

Progress Notes contain *interim* data and conclusions and are presented as a service to other wildlife biologists and agencies.

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A comparison of two methods of counting ducks and ponds on roadside transects

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Abstract

Canvasbacks (*Aythya valisineria*), Redheads (*A. americana*) and ponds were counted on 1/4-mile wide roadside transects and recorded two ways: (1) when over one-half a pond fell on the transect all of it was included, while if less than one-half a pond was on the transect all of it was excluded; and (2) only that fraction of a pond on the transect was censused. Numbers of ducks and ponds recorded were similar with both methods. Where large ponds (over 1/2-mile wide) are uncommon, the first method is favoured because it eliminates the need to decide if borderline ducks are on or off the transect, it reduces the number of distant ponds that need censusing, and it eliminates bias caused by ducks moving off the transect before they have been censused.

Résumé

A l'intérieur de virées larges de 1/4 de mille et s'étendant le long d'un chemin, on a dénombré les Morillons à dos blanc (*Aythya valisineria*), les Morillons à tête rouge (*A. americana*) et les étangs selon deux méthodes: (1) en incluant tout l'étang quand plus de la moitié faisait partie de la virée ou en excluant tout l'étang quand moins de la moitié en faisait partie, et (2) en n'étudiant que la fraction de l'étang comprise dans la virée. On a relevé avec les deux méthodes un nombre semblable de canards et d'étangs. Lorsque les grands étangs (plus de 1/2 mille de largeur) n'abondent pas, on préfère la première méthode parce qu'alors il n'est pas besoin de décider si les canards qui sont sur la limite font ou non partie de la virée, on peut réduire le nombre d'étangs éloignés à dénombrer et il n'y a pas de distorsion causée par le fait que des canards sortent de la virée avant d'avoir été comptés.

Introduction

Roadside transects are frequently used to obtain waterfowl population indices and quantitative data on wetlands. The most commonly used transect width is 1/4 mile (1/8 mile on each side of the road). When a pond is cut by the outer transect boundary, it can be treated in two ways. If more than one-half of the pond lies on the transect, all of it is included, whereas if less than one-half is within the transect, all of it is excluded (Smith, 1971). An alternative is to census only that part of a pond within the transect. Sauder *et al.* (1971) used a combination of the two methods, censusing entire ponds more than one-half on the transect and only a fraction of ponds less than one-half on the transect. This paper compares results of the two methods used in one study.

Methods

Canvasbacks and Redheads were counted ten times in May 1973 along one roadside transect (1/4 mile wide) comprising 4.5 square miles of area, 30 miles east of Saskatoon, Saskatchewan. Ponds had been mapped from aerial photographs, and locations of all birds were plotted for ponds that fell on the transect boundary. Care was taken to plot locations before any ducks were disturbed by the observer. For Method A, all of a pond more than one-half on the transect was included while one with less than one-half on was entirely excluded (Fig. 1A). In Method B, only the fraction of a pond lying on the transect was censused (Fig. 1B). Pond area was measured from aerial photographs and the fraction on the transect was determined. These fractions were added to the whole ponds on the transect to derive a total. Pond data only were collected on a second transect comprising 44 linear miles and 10.3 square miles.

A paired comparison t-test was used to test the significance of differences between duck counts resulting from the two methods. G.E.J. Smith, CWS, kindly provided advice on statistical tests.

Results and discussion

Neither number of ponds nor pond area differed significantly between methods of recording on either transect (Table 1). Proportionately more ponds were intercepted by transect boundaries on the second area because pond area was larger there.

Difference between numbers of ducks recorded by the two methods (Table 2) was almost but not significant at the 5 per cent level for Canvasbacks ($t=2.23$, 9 d. f.), and not significant for Redheads ($t=0.26$, 9 d. f.). The difference of 17 in total Canvasbacks recorded resulted from 30 recorded under Method B but not A, and 13 recorded by Method A but not B. All of the latter were near the distant shore of one 5.0-acre "included" pond, while 21 of the former were seen inside the transect on one 3.8-acre "excluded" pond.

While this experiment was not designed to measure the influence of roads on the distribution of ducks, the results indicate that roads did not affect duck distribution on ponds near transect boundaries. One might reasonably expect ducks to tend to occupy distant parts of ponds located near roads. In the case of ponds cut by transect boundaries, this would result in fewer ducks being recorded by Method B which was not the case. However, other species and additional transects should be tested before a general conclusion is made.

Results from the two methods of recording data differ little and, for practical purposes, choice of method can be based on other factors. Two advantages of Method A are that it eliminates the need to decide if birds near the boundary are on or off the transect, and it is time-saving in that fewer ponds near the outside of the transect need be censused. A third advantage is that birds can not swim off the

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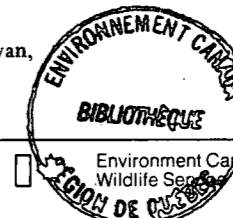
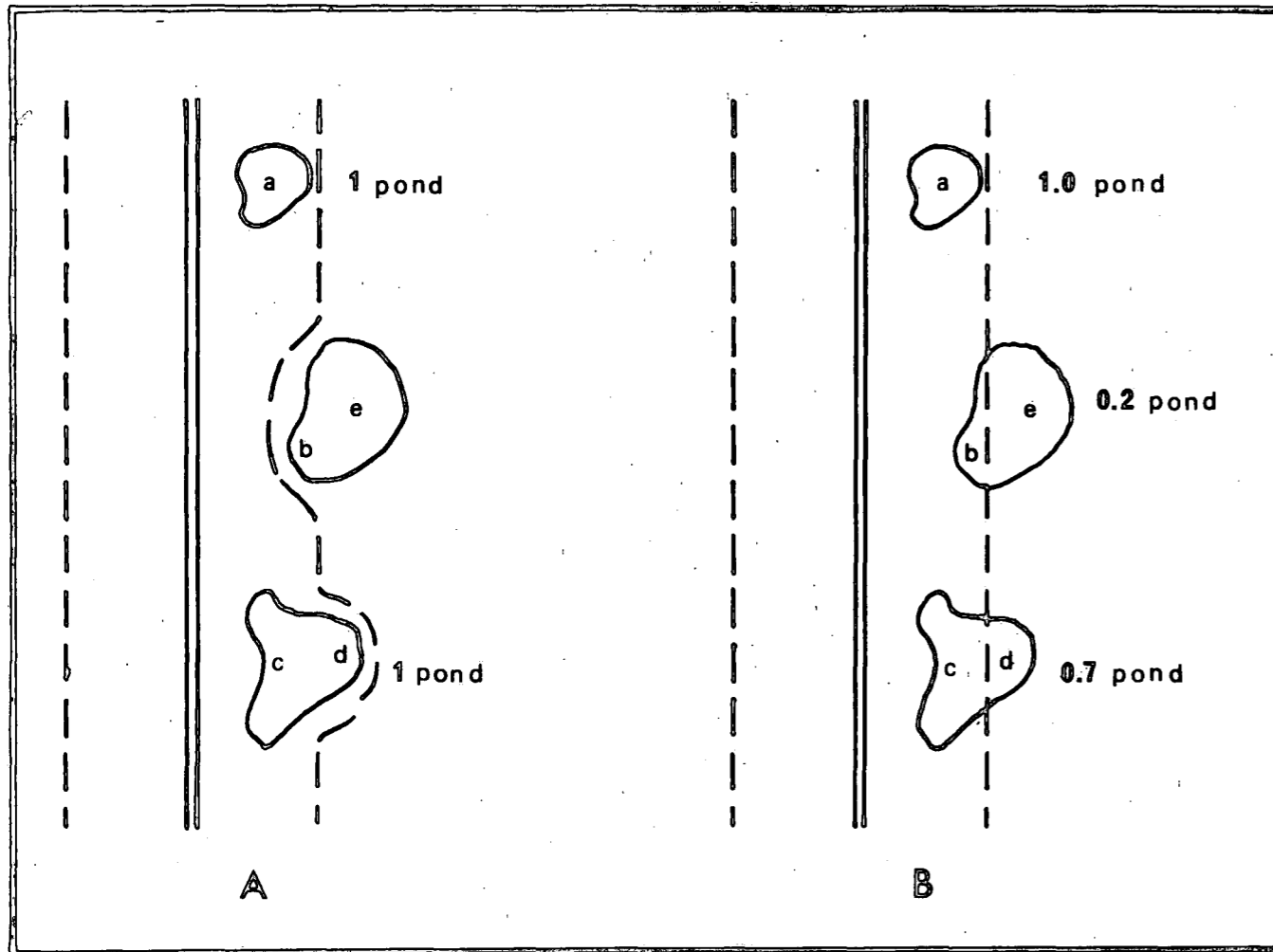


Figure 1
Diagram illustrating two methods of recording ducks and ponds on roadside transects. In A, ducks *a*, *c* and *d* would be recorded; in B, ducks *a*, *b* and *c* would be recorded.



transect when alarmed by the observer. This is particularly important when transects are used for brood counts, since flightless ducks sometimes move to the distant end of a pond before being censused.

The only disadvantage of Method A is that its use is limited by pond size. Ponds so large that more than one-half of the area could not fall on the transect would always be excluded. However, such ponds would have to exceed 1/2 mile in diameter (assuming circular shape) since the transect width is 1/4 mile. Few areas of the prairie pothole region would fail to meet the requirements for a transect using Method A because of large ponds.

Conclusions

Canvasback, Redhead and pond counts on roadside transects were similar when recorded two ways (1) when ponds more than one-half off the transect were excluded and ponds over one-half on were included, and (2) when only those parts of

ponds lying on the transect were censused. For areas where large ponds (over 1/2 mile wide) are not prevalent, the first method is favoured because it eliminates the need to decide if ducks are on or off the transect, reduces the number of distant ponds that have to be censused, and eliminates bias caused by birds moving off the transect before being censused. Similar comparisons using additional species and transects are recommended.

Literature cited

Sauder, D.W., R.L. Linder, R.B. Dahlgren and W.L. Tucker. 1971. An evaluation of the roadside technique for censusing breeding waterfowl. *J. Wildl. Mgmt.* 35:538-543.

Smith, A.G. 1971. Ecological factors affecting waterfowl production in the Alberta parklands. Resource Publication 98. Bureau of Sport Fisheries and Wildl. U.S.D.I. Washington, D.C.

Table 1
Pond data recorded by two methods on two roadside transects

Item	First transect*		Second transect†	
	A‡	B	A	B
Included ponds	23		34	
Excluded ponds	19		42	
Whole ponds	201	201	203	203
Summed fractions		21.9		35.5
Total ponds	224	222.9	237	238.5
Total pond area (acres)	220.3	218.8	353.2	359.2
Average pond area	1.0	1.0	1.5	1.5

* 18 linear miles.

† 44 linear miles.

‡ See text for methods.

Table 2
Canvasbacks and Redheads recorded two ways during ten transect counts

Census no.	Canvasback		Redhead	
	A	B	A	B
1	45	47	42	45
2	55	55	71	71
3	63	67	53	53
4	50	49	78	78
5	37	41	59	59
6	45	50	31	31
7	51	55	31	31
8	49	50	31	29
9	46	45	27	27
10	54	53	21	21
Total	495	512	444	445
Mean	49.5	51.2	44.4	44.5
Mean difference (B-A)		1.7		0.1
Confidence interval, 95%		-0.02, 3.42		-0.76, 0.96

