



MONITORING OF AVIAN POPULATIONS
DURING EXPERIMENTAL INSECT
CONTROL OPERATIONS IN
BRITISH COLUMBIA IN 1976.

by

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INTRODUCTION

Experimental trials using aerial applications of Orthene^R and Dimilin^R were carried out against the Douglas fir tussock moth, Orgyia pseudotsugata (McDunnough) infestations in the Kamloops area of British Columbia. Orthene was applied at the emitted dosage rate of 1.121 kg/ha (16 oz/ac) and Dimilin at the rate of 0.140 kg/ha (2 oz/ac) and 0.035 kg/ha ($\frac{1}{2}$ oz/ac).

The Environment Impact group of the Chemical Control Research Institute monitored the forest bird complex in treated and untreated forest stands and the aquatic invertebrate complex inhabiting ponds and streams in both treated and untreated areas.

This report highlights the results of bird monitoring operations that are available to date. The aquatic monitoring data has not been processed to the point to where the results are available for this report.

METHODS

Forest songbird populations were assessed on 4 hectare (10 acre) plots in treated and untreated areas using techniques similar to those described by Kendeigh 1944. Populations were monitored daily and recorded on plot maps starting about 5 days prior to the application of the insecticide and continuing throughout the experimental period, ending approximately 5 days after the treatment. On the day of the application of the insecticide, plot searches were carried out in an attempt to recover any sick or dead birds for pesticide residue analysis. Five forest plots (Tables I - V) and one open marsh plot were monitored in the Orthene trials and two forest plots (Tables VI and VII) monitored in the 0.140 kg/ha (2 oz/ac) Dimilin trial.

Aquatic organisms were collected from streams and ponds in areas receiving the Orthene and both Dimilin trials. Surber samples (Surber 1936) were taken from stream and pond bottoms, preserved and returned to the laboratory for sorting, identification and data analysis.

RESULTS

Orthene: Preliminary analysis of the data indicate that the Orthene trials did not cause any mortality to breeding bird populations on the census plots. Avian populations on the treated plots remained relatively stable while those on the untreated check plot increased. This population increase is mainly due to small groups of such species as brown-headed cowbirds, Molothrus ater (Boddaert), black-capped chickadees, Parus atricapillus Linnaeus and pine siskins, Spinus pinus (Wilson) foraging through the plot. The data do not indicate that these species had vacated the treated areas. Species occupying breeding territories such as the Traill's flycatcher, Empidonax traillii (Audubon) and the chipping sparrow, Spizella passerina (Beckstein) were not affected by the treatment except on plot 2 (Table III) where activity was noticeably reduced on the day following treatment but territories remained occupied.

Red-winged blackbirds, Agelaius phoeniceus (Linnaeus) occupying territories in an open catail marsh were observed throughout the Orthene trial monitoring period. Numerous territories were identified but only three nests were located close to the shore. Searches for nests in the other territories being hampered by deep water and muddy bottom conditions. Living young were observed in all three nests throughout the census period.

Dimilin: Avian populations on the untreated check plot increased after the application of Dimilin while populations on the treated plot remained relatively constant. A decrease in activity was recorded on the day after the application but returned to normal on day 2. Small groups of black-capped chickadees P. atricapillus L. and American robins, Tardus migratorius Linnaeus were mainly responsible for the daily population fluctuations of the daily population census. Again the data do not indicate that these wandering groups were forced to leave the treated area.

SUMMARY

Preliminary analysis of the data indicate that under the conditions of application neither Orthene^R at the emitted dosage rate of 1.121 kg/ha or Dimilin^R at the emitted dosage rate of 0.140 kg/ha caused any mortality to the small forest bird complex in the treatment areas. A one day reduction in activity was experienced on plot 2 (Table III) in the Orthene trials and on the Dimilin treatment plot. The data do not indicate the insecticides caused this decline. Nestling blackbirds in nests exposed to the Orthene trial were not affected.

Table I
Forest bird population census
Orthene^R untreated check plot
Kamloops, British Columbia
May 23 - June 2
1976

| Family | Species | Pre-spray days | | | | | | Post-spray days | | | | | |
|--------------|-----------------------------|----------------|-----|-----|-----|-----|------------------|-----------------|-----|-----|------|------|------------------|
| | | May | May | May | May | May | Daily Average | May | May | May | June | June | Daily Average |
| | | 23 | 24 | 25 | 26 | 27 | | 29 | 30 | 31 | 1 | 2 | |
| | | -5 | -4 | -3 | -2 | -1 | | +1 | +2 | +3 | +4 | +5 | |
| Scolopacidae | Common Snipe | 0 | 0 | 1 | 1 | 1 | 0.6 | 1 | 1 | 1 | 1 | 1 | 1.0 |
| Columbidae | Mourning Dove | 1 | 1 | 1 | 1 | 0 | 0.8 | 1 | 0 | 0 | 0 | 0 | 0.2 |
| Trochilidae | Calliope Hummingbird | 0 | 0 | 0 | 0 | 0 | 0.0 | 1 | 1 | 1 | 0 | 0 | 0.6 |
| Picidae | Common Flicker | 0 | 1 | 0 | 0 | 0 | 0.2 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| | Yellow-bellied Sapsucker | 0 | 0 | 0 | 0 | 0 | 0.0 | 1 | 1 | 2 | 2 | 2 | 1.6 |
| Tyrannidae | Say's Phoebe | 1 | 1 | 0 | 0 | 0 | 0.4 | 1 | 0 | 0 | 0 | 0 | 0.2 |
| | Traill's Flycatcher | 4 | 2 | 2 | 4 | 5 | 3.4 | 4 | 5 | 6 | 6 | 6 | 5.6 |
| Corvidae | Raven | 0 | 1 | 0 | 2 | 0 | 0.6 | 0 | 0 | 1 | 0 | 0 | 0.2 |
| Paridae | Black-capped Chickadee | 1 | 2 | 1 | 4 | 3 | 2.2 | 5 | 5 | 4 | 0 | 6 | 4.0 |
| | Mountain Chickadee | 0 | 2 | 0 | 0 | 0 | 0.4 | 0 | 0 | 0 | 4 | 0 | 0.8 |
| Sittidae | White-breasted Nuthatch | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | 1 | 1 | 0 | 0 | 0.4 |
| | Red-breasted Nuthatch | 0 | 0 | 0 | 0 | 0 | 0.0 | 1 | 1 | 0 | 1 | 1 | 0.8 |

Table I cont'd

| Family | Species | Pre-spray days | | | | | Daily Average | Post-spray days | | | | | Daily Average |
|----------------------|-----------------------------|----------------|-----|-----|-----|-----|------------------|-----------------|-----|-----|------|------|------------------|
| | | May | May | May | May | May | | May | May | May | June | June | |
| | | 23 | 24 | 25 | 26 | 27 | | 29 | 30 | 31 | 1 | 2 | |
| | | -5 | -4 | -3 | -2 | -1 | | +1 | +2 | +3 | +4 | +5 | |
| Turdidae | American Robin | 1 | 4 | 1 | 0 | 1 | 1.4 | 1 | 1 | 3 | 4 | 4 | 2.6 |
| | Swainson's Thrush | 1 | 1 | 1 | 1 | 0 | 0.8 | 1 | 2 | 0 | 0 | 1 | 0.8 |
| | Townsend's Solitaire | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | 0 | 0 | 1 | 1 | 0.4 |
| Vireonidae | Solitary Vireo | 2 | 0 | 2 | 2 | 1 | 1.4 | 2 | 2 | 0 | 3 | 3 | 2.0 |
| Parulidae | Magnolia Warbler | 0 | 1 | 0 | 0 | 0 | 0.2 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| | Black-throated Gray Warbler | 0 | 0 | 1 | 0 | 2 | 0.6 | 1 | 0 | 0 | 0 | 0 | 0.0 |
| | Audubons Warbler | 3 | 2 | 3 | 0 | 1 | 1.8 | 1 | 3 | 2 | 3 | 2 | 2.2 |
| | Chestnut-sided Warbler | 0 | 0 | 0 | 2 | 0 | 0.4 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| | Wilson's Warbler | 1 | 0 | 0 | 2 | 0 | 0.6 | 0 | 2 | 1 | 1 | 0 | 0.8 |
| Icteridae | Brewer's Blackbird | 1 | 3 | 1 | 0 | 0 | 1.0 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| | Brown-headed Cowbird | 0 | 0 | 0 | 3 | 1 | 0.8 | 5 | 2 | 3 | 7 | 3 | 4.0 |
| Thraupidae | Western Tanager | 3 | 5 | 3 | 4 | 1 | 3.2 | 2 | 2 | 4 | 6 | 2 | 3.2 |
| Fringillidae | Pine Siskin | 0 | 0 | 0 | 1 | 0 | 0.2 | 2 | 0 | 0 | 5 | 8 | 3.0 |
| | Chipping sparrow | 6 | 3 | 5 | 2 | 6 | 4.4 | 2 | 5 | 5 | 5 | 5 | 4.4 |
| Unidentified species | | 0 | 0 | 1 | 0 | 0 | 0.2 | 1 | 0 | 0 | 0 | 3 | 0.8 |
| Totals | | 25 | 29 | 23 | 29 | 22 | 26.6 | 33 | 34 | 34 | 49 | 47 | 39.4 |

Table II
Forest bird population census
Orthene[®] treatment plot 1
Kamloops, British Columbia
May 23 - June 2, 1976

| Family | Species | Pre-spray days | | | | | | Post-spray days | | | | | |
|-------------|---------------------|----------------|-----|-----|-----|-----|-------|-----------------|-----|-----|------|------|-------|
| | | May | May | May | May | May | Daily | May | May | May | June | June | Daily |
| | | 23 | 24 | 25 | 26 | 27 | | 29 | 30 | 31 | 1 | 2 | |
| | | -5 | -4 | -3 | -2 | -1 | ave | +1 | +2 | +3 | +4 | +5 | ave |
| Tetraonidae | Ruffed Grouse | 1 | 1 | 2 | 0 | 0 | 0.8 | 0 | 1 | 0 | 0 | 0 | 0.2 |
| Trochilidae | Calliope | 2 | 2 | 4 | 1 | 2 | 2.2 | 0 | 2 | 2 | 0 | 1 | 1.0 |
| | Hummingbird | | | | | | | | | | | | |
| Picidae | Common Flicker | 0 | 0 | 1 | 0 | 0 | 0.2 | 1 | 1 | 0 | 0 | 0 | 0.4 |
| | Yellow-bellied | | | | | | | | | | | | |
| | Sapsucker | 0 | 0 | 0 | 1 | 0 | 0.2 | 0 | 0 | 0 | 0 | 1 | 0.2 |
| Tyrannidae | Traill's Flycatcher | 1 | 1 | 3 | 2 | 2 | 1.8 | 5 | 5 | 3 | 4 | 2 | 3.8 |
| Corvidae | Black-billed Magpie | 0 | 0 | 0 | 0 | 1 | 0.2 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| Paridae | Black-capped | | | | | | | | | | | | |
| | Chickadee | 0 | 2 | 0 | 1 | 0 | 0.6 | 5 | 0 | 2 | 0 | 0 | 1.4 |
| | Mountain Chickadee | 0 | 0 | 2 | 0 | 0 | 0.4 | 0 | 0 | 0 | 2 | 0 | 0.4 |
| Sittidae | Red-breasted | | | | | | | | | | | | |
| | Nuthatch | 0 | 0 | 0 | 1 | 0 | 0.2 | 0 | 0 | 0 | 1 | 0 | 0.2 |
| Turdidae | American Robin | 2 | 3 | 1 | 4 | 1 | 2.2 | 0 | 0 | 1 | 3 | 1 | 1.0 |
| | Swainson's Thrush | 0 | 0 | 0 | 1 | 1 | 0.4 | 0 | 0 | 1 | 1 | 1 | 0.6 |
| | Townsend's | | | | | | | | | | | | |
| | Solitaire | 0 | 1 | 0 | 0 | 1 | 0.4 | 2 | 0 | 1 | 0 | 2 | 1.0 |
| Vireonidae | Solitary Vireo | 3 | 1 | 0 | 1 | 1 | 1.2 | 0 | 0 | 0 | 1 | 1 | 0.4 |
| | Warbling Vireo | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | 1 | 0 | 0 | 0 | 0.2 |

Table II Cont'd

| Family | Species | Pre-spray days | | | | | | Post-spray days | | | | | |
|--------------|------------------------|----------------|-----|-----|-----|-----|-------|-----------------|-----|-----|------|------|-------|
| | | May | May | May | May | May | Daily | May | May | May | June | June | Daily |
| | | 23 | 24 | 25 | 26 | 27 | | 29 | 30 | 31 | 1 | 2 | |
| | | -5 | -4 | -3 | -2 | -1 | ave | +1 | +2 | +3 | +4 | +5 | ave |
| Parulidae | Nashville Warbler | 0 | 1 | 1 | 0 | 0 | 0.4 | 1 | 0 | 0 | 0 | 0 | 0.2 |
| | Audubon's Warbler | 1 | 0 | 0 | 0 | 0 | 0.2 | 1 | 0 | 0 | 1 | 0 | 0.4 |
| | MacGillivray's Warbler | 1 | 0 | 0 | 1 | 0 | 0.4 | 0 | 1 | 0 | 0 | 0 | 0.2 |
| | Wilson's Warbler | 1 | 0 | 0 | 0 | 0 | 0.2 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| Icteridae | Rusty Blackbird | 1 | 0 | 0 | 0 | 0 | 0.2 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| | Brewer's Blackbird | 0 | 0 | 0 | 0 | 0 | 0.0 | 1 | 0 | 0 | 0 | 0 | 0.2 |
| | Brown-headed Cowbird | 0 | 0 | 0 | 1 | 0 | 0.2 | 0 | 1 | 0 | 0 | 1 | 0.4 |
| Thraupidae | Western Tanager | 2 | 2 | 1 | 2 | 1 | 1.6 | 4 | 4 | 1 | 1 | 2 | 2.4 |
| Fringillidae | Evening Grosbeak | 0 | 4 | 0 | 0 | 0 | 0.8 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| | Pine Siskin | 3 | 7 | 2 | 1 | 0 | 2.6 | 3 | 2 | 2 | 5 | 0 | 2.4 |
| | Dark-eyed Junco | 0 | 0 | 0 | 0 | 0 | 0.0 | 1 | 0 | 3 | 1 | 1 | 1.2 |
| | Chipping Sparrow | 5 | 7 | 8 | 3 | 7 | 6.0 | 7 | 4 | 4 | 2 | 0 | 3.4 |
| Totals: | | 23 | 32 | 25 | 20 | 17 | 23.4 | 31 | 22 | 20 | 22 | 13 | 21.6 |

Table III
Forest bird population census
Orthene® treatment plot 2
Kamloops, British Columbia
May 23 - June 2, 1976

| Family | Species | Pre-spray days | | | | | Daily ave | Post-spray days | | | | | Daily ave |
|-------------|--------------------------|----------------|-----|-----|-----|-----|--------------|-----------------|-----|-----|------|------|--------------|
| | | May | May | May | May | May | | May | May | May | June | June | |
| | | 23 | 24 | 25 | 26 | 27 | | 29 | 30 | 31 | 1 | 2 | |
| | | -5 | -4 | -3 | -2 | -1 | | +1 | +2 | +3 | +4 | +5 | |
| Tetraonidae | Ruffed Grouse | 1 | 1 | 0 | 0 | 0 | 0.4 | 0 | 1 | 0 | 0 | 1 | 0.4 |
| Columbidae | Mourning Dove | 1 | 0 | 0 | 0 | 0 | 0.2 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| Trochilidae | Calliope Hummingbird | 0 | 2 | 0 | 2 | 1 | 1.0 | 1 | 0 | 1 | 1 | 0 | 0.6 |
| Picidae | Common Flicker | 0 | 0 | 0 | 0 | 1 | 0.2 | 1 | 1 | 0 | 0 | 0 | 0.4 |
| | Yellow-bellied Sapsucker | 0 | 0 | 1 | 0 | 0 | 0.2 | 0 | 1 | 2 | 0 | 0 | 0.6 |
| Tyrannidae | Traill's Flycatcher | 1 | 1 | 1 | 1 | 0 | 0.8 | 1 | 3 | 4 | 3 | 2 | 2.6 |
| Paridae | Black-capped Chickadee | 0 | 1 | 1 | 4 | 2 | 1.6 | 1 | 4 | 5 | 1 | 0 | 2.2 |
| | Mountain Chickadee | 0 | 0 | 1 | 0 | 0 | 0.2 | 0 | 0 | 0 | 0 | 1 | 0.2 |
| Sittidae | Red-breasted Nuthatch | 1 | 0 | 0 | 0 | 0 | 0.2 | 1 | 0 | 0 | 0 | 0 | 0.2 |
| Turdidae | American Robin | 3 | 0 | 2 | 2 | 3 | 2.0 | 0 | 2 | 1 | 4 | 1 | 1.6 |
| | Swainson's Thrush | 0 | 0 | 0 | 0 | 0 | 0.0 | 2 | 1 | 1 | 1 | 2 | 1.4 |
| Vireonidae | Hutton's Vireo | 1 | 0 | 0 | 0 | 0 | 0.2 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| | Solitary Vireo | 2 | 1 | 2 | 3 | 0 | 1.6 | 0 | 0 | 2 | 1 | 1 | 0.8 |
| Parulidae | Nashville Warbler | 0 | 0 | 0 | 0 | 1 | 0.2 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| | Audubon's Warbler | 2 | 5 | 2 | 2 | 2 | 2.6 | 1 | 2 | 2 | 1 | 3 | 1.8 |
| | Townsend's Warbler | 0 | 2 | 0 | 0 | 0 | 0.4 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| | Wilson's Warbler | 0 | 0 | 0 | 0 | 1 | 0.2 | 0 | 0 | 0 | 1 | 1 | 0.4 |

Table III

Cont'd

| Family | Species | Pre-spray days | | | | | Daily ave | Post-spray days | | | | | Daily ave |
|----------------------|----------------------|-----------------|-----------------|-----------------|-----------------|-----------------|--------------|-----------------|-----------------|-----------------|-----------------|-----------------|--------------|
| | | May 23 -5 | May 24 -4 | May 25 -3 | May 26 -2 | May 27 -1 | | May 29 +1 | May 30 +2 | May 31 +3 | June 1 +4 | June 2 +5 | |
| Icteridae | Brewer's Blackbird | 1 | 0 | 0 | 0 | 0 | 0.2 | 0 | 1 | 0 | 0 | 0 | 0.2 |
| | Brown-headed Cowbird | 0 | 0 | 1 | 0 | 4 | 1.0 | 2 | 2 | 1 | 3 | 2 | 2.0 |
| Thraupidae | Western Tanager | 0 | 1 | 0 | 1 | 4 | 1.2 | 0 | 1 | 0 | 0 | 4 | 1.0 |
| Fringillidae | Eyening Grosbeak | 0 | 0 | 0 | 0 | 2 | 0.4 | 0 | 0 | 0 | 0 | 1 | 0.2 |
| | Purple Finch | 0 | 1 | 0 | 0 | 0 | 0.2 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| | Pine Siskin | 2 | 0 | 0 | 0 | 0 | 0.4 | 2 | 3 | 4 | 2 | 1 | 2.4 |
| | Chipping Sparrow | 8 | 8 | 6 | 5 | 5 | 6.4 | 4 | 8 | 5 | 9 | 2 | 5.6 |
| Unidentified Species | | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | 0 | 0 | 1 | 0 | 0.2 |
| Totals: | | 23 | 21 | 17 | 20 | 26 | 21.4 | 16 | 29 | 27 | 28 | 22 | 24.4 |

Table IV
Forest bird population census
Orthene^R treatment plot 5
Kamloops, British Columbia
May 23 - June 2
1976.

| Family | Species | Pre-spray days | | | | | Daily Average | Post-spray days | | | | | Daily Average |
|--------------|-----------------------------|----------------|-----------|-----------|-----------|-----------|------------------|-----------------|-----------|-----------|-----------|-----------|------------------|
| | | May 23 | May 24 | May 25 | May 26 | May 27 | | May 29 | May 30 | May 31 | June 1 | June 2 | |
| | | -5 | -4 | -3 | -2 | -1 | | +1 | +2 | +3 | +4 | +5 | |
| Tetraonidae | Ruffed Grouse | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | 0 | 1 | 0 | 0 | 0.2 |
| Columbidae | Mourning Dove | 0 | 0 | 1 | 0 | 0 | 0.2 | 1 | 0 | 0 | 0 | 0 | 0.2 |
| Trochilidae | Calliope Hummingbird | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | 1 | 1 | 0 | 1 | 0.6 |
| Picidae | Yellow-bellied Sapsucker | 0 | 0 | 1 | 0 | 0 | 0.2 | 0 | 0 | 1 | 0 | 0 | 0.4 |
| Tyrannidae | Traill's Flycatcher | 0 | 1 | 0 | 1 | 0 | 0.4 | 1 | 0 | 1 | 0 | 2 | 0.8 |
| Paridae | Black-capped Chickadee | 0 | 0 | 0 | 0 | 1 | 0.2 | 0 | 3 | 0 | 0 | 2 | 1.0 |
| Turdidae | American Robin | 0 | 1 | 0 | 1 | 0 | 0.4 | 1 | 0 | 0 | 0 | 0 | 0.2 |
| Sylviidae | Ruby-crowned Kinglet | 1 | 1 | 0 | 1 | 0 | 0.6 | 0 | 1 | 0 | 0 | 0 | 0.2 |
| Vireonidae | Solitary Vireo | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | 0 | 1 | 0 | 0 | 0.2 |
| Parulidae | Audubons Warbler | 0 | 0 | 1 | 1 | 1 | 0.6 | 0 | 1 | 0 | 0 | 0 | 0.2 |
| | Wilson's Warbler | 1 | 0 | 0 | 0 | 0 | 0.2 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| Icteridae | Brewer's Blackbird | 1 | 0 | 1 | 0 | 0 | 0.4 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| Fringillidae | Pine Siskin | 0 | 3 | 0 | 0 | 2 | 1.0 | 0 | 0 | 3 | 0 | 0 | 0.6 |
| | Chipping Sparrow | 0 | 1 | 1 | 1 | 2 | 1.0 | 2 | 1 | 2 | 1 | 1 | 1.4 |
| | Song Sparrow | 0 | 0 | 0 | 1 | 0 | 0.2 | 1 | 1 | 1 | 1 | 1 | 1.0 |
| Totals | | 3 | 7 | 5 | 6 | 6 | 5.4 | 7 | 8 | 11 | 2 | 7 | 7.0 |

Table V
Forest bird population census
Orthene[®] treatment plot 6
Kamloops, British Columbia
May 23 - June 2, 1976

| Family | Species | Pre-spray days | | | | | Daily ave | Post-spray days | | | | | Daily ave |
|-------------|---------------------|----------------|-----|-----|-----|-----|--------------|-----------------|-----|-----|------|------|--------------|
| | | May | May | May | May | May | | May | May | May | June | June | |
| | | 23 | 24 | 25 | 26 | 27 | | 29 | 30 | 31 | 1 | 2 | |
| | | -5 | -4 | -3 | -2 | -1 | | +1 | +2 | +3 | +4 | +5 | |
| Tetraonidae | Ruffed Grouse | 1 | 1 | 1 | 1 | 1 | 1.0 | 1 | 0 | 0 | 0 | 1 | 0.4 |
| Columbidae | Mourning Dove | 1 | 1 | 0 | 0 | 0 | 0.4 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| Trochilidae | Calliope | | | | | | | | | | | | |
| | Hummingbird | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | 0 | 1 | 0 | 1 | 0.2 |
| Picidae | Yellow-bellied | | | | | | | | | | | | |
| | Sapsucker | 0 | 1 | 1 | 1 | 1 | 0.8 | 1 | 0 | 0 | 0 | 1 | 0.2 |
| Tyrannidae | Traill's Flycatcher | 1 | 1 | 0 | 1 | 0 | 0.6 | 1 | 2 | 1 | 0 | 0 | 0.8 |
| Paridae | Black-capped | | | | | | | | | | | | |
| | Chickadee | 1 | 0 | 0 | 0 | 0 | 0.2 | 3 | 0 | 1 | 0 | 1 | 1.0 |
| | Mountain Chickadee | 0 | 0 | 0 | 1 | 0 | 0.2 | 0 | 0 | 0 | 0 | 1 | 0.2 |
| Sittidae | Red-breasted | | | | | | | | | | | | |
| | Nuthatch | 1 | 0 | 0 | 0 | 0 | 0.2 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| Turdidae | American Robin | 1 | 0 | 1 | 1 | 0 | 0.6 | 0 | 0 | 0 | 0 | 1 | 0.2 |
| | Swainson's Thrush | 0 | 0 | 0 | 0 | 0 | 0.0 | 1 | 1 | 0 | 2 | 2 | 1.2 |
| Sylviidae | Golden-crowned | | | | | | | | | | | | |
| | Kinglet | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | 0 | 0 | 0 | 2 | 0.4 |
| | Ruby-crowned | | | | | | | | | | | | |
| | Kinglet | 2 | 2 | 3 | 2 | 2 | 1.2 | 1 | 2 | 2 | 2 | 2 | 1.8 |
| Vireonidae | Solitary Vireo | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | 1 | 1 | 0 | 1 | 0.6 |
| | Warbling Vireo | 1 | 1 | 1 | 1 | 1 | 1.0 | 2 | 0 | 1 | 0 | 1 | 0.8 |

Table V

Cont'd

| Family | Species | Pre-spray days | | | | | | Post-spray days | | | | | |
|--------------|----------------------|----------------|-----|-----|-----|-----|-------|-----------------|-----|-----|------|------|-------|
| | | May | May | May | May | May | Daily | May | May | May | June | June | Daily |
| | | 23 | 24 | 25 | 26 | 27 | | 29 | 30 | 31 | 1 | 2 | |
| | | -5 | -4 | -3 | -2 | -1 | ave | +1 | +2 | +3 | +4 | +5 | ave |
| Parulidae | Audubon's Warbler | 0 | 0 | 1 | 0 | 0 | 0.2 | 0 | 1 | 0 | 1 | 0 | 0.4 |
| | Wilson's Warbler | 1 | 1 | 0 | 1 | 1 | 0.8 | 1 | 1 | 1 | 1 | 0 | 0.8 |
| Icteridae | Brewer's Blackbird | 0 | 0 | 1 | 0 | 0 | 0.2 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| | Brown-headed Cowbird | 0 | 0 | 0 | 0 | 0 | 0.0 | 2 | 0 | 0 | 1 | 0 | 0.6 |
| Thraupidae | Western Tanager | 0 | 0 | 0 | 1 | 0 | 0.2 | 1 | 0 | 1 | 1 | 2 | 1.0 |
| Fringillidae | Pine Siskin | 10 | 5 | 0 | 1 | 0 | 3.2 | 0 | 2 | 3 | 0 | 0 | 1.0 |
| | Dark-eyed Junco | 0 | 0 | 1 | 2 | 0 | 0.6 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| | Chipping Sparrow | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | 0 | 2 | 0 | 0 | 0.4 |
| | Song Sparrow | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | 0 | 0 | 1 | 0 | 0.2 |
| Totals: | | 20 | 13 | 10 | 13 | 6 | 12.4 | 14 | 10 | 14 | 9 | 16 | 12.6 |

Table VI
Forest bird population census
Dimilin^R untreated check plot
Kamloops, British Columbia
June 12 - 24
1976

| Family | Species | Pre-spray days | | | | | | Post-spray days | | | | | |
|-------------|--------------------------|----------------|---------|---------|---------|---------|-----------|-----------------|---------|---------|---------|---------|-----------|
| | | June 12 | June 13 | June 14 | June 15 | June 17 | Daily ave | June 19 | June 20 | June 21 | June 23 | June 24 | Daily ave |
| | | -6 | -5 | -4 | -3 | -1 | | +1 | +2 | +3 | +5 | +6 | |
| Tetraonidae | Ruffed Grouse | 0 | 0 | 1 | 0 | 0 | 0.2 | 0 | 0 | 1 | 0 | 0 | 0.2 |
| Trochilidae | Calliope Hummingbird | 1 | 0 | 1 | 1 | 0 | 0.6 | 1 | 3 | 1 | 2 | 2 | 1.8 |
| Picidae | Yellow-bellied Sapsucker | 0 | 0 | 0 | 0 | 1 | 0.2 | 2 | 2 | 2 | 2 | 1 | 1.8 |
| Tyrannidae | Traill,s Flycatcher | 1 | 1 | 1 | 1 | 1 | 1.0 | 0 | 0 | 1 | 1 | 1 | 0.6 |
| Paridae | Black-capped Chickadee | 1 | 2 | 1 | 0 | 0 | 0.8 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| | Mountain Chickadee | 1 | 0 | 2 | 1 | 0 | 0.8 | 0 | 6 | 4 | 6 | 2 | 3.6 |
| Sittidae | Red-breasted Nuthatch | 0 | 0 | 0 | 1 | 0 | 0.2 | 0 | 0 | 2 | 0 | 1 | 0.6 |
| Turdidae | American Robin | 0 | 0 | 2 | 7 | 1 | 2.0 | 1 | 0 | 1 | 1 | 3 | 1.2 |
| | Swainson's Thrush | 2 | 2 | 2 | 1 | 0 | 1.4 | 2 | 1 | 2 | 0 | 1 | 1.2 |
| Sylviidae | Ruby-crowned Kinglet | 0 | 0 | 0 | 0 | 2 | 0.4 | 0 | 0 | 1 | 2 | 3 | 1.2 |
| Vireonidae | Hutton's Vireo | 0 | 0 | 0 | 0 | 0 | 0.0 | 1 | 0 | 0 | 0 | 0 | 0.2 |
| | Warbling Vireo | 1 | 3 | 4 | 1 | 1 | 2.0 | 2 | 1 | 3 | 0 | 3 | 1.8 |

Table VI (Cont'd.)

| Family | Species | Pre-spray days | | | | | | Post-spray days | | | | | |
|--------------|----------------------|----------------|---------|---------|---------|---------|-----------|-----------------|---------|---------|---------|---------|-----------|
| | | June 12 | June 13 | June 14 | June 15 | June 17 | Daily ave | June 19 | June 20 | June 21 | June 23 | June 24 | Daily ave |
| | | -6 | -5 | -4 | -3 | -1 | | +1 | +2 | +3 | +5 | +6 | |
| Parulidae | Audubon's Warbler | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | 0 | 1 | 1 | 0 | 0.2 |
| Icteridae | Brown-headed Cowbird | 1 | 0 | 0 | 0 | 0 | 0.2 | 0 | 1 | 1 | 0 | 1 | 0.4 |
| | Western Meadowlark | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | 1 | 0 | 0 | 0 | 0.2 |
| Thraupidae | Western Tanager | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | 1 | 0 | 0 | 0 | 0.2 |
| Fringillidae | Cassin's Finch | 0 | 0 | 0 | 0 | 0 | 0.0 | 1 | 0 | 0 | 0 | 1 | 0.4 |
| | Pine Siskin | 0 | 0 | 0 | 0 | 3 | 0.6 | 1 | 0 | 0 | 1 | 3 | 1.0 |
| | Vesper Sparrow | 0 | 1 | 1 | 1 | 2 | 1.0 | 0 | 2 | 2 | 2 | 2 | 1.6 |
| | Dark-eyed Junco | 0 | 1 | 1 | 0 | 0 | 0.4 | 0 | 0 | 0 | 1 | 0 | 0.2 |
| | Chipping Sparrow | 2 | 3 | 7 | 4 | 3 | 3.8 | 5 | 3 | 6 | 3 | 4 | 4.2 |
| Unidentified | species | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | 0 | 1 | 0 | 0 | 0.2 |
| Totals | | 10 | 13 | 23 | 18 | 14 | 15.6 | 16 | 21 | 29 | 22 | 28 | 23.2 |

Table VII
Forest bird population census
Dimilin^R treatment plot
Kamloops, British Columbia
June 12 - 24
1976

| Family | Species | Pre-spray days | | | | | | Post-spray days | | | | | |
|-------------|--------------------------|----------------|---------|---------|---------|---------|-----------|-----------------|---------|---------|---------|---------|-----------|
| | | June 12 | June 13 | June 14 | June 15 | June 17 | Daily ave | June 19 | June 20 | June 21 | June 23 | June 24 | Daily ave |
| | | -6 | -5 | -4 | -3 | -1 | | +1 | +2 | +3 | +5 | +6 | |
| Trochilidae | Calliope Hummingbird | 0 | 0 | 1 | 0 | 0 | 0.2 | 0 | 1 | 0 | 0 | 0 | 0.2 |
| Picidae | Common Flicker | 1 | 2 | 0 | 1 | 1 | 1.0 | 0 | 2 | 0 | 0 | 0 | 0.4 |
| | Yellow-bellied Sapsucker | 2 | 0 | 0 | 1 | 1 | 0.8 | 0 | 2 | 1 | 2 | 2 | 1.4 |
| Tyrannidae | Traill's Flycatcher | 1 | 2 | 3 | 1 | 2 | 1.8 | 0 | 0 | 0 | 1 | 0 | 0.2 |
| Corvidae | Raven | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | 0 | 0 | 0 | 1 | 0.2 |
| | Crow | 0 | 0 | 0 | 0 | 1 | 0.2 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| Paridae | Black-capped Chickadee | 0 | 6 | 6 | 0 | 0 | 2.4 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| | Mountain Chickadee | 0 | 3 | 6 | 5 | 4 | 3.6 | 3 | 4 | 3 | 1 | 0 | 2.2 |
| Sittidae | White-breasted Nuthatch | 0 | 0 | 1 | 0 | 0 | 0.2 | 0 | 1 | 0 | 1 | 0 | 0.4 |
| | Red-breasted Nuthatch | 2 | 0 | 0 | 0 | 1 | 0.6 | 0 | 2 | 0 | 0 | 0 | 0.4 |
| Turdidae | American Robin | 0 | 6 | 8 | 5 | 6 | 5.0 | 3 | 1 | 2 | 3 | 3 | 2.4 |
| | Swainson's Thrush | 1 | 2 | 2 | 2 | 2 | 1.8 | 2 | 1 | 2 | 2 | 1 | 1.6 |
| | Townsend's Solitaire | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | 0 | 0 | 1 | 0 | 0.2 |

Table VII (Cont'd)

| Family | Species | Pre-spray days | | | | | Daily ave | Post-spray days | | | | | Daily ave |
|--------------|----------------------|----------------|------------|------------|------------|------------|--------------|-----------------|------------|------------|------------|------------|--------------|
| | | June 12 | June 13 | June 14 | June 15 | June 17 | | June 19 | June 20 | June 21 | June 23 | June 24 | |
| | | -6 | -5 | -4 | -3 | -1 | | +1 | +2 | +3 | +5 | +6 | |
| Vireonidae | Solitary Vireo | 0 | 0 | 0 | 1 | 1 | 0.4 | 1 | 0 | 2 | 2 | 1 | 1.2 |
| | Warbling Vireo | 2 | 3 | 3 | 3 | 2 | 2.6 | 2 | 3 | 2 | 1 | 1 | 1.8 |
| Parulidae | Audubon's Warbler | 1 | 2 | 1 | 1 | 1 | 1.2 | 1 | 4 | 2 | 1 | 3 | 2.2 |
| | Wilson's Warbler | 1 | 1 | 0 | 0 | 0 | 0.4 | 0 | 0 | 0 | 0 | 0 | 0.0 |
| Icteridae | Brown-headed Cowbird | 4 | 2 | 2 | 1 | 3 | 2.4 | 1 | 1 | 4 | 4 | 2 | 2.4 |
| | Western Meadowlark | 0 | 0 | 0 | 0 | 0 | 0.0 | 0 | 0 | 0 | 1 | 0 | 0.2 |
| Thraupidae | Western Tanager | 3 | 0 | 3 | 2 | 1 | 1.8 | 0 | 2 | 1 | 2 | 0 | 1.0 |
| Fringillidae | Cassin's Finch | 0 | 0 | 2 | 0 | 1 | 0.6 | 0 | 1 | 0 | 0 | 0 | 0.2 |
| | Pine Siskin | 0 | 4 | 0 | 1 | 5 | 2.0 | 6 | 6 | 8 | 3 | 4 | 5.4 |
| | Vesper Sparrow | 2 | 0 | 0 | 1 | 1 | 0.8 | 1 | 1 | 1 | 0 | 0 | 0.6 |
| | Dark-eyed Junco | 1 | 4 | 1 | 1 | 1 | 1.6 | 1 | 2 | 2 | 4 | 3 | 2.4 |
| | Chipping Sparrow | 4 | 4 | 3 | 1 | 3 | 3.0 | 1 | 3 | 5 | 6 | 2 | 3.4 |
| Totals | | 25 | 41 | 42 | 27 | 37 | 34.4 | 22 | 37 | 35 | 35 | 23 | 30.4 |

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