Detectability of Non-passerines Using “Pishing” in Eastern Ontario Woodlands

J. RYAN ZIMMERLING

University of Western Ontario, Department of Biology, London, Ontario N6A 5B7 Canada
Current address: Bird Studies Canada, 115 Front Street, Port Rowan, Ontario N0E 1M0 Canada

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During spring and summer 1997, non-passerines were surveyed in three woodlots near Arnprior, Ontario, using standard point counts, and standard point counts combined with “pishing” (pishing involves the observer saying the words “pish pish pish pish” in a continuous series of short bursts). Of the 27 non-passerine species detected, 22 were recorded on more days using pishing as opposed to the standard point co.unt method. However, only three of these species were recorded on significantly more days using pishing. Several woodpecker species approached more closely during point counts with pishing, which facilitated identification. In contrast, raptors and some other non-passerines that may have otherwise gone unnoticed were identified as they fled from the pishing sound. Hence, when the overall goal of research is to detect species richness or to gather presence and absence data in woodlands, point counts combined with pishing may increase detectability of some non-passerines.

Key Words: breeding birds, non-passerines, pishing, point counts, woodlands, Arnprior, Ontario.

Birds are surveyed by numerous methods including line transects, territory mapping, mark-recapture, point count, and playback recordings (Bibby et al. 1992). The point count method relies upon the ability of the observer to correctly identify birds using both visual and auditory cues. For most observers, identifying birds by song is more difficult than is visual detection (Faanes and Bystrak 1981). In addition, some species of birds, especially non-passerines, are rarely heard during the breeding season and thus are usually only identified visually or by call-note; e.g., Sharp-shinned Hawk (*Accipiter striatus*). Moreover, songs or calls of some species are practically indistinguishable from others. Many species of woodpeckers, for example, cannot be positively identified by drumming alone because of the high variation in resonance among drumming substrates (Robbins and Stallcup 1981). Numerous species of birds also are excellent mimics. The Blue Jay (*Cyanocitta cristata*) can imitate the call of the Broad-winged Hawk (*Buteo platypterus*). These difficulties, inherent in the aural detection of some bird species, have resulted in other surveying methods being devised that augment detection probability.

Playback recordings of bird songs and calls have been used primarily for augmenting more conventional survey techniques. This method is primarily used for detecting nocturnal non-passerines and other birds that do not normally vocalize by song (Johnson and Brown 1981; Gunn et al. 2000). Playbacks of Red-shouldered Hawks (*Buteo lineatus*) are used during the breeding season to elicit a territorial response from this uncommon species (Badzinski 2003*). Although playbacks often are useful for attracting conspecifics closer to the observer, a better playback method would attract a number of different bird species. Many naturalists, bird photographers, and several researchers have used “pishing” (described by repeating the words “pish pish pish pish pish”) to entice various species of birds to approach the observer (e.g., Emlen 1971; Wiedner et al. 1992; Runtz 1995; Porneluzi and Faaborg 1999; Sibley 2002; Prescott 2003*). In addition, several long-term bird monitoring programs such as the Christmas Bird Count and the Ontario Breeding Bird Atlas also permit pishing to be used to gather species distribution data (Ontario Breeding Bird Atlas 2001*). Interestingly, many European bird species appear unresponsive to pishing (Purdy 1998*; BBC 2003*; but see Foppen et al. 2000). Some researchers believe that pishing simulates the sounds of a group of birds mobbing a predator while others believe that it is curiosity alone that attracts the birds to the sounds (Runtz 1995, Zimmer 2000).

There are few studies that quantify the effectiveness of pishing. Lynch (1995) found that aural stimuli using playbacks, owl imitations, and pishing increased number of species detected. However, Lynch did not attempt to distinguish separate effects of the three stimuli tested. Zimmerling and Ankney (2000) found that, on average, 3.6 more passerine species were detected using pishing during spring point counts than point counts without pishing. Pishing has also been shown to be an effective technique for augmenting fall and winter point counts (MacDonald 2003*). Although primarily used for attracting passerines, it has been suggested that some hawks, owls, hummingbirds, and woodpeckers will also respond to pishing (Zimmer 2000; BBC 2003*). To my knowledge, however, there are no data that examine the effectiveness of pishing with respect to detecting non-passerines during the breeding season.

Therefore, the primary objective of this study was to determine if pishing in conjunction with the standard point count method (hereafter referred to as pishing) would affect the number of non-passerine species detected relative to the standard point count method (hereafter referred to as standard method).

Methods

Study Area

This study was conducted in three woodlots located near Arnprior, Ontario (45°26'N, 76°21'W). The woodlots varied in size (approximately 0.75 km^2, 2 km^2 and 2.25 km^2), but each was a rectangular "island", bordered on the north by the Ottawa River and non-maintained roads, fields, and residential areas on the other sides. A distance of 10 km separated the middle woodlot from woodlots to the west and east. Vegetation was dominated by mature Sugar Maple (*Acer saccharum*) and American Beech (*Fagus grandifolia*) interspersed with White Pine (*Pinus strobus*). Herbaceous plants dominated the understory vegetation. Each woodlot had at least one small marsh within its boundaries; and swamps were also present within the two largest woodlots.

Bird Surveys

Within each woodlot, two transect paths were flagged with plastic tape before surveying began. Each transect was divided into two lines that formed a 90° angle to each other. The first line of the first transect began in the southwest corner of the woodlot and bisected the northern boundary. The second line began 100 m to the east of the final point of the first line and terminated in the southeast corner of the woodlot. The second transect used the same line configuration as the first, but the orientation was reversed such that the first line of the second transect began in the northeast corner of the woodlot and bisected the southern boundary. The second line began 100 m to the west of the final point of the first line and terminated in the northwest corner of the woodlot. Number of points per line varied with size of the woodlot: the smallest woodlot had 11 sampling points spaced >100 m apart, but lines for the two larger woodlots each had 15 sampling points spaced >100 m apart.

Surveys were conducted from 28 April to 1 July 1997 and began at sunrise (05:00 – 06:00 EST). Wind velocity, measured using a hand-held anemometer, and ambient air temperature, measured with a thermometer, were recorded before surveys began and after they were completed on each of the two lines. Surveys were terminated if wind velocity exceeded 17 km/h or if precipitation occurred (Robbins 1981). Results of incomplete surveys were excluded from analysis.

A different protocol was used to survey birds for each line on a given transect. Surveying both lines on the same day using the different protocols controlled for variation in detectability that might have been attributable to change in weather from one day to the next. The first protocol employed standard point count methodology with birds surveyed for four minutes at each point. Birds were counted if they were detected either aurally or visually within or below the forest canopy. Species and sex (whenever possible) were recorded for each individual detected and the mode of detection (visual or aural) that first allowed positive species identification was also recorded. Behaviour of a detected bird towards the observer's presence was documented for each detection.

During the second protocol, a recording of JRZ pishing was played. The recording only included the "pish pish pish pish pish" repertoire and did not include squeaking, squeeling, owl imitations, or other noises. The pishing recording was analyzed using a spectrogram to ensure comparable quality and temporal aspects with JRZ's voice. The volume of the tape player was set before sampling at a volume similar to that of JRZ's voice pishing. At each point, 30-second intervals of playing the pishing recording and listening periods were implemented. The procedure was repeated three more times, with the speaker held 180° in the opposite direction each succeeding time such that birds on opposite sides of the line had equal detection probabilities. In total, two minutes were spent playing the recording and two minutes were spent in silence. Data on bird species were recorded as on the previous line with three minutes allotted for travel between sampling points.

The order of protocols for each line of a transect was reversed every other day of surveying to control for variation in detectability that might be attributable to time of day. Thus, each woodlot was surveyed for two consecutive days before the next woodlot was surveyed. After all woodlots had been surveyed using the first transect (six complete surveys), the second transect was surveyed (six complete surveys). Thus, 12 surveying days were required to survey all three woodlots using both transects. This was repeated two more times for a total of 36 surveys.

Data Analysis

Chi-square analysis (PROC FREQ; SAS Institute 2001) was used to determine if each bird species was detected more often using one of the two survey methods. Only those bird species that were detected on five or more different days via one of the two methods were tested statistically. Birds that were detected between point count locations were excluded from the analysis.

Results and Discussion

Of the 15 non-passerine species wherein sample sizes were sufficiently large to test for statistical significance, three species were detected on significantly more days using pishing as opposed to the standard point count method (Table 1). However, irrespective of statistical significance, 22 of the 27 non-passerine species detected were recorded on more days using pishing, whereas only three species were observed on more days using the standard method. Because sample sizes were small, and encounters of some species were likely incidental (i.e., shorebirds), these results should be interpreted with caution. For example, shorebirds were unresponsive to pishing and most were detected on the same day and at the same location several hours after a severe thunderstorm presumably halted their migration activities. These results confirm those by MacDonald (2003*) that suggested, in general, that passerine species seemed to approach more closely in response to pishing than did non-passerines, presumably because passerines mob more frequently. Indeed, both Lynch (1995) and Zimmerling and Ankney (2000) detected 19% more species during point counts using pishing than without, but those studies were limited to passerines during the breeding season.

Interestingly, several woodpecker species were detected more often and approached more closely during point counts with pishing. For example, Hairy Woodpeckers (*Picoides villosus*) and Yellow-bellied Sapsuckers (*Sphyrapicus varius*) often approached within 15 m of the point count location when the pishing recording was played. Northern Flickers (*Colaptes auratus*) were detected significantly more often using pishing than during the standard method but this species did not approach the point-count location. Other researchers (e.g., Zimmer 2000) have suggested that woodpeckers are generally responsive to pishing, and therefore, it is not surprising that they have also been shown to mob predators (e.g., Gehlbach and Leverett 1995).

Although pishing increased detectability by inducing some woodpeckers to approach point-count locations more closely, detectability of other species was also increased due to birds fleeing (i.e., taking flight) from the pishing sound. For example, when pishing was used, Red-shouldered Hawks (*Buteo lineatus*) were recorded significantly more often as they flushed from perches. Other raptors, such as American Kestrels (*Falco sparverius*), Cooper's Hawks (*Accipiter cooperii*), and Merlins (*Falco columbarius*) exhibited a similar response. Had these birds not fled from their perches, they might have gone unnoticed. This fleeing reaction by raptors is not surprising. Other studies have demonstrated that, as a result of harassment by mobbing passerines or advertisement of perception of the predator by the mobbers, predators usually leave (e.g., Bildstein 1982). Admittedly, for species that exhibited a flee response to pishing, any recorded, unnatural sound (e.g., clapping hands or shouting) proba-

TABLE 1. Number of days each non-passerine species was detected using the standard point-count method and pishing in Ontario woodlands, 1997.

Common Name (Species name)	Standard	Pishing	P[a]
Canada Goose (*Branta canadensis*)	1	2	nt
Wood Duck (*Aix sponsa*)	7	10	NS
Mallard (*Anas platyrhynchos*)	5	8	NS
Blue-winged Teal (*Anas discors*)	0	1	nt
Ruffed Grouse (*Bonasa umbellus*)	6	5	NS
Great Blue Heron (*Ardea herodias*)	1	8	0.01
Osprey (*Pandion haliaetus*)	1	1	nt
Sharp-shinned Hawk (*Accipiter striatus*)	1	1	nt
Cooper's Hawk (*Accipiter cooperii*)	0	4	nt
Red-shouldered Hawk (*Buteo lineatus*)	6	15	0.02
American Kestrel (*Falco sparverius*)	0	1	nt
Merlin (*Falco columbarius*)	0	2	nt
Killdeer (*Charadrius vociferus*)	5	7	NS
Greater Yellowlegs (*Tringa melanoleuca*)	1	0	nt
Lesser Yellowlegs (*Tringa flavipes*)	0	1	nt
Spotted Sandpiper (*Actitis macularia*)	0	1	nt
Dunlin (*Calidris alpina*)	0	1	nt
Least Sandpiper (*Calidris minutilla*)	0	1	nt
Mourning Dove (*Zenaida macroura*)	10	8	NS
Barred Owl (*Strix varia*)	5	7	NS
Ruby-throated Hummingbird (*Archilochus colubris*)	2	7	NS
Belted Kingfisher (*Ceryle alcyon*)	4	5	NS
Yellow-bellied Sapsucker (*Sphyrapicus varius*)	13	17	NS
Downy Woodpecker (*Picoides pubescens*)	5	5	NS
Hairy Woodpecker (*Picoides villosus*)	9	17	NS
Northern Flicker (*Colaptes auratus*)	18	29	0.01
Pileated Woodpecker (*Dryocopus pileatus*)	7	7	NS

[a] NS = no significant difference; nt = not tested (see text)

bly would have induced the same behaviour. For example, on point counts using pishing, Great Blue Herons (*Ardea herodias*) were frequently detected as they flew from the emergent vegetation around swamps. Because better methods, such as playbacks, can be used to elicit a vocal response in some non-passerines, it is not recommended that pishing be used for the sole purpose of surveying these species. In addition, Zimmerling and Ankney (2000) caution that pishing can confound relative abundance estimates of species that are particularly responsive to pishing. However, when the goal of a study is to detect as many bird species as possible in a woodlot, regardless of taxonomy, or to acquire presence/absence data for specific species, the results of this study suggest that pishing, when combined with standard point count methodology, may increase detectability of many bird species, including non-passerines.

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