PRELIMINARY TEST OF POINT COUNT SURVEY METHOD OF POPULATION SIZE ESTIMATION ON BREEDING RED-WINGED AND YELLOW-HEADED BLACKBIRDS AT MYERS WETLANDS, BRITISH COLUMBIA

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Abstract -- The traditional point count survey method of population size estimation was tested on breeding Red-winged Blackbird (*Agelaius phoeniceus*) and Yellow-headed Blackbird (*Xanthocephalus xanthocephalus*) populations at Myers Wetlands, British Columbia. Initial counts of the two icterids totalled seven male and five female red-wings and 32 male and eight female yellow-heads. The polygynous nature of both species may result in underestimates of population size if the population size is estimated by multiplying the number of males counted by two to include their mates. At Myers Wetlands, traditional methods produced estimates of 14 red-wings and 64 yellow-heads; yet, 67 active red-wing and 178 active yellow-head nests were found. Thus, results of traditional point count surveys should be interpreted with caution, even when attempting to estimate minimum rather than actual population sizes.

Key words: Agelaius phoeniceus, British Columbia, point count survey, population estimation, Red-winged Blackbird, *Xanthocephalus xanthocephalus,* Yellow-headed Blackbird.

Population monitoring plays a crucial role in conservation biology by providing the information necessary to identify problems at an early stage (Goldsmith 1991). Often, the primary method of gathering information comes from visual counts and subsequent analysis of these data. When estimating population sizes, counts are usually performed on a sample of the population during breeding times. Ideally, the population is divided into non-overlapping units, a sample of these units (*i.e.*, all the birds within a specified site) is selected according to a pre-defined procedure, and a complete census is taken of each unit (Thomas 1996). In traditional count methods, each observed male is assumed to represent a breeding pair, regardless of whether it is detected on a breeding territory or in a nonbreeding situation (Nelms *et al.* 1994). For polygynous species, such estimates are considered minimums.

A wide variety of methods have been used to inventory and monitor population sizes of different species. Examples of such techniques include: aerial surveys, transects, capture-recapture, point counts, quadrant sampling and broadcast call surveys. Of these techniques, point counts are among the more frequently employed methods. A commonly-used type of point count consists of a tally of birds detected by a single observer from a fixed station during a specified period. Counts are usually performed in the morning, typically during the breeding season under specified weather conditions. A group of point counts strategically distributed across a property constitutes a point count survey (Hamel *et al.* 1996). Unfortunately, the efficacy of point count methods on polygynous species has not been well-documented.

Factors such as season, weather, time of day, flight pattern, body size/colour, behaviour, habitat and observer variability have been suggested as influencing avian detection probability (Ralph and Scott 1981; Ethier 1993). Therefore, the purpose of this study was to evaluate the accuracy of point count surveys in estimating population sizes of breeding polygynous species. Red-winged Blackbirds are considered strongly polygynous (Nero 1984; Yasukawa and Searcy 1995), though not invariably so (Bent 1958), with individual marsh-breeding males mated to zero to nine females (Weatherhead and Robertson 1977) and upland males mated to one to four females (Blakley 1976). Yellow-headed Blackbirds are also polygynous, with individual males usually mated to one to three females (Twedt and Crawford 1995), occasionally up to eight (Skutch 1996). Thus, these are two species suitable for such an assessment.

STUDY AREA AND METHODS

Observations were recorded at both Myers Lake and Myers Marsh of Myers Wetlands (49^0 01'N, 119^0 01'W), British Columbia (Figure 1) from 3-4 June 1997. The study site was selected because the entire area could be examined via ground and water surveys.

Myers Wetlands was divided into four sections (A, B, C and D; Figure 1), such that water depth and vegetational variation within each section were lower than variation among sections. Weather was sunny from 08:00 to 09:30 on 3 June, then alternated between sunny and overcast conditions for the rest of the study.

From 08:30 to 08:45 on 3 June, all territorial red-wings and yellow-heads were counted in each area with the aid of binoculars. Each of the four wetland areas was assigned to two trained observers. Initially, all observers surveyed their designated sections from left to right at approximately the same time in order to prevent double-counting flushed birds. During

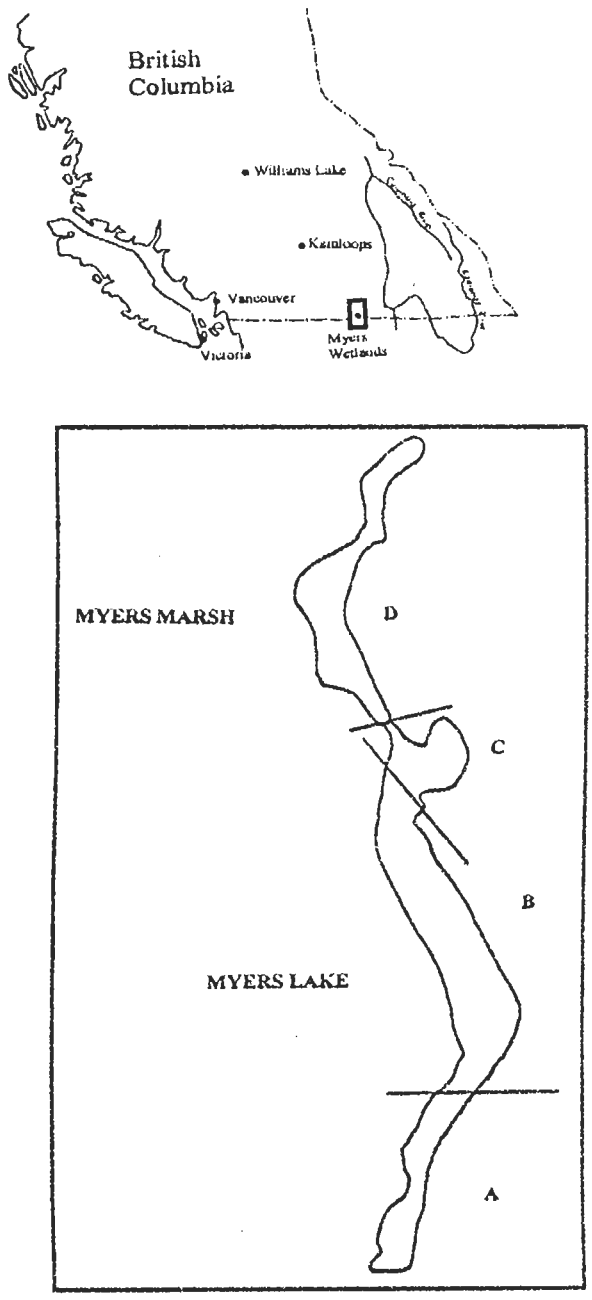

Figure 1: Schematic diagram of Myers Wetland, showing the four study sections: A, B, C and D. Inset map indicates location of Myers Wetland within British Columbia.

the rest of the study, the assigned wetland areas were searched thoroughly for active blackbird nests. Two canoes were used to examine the centre of the marsh.

RESULTS

During the initial point counts, seven male and five female Red-winged Blackbirds and 32 male and eight female yellow-heads were observed. Population sizes estimated by doubling the number of males observed were 14 red-wings and 64 yellow-heads (Table 1). The nest search yielded 67 active red-wing and 178 active yellow-head nests, for a combined population of 245 female blackbirds (Table 2).

DISCUSSION

Test of Point Count Survey

In this preliminary test of the point count survey technique, a number of point counts were combined into an overall census. This method of survey is used frequently due to its time effectiveness and ease of use in rugged terrain (Gutzwiller 1991). Bibby *et al.* (1993) list the following assumptions that must be recognized when employing point counts: birds neither flee from nor approach the observer, 100% of the birds are detectable from the observer's position, birds do not move during the count period, birds behave independently of one another, and birds are identified fully and correctly. My study location and design likely minimized the influence of these potentially invalidating assumptions on the results. The blackbirds at Myers Wetlands tended to neither approach nor flee from the observers. The points selected for counting provided full view of the specified areas, ensuring that most birds present on their territories should have been visible. It is likely, however, that some birds were missed while feeding or incubating out of sight (Francis 1973). Counts in each section were performed simultaneously, so bird movement among locations did not skew results. In addition, the fact that polygynous, territorial birds do not behave independently of each other (e.g., both species vocalize in response to conspecifics frequently) may have aided observation. The moderate densities of blackbirds present meant more noticeable intra and inter-specific interactions, and thus easier detection. Finally, since all observers were trained in identification, and since both species are relatively conspicuous, the possibility of misidentification was low. The potential influence of other environmental factors, such as weather, season, and time of day was minimized by methodical design. Point counts were performed against a well-lit sky during the early morning in peak breeding season.

The population sizes of 14 red-wings and 64 yellow-heads estimated from the point survey results of the entire wetlands clearly grossly underestimated the minimum of 245 female blackbirds shown to be present by counting active nests. Such underestimations could give the false impression that a given area is not biologically productive.

Recommendations and Conclusions

Several suggestions result from this preliminary test of a point count survey. First, if time, weather and terrain permit, field researchers should employ more than just point count methods, as suggested previously by others (e.g., Ralph *et al.* 1993). In situations where other methods are not possible due to

TABLE 1

NUMBERS OF RED-WINGED (RWBL) AND YELLOW-HEADED (YHBL) BLACKBIRDS COUNTED IN EACH OF THE FOUR SECTIONS (A,B,C,D) OF MYERS WETLANDS, BRITISH COLUMBIA

Section	RWBL Males	RWBL Females	RWBL Population Estimations	YHBL Males	YHBL Females	YHBL Population Estimations
A	3	1	6	9	3	18
B	-	-	-	1	-	2
C	1	1	2	10	2	20
D	3	3	6	12	3	24
Total	**7**	**5**	**14**	**32**	**8**	**64**

TABLE 2

NUMBER OF ACTIVE RED-WINGED (RWBL) AND YELLOW-HEADED (YHBL) BLACKBIRD NESTS IN EACH OF THE FOUR SECTIONS (A,B,C,D) OF MYERS WETLANDS, BRITISH COLUMBIA

Section	RWBL Nests	YHBL Nests	Total Nests
A	35	26	61
B	3	27	30
C	17	65	82
D	12	60	72
Total	**67**	**178**	**245**

topographical or time constraints, multiple point count surveys should be made. To increase the statistical significance of the data obtained, the entire area should be re-surveyed on separate days of the breeding season or at an interval appropriate to the specific study.

Secondly, researchers should be aware of the ecology and behaviour of the species of interest. Knowledge of peak breeding times, foraging behaviour, flight patterns, habitats, etc. is necessary to select optimal census techniques and subsequent experimental designs. Furthermore, researchers should become familiar with underlying assumptions and with environmental influences in order to minimize potentially confounding effects on the resulting data.

Assessments such as that reported here help improve the accuracy and credibility of census methodology, thus increasing our confidence in reported population trends resulting from increasing habitat deterioration and destruction adversely affecting an increasing number of species.

ACKNOWLEDGEMENTS

I thank Bill Harpur and his family for permitting this census to take place on their property. I am grateful for the assistance of R. W. Campbell, C. R. Copely, R. F. Galbraith, M. E. Gustavus, and M. L. Funk in point count observations and nest searches. I also thank Martin K. McNicholl, Robert W. Nero and Kenneth H. Morgan for their thorough reading of the manuscript. I am currently supported by a National Sciences and Engineering Research Council scholarship.

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