0.5
	Least Flycatcher	2	4	2	2	2	2.4	2	6	4	4	12	3	6	2	4.9
	Eastern Wood Pewee	0	0	0	0	0	0.0	0	2	1	1	0	0	2	0	0.8
	Olive-sided Flycatcher	2	0	2	0	0	0.8	0	0	0	2	0	2	0	2	0.8
Hirundinidae	Tree Swallow	0	0	0	0	0	0.0	2	2	1	0	0	1	0	0	0.8
Corvidae	Blue Jay	0	0	1	0	0	0.2	0	0	0	0	1	0	1	0	0.3
	Common Raven	0	0	0	0	0	0.0	0	1	0	0	0	0	2	0	0.4
Sittidae	Red-breasted Nuthatch	2	0	0	0	0	0.4	2	0	0	0	0	0	2	0	0.5
Troglodytidae	Winter Wren	0	2	0	0	0	0.4	0	2	2	6	2	4	2	2	2.5
Turdidae	American Robin	0	2	0	2	0	0.8	2	1	2	1	1	3	2	3	1.9
	Wood Thrush	1	0	3	1	0	0.8	0	0	0	0	2	2	5	4	1.6

Table 37 . Cont'd

Family	Species	Pre-spray days						Post-spray days								
		June	June	June	July	July	Daily ave	July	July	July	July	July	July	July	July	Daily ave
		28	29	30	3	4		5	6	7	8	9	10	11	12	
		-7	-6	-5	-2	-1		+1	+2	0	+1	+2	+3	+4	+5	
Turdidae	Hermit Thrush	2	1	1	2	2	1.6	3	0	0	1	1	2	0	0	0.9
	Swainson's Thrush	5	0	4	4	5	3.6	8	4	7	10	13	8	13	6	8.6
Sylviidae	Golden-crowned Kinglet	4	0	0	0	0	0.8	0	2	0	0	2	0	2	1	0.9
	Ruby-crowned Kinglet	7	6	8	4	4	5.8	4	4	6	5	6	6	6	6	5.4
Bombycillidae	Cedar Waxwing	2	1	2	3	0	1.6	0	3	1	1	0	1	1	4	1.4
Vireonidae	Solitary Vireo	0	0	0	2	0	0.4	0	0	0	0	0	0	0	0	0.0
	Red-eyed Vireo	0	2	2	0	0	0.8	2	0	4	0	0	4	2	0	1.5
Parulidae	Tennessee Warbler	3	3	2	4	5	3.4	7	6	6	5	7	7	6	4	6.0
	Nashville Warbler	2	2	6	4	2	3.2	2	4	4	4	6	8	7	4	4.9
	Parula Warbler	0	2	4	4	0	2.0	2	1	0	0	0	0	0	2	0.6
	Magnolia Warbler	10	8	4	6	2	6.0	10	5	6	3	8	6	10	8	7.0
	Cape May Warbler	0	0	0	0	0	0.0	0	2	4	0	0	0	0	0	0.8
	Myrtle Warbler	0	4	0	3	0	1.4	0	2	0	0	0	0	2	4	1.0
	Black-throated Green Warbler	0	4	0	0	0	0.8	0	2	0	0	0	2	0	0	0.5
	Blackburnian Warbler	0	0	0	0	0	0.0	0	0	1	2	0	0	0	0	0.4
	Bay-breasted Warbler	2	0	0	0	0	0.4	0	0	0	0	0	0	0	0	0.0
	Ovenbird	4	6	2	2	4	3.6	4	11	8	6	6	8	10	8	7.6

Table 37 Cont'd

Family	Species	Pre-spray days						Post-spray days								
		June	June	June	July	July	Daily ave	July	July	July	July	July	July	July	July	Daily ave
		28	29	30	3	4		5	6	7	8	9	10	11	12	
		-7	-6	-5	-2	-1		+0	+1	+0	+1	+2	+3	+4	+5	
Fringillidae	Yellowthroat	10	15	14	9	11	11.8	12	19	8	16	17	20	23	13	16.0
	Wilson's Warbler	0	0	0	0	0	0.0	0	0	0	0	0	0	0	1	0.1
	Canada Warbler	6	0	2	4	0	2.4	4	8	10	6	5	7	3	10	6.6
	American Redstart	7	8	7	8	6	7.2	6	4	4	4	6	3	0	0	2.1
	Rose-breasted Grosbeak	0	0	0	0	0	0.0	2	0	2	2	2	0	1	0	1.1
	Purple Finch	13	11	5	9	4	8.4	5	4	8	6	1	1	0	0	3.1
	American Goldfinch	1	1	0	0	0	0.4	2	0	1	0	0	0	0	0	0.4
	White-winged Crossbill	2	9	3	3	2	3.6	2	2	3	2	0	1	2	1	1.6
	Dark-eyed Junco	0	6	6	6	0	3.6	6	4	4	3	6	3	9	7	5.3
	White-throated Sparrow	18	18	16	17	6	15.0	19	11	15	12	8	11	11	17	13.0
	Lincoln's Sparrow	0	0	0	0	0	0.0	2	0	0	2	0	0	2	2	0.5
Total:		107	115	98	104	55	95.8	112	118	112	105	115	117	135	113	115.9

Table 38

Forest bird population census
Fenitrothion treatment block 1492
Minto, New Brunswick
May 1976

Family	Species	Pre-spray days						Post-spray days 1st application						Post-spray days 2nd application				
		May	May	May	May	May	Daily ave	May	May	May	May	May	Daily ave	May	May	May	May	Daily ave
		16	17	18	19	20		21	23	24	25	26		27	28	29	30	
		-4	-3	-2	-1	-0		+1	+3	+4	+5	+6		+1	+2	+3	+4	
Tetraonidae	Ruffed Grouse	1	0	1	1	0	0.6	1	0	1	0	0	0.4	1	1	0	1	1.0
Picidae	Common Flicker	0	0	0	0	2	0.4	1	1	0	0	0	0.4	0	0	0	0	0.0
	Yellow-bellied Sapsucker	5	4	2	1	1	2.6	1	3	1	1	3	1.8	1	3	3	1	2.0
	Hairy Woodpecker	1	0	1	0	0	0.4	0	0	0	0	0	0.0	0	0	0	1	0.3
Tyrannidae	Least Flycatcher	0	0	0	0	0	0.0	0	0	0	0	0	0.0	0	1	0	0	0.3
Corvidae	Gray Jay	0	2	0	1	1	0.8	0	1	4	2	1	1.6	3	1	0	1	1.3
	Raven	1	0	0	1	1	0.6	0	2	0	0	0	0.4	1	0	0	0	0.3
Paridae	Black-capped Chickadee	0	0	0	0	0	0.0	0	1	0	0	0	0.2	0	1	0	0	0.3
Troglodytidae	Winter Wren	0	1	1	1	0	0.6	1	1	1	0	0	0.6	0	0	1	0	0.3
Turdidae	American Robin	3	2	2	2	2	2.2	3	1	2	0	1	1.4	1	1	3	1	1.5
	Hermit Thrush	0	0	1	0	1	0.4	0	1	1	1	0	0.6	0	0	0	0	0.0
Sylviidae	Golden-crowned Kinglet	3	6	2	3	1	3.0	1	3	1	0	0	1.0	1	1	0	1	1.0
	Ruby-crowned Kinglet	6	4	6	6	5	5.4	4	2	3	1	2	2.4	3	5	4	3	3.8
Vireonidae	Solitary Vireo	0	0	0	0	0	0.0	0	0	1	0	0	0.2	0	0	0	0	0.0
Parulidae	Black-and White Warbler	0	1	0	1	1	0.6	1	1	1	0	0	0.6	0	0	0	0	0.0

Table 38

Cont'd

Family	Species	Pre-spray days						Post-spray days 1st application						Post-spray days 2nd application				
		May	May	May	May	May	Daily ave	May	May	May	May	May	Daily ave	May	May	May	May	Daily ave
		16	17	18	19	20		21	23	24	25	26		27	28	29	30	
		-4	-3	-2	-1	-0		+1	+3	+4	+5	+6		+1	+2	+3	+4	
Parulidae cont'd	Tennessee Warbler	0	0	0	0	1	0.2	0	0	0	0	0	0.0	2	7	5	7	5.3
	Nashville Warbler	0	0	0	0	0	0.0	0	0	1	0	0	0.2	1	0	0	0	0.3
	Magnolia Warbler	0	0	2	2	1	1.0	4	1	2	1	0	1.6	3	5	3	6	4.3
	Cape May Warbler	0	0	0	0	0	0.0	0	0	0	0	0	0.0	0	0	0	1	0.3
	Myrtle Warbler	0	0	0	1	2	0.6	3	2	2	0	1	1.6	2	2	2	0	1.5
	Black-throated Green Warbler	3	5	2	4	2	3.2	4	1	1	2	1	1.8	1	2	1	0	1.0
	Blackburnian Warbler	0	0	1	0	0	0.2	0	0	0	0	0	0.0	0	0	0	0	0.0
	Bay-breasted Warbler	0	0	0	1	1	0.4	1	0	0	0	0	0.2	0	1	0	3	1.0
	Ovenbird	5	2	3	3	2	3.0	2	2	2	3	3	2.4	3	4	3	2	3.0
	Yellowthroat	0	0	0	0	0	0.0	2	2	0	0	1	1.0	3	2	3	3	2.8
American Redstart	0	0	0	0	0	0.0	0	0	0	0	0	0.0	0	0	1	0	0.3	
Fringillidae	Rose-breasted Grosbeak	0	0	0	0	0	0.0	0	0	1	0	0	0.2	0	0	0	0	0.0
	Evening Grosbeak	0	0	0	0	0	0.0	0	0	0	0	0	0.0	0	0	1	0	0.3
	Purple Finch	0	1	1	3	1	1.2	0	2	1	0	0	0.6	1	1	2	0	1.0
	Pine Grosbeak	0	0	0	0	1	0.2	0	0	0	0	0	0.0	0	0	0	0	0.0

Table 38

Cont'd

Family	Species	Pre-spray days						Post-spray days 1st application						Post-spray days 2nd application					
		May 16	May 17	May 18	May 19	May 20	Daily	May 21	May 23	May 24	May 25	May 26	Daily	May 27	May 28	May 29	May 30	Daily	
		-4	-3	-2	-1	-0	ave	+1	+3	+4	+5	+6	ave	+1	+2	+3	+4	ave	
Fringillidae	Pine Siskin	0	0	0	0	0	0.0	0	0	1	0	0	0.2	0	0	0	0	0.0	
	Dark-eyed Junco	1	1	0	1	0	0.6	1	2	1	1	1	1.2	2	2	1	1	1.5	
	Chipping Sparrow	0	0	0	0	0	0.0	0	0	0	0	2	0.4	2	0	0	0	0.5	
	White-throated Sparrow	9	8	4	6	5	6.4	3	4	6	2	2	3.4	6	2	4	5	4.3	
	White-crowned Sparrow	0	0	0	0	0	0.0	0	0	1	0	0	0.2	0	0	0	0	0.0	
	Unidentified species	5	3	2	3	0	2.6	2	4	0	3	2	2.2	3	2	4	1	2.5	
	Totals:	43	40	31	41	31	37.2	35	37	35	14	20	28.8	40	44	41	38	40.7	

Table 39
Forest bird population census
Fenitrothion treatment block 1493
Minto, New Brunswick
May 1976

Family	Species	Pre-spray days					Post-spray days 1st application						Post-spray days 2nd application				
		May	May	May	May	Daily ave	May	May	May	May	May	Daily ave	May	May	May	May	Daily ave
		17	18	19	20		21	23	24	25	26		27	28	29	30	
		-3	-2	-1	-0		+1	+3	+4	+5	+6		+1	+2	+3	+4	
Tetraonidae	Ruffed Grouse	0	0	0	0	0.0	0	2	2	0	1	1.0	0	0	2	0	0.5
Picidae	Common Flicker	1	2	1	1	1.3	0	0	0	0	0	0.0	0	0	0	0	0.0
	Pileated Woodpecker	0	0	0	0	0.0	1	0	0	0	0	0.2	0	0	0	0	0.0
	Yellow-bellied Sapsucker	0	0	0	1	0.3	2	4	3	3	0	2.4	1	3	0	0	1.0
	Hairy Woodpecker	0	0	0	0	0.0	0	0	0	0	0	0.0	2	0	0	0	0.5
Corvidae	Gray Jay	0	0	0	0	0.0	0	1	0	0	0	0.2	0	0	1	1	0.5
Paridae	Black-capped Chickadee	0	1	0	0	0.3	0	0	1	1	0	0.4	0	0	0	0	0.0
Titidae	Red-breasted Nuthatch	1	0	0	0	0.3	0	0	0	0	0	0.0	0	0	0	0	0.0
Turdidae	American Robin	1	0	2	0	0.8	0	1	2	0	1	0.8	1	1	1	1	1.0
	Hermit Thrush	0	1	0	0	0.3	0	0	0	0	0	0.0	1	2	0	0	0.8
	Swainson's Thrush	0	0	0	0	0.0	0	0	3	0	0	0.6	0	0	0	0	0.0
Polioptilidae	Golden-crowned Kinglet	0	1	1	0	0.5	1	0	1	0	0	0.4	0	0	1	0	0.3
	Ruby-crowned Kinglet	1	3	1	2	1.8	3	4	2	3	5	3.4	4	3	2	4	3.3
Vireonidae	Solitary Vireo	1	1	1	2	1.3	1	0	1	0	1	0.6	2	2	1	0	1.3
Parulidae	Black and White Warbler	2	0	1	1	1.0	1	0	0	0	0	0.2	0	1	0	0	0.3
	Tennessee Warbler	3	1	3	4	2.8	5	4	8	11	4	6.4	10	5	8	5	7.0

Table 39

Cont'd

Family	Species	Pre-spray days					Post-spray days 1st application						Post-spray days 2nd application				
		May	May	May	May	Daily ave	May	May	May	May	May	Daily ave	May	May	May	May	Daily ave
		17	18	19	20		21	23	24	25	26		27	28	29	30	
		-3	-2	-1	-0		+1	+3	+4	+5	+6		+1	+2	+3	+4	
Parulidae cont'd	Nashville Warbler	2	1	1	1	1.3	1	5	1	0	0	1.4	0	0	0	1	0.3
	Parula Warbler	1	0	0	0	0.3	0	0	0	0	0	0.0	0	0	0	0	0.0
	Magnolia Warbler	1	0	2	3	1.5	1	1	3	0	1	1.2	2	1	2	0	1.3
	Cape May Warbler	0	1	2	2	1.3	1	1	0	1	2	1.0	1	1	2	1	1.3
	Black-throated Blue Warbler	0	0	0	0	0.0	0	0	1	0	0	0.2	0	0	0	0	0.0
	Myrtle Warbler	1	4	1	1	1.8	2	0	1	0	0	0.6	0	0	0	0	0.0
	Black-throated Green Warbler	1	1	1	1	1.0	1	1	1	0	0	0.6	0	2	2	0	1.0
	Blackburnian Warbler	0	0	0	2	0.5	0	0	0	0	0	0.0	0	0	0	1	0.3
	Chestnut-sided Warbler	0	0	0	0	0.0	0	1	0	2	0	0.6	1	0	0	0	0.3
	Bay-breasted Warbler	0	1	0	0	0.3	0	0	0	0	0	0.0	0	0	0	0	0.0
	Ovenbird	3	3	5	2	3.3	3	5	2	2	4	3.2	4	3	2	3	3.0
	Yellowthroat	0	0	0	1	0.3	1	1	0	0	0	0.4	0	0	0	0	0.0
	American Redstart	1	1	3	2	1.8	0	0	0	0	0	0.0	0	0	0	6	1.5
Icteridae	Brown-headed Cowbird	0	0	1	0	0.3	1	1	0	0	0	0.4	0	0	0	0	0.0
Fringillidae	Rose-breasted Grosbeak	0	0	0	1	0.3	1	0	0	0	0	0.2	0	0	0	0	0.0

Table 39

Cont'd

Family	Species	Pre-spray days					Post-spray days 1st application						Post-spray days 2nd application				
		May	May	May	May	Daily ave	May	May	May	May	May	Daily ave	May	May	May	May	Daily ave
		17	18	19	20		21	23	24	25	26		27	28	29	30	
		-3	-2	-1	-0		+1	+3	+4	+5	+6		+1	+2	+3	+4	
Fringillidae cont'd	Evening Grosbeak	0	0	1	0	0.3	0	0	0	0	0	0.0	0	0	0	0	0.0
	Purple Finch	1	1	1	1	1.0	3	1	3	2	3	2.4	1	3	0	2	1.5
	Dark-eyed Junco	0	0	0	1	0.3	0	0	1	0	0	0.2	0	0	1	0	0.3
	Chipping Sparrow	0	0	0	0	0.0	0	0	0	0	1	0.2	0	0	0	0	0.0
	White-throated Sparrow	0	2	2	4	2.0	2	2	5	3	4	3.2	5	3	0	2	2.5
Totals:		21	25	30	37	25.7	31	35	41	28	27	30.4	35	30	25	27	29.2

Table 40
Forest bird population census
Fenitrothion treatment block 1494
Minto, New Brunswick
May 1976

Family	Species	Pre-spray days						Post-spray days 1st application					Post-spray days 2nd application				
		May	May	May	May	May	Daily ave	May	May	May	May	Daily ave	May	May	May	May	Daily ave
		17	18	19	20	21		23	24	25	26		27	28	29	30	
		-4	-3	-2	-1	-0		+2	+3	+4	+5		+1	+2	+3	+4	
Tetraonidae	Ruffed Grouse	0	1	1	1	1	0.8	1	1	1	0	0.8	0	0	0	0	0.0
Trochilidae	Ruby-throated Hummingbird	0	0	0	0	1	0.2	0	0	0	0	0.0	0	0	0	0	0.0
Picidae	Common Flicker	0	1	0	0	0	0.2	0	0	0	0	0.0	0	0	0	0	0.0
	Yellow-bellied Sapsucker	0	0	0	1	2	0.6	1	0	0	0	0.3	0	2	1	0	0.8
	Black-backed 3-toed Woodpecker	0	0	0	0	0	0.0	0	0	1	0	0.3	0	0	0	0	0.0
Tyrannidae	Least Flycatcher	0	0	0	0	0	0.0	0	0	0	0	0.0	0	1	0	0	0.3
Corvidae	Gray Jay	1	0	0	0	0	0.2	0	0	0	1	0.3	0	0	0	0	0.0
	Raven	0	0	0	1	0	0.2	0	0	1	0	0.3	0	0	0	1	0.3
Paridae	Black-capped Chickadee	0	0	0	0	0	0.0	0	0	0	0	0.0	3	0	0	0	0.8
Troglodytidae	Winter Wren	0	2	0	0	0	0.4	0	0	1	1	0.5	0	0	0	0	0.0
Turdidae	American Robin	0	1	0	1	1	0.6	1	0	0	0	0.3	0	3	0	2	1.3
	Hermit Thrush	0	0	0	1	1	0.4	1	2	1	0	1.0	3	3	0	1	1.8
	Swainson's Thrush	0	0	1	0	0	0.2	0	0	0	0	0.0	0	0	0	0	0.0
Sylviidae	Golden-crowned Kinglet	2	2	0	2	1	1.4	0	0	1	1	0.5	1	2	1	0	1.0
	Ruby-crowned Kinglet	2	4	5	6	5	4.4	7	8	5	3	5.8	2	4	6	4	4.0
Vireonidae	Solitary Vireo	0	0	0	0	0	0.0	1	0	0	0	0.3	0	0	0	0	0.0

Table 40

Cont'd

Family	Species	Pre-spray days						Post-spray days 1st application						Post-spray days 2nd application					
		May	May	May	May	May	Daily ave	May	May	May	May	Daily ave	May	May	May	May	Daily ave		
		17	18	19	20	21		23	24	25	26		27	28	29	30			
		-4	-3	-2	-1	-0		+2	+3	+4	+5		+1	+2	+3	+4			
Parulidae	Black and White Warbler	0	0	1	0	0	0.2	0	0	0	0	0.0	1	0	0	0	0.3		
	Tennessee Warbler	0	0	3	1	2	1.2	1	3	0	0	1.0	5	6	5	7	5.8		
	Nashville Warbler	0	0	0	0	0	0.0	0	0	0	1	0.3	0	0	0	0	0.0		
	Magnolia Warbler	0	0	1	0	0	0.2	0	0	1	4	1.3	3	4	3	6	3.2	137	
	Cape May Warbler	0	0	1	2	4	1.4	1	2	0	1	1.0	2	4	2	1	2.3		
	Myrtle Warbler	0	0	0	0	4	0.8	3	3	2	0	2.0	0	7	0	0	1.8		
	Black-throated Green Warbler	0	0	0	1	2	0.6	0	0	1	1	0.5	0	2	0	2	1.0		
	Bay-breasted Warbler	0	0	0	0	0	0.0	0	0	0	0	0.0	1	0	1	1	0.8		
	Ovenbird	2	2	2	1	1	1.6	1	2	1	4	2.0	2	6	2	3	3.3		
	Northern Waterthrush	0	0	0	2	1	0.6	1	1	1	0	0.8	1	0	0	0	0.3		
	Yellowthroat	1	0	0	0	8	1.8	2	3	6	4	3.8	5	7	5	5	5.5		
	American Redstart	0	0	0	0	0	0.0	0	0	0	0	0.0	0	1	0	0	0.3		
Icteridae	Red-winged Blackbird	0	0	0	0	0	0.0	0	0	0	0	0.0	0	1	0	0	0.3		
Fringillidae	Evening Grosbeak	0	0	0	0	0	0.0	0	0	0	0	0.0	2	0	0	0	0.5		
	Purple Finch	0	1	0	1	1	0.6	1	0	2	0	0.8	0	0	2	0	0.5		
	Dark-eyed Junco	0	0	1	2	1	0.8	0	0	1	0	0.3	2	3	1	1	1.8		

Table 40

Cont'd

Family	Species	Pre-spray days						Post-spray days 1st application					Post-spray days 2nd application				
		May	May	May	May	May	Daily ave	May	May	May	May	Daily ave	May	May	May	May	Daily ave
		17	18	19	20	21		23	24	25	26		27	28	29	30	
		-4	-3	-2	-1	-0		+2	+3	+4	+5		+1	+2	+3	+4	
Fringillidae cont'd	White-throated Sparrow	2	2	4	4	6	3.6	4	7	4	3	4.5	4	4	4	5	4.3
	Unidentified species	0	5	1	1	3	2.0	3	0	3	2	2.0	0	3	2	3	2.0
	Totals:	10	21	21	28	45	25.0	29	32	33	26	30.0	37	63	35	42	44.2

Table 41
Forest bird population census
Fenitrothion treatment block 1495
Minto, New Brunswick
May 1976

Family	Species	Pre-spray days						Post-spray days 1st application					Post-spray days 2nd application				
		May 17	May 18	May 19	May 20	May 21	Daily ave	May 23	May 24	May 25	May 26	Daily ave	May 27	May 28	May 29	May 30	Daily ave
		-4	-3	-2	-1	-0		+2	+3	+4	+5		+1	+2	+3	+4	
Picidae	Common Flicker	2	1	0	1	0	0.8	0	0	0	0	0.0	0	0	0	0	0.0
	Yellow-bellied Sapsucker	1	0	0	0	1	0.4	1	2	0	0	0.8	2	0	0	0	0.5
Tyrannidae	Eastern Phoebe	0	0	0	0	0	0.0	1	0	0	0	0.3	0	0	0	0	0.0
Hirundinidae	Tree Swallow	0	1	0	0	0	0.2	0	0	0	0	0.0	1	0	0	0	0.3
Corvidae	Gray Jay	1	0	0	1	0	0.4	2	3	0	2	1.8	1	4	1	0	1.5
	Common Crow	0	0	0	0	0	0.0	0	0	0	2	0.5	0	0	0	0	0.0
Paridae	Black-capped Chickadee	0	0	0	0	0	0.0	0	0	0	0	0.0	1	0	0	0	0.3
Sittidae	Red-breasted Nuthatch	1	0	0	0	0	0.2	0	0	0	0	0.0	0	0	0	0	0.0
Turdidae	American Robin	1	0	1	1	2	1.0	1	2	2	1	1.5	1	0	1	2	1.0
	Wood Thrush	0	0	0	0	0	0.0	0	0	0	0	0.0	0	1	0	0	0.3
	Hermit Thrush	1	1	1	1	3	1.4	3	1	0	0	1.0	1	1	2	0	1.0
	Swainson's Thrush	0	0	0	0	0	0.0	0	1	0	0	0.3	0	0	2	0	0.5
Sylviidae	Golden-crowned Kinglet	3	4	1	3	5	3.2	2	4	3	2	2.8	1	0	1	0	0.5
	Ruby-crowned Kinglet	3	6	5	3	7	4.8	3	6	5	6	5.0	3	7	6	7	5.8

Table 41 Cont'd

Family	Species	Pre-spray days						Post-spray days 1st application					Post-spray days 2nd application				
		May	May	May	May	May	Daily ave	May	May	May	May	Daily ave	May	May	May	May	Daily ave
		17	18	19	20	21		23	24	25	26		27	28	29	30	
		-4	-3	-2	-1	-0		+2	+3	+4	+5		+1	+2	+3	+4	
Vireonidae	Solitary Vireo	0	1	0	0	2	0.6	0	0	0	1	0.3	1	2	0	0	0.8
Parulidae	Black and White Warbler	0	0	0	0	0	0.0	0	0	0	0	0.0	2	0	0	0	0.5
	Tennessee Warbler	1	0	3	6	3	2.6	0	4	2	2	2.0	5	4	7	9	6.3
	Nashville Warbler	2	0	0	1	0	0.6	2	3	1	1	1.8	2	0	1	1	1.0
	Parula Warbler	0	0	0	0	1	0.2	0	0	0	0	0.0	0	0	0	0	0.0
	Yellow Warbler	0	0	0	0	0	0.0	0	0	0	0	0.0	0	1	0	0	0.3
	Magnolia Warbler	1	1	1	1	0	0.8	0	0	0	0	0.0	0	0	2	0	0.5
	Cape May Warbler	2	3	1	1	1	1.6	3	1	1	0	1.3	3	2	1	6	3.0
	Black-throated Blue Warbler	0	0	0	0	0	0.0	0	0	0	0	0.0	1	0	0	0	0.3
	Myrtle Warbler	3	0	0	1	3	1.4	0	0	0	0	0.0	0	0	0	0	0.0
	Black-throated Green Warbler	0	0	0	0	0	0.0	0	0	1	1	0.5	2	2	0	0	1.0
	Bay-breasted Warbler	0	0	1	2	0	0.6	0	0	0	0	0.0	0	0	0	0	0.0
	Ovenbird	4	2	5	4	3	3.6	10	5	4	4	5.8	6	6	4	2	4.5
	Northern Waterthrush	1	0	1	2	1	1.0	0	2	0	0	0.5	0	0	0	0	0.0
	Yellowthroat	1	0	1	1	0	0.6	0	1	0	0	0.3	0	0	0	0	0.0

Table 41 Cont'd

Family	Species	Pre-spray days						Post-spray days 1st application					Post-spray days 2nd application				
		May	May	May	May	May	Daily ave	May	May	May	May	Daily ave	May	May	May	May	Daily ave
		17	18	19	20	21		23	24	25	26		27	28	29	30	
		-4	-3	-2	-1	-0		+2	+3	+4	+5		+1	+2	+3	+4	
Icteridae	Brown-headed Cowbird	0	0	0	0	0	0.0	3	2	0	1	1.5	0	0	1	2	0.8
Fringillidae	Evening Grosbeak	0	0	0	2	0	0.4	0	0	0	0	0.0	0	0	0	0	0.0
	Purple Finch	3	0	1	2	3	1.8	2	1	1	2	1.5	3	1	0	2	1.5
	American Goldfinch	0	0	0	0	1	0.2	0	0	0	0	0.0	0	0	0	0	0.0
	Dark-eyed Junco	0	1	1	0	0	0.4	0	1	0	1	0.5	2	1	0	0	0.8
	Chipping Sparrow	0	0	0	0	1	0.2	1	0	0	0	0.3	0	0	0	0	0.0
	White-throated Sparrow	3	1	2	2	0	1.6	4	1	1	4	2.5	4	2	0	1	1.8
	Unidentified species	0	0	0	0	0	0.0	0	0	0	1	0.3	0	0	0	1	0.3
Totals:		34	22	25	35	37	30.6	38	40	21	31	32.5	42	34	29	33	34.5