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1975

Bird responses to forest sprays in New Brunswick, 1975.  
A summary report.

P.A. Pearce  
Canadian Wildlife Service  
Fredericton, N.B.

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REPORT

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## Introduction

Monitoring of the responses of forest songbirds to larviciding operations against the spruce budworm in New Brunswick was continued by the Canadian Wildlife Service in 1975. Field activities were conducted in the context of aerial spraying by two organizations - Forest Protection Limited (FPL), and J.D. Irving Limited (JDI) - in which fenitrothion, phosphamidon (Dimecron), and aminocarb (Matacil) were employed. The effects on birds of trichlorfon (Dylox), also used in the spray programs, were not examined. A brief outline of the investigation is presented here, together with some conclusions drawn from it.

## Method

Transects were established, usually on forest roads, along which surveys of singing birds were made before and after sprays were applied. In the vicinity of transects and elsewhere in treated forest, post-spray searches were made for evidence that birds were adversely affected. Those showing advanced symptoms of poisoning were collected and preserved, as were dead birds. Reports of bird kills, from various sources and places, were investigated as time allowed.

Bird surveys were made in the following three regions: in spray blocks 411-412 near Fredericton, in 626 on Mamozekel River, and in spray blocks 635-636 and in 637 on Jardine Brook. A schedule of insecticidal treatments in those blocks is given in Table 1.

## Results and discussion

Summaries of the average numbers of birds counted on transects (1.5 or 2 miles long) in spray blocks 411-412, 626, and 637 are shown in Tables 2, 3, and 5 respectively. Indices of populations of birds in blocks 635-636, where a slightly different survey technique was used, are given in Table 4.

Treatment: fenitrothion - phosphamidon

The major part of the spray operation mounted by FPL involved a single application of fenitrothion followed by one spray of phosphamidon. Bird responses to that treatment were monitored in blocks 411-412. Survey data did not show any adverse effects on birds after a morning (411) and evening (412) spray of fenitrothion. Post-spray searches revealed no casualties, with the possible exception of one American Redstart. The sprays took place early in the season when some migrants were still moving in, a phenomenon which may have tended to mask any spray impact. Two weeks later both blocks were sprayed with phosphamidon, causing an observable and measurable impact on birds. Only two carcasses were found (Canada Warbler, American Redstart) but intoxicated birds of the following species were seen: Tennessee Warbler, Cape May Warbler, Bay-breasted Warbler, American Redstart, and Chipping Sparrow. Least Flycatchers, Solitary Vireos, Canada Warblers, and Chipping Sparrows were apparently eliminated by the spray. Other species were reduced in number. Survey data showed an apparent reduction in the total avifaunal complement of about 20 percent. The pattern of loss was unevenly distributed along the transect, in general reflecting observed patterns of overswathing by spray aircraft.

During the spray operations, reports, usually somewhat belated, came in of birds dying and acting strangely at several widely scattered places. Investigation on the ground was possible in only a few cases, when some carcasses were obtained. Later examination of spray schedules revealed that in all reported instances, casualties were noted on days immediately following applications. Mortality seems to have been fairly light in the following fenitrothion-treated blocks: 324, 338, 339, 435, 528, 529, and 535. A more serious impact occurred in the following phosphamidon blocks: 1014, 1015, 1107, 1108, 1229, 1259, 1272, 1273. Bird mortality was particularly notable in blocks 1014 and 1015 - contiguous blocks sprayed on the same day. In that area eye-witnesses reported spray aircraft passing repeatedly overhead.

Treatment: aminocarb - fenitrothion - aminocarb

An attempt was made to assess bird responses in one of ten blocks of forest sprayed with aminocarb before and again after an application of fenitrothion. Because of commitments in other spray blocks it was not possible to conduct a really adequate number of bird surveys in the aminocarb-treated zone. Careful observation after each of the three sprays failed to produce any evidence that birds were harmed by the sprays. Because of that, little significance can be attached to a small, about 15 percent, reduction in the total number of birds noted along the survey transect over the whole study period. Each of the three sprays was made by FPL.

Bird surveys were made in two zones in both of which spray operations by FPL and by JDI were carried out involving, in both situations, the application of fenitrothion twice and phosphamidon once.

Treatment: fenitrothion -fenitrothion - phosphamidon(1)

Indices to bird populations obtained along a transect in blocks 635-636 showed that bird were not affected by the first two sprays and only slightly by the third one. Some casualties (Tennessee Warbler, Parula Warbler, American Robin, Dark-eyed Junco) were found in other parts of the spray zone after phosphamidon had been applied. There is doubt that part of the study area, an area supporting hardwood growth, was actually sprayed by JDI. The transect was established across the boundary between contiguous blocks to determine whether overswathing occurred in such situations, a likelihood when both blocks are sprayed in the same "splash" period. The objective was not met, however, because the various spray applications took place at intervals of a day or more.

Treatment: fenitrothion - fenitrothion - phosphamidon(2)

In marked contrast to the absence of harmful effects on birds in blocks 635-636, a very notable impact occurred in block 637 subjected, in terms of chemical and dosage, to the same insecticidal treatments. After the three

sprays had been made, the total bird complement had been reduced by nearly two-thirds. Tennessee Warblers, the most populous species which initially comprised about one-third of the total birds present, were reduced by 90 percent. Ruby-crowned Kinglets were reduced by about 80 percent, and Cape May Warblers by 60 percent. Some reduction in numbers occurred after the first application of fenitrothion (at 4.0 oz per acre by JDI). A woodcock was among dead birds found. Numbers remained fairly stable after the second spray of fenitrothion (at 2.5 oz per acre by FPL). A further reduction of about 50 percent took place after the third, phosphamidon, spray. The effect was not uniform along the bird survey transect, some sections apparently being much harder hit than others. American Robins, Dark-eyed Juncos, and White-throated Sparrows were the most commonly found casualties although survey data showed that they were not as severely affected as some other species, such as those mentioned above.

The spray operations apparently took a toll of a wide variety of birds (Table 6) occupying a diversity of ecological niches. Comments on some species follow:

Ruffed Grouse: the finding of an apparently intoxicated individual of a species as robust as this surely indicates a major spray impact:

American Woodcock: several sick birds were reported after a phosphamidon spray, and one was found dead after a fenitrothion spray;

Barn Swallow: an adult was found dead on its nest after a phosphamidon spray;

Vesper Sparrow: an unexpected casualty because it is a bird of open fields and pastures;

White-throated Sparrow: three nestlings were found dead in the nest and several adults were found dead in the vicinity after a phosphamidon spray.

#### Summary and conclusions

Songbird mortality was a recurring feature of the complex 1975 spray operations. Unseasonable weather, which caused widespread bird deaths in the spring of 1974, can be ruled out as a contributive factor. In 1975 bird

kills occurred locally, with no consistent pattern of severity or predictability. They were associated primarily though not exclusively with the use of phosphamidon. No estimate of the total number of birds affected can be made. Observations of movements of spray aircraft suggest that overswathing may have been a feature of spraying activities, either within or between blocks. The uneven responses of birds on three study areas certainly suggests a far from uniform pattern of spray emission. It was not possible to determine the relevance to bird hazard of the different delivery systems (TBM Avenger/boom and nozzle, Thrush Commander/Micronair) used by the two applicators. Insecticide formulation errors may have contributed to some of the inconsistent results obtained in the field.

The 1975 forest spray program in New Brunswick provided further illustration of the avian toxicity of phosphamidon. It is evident that in the New Brunswick operational spray context, the use of that chemical at effective budworm larvicidal levels cannot be entirely dissociated from acute danger to birds. Concerning the use of fenitrothion, the margin of safety is broader but application of that insecticide, even at registered dosages, can in some situations cause avian mortality. Aminocarb appeared to be fairly safe to birds at the level used but further investigation is required to confirm that impression.

Table 1 - Schedule of spray treatments in blocks where bird responses were monitored.

Block designation	Treatment	Date	Organization
411-412 (1111-1112)	2.5 oz. fenitrothion 2.5 oz. phosphamidon	20,21 May 5,5 June	FPL <sup>(a)</sup> FPL
626 (1326) (1426)	0.75 oz. aminocarb 2.5 oz. fenitrothion 0.75 oz. aminocarb	10 June 18 June 26 June	FPL FPL FPL
(71) <sup>(b)</sup> 635-636 (1335-1336)	4.0 oz. fenitrothion 2.5 oz. fenitrothion 2.5 oz. phosphamidon	3 June 11,10 June 22,21 June	JDI <sup>(c)</sup> FPL FPL ± JDI for FPL
(63,64,110,111) <sup>(b)</sup> 637 (1337)	4.0 oz. fenitrothion 2.5 oz. fenitrothion 2.5 oz. phosphamidon	3 June 10 June 21 June	JDI FPL JDI for FPL

(a) Forest Protection Limited

(b) JDI block designations

(c) J.D. Irving Limited

Table 2 - Summary of bird survey data, spray blocks 411-412 (1111-1112).

Period	Number of surveys	Average number of birds per quarter-mile interval							
		Block 411				Block 412			
Pre fenitrothion spray	3	43	39	39	37	36	38	33	44
Post fenitrothion spray	3	44	37	39	40	39	39	31	43
		(Block 1111)				(Block 1112)			
Pre phosphamidon spray	3	46	41	35	44	35	37	30	42
Post phosphamidon spray	3	43	36	31	32	24	26	24	28

Table 3 - Summary of bird survey data, spray block 626 (1326 - 1426).

Period	Number of surveys	Average number of birds per quarter-mile interval							
		Block 626							
Pre aminocarb spray	5	28	30	25	27	19	22		
Post aminocarb spray	1	29	24	26	30	12	24		
		(Block 1326)							
Pre fenitrothion spray	(1)	(29)	(24)	(26)	(30)	(12)	(24)		
Post fenitrothion spray	3	29	26	22	23	13	22		
		(Block 1426)							
Pre aminocarb spray	(3)	(29)	(26)	(22)	(23)	(13)	(22)		
Post aminocarb spray	3	26	24	19	18	14	22		



Table 4 - Summary of bird survey data, spray blocks 635-636 (1335-1336).

Number of surveys	Birds/minute	Bird population indices		Species
			Songs/minute	
5	1.3		16	32
		first fenitrothion application		
3	1.6		16	28
		second fenitrothion application		
4	1.6		17	32
		phosphamidon application		
3	1.4		16	31

Table 5 - Summary of bird survey data, spray block 637 (1337).

Period	Number of surveys	Average number of birds per quarter-mile interval					
		Blocks 63,64,110,111 (a)					
Pre first fenitrothion spray	5	23	20	23	20	19	19
Post first fenitrothion spray	3	23	19	21	11	12	14
		(Block 637)					
Pre second fenitrothion spray	(3)	(23)	(19)	(21)	(11)	(12)	(14)
Post second fenitrothion spray	6	22	17	14	10	16	12
		(Block 1337)					
Pre phosphamidon spray	(6)	(22)	(17)	(14)	(10)	(16)	(12)
Post phosphamidon spray	4	16	6	8	5	4	6

(a) JDI block designations

Table 6 - Bird species believed to have been acutely affected by forest spraying in New Brunswick in 1975. <sup>(a)</sup>

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Ruffed Grouse	Blackburnian Warbler
American Woodcock	Bay-breasted Warbler
Common Nighthawk	Blackpoll Warbler
Eastern Kingbird	Wilson's Warbler
Tree Swallow	Canada Warbler
Barn Swallow	American Redstart
American Robin	Pine Siskin
Swainson's Thrush	Vesper Sparrow
Tennessee Warbler	Dark-eyed Junco
Parula Warbler	Chipping Sparrow
Magnolia Warbler	White-throated Sparrow
Cape May Warbler	Lincoln's Sparrow

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(a) Insecticide residue measurements and/or acetylcholinesterase activity determinations to be made on selected samples.