

Observations of Two Species at Risk in Mainland Southwestern British Columbia: Hutton's Vireo and Western Screech-Owl

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ABSTRACT

Hutton's vireo (*Vireo huttoni huttoni*) and western screech-owl (*Otus kennicottii kennicottii*) are 2 subspecies at risk occupying lowland coniferous or mixed coniferous-deciduous woodlands in the Greater Vancouver and Sunshine Coast areas of British Columbia. Since 1993, we have conducted 43 intensive censuses of the avifauna of 38 sites in this region, including wooded areas proposed for development (84%), and parks and other protected areas (16%). The sampled sites varied from 1.5 to 190 ha, and were all second or third growth, with stand age estimated between 30 and 100 years. We detected Hutton's vireos and western screech-owls at 51% and 42% respectively of all sites censused, comprising 43% and 64% respectively at sites in the Fraser Valley, 54% and 25% on the Vancouver North Shore, and 71% and 29% on the Sunshine Coast. Highest occurrence of both species was in coniferous habitats, followed by mixed coniferous-deciduous habitats. They were absent in deciduous woodland. We conclude that since most survey sites have been completely or partially cleared for land development, the original concerns for Hutton's vireo and western screech-owl populations remain. These concerns may be reduced if studies in the managed forests of southwestern British Columbia confirm the consistent presence of these species in forest stands as young as 25 years old.

Key words: Greater Vancouver, habitat selection, Hutton's vireo, land development, *Otus kennicottii kennicottii*, Sunshine Coast, *Vireo huttoni huttoni*, western screech-owl.

In British Columbia, Hutton's vireo (*Vireo huttoni huttoni*) and the western screech-owl (*Otus kennicottii kennicottii*) share several distinct features. They are frequently a challenge to detect. They have a limited distribution, primarily in low-elevation coniferous or mixed coniferous-deciduous woodlands in the southwestern corner of the province, although the range of the western screech-owl extends eastward where lowland habitats are available (Campbell et al. 1990, 1997). They are both species at risk, particularly in areas facing development pressure, such as the areas within which our surveys took place. Hutton's vireo is Blue-listed (i.e. designated as vulnerable) by the government of British Columbia (Cannings 1998). The *kennicottii* subspecies of

the western screech-owl was Blue-listed until it was subdivided into separate subspecies—*saturatus* (Gulf Islands/Vancouver Island) and *kennicottii* (Lower Mainland)—with only the former remaining as Blue-listed (Cannings 1998). On the basis of these ecological and management similarities, we have combined in this paper our observations on these 2 taxonomically distant species.

Owing to the status of these species, they have been a special focus of the avian inventory and environmental assessment projects we have conducted in the past 5 years (1993–98). During this period we have conducted 43 intensive avian inventories of low-elevation woodland sites in the Lower Mainland, on Vancouver's North Shore, and on the Sunshine Coast (Fig. 1). Neither species was a specific target of these surveys, and all sites were surveyed during the day. This explains why in 17 of our surveys we made no special effort to find western screech-owls or their roosts. Though most

of our surveys were 1-time, intensive inventories of an area, we made 4 surveys in a North Vancouver park and 3 at a Howe Sound development site to cover multi-seasonal avian use. While the survey locations were nominally opportunistic, we believe their number and distribution encompass representative habitats at risk. The inventories themselves were conducted following systematic survey protocols.

Our principal objectives with this paper have been: to report on the occurrence of these 2 species at the surveyed sites; categorize their occurrence by local geography, habitat, and season; discuss challenges of detection; and comment on habitats at risk for these 2 species in the environments surveyed.

METHODS

Survey methods combined scientific and regulatory requirements. For most inventories (40) we followed the raptor/heron-nest-survey protocol (Barnard n.d., B.C. MELP 1997) because it was a regulatory requirement for development applications. In 1 study area on the Sunshine Coast, where study area stratification was a requirement, we followed forest-and-grassland-songbird-survey methods for the 3 surveys conducted there (B.C. RIC 1997).

In spite of the focus of raptor/heron nest surveys, we used these foot surveys to complete a relatively comprehensive bioinventory in which species richness was the primary objective. The raptor/heron-nest-survey protocol is a line-transect method with a recommended transect interval of 10 m. In practice, we adapted these methods, with approval of regulators, by varying transect width from 10–50 m, depending primarily on visibility and forest structure: 10 m in dense coniferous forest; wider transect widths as the deciduous proportion increased. Search patterns consisted of observers progressing along each of the transects listening for and observing birds (similar to encounter-transect methods discussed below), and plotting the locations of those observed and heard on maps of the study area. Second, in a more active mode, observers mimicked the calls of the northern pygmy-owl (*Glaucidium gnoma*) and added “pishing” sounds to attract certain birds that might have been missed. In those 26 instances where we were searching for western screech-owls as well as Hutton’s vireos, the observers closely examined all of the denser thickets, particularly clusters of conifers, for owls or their sign (e.g., guano stains, pellets, feathers), or other indications of an owl roost. For the surveys discussed here, we report on only those western screech-owls that were observed.

At 1 site in Howe Sound (Sunshine Coast), where we sampled on 3 occasions, we used a combination of unlimited radius point counts and encounter transects (B.C. RIC 1997). At each point-count station the observers waited at least 1 minute prior to beginning the count. A count period of

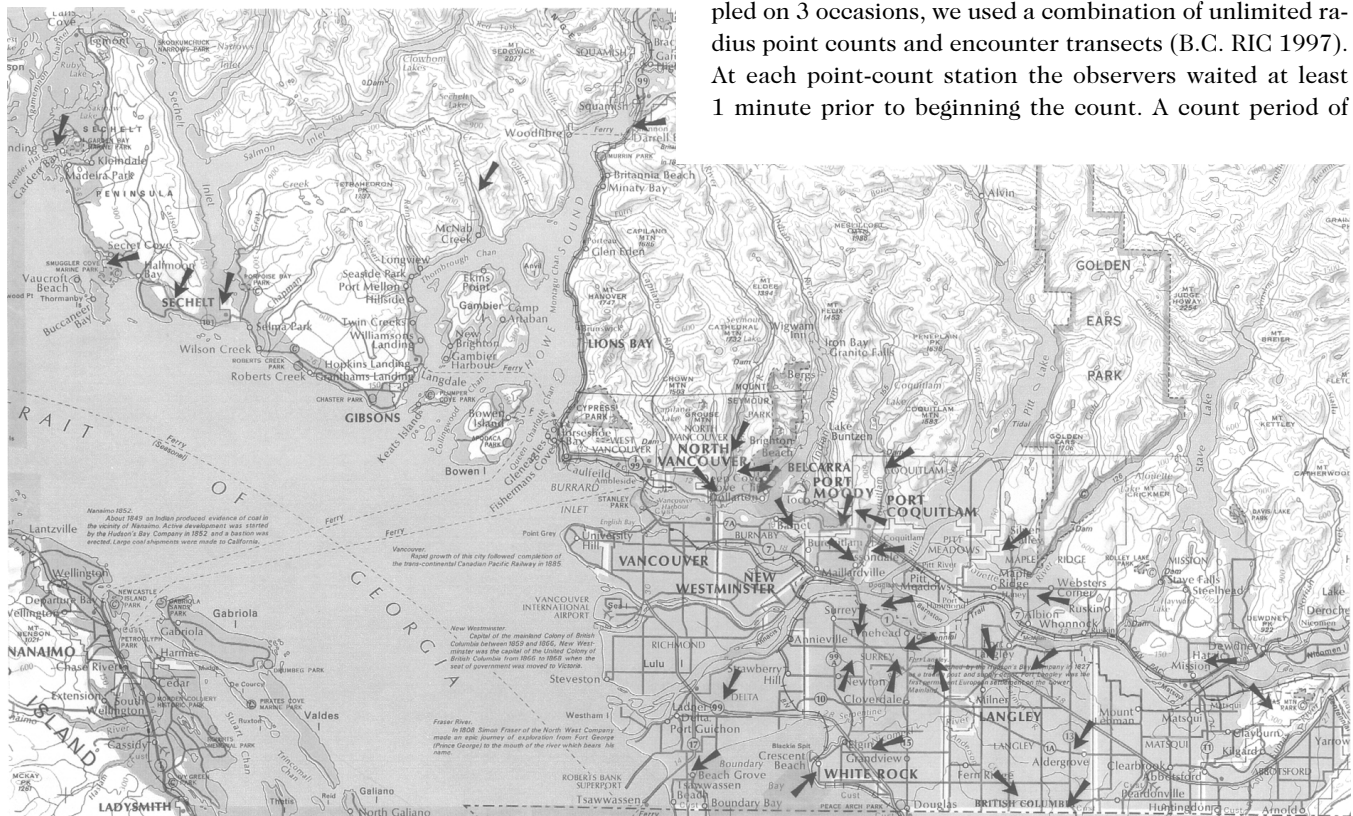


Figure 1. Survey sites for Hutton’s vireo and western screech-owl.

Table 1. Size distribution of sampling sites.

Site size (ha)	<5	5–9	10–24	25–49	≥50
No. of sampling sites	9	7	9	11	7

5 minutes was established. During this period, most birds were identified by sound. After individual point counts, we imitated northern pygmy owl calls and began “pishing.” Pishing mimics an alarm call of songbirds and, in combination with owl calls, often causes birds that were otherwise undetected to approach the observer and/or vocalize; occasionally these sounds can induce owls to call during daylight. According to British Columbia Resources Inventory Committee (RIC) methodology regarding encounter transects, the observer(s) walks a route and records birds encountered (B.C. RIC 1997). Our encounter transects were a record of all birds observed or heard (mostly) between 1 point-count station and the next. This included the birds recorded in response to simulated owl calls and pishing.

STUDY SITES AND SAMPLING

The choice of sampling sites was opportunistic. The common element was that the sites were being considered for development or were part of conservation areas or parks; in both cases bioinventory was required. The sampling sites were located in the Fraser Valley (54%), at lower elevations of the North Shore (30%), and on the Sunshine Coast (16%). The 43 sampled sites varied in size from 1.5 to 190 ha, with the average sampling area ranging from 25.3 ha in the Fraser Valley to 29.3 ha at Sunshine Coast sites. The distribution of sampling site sizes is indicated in Table 1.

In total, 1,123.5 ha were sampled. While most sites were covered with second- or third-growth forest estimated at 30–100 years old, several sites included small components of shrub habitat or old-field community. On a few sites there was a combination of old-field community, shrub habitat,

and several woodland types (Appendix A). Though sampling took place throughout the year, the bulk of it took place between February and July (Table 2).

RESULTS

FREQUENCY OF OCCURRENCE

Hutton's vireo

This species was detected at 51% of sites sampled (Table 3). During their February–May breeding season, when their singing is an aid to detection, they were recorded during 12 of 23 samplings. From June through January, when their reduced singing makes them less detectable (Davis 1995), Hutton's vireos were recorded during 10 of 20 samplings. On the basis of a small number of samples, season did not appear to affect detection in this species. The number observed (27) on the Sunshine Coast reflects the 24 Hutton's vireos recorded at a forestry plantation that was sampled on 3 occasions.

Occurrence varied among sites in the Fraser Valley (0.43), the lower elevations of the North Shore (0.54), and the Sunshine Coast (0.71). These results may reflect the higher proportion of coniferous forests and plantations sampled on the Sunshine Coast and North Shore. This is borne out by limited habitat information (Table 4), which is consistent with the apparent preference of Hutton's vireo for coniferous habitats, particularly immature plantations (Bryant et al. 1993, Deal and Lessard 1995).

Western screech-owl

An estimated 889 ha of woodland habitat was surveyed on 26 occasions when we specifically searched for owls at their daytime roosts. We recorded western screech-owls on 42% of those surveys, and the total number of western screech-owls observed was 22 (Table 5). Frequency of occurrence was highest in the Fraser Valley (0.64), with considerably lower occurrence rates on the Sunshine Coast (0.29) and the lower elevations of the North Shore (0.25). Although occurrence

Table 2. Monthly distribution of systematic observations.

Month	J	F	M	A	M	J	J	A	S	O	N	D
No. of surveys	1	8	6	6	3	5	8	0	2	0	1	3

Table 3. Frequency of occurrence of Hutton's vireo.

	All sites	Fraser Valley	North Shore	Sunshine Coast ^a
Area sampled (ha)	1,123.5	582.5	336	205
No. of surveys	43	23	13	7
Frequency of occurrence	0.51	0.43	0.54	0.71
No. of birds observed	59	18	14	27

^a 5 locations (1 surveyed 3 times)

Table 4. Occurrence of Hutton's vireo by habitat.

	Plantation	Mixed coniferous-deciduous		Deciduous
		>50 yrs	<50 yrs	
No. of surveys ^a	3	21	5	4
Frequency of occurrence	1.0	0.57	0.60	0.00
No. of birds observed	24	23	5	0

^a 10 surveys are not included because their locations involved a complex mosaic of habitats, which could not be classified

rates were low on the Sunshine Coast, the greatest number of owl observations (11) was from here. All 11 observations were recorded from 1 watershed that flows into Howe Sound; these owls were found in 25- to 50-year-old forestry plantations situated adjacent to the more mature forests that bordered the main creek (Table 6). Other habitats where we found considerable numbers were mixed coniferous-deciduous forests >50 years old. This species was absent in our limited sampling of deciduous woodlands. At individual daytime roosts, western screech-owls were located next to the trunks of western hemlock (50%), western redcedar (40%), and Douglas-fir (10%).

DISCUSSION

Our observations, in combination with those of other researchers, indicate that although Hutton's vireos and western screech-owls are observed frequently and are persisting in the developing areas of the Georgia Depression ecoprovince (Demarchi et al. 1990), the locus of their continued survival could lie in the managed low-elevation forest lands within both the Georgia Depression and those parts of the Coast and Mountains ecoprovince immediately adjacent.

With Hutton's vireos, the overall frequency of occurrence (0.51) is broadly comparable with their occurrence during breeding songbird surveys in old-growth and managed forests on western and northern Vancouver Island (Bryant et al. 1993, Deal and Lessard 1995).

Most of the sites we surveyed represented a highly variable combination of second-growth, coniferous-deciduous forest, mostly >50 years old, with a considerable shrub understory, and in which occasionally thick coniferous stands bordered deciduous riparian woodland or edge (clearing, farm field, etc.). This is the model habitat of Hutton's vireo, based on sightings near human settlement in the Georgia Depression ecoprovince (Campbell et al. 1997). At approximately half of all such sites, we found Hutton's vireos. At most of these locations, Hutton's vireos were observed in coniferous trees. The habitat function of deciduous woodland and shrubs, and of edge, for this species is not clear and remains to be determined. There are several possibilities. First, the consistent occurrence of breeding Hutton's vireos in managed forest lands within stand ages from 25 years to old growth may indicate a minor role for deciduous woodland and shrub, at least during the breeding season. Second, in managed forests, it is within Douglas-fir stands that

Table 5. Frequency of occurrence of western screech-owl.

	All sites	Fraser Valley	North Shore	Sunshine Coast ^a
Area sampled	889	475	209	206
No. of surveys	26	11	8	7
Frequency of occurrence	0.51	0.64	0.25	0.29
No. of birds observed	22	8	3	11

^a 5 locations (1 surveyed 3 times)

Table 6. Occurrence of western screech-owl by habitat.

	Plantation	Mixed coniferous-deciduous		Deciduous
		>50 yrs	<50 yrs	
No. of surveys ^a	3	8	4	2
Frequency of occurrence	1.0	0.62	0.25	0.00
No. of birds observed	11	6	2	0

^a 9 surveys are not included because their locations involved a complex mosaic of habitats, which could not be classified.

Hutton's vireo occurs; it is virtually absent in western redcedar-dominated forests (A. Bryant, pers. comm.). Since the preferred nursery stock to revegetate the Fraser Valley and southern Vancouver Island woodlands was originally Douglas-fir (R. Merrell, Green Timbers Nursery, pers. comm.), second-growth Douglas-fir in this area is widespread and at an age (>30 years old) that is preferred by Hutton's vireo. Third, the forage provided by deciduous woodlands and shrubs may be vital to the overwintering survival of Hutton's vireo.

Our perspective on western screech-owls was considerably more narrow; we found them primarily at their daytime roosts. Here they were located exclusively in conifers, primarily western hemlock and western redcedar, and in 90% of instances they were pressed up against the tree trunk. This behaviour is consistent with the pattern of their cryptic colouration (Johnsgard 1988). Their relatively high frequency of occurrence in the Fraser Valley and high numbers during 2 surveys at 1 Sunshine Coast location, are similar to habitat occurrence patterns in Hutton's vireo. In the Fraser Valley, the survival of western screech-owls is probably dependent in part on the continued availability of dense coniferous stands within which to roost. The size of such refuges is probably important. We speculate that small woodland refuges (<10 ha) may enhance western screech-owl survival by helping these owls avoid competition with, or predation by, larger owls. Five of the 8 owls observed at Fraser Valley locations were at sites of ≤ 10 ha. Large owls (great horned owl [*Bubo virginianus*] and barred owl [*Strix varia*]) were recorded during only 2 of the 11 surveys in which western screech-owls were observed. Recent sign of large owls was recorded at 3 additional sites.

The anomalous location among our survey sites was the McNab Creek drainage in Howe Sound. Here, during successive surveys in February and March covering an estimated 50 ha of Douglas-fir plantation aged approximately 25–30 years old and contiguous with mature stands bordering McNab Creek, we found 6 and 5 western screech-owls respectively. (None were recorded when we repeated the survey in June). Their presence in similar numbers was confirmed in nocturnal owl call playback surveys of the same area. The unusual results were related to the high numbers recorded, the very low proportion of deciduous vegetation, and the stand age. This habitat seems far removed from the paradigm of open deciduous and coniferous woodlands bordering riparian corridors (Johnsgard 1988, Campbell et al. 1990), which mostly pre-dated detailed avian studies in managed forests. Somewhat similar results have been recorded by Deal and Lamont (1996) who, in March–May 1995, detected western screech-owls more frequently (0.22) than other owl species in surveys at 353 sampling stations in the Nimpkish Valley on Vancouver Island. Stand age from which responding owls called varied from 15- to 20-year-old regenerating plantations

to old growth, plus riparian forest (J. Deal, Canadian Forest Products, pers. comm.). These and similar results from managed forest lands need to be incorporated into our perception of the life history, distribution, abundance, and habitat use of the widening array of avian species of management interest.

Both Hutton's vireos and western screech-owls are easily overlooked. For this reason our surveys probably missed a number of individuals. In addition, our surveys were not directed specifically at these species. As a consequence, certain habitat information was not collected. On the other hand, the raptor/heron-nest-survey protocol that we used in 40 of 43 surveys has no built-in time limit, unlike point counts; thus, our coverage, while somewhat unorthodox, might have been superior to point counts, at least for these 2 species. Survey guidelines and standards recommend experienced observers, but with wildlife management broadening its species focus this is not easy to achieve. The emphasis of our search pattern for Hutton's vireo was first on its vocalizations, particularly its February–May "zu-weep" song, and its rasping "chee-vee-vee" call, variations on which may represent alarm notes uttered throughout the year. Second, we employed "pishing" sounds and mimicked certain avian predators, particularly the northern pygmy owl; this is highly effective in eliciting responses from songbirds and should be stressed. Third, our visual search emphasized the preferred habitats (discussed above) and solitary birds in conifers. With respect to western screech-owls, we do not recommend surveys to find diurnally roosting owls. Other techniques such as owl call playback surveys are equally useful, and have less potential for disturbance.

While our frequency of occurrence data for Hutton's vireo and western screech-owl may seem high for species at risk, it should be remembered that many of the areas surveyed have been partially or completely cleared for land development. Therefore, the original concerns for populations of these species, and particularly Hutton's vireo, remain. New information from certain managed forests indicates that both Hutton's vireo and the western screech-owl are consistently being recorded. If such data are replicated from equivalent studies in other managed forests in southwestern British Columbia, then the status of these species at risk may no longer be valid.

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Appendix A. Summary of information from surveys of Hutton's vireo (HUVI) and western screech-owl (WSOW)

Survey no. and date	HUVI	WSOW	Area (ha)	Survey method ^a	Location	Habitat characteristics
1. Sep 1993	0	NS ^b	20	RHNS	Mission	Fields, cottonwood plantation, coniferous ^c forest, mixed coniferous/deciduous woodland
2. Apr 1994	3	NS	20	RHNS	North Vancouver	Mixed coniferous/deciduous forest (>50 yrs)
3. May 1994	1+	NS	5	RHNS	Coquitlam	Mixed coniferous/deciduous forest (>50 yrs)
4. Nov 1994	3	0	23	RHNS	North Vancouver	Mixed coniferous/deciduous forest (>50 yrs)
5. Feb 1995	3	1	8	RHNS	North Vancouver	Mixed coniferous/deciduous forest (>50 yrs)
6. Feb 1995	4	1	35	RHNS	Langley	Mixed deciduous/coniferous woodland (>50 yrs) plus extensive shrubs ^c
7. Apr 1995	0	NS	5	RHNS	North Surrey	Mixed coniferous/deciduous forest (>50 yrs)
8. Jul 1995	0	NS	2	RHNS	Burns Bog	Mixed coniferous/deciduous forest (>50 yrs)
9. Jul 1995	1+	NS	50	RHNS	North Vancouver	Mixed coniferous/deciduous forest (>50 yrs)
10. Dec 1995	0	1	32	RHNS	North Surrey	Open fields, mixed deciduous /coniferous ^c forest, coniferous forest, shrub thickets, and small wetlands
11. Feb 1996	0	NS	4	RHNS	Walnut Grove	Mixed coniferous/deciduous forest (<50 yrs)
12. Feb 1996	0	0	37	RHNS	Coquitlam, Riverview	Deciduous woodland
13. Feb 1996	0	NS	4	RHNS	Coquitlam	Mixed coniferous/deciduous forest (>50 yrs)
14. Mar 1996	0	NS	2	RHNS	Sumas Mtn.	Mixed coniferous/deciduous forest (>50 yrs)
15. Apr 1996	1+	NS	1.5	RHNS	Surrey	Mixed coniferous/deciduous forest (>50 yrs)
16. Apr 1996	1	0	40	RHNS	North Vancouver	Shrub, grassy area and playing fields, disturbed area, and mixed coniferous/deciduous forest ^c

Continued...

Appendix A. Continued.

Survey no. and date	HUVI	WSOW	Area (ha)	Survey method ^a	Location	Habitat characteristics
17. Jun 1996	1	NS	50	RHNS	Burnaby	Mixed coniferous/deciduous forest (>50 yrs)
18. Jul 1996	0	0	40	RHNS	North Vancouver	Shrub, grassy area and playing fields, disturbed area, mixed coniferous/deciduous forest ^c
19. Jul 1996	0	NS	15	RHNS	Maple Ridge	Mixed coniferous/deciduous forest (>50 yrs)
20. Sep 1996	0	0	40	RHNS	North Vancouver	Shrub, grassy area and playing fields, disturbed area, and mixed coniferous/deciduous forest ^c
21. Dec 1996	1	1	10	RHNS	Langley	Mixed coniferous/deciduous forest (>50 yrs)
22. Dec 1996	1	2	40	RHNS	North Vancouver	Shrub, grassy area and playing fields, disturbed area, and mixed coniferous/deciduous forest ^c
23. Feb 1997	2	0	20	RHNS	Sunshine Coast	Mixed coniferous/deciduous forest (<50 yrs)
24. Mar 1997	0	1	7	RHNS	Surrey	Mix of deciduous and coniferous woodlands ^c
25. Mar 1997	0	NS	2	RHNS	Langley	Deciduous woodland
26. Apr 1997	1	0	34	RHNS	Langley	Fields, coniferous/deciduous forest, wetland ^c
27. May 1997	0	NS	40	RHNS	North Vancouver	Mixed coniferous/deciduous forest (>50 yrs)
28. May 1997	0	0	8	RHNS	Squamish	Mixed coniferous/deciduous forest (>50 yrs)
29. Jun 1997	0	0	70	RHNS	Tsawwassen	Primarily old field with hedgerows, plus small coniferous/deciduous woodland ^c
30. Jul 1997	1	0	10	RHNS	Port Moody	Mixed coniferous/deciduous forest (<50yrs)
31. Jan 1998	0	0	4	RHNS	Sechelt	Deciduous woodland
32. Feb 1998	1	6	50	FGSS NSOS	Howe Sound	Plantation (25 yrs), mature coniferous, and some mixed coniferous/deciduous woodland
33. Feb 1998	0	0	6	RHNS	Pender Hbr.	Mixed coniferous/deciduous forest (<50 yrs)
34. Mar 1998	2	0	10	RHNS	Coquitlam	Mixed coniferous/deciduous forest (<50 yrs)
35. Mar 1998	0	2	5	RHNS	Surrey	Mixed coniferous/deciduous forest (>50 yrs)
36. Mar 1998	13	5	50	FGSS NSOS	Howe Sound	Plantation (25 yrs), mature coniferous, plus mixed coniferous/deciduous woodland
37. Apr 1998	6	1	190	RHNS	North Surrey	Mixed coniferous/deciduous forest (>50 yrs)
38. Jun 1998	10	0	50	FGSS NSOS	Howe Sound	Plantation (25 yrs), mature coniferous, and some mixed coniferous/deciduous woodland
39. Jun 1998	1	NS	2	RHNS	South Surrey	Mixed coniferous/deciduous forest (>50 yrs)
40. Jun 1998	1	1	45	RHNS	Aldergrove	Mixed coniferous/deciduous forest (>50 yrs)
41. Jul 1998	0	NS	2	RHNS	Maple Ridge	Mixed coniferous/deciduous forest (>50 yrs)
42. Jul 1998	1	0	25	RHNS	Halfmoon Bay	Mixed coniferous/deciduous forest (>50 yrs)
43. Jul 1998	0	NS	10	RHNS	Aldergrove	Deciduous woodland

^a RHNS = raptor/heron nest survey; FGSS = forest and grassland songbird survey; NSOS = northern spotted owl survey

^b NS = not surveyed

^c Habitat not classified for analysis

