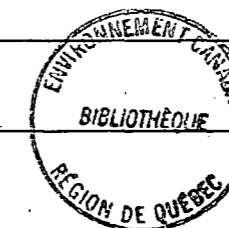


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### Songbird banding during migration in the Whitehorse, Yukon, area, 1993

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#### Abstract

We censused songbirds during migration in the Whitehorse area by trapping them in mist nets in spring and fall of 1993. We captured and banded 420 birds of 38 species during 41 days of banding at Porter Creek and three days at Shallow Bay. At Porter Creek, 62% of the target species observed at the banding site were caught in the mist nets. Capture rates at Porter Creek peaked in mid-May and mid-August and were much lower than at Shallow Bay. We recommend that banding be carried out for the entire spring and/or fall migration seasons at Shallow Bay in 1994 and for a further four years if the number and variety of birds captured are adequate. Such a program would provide valuable data on the species composition of migrating songbirds and chronology of songbird migration in the Yukon, and it could be continued as a long-term population monitoring project.

#### Introduction

Concern about songbird populations has increased dramatically since the late 1980s, when analysis of data from the North American Breeding Bird Survey (BBS) produced strong evidence of widespread population declines in a number of species in eastern North America (Robbins et al. 1989), corroborating anecdotal evidence that had existed for years. Although the BBS includes the Yukon Territory, it has certain limitations in this area owing to the scarcity of both roads and qualified observers (for BBS methodology, see Bystrak 1981).

Recently, counts of birds during migration have also been used to detect population changes (e.g., Hagan et al. 1992, Hussell et al. 1992). Migration counts (of birds seen, heard, or caught in mist nets) can be more efficient than counts during the breeding season because birds populating a large geographic area can be censused in one place, as they migrate through.

To date, no long-term census of songbird populations during migration has taken place in northern Canada. In general, knowledge of the breeding distribution of songbirds in the Yukon, their timing of migration, the species composition of migrating birds, and their migration routes is limited. Songbird censuses are restricted by the availability of qualified observers at sites where migrant songbirds concentrate. A five-year banding project in Yellowknife, Northwest Territories, concluded that

songbirds did not pass through the Yellowknife area in high enough concentrations to make such a project worthwhile (Sirois 1993).

Although several migration monitoring sites already exist in southern Canada and the United States, a northern site could contribute valuable comparative data, as it would census only populations that had suffered little from habitat loss and cowbird parasitism on the breeding grounds. Also, data from a northern site could help to detect whether habitat loss farther south is causing some populations to shift northward.

Whitehorse, Yukon Territory, is one of the few sites in northern Canada where there may be enough qualified observers over the long term to monitor songbirds during migration. The purpose of our project was to evaluate the potential for banding and censusing songbirds during migration in the Whitehorse area. We chose mist-netting as the census technique because birds in the hand can be keyed to species using measurements, and identification in the hand requires less experience than identifying birds in the field by sight or sound. In addition, effort can be easily standardized using net hours, observer biases are minimized, and some secretive species that are difficult to detect with other census techniques can be easily caught in nets.

#### Methods

Songbirds were captured using mist nets at a 4-ha site on Porter Creek (60°43'N, 135°10'W) near Whitehorse, Yukon Territory (Fig. 1), during spring and fall migration in 1993. The habitat at this site is a mixture of willow shrub *Salix* spp., small creeks and ponds, and mixed spruce (white spruce *Picea glauca*, black spruce *P. mariana*) forest with patches of balsam poplar *Populus balsamifera*. The nets were set usually from about sunrise to noon and occasionally in the afternoon or evenings, and they were checked every half-hour. The nets were of three sizes: 9 m × 2 m, 12 m × 2.6 m, and 6 m × 2.6 m, all with a 36-mm mesh of black nylon threads.

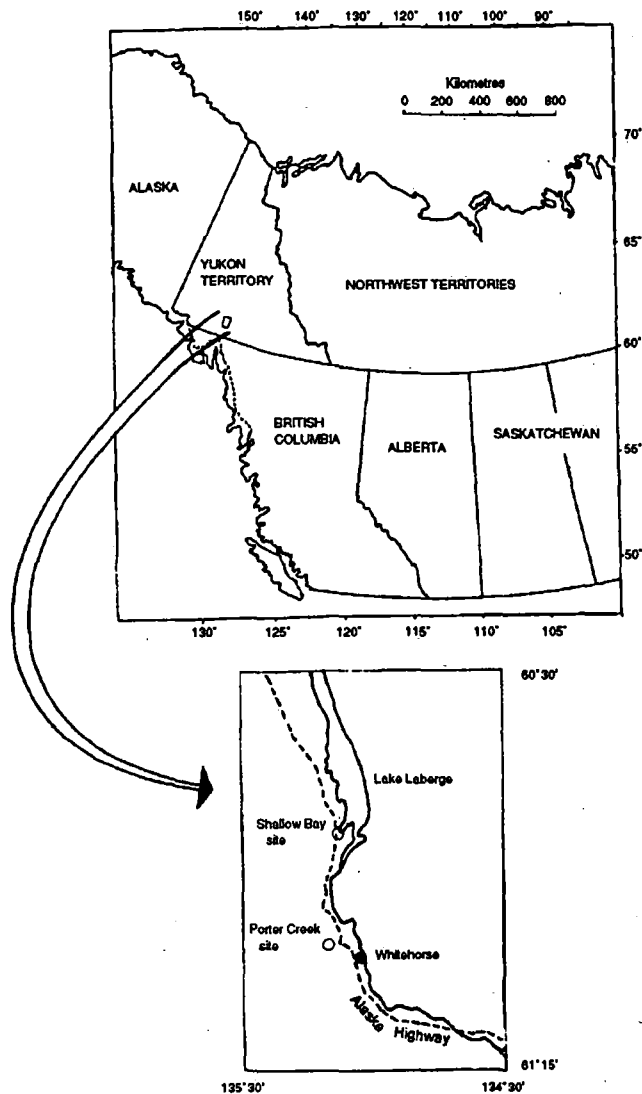
At the Porter Creek site, up to 10 nets were set on 16 days in spring (12 May to 2 June) and 25 days in fall (4 August to 21 September), for a total of 1983 net hours (536 in spring and 1447 in fall). Net hours were calculated using the 9 m × 2 m size as one standard net.

Once extracted from the nets, birds were carried in cloth bags to a central banding station and were weighed, measured, sexed, and aged when possible. One standard U.S. Fish and Wildlife Service aluminum band was placed on the right leg of each bird.

On three mornings in August, birds were captured and banded at a second site at Shallow Bay (60°57'N, 135°09'W), also near Whitehorse. Shallow Bay is an inlet at

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**Figure 1**  
Location of the study area (Whitehorse, Yukon Territory, Canada)



the southwest end of Lake Laberge, which has a north-south orientation and is essentially a widening of the Yukon River. The nets were set on a narrow dirt track that is perpendicular to the shoreline of the bay and cuts through a young trembling aspen *Populus tremuloides* forest, a grassy meadow, and a band of 2- to 3-m-high willows.

During each day of banding, incidental observations of birds in the study area were recorded.

### Results

Thirty-eight species were captured, including one raptor, two sandpipers, one kingfisher, two woodpeckers, and 32 passerines (Table 1). Thirty-six species were caught at the Porter Creek site (21 species in spring and 27 in fall). At the Shallow Bay site, 13 species were captured. In total, 420 birds were banded. An additional 66 recaptures of previously banded birds and 12 birds that escaped before being banded brought the total number of captures up to 498.

Overall, the average capture rate was 24 birds/100 net hours. At the Porter Creek site, the average rate was 23 birds/100 net hours, whereas at the Shallow Bay site the average rate was 63 birds/100 net hours.

The most abundant species banded were Yellow-rumped Warbler<sup>b</sup> (42% of birds banded), Wilson's Warbler (9.8%), Dark-eyed Junco (7.4%), Hammond's Flycatcher (5.0%), and Lincoln's Sparrow (5.0%). In fall, 82.4% of birds banded and aged were young of the year ( $n = 256$ ), and 88% of the Yellow-rumped Warblers banded and aged in fall were young of the year ( $n = 133$ ).

In spring, 17 of the 92 birds banded were recaptured at least once. Of these, seven were recaptured at least a week after being banded: two Hammond's Flycatchers, two Yellow-rumped Warblers, two Dark-eyed Juncos, and a Wilson's Warbler, which was captured 14 days after banding. In fall, 28 of the 288 birds banded at Porter Creek were recaptured. Of these, 14 were recaptured at least a week after being banded: three Black-capped Chickadees, and 11 Yellow-rumped Warblers. In addition, six birds banded in spring were recaptured in fall: one Black-capped and two Boreal chickadees, one Yellow-rumped Warbler, and two Dark-eyed Juncos.

Of the 38 species banded, 21 (147 individuals or 35%) were long-distance migrants that winter mostly south of the United States. Thirteen species (254 individuals or 60%) were mid-distance migrants that winter mostly in the United States, whereas four species (19 individuals or 5%) were year-round residents in the Whitehorse area.

Capture rates peaked at 08:00 at Porter Creek in fall but were highest at 11:00 at Shallow Bay (Fig. 2). In spring, capture rates peaked on 14 and 19 May (Fig. 3); in fall, they peaked on 10 and 16 August at Porter Creek but were still high at Shallow Bay on 14 September (Fig. 4).

Thirty-five observers and volunteers visited the project.

### Discussion

Seventy-one landbird species that can be trapped with 36-mm mist nets were observed in the Whitehorse area during the study period (Yukon Bird Club 1993). These "target" species included a kingfisher, woodpeckers, and passerines; raptors and shorebirds were not considered to be target species for this study. Of the 71 target species, 35 (49%) were caught in our nets, including one rare species (American Redstart), which was captured but not otherwise observed.

This study did not encompass the entire spring and fall migration periods, and some early and late migrating species may have been missed for this reason. At the Porter Creek site in spring, 39 target species were observed. Of these, 20 (51%) were captured. In fall, 44 target species were observed and 25 (57%) were captured. Overall, 33 (62%) of the 53 target species observed at Porter Creek were captured. At the Shallow Bay site, 24 target species were observed and 13 (54%) were captured.

The capture rates at both sites compared favourably with those at other northern songbird banding sites. At the Porter

<sup>b</sup> Scientific names of species mentioned in the text may be found in Table 1.

**Table 1**  
Birds observed and banded during migration in the Whitehorse area in 1993

Species <sup>a</sup>	Migrant status <sup>b</sup>	Number of birds banded <sup>c</sup>			Total
		Porter Creek Spring	Porter Creek Fall	Shallow Bay Fall	
Sharp-shinned Hawk <i>Accipiter striatus</i> <sup>d</sup>	M	+	1	+	1
Solitary Sandpiper <i>Tringa solitaria</i> <sup>d</sup>	L	+	1		1
Spotted Sandpiper <i>Actitis macularia</i> <sup>d</sup>	L	2	+		2
Belted Kingfisher <i>Ceryle alcyon</i> Tàch'ál	M	+	2		2
Yellow-bellied Sapsucker <i>Sphyrapicus varius</i>	M				
Downy Woodpecker <i>Picoides pubescens</i> Tsürkhèla	R		1		1
Hairy Woodpecker <i>Picoides villosus</i>	R			+	
Three-toed Woodpecker <i>Picoides tridactylus</i>	R		+		
Black-backed Woodpecker <i>Picoides arcticus</i>	R		+		
Northern Flicker <i>Colaptes auratus</i> Átsāna	M	+	1	+	1
Olive-sided Flycatcher <i>Contopus borealis</i>	L	1	+		1
Western Wood-Pewee <i>Contopus sordidulus</i>	L	1			1
Alder Flycatcher <i>Empidonax alnorum</i>	L		15 (2)		15 (2)
Least Flycatcher <i>Empidonax minimus</i>	L		1		1
Hammond's Flycatcher <i>Empidonax hammondii</i>	L	9 (4)	12		21 (4)
Dusky Flycatcher <i>Empidonax oberholseri</i>	L				
Say's Phoebe <i>Sayornis saya</i>	M				
Horned Lark <i>Eremophila alpestris</i>	M			+	
Tree Swallow <i>Tachycineta bicolor</i>	M	+			
Violet-green Swallow <i>Tachycineta thalassina</i>	L	+	+		
Northern Rough-winged Swallow	L	1			1
<i>Stelgidopteryx serripennis</i>					
Bank Swallow <i>Riparia riparia</i>	L	+	+		
Cliff Swallow <i>Hirundo pyrrhonota</i>	L	+	1		1
Barn Swallow <i>Hirundo rustica</i>	L	2	+	+	2
Gray Jay <i>Perisoreus canadensis</i> Ts'ùk'ay	R	+	1		1
Black-capped Chickadee <i>Parus atricapillus</i> Ts'egègia	R	1 (3)	8 (8)	1	10 (11)
Boreal Chickadee <i>Parus hudsonicus</i>	R	4 (1)	1 (2)	2	7 (3)
Red-breasted Nuthatch <i>Sitta canadensis</i>	M	+	+		
American Dipper <i>Cinclus mexicanus</i> Tus Ts'eze	R	+	+		
Golden-crowned Kinglet <i>Regulus satrapa</i>	M	+	+		
Ruby-crowned Kinglet <i>Regulus calendula</i>	M	+	13 (1)	1	14 (1)
Mountain Bluebird <i>Sialia currucoides</i> Tsya Jentl'ür	M				
Townsend's Solitaire <i>Myadestes townsendi</i>	M				
Gray-cheeked Thrush <i>Catharus minimus</i>	L	3	1		4
Swainson's Thrush <i>Catharus ustulatus</i>	L	8 (7)	3		11 (7)
Hermit Thrush <i>Catharus guttatus</i>	M		1	+	1
American Robin <i>Turdus migratorius</i> Chùtsi	M	2	1	1	4
Varied Thrush <i>Ixoreus naevius</i>	M		1		1
American Pipit <i>Anthus rubescens</i>	M		+	+	
Bohemian Waxwing <i>Bombycilla garrulus</i>	R	+	+		
Northern Shrike <i>Lanius excubitor</i>	M			+	
Warbling Vireo <i>Vireo gilvus</i>	L	+			
Tennessee Warbler <i>Vermivora peregrina</i>	L				
Orange-crowned Warbler <i>Vermivora celata</i>	L	+	+	(1)	(1)
Yellow Warbler <i>Dendroica petechia</i>	L	1		3	4
Yellow-rumped Warbler <i>Dendroica coronata</i>	M	16 (8)	158 (28)	2	176 (36)
Townsend's Warbler <i>Dendroica townsendi</i>	L	+			
Blackpoll Warbler <i>Dendroica striata</i>	L	3	+		3
American Redstart <i>Setophaga ruticilla</i>	L		1		1
Northern Waterthrush <i>Seiurus noveboracensis</i>	L	6	4		10
MacGillivray's Warbler <i>Oporornis tolmiei</i>	L	+			
Common Yellowthroat <i>Geothlypis trichas</i>	L	+	3	2	5
Wilson's Warbler <i>Wilsonia pusilla</i>	L	19 (4)	22 (2)	+	41 (6)
American Tree Sparrow <i>Spizella arborea</i>	M		3	7	10
Chipping Sparrow <i>Spizella passerina</i>	L	1	+		1
Brewer's Sparrow <i>Spizella breweri</i>	L				
Savannah Sparrow <i>Passerculus sandwichensis</i>	M			4	4

**Table 1 (Continued)**  
Birds observed and banded during migration in the Whitehorse area in 1993

Species <sup>a</sup>	Migrant status <sup>b</sup>	Number of birds banded <sup>c</sup>			Total
		Porter Creek		Shallow Bay	
		Spring	Fall	Fall	
Fox Sparrow <i>Passerella iliaca</i>	M			+	
Song Sparrow <i>Melospiza melodia</i>	M				
Lincoln's Sparrow <i>Melospiza lincolnii</i>	L	2	15 (1)	4	21 (1)
Golden-crowned Sparrow <i>Zonotrichia atricapilla</i>	M				
White-crowned Sparrow <i>Zonotrichia leucophrys</i>	M	2	3	2	7
Dark-eyed Junco <i>Junco hyemalis</i>	M	6 (3)	14 (3)	11	31 (6)
Lapland Longspur <i>Calcarius lapponicus</i>	M			+	
Smith's Longspur <i>Calcarius pictus</i>	M				
Red-winged Blackbird <i>Agelaius phoeniceus</i>	M				
Rusty Blackbird <i>Euphagus carolinus</i> Tàtl'ùra	M	+	+	+	
Brown-headed Cowbird <i>Molothrus ater</i>	M	+			
Pine Grosbeak <i>Pinicola enucleator</i>	R		+		
Purple Finch <i>Carpodacus purpureus</i>	M	2			2
Red Crossbill <i>Loxia curvirostra</i>	R				
White-winged Crossbill <i>Loxia leucoptera</i>	R		+		
Common Redpoll <i>Carduelis flammea</i>	R		+		
Pine Siskin <i>Carduelis pinus</i>	M		+		
Total no. of birds banded		92 (30)	288 (47)	40 (1)	420 (78)
No. of species captured		21	27	13	38
No. of species observed		42	47	25	62
Total no. of net hours		536	1447	65	2048
No. of birds captured/100 net hours		22.8 <sup>e</sup>	23.2	63.1	24.3

<sup>a</sup> English names are followed by scientific names and, where available, Southern Tutchone names.

<sup>b</sup> L = long-distance migrant; M = mid-distance migrant; R = resident (see text).

<sup>c</sup> Numbers are birds banded, with additional captures in parentheses; additional captures include captures of previously banded birds as well as birds that escaped before being banded. "+" indicates species that were observed at the banding site but not captured.

<sup>d</sup> Not "target" species for mist-netting.

<sup>e</sup> Capture rate in spring artificially high owing to decreased effort during low bird activity.

Creek site, capture rates were similar in spring (22.8 birds/100 net hours) and fall (23.2 birds/100 net hours). However, in spring the nets were often closed early when there were few birds in the area, and this artificially increased the capture rates. This may explain why the spring capture rates at Porter Creek were so much higher than the spring capture rates reported from the Alaska Bird Observatory (ABO) at Fairbanks (6.7 birds/100 net hours; Alaska Bird Observatory 1992) and from Yellowknife (4.7–16.7 birds/100 net hours, depending on the year; J. Sirois, unpubl. data).

In fall, nets were set from dawn to noon regardless of bird activity, so capture rates should be unbiased. At Porter Creek, the capture rate of 23.2 birds/100 net hours was similar to the fall capture rate at Fairbanks (25.0 birds/100 net hours; Alaska Bird Observatory 1992). The fall capture rate at Shallow Bay (63.1 birds/100 net hours) was much higher than those at Porter Creek and Fairbanks.

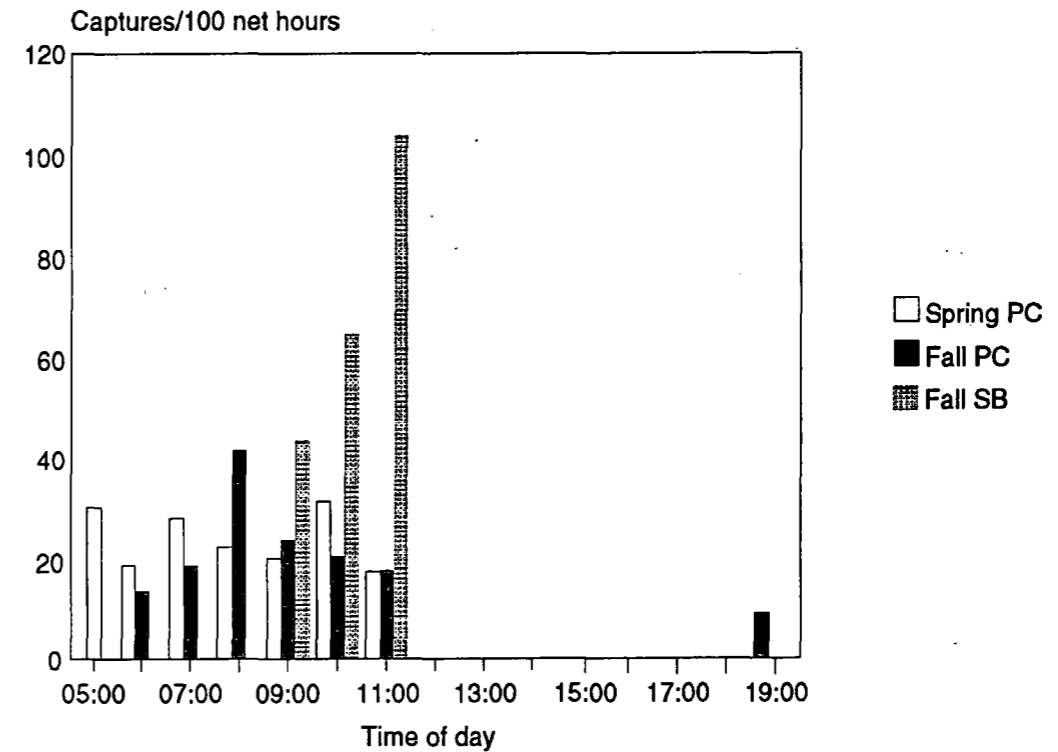
At the Porter Creek site, many of the birds caught were probably local breeders and locally produced young. For example, recaptures in fall of Yellow-rumped Warblers 7–14 days after banding suggest that these birds were not yet migrating. Large visible movements of songbirds were not observed at this site. Most of the birds banded in fall were captured at one small pond with dense shrub cover,

which appeared to be a rich feeding area for insectivorous birds.

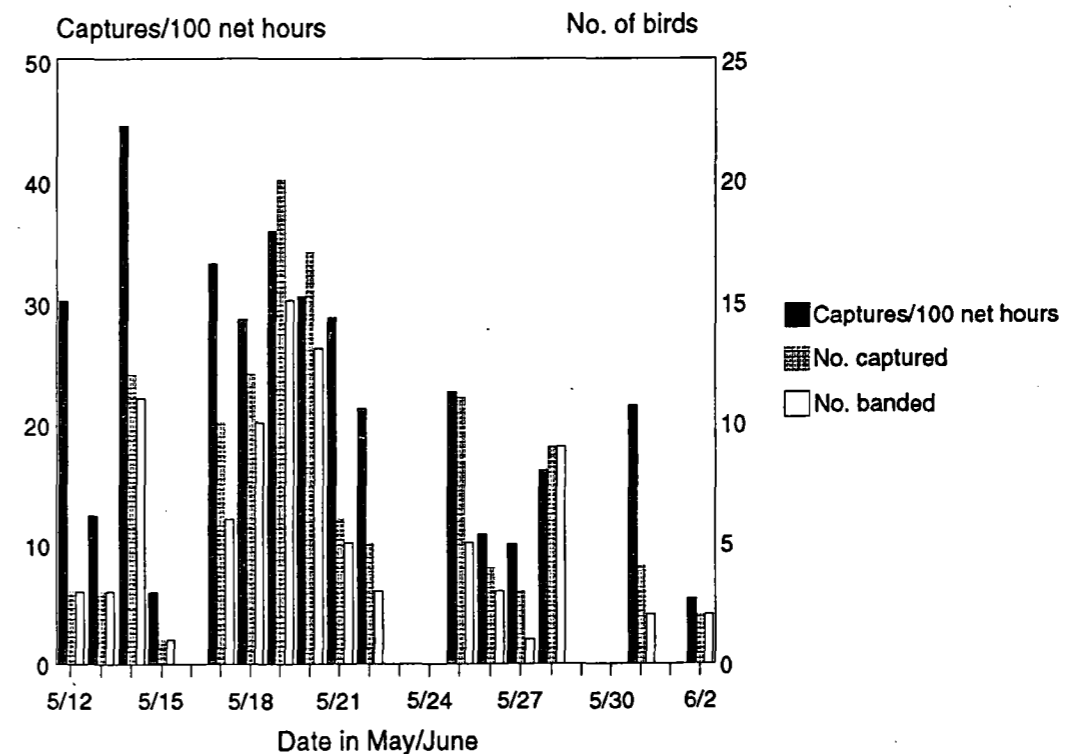
The high percentage of young birds in fall was unexpected, as the expected ratio of young to adults is about 1:1; however, our age ratios were similar to those at Fairbanks where, in fall, 91% of birds banded were young of the year (Alaska Bird Observatory 1992). The predominance of young was noticed in the birds observed as well as in the birds captured and may result from differential migration behaviour — for example, if adults tend to make longer, high-altitude flights while young migrate more slowly and spend more time feeding.

At Shallow Bay, visible diurnal movements of birds are common in fall. On one of the three mornings of banding at this site, hundreds of passerines were observed moving south through and over the band of shrubs along the shore. Although no banding took place here in spring, local observers report that high numbers of migrant songbirds use the area during that season as well. Shallow Bay may be an efficient site for mist-netting songbirds, at least in fall, because birds moving south along the Yukon River valley would be reluctant to cross Lake Laberge and would concentrate along its shores. The low shrub habitat along the shore of the bay brings birds down to the level of the nets, increasing the likelihood of capture. In contrast, the

**Figure 2**  
Daily pattern of capture rates (PC = Porter Creek, SB = Shallow Bay)

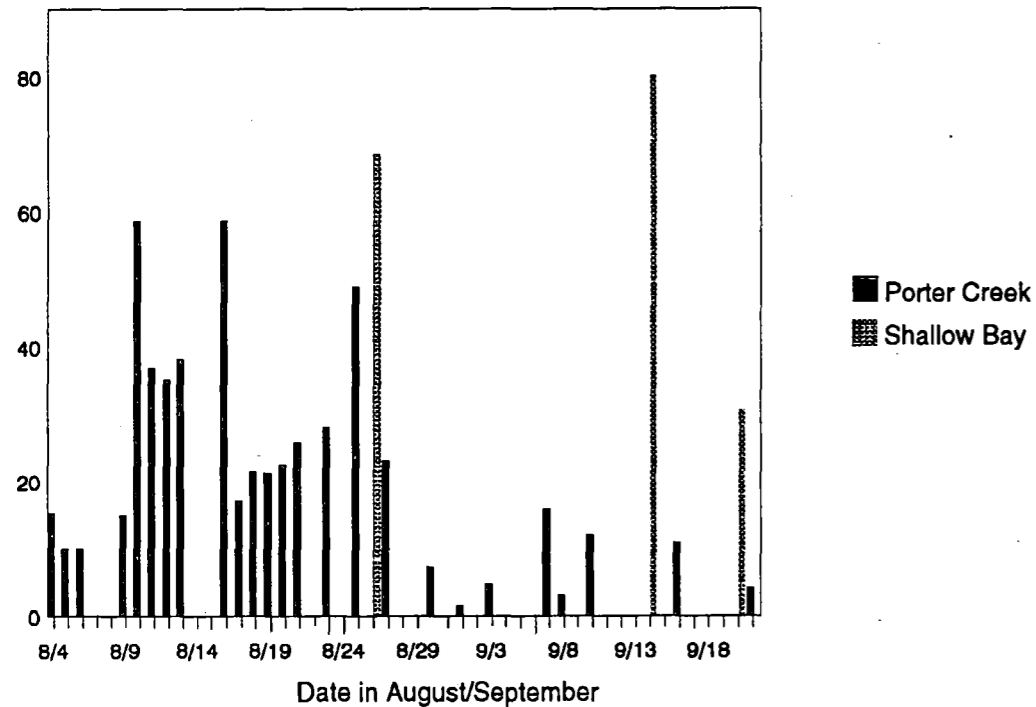


**Figure 3**  
Seasonal pattern of captures in spring at the Porter Creek site. Because capture rates may be artificially high on some days owing to decreased effort during days with lower bird activity, absolute numbers of birds captured and banded are also shown.



**Figure 4**  
Seasonal pattern of captures in fall at Porter Creek and Shallow Bay. Nets were open from dawn to noon regardless of bird activity.

Captures/100 net hours



Porter Creek site has no landscape features that concentrate landbirds, and much of the habitat consists of taller trees that allow most birds to pass over the nets without being caught.

**Recommendations**

We recommend that songbirds be banded at the Shallow Bay site for the entire spring and/or fall migration periods, for three to five years, in order to determine the timing of migration for each species and to collect further information on the species composition of songbirds migrating through the Whitehorse area.

The first year should be used to test the potential of the site for capturing large numbers of a variety of songbirds, and, if the site proves suitable, banding should continue for the following two to four years.

We recommend banding during migration periods of 20 April to 10 June (spring) and 20 July to 30 September (fall).

This three- to five-year study should be carried out in a standardized and repeatable manner so that, if successful, it can be extended into a long-term population monitoring program.

The potential for using this banding project for public education in songbird ecology and conservation should be further developed, by continuing to invite groups of visitors for tours and demonstrations.

Interested volunteers should be recruited and trained as banders, so as to increase the number of qualified local banders who could help to sustain a long-term program.

**Acknowledgements**

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