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THE HEBRIDEAN WADER SURVEY : DID THE OBSERVERS RECORD IN THE SAME WAY ?

by A. Webb, T.M. Reed and T.D. Williams

INTRODUCTION

Any large scale survey requires that inter-observer differences in efficiency or recording method are minimised so that population estimates will be comparable between areas (Ralph & Scott 1981).

In this paper we compare the results of the Nature Conservancy Council (NCC) and Wader Study Group (WSG) field teams in the Uists in 1983 in order to determine whether there were differences which may have affected population estimates for survey areas.

METHODS

Data were collected by transect survey and analysed (Reed and Fuller 1983) to produce population estimates for Oystercatcher *Haematopus ostralegus*, Ringed Plover *Charadrius hiaticula*, Lapwing *Vanellus vanellus*, Dunlin *Calidris alpina*, Snipe *Gallinago gallinago* and Redshank *Tringa totanus* for the whole of the machair and selected adjacent blackland areas.

Included in the survey area were a number of sites censused by both NCC (team G) and WSG field teams (teams A, B, C, D and E). These sites were censused independently within a few days (mean 6.5 + SD 4.9 days) of the other team's visit, and records then compared for Dunlin, Oystercatcher, Redshank and Ringed Plover. Lapwing and Snipe records were insufficiently detailed to allow comparison. We assume here that the NCC team were consistent in their field methods so that this team is used as a standard by which the 5 WSG teams could be compared. This paper is therefore concerned with consistency between observers. The question of validity of the censuses (i.e. how they relate to the numbers of pairs actually present) is considered by Jackson & Percival (1983) and, to some extent, by Fuller, Green and Pienkowski (1983).

Field registrations were divided into five categories:

1. Pair of birds;
2. Two birds together, not recorded as a pair;
3. Two single birds close enough to be considered a pair;
4. Single birds;
5. Groups of three or more birds.

Additionally the number of 'twosomes' (the sum of categories 1, 2 and 3 above) was calculated: removing any bias caused in interpreting records as pairs.

The numbers of birds recorded in each of the above categories by each field team were compared using χ^2 tests. Because one would expect some variation in recording methods between teams, only large differences ($P < 0.005$) have been highlighted.

RESULTS

Grouping all species together (Table 1) showed that the record interpretation of three groups (teams B, D and E) differed little from team G, with team B tending to record a slightly higher proportion of birds as pairs rather than singles, and team E recording a slightly higher proportion of singles than did the other teams. However, teams A, and C differed significantly from team G in all comparisons, apart from the proportion of singles recorded. Estimates of the breeding shorebird population made by these two teams differed markedly from NCC estimates (42.5% and 57.5% respectively (Table 2)). Mean percentages of birds in each recording category (Table 3) suggest broad similarity in record interpretation between NCC and WSG observers, with perhaps a slight tendency for WSG to record more groups and fewer pairs. None of the categories differed significantly when NCC and WSG means were compared by t-test (Snedecor and Cochran, 1967).

Results for all WSG teams were then grouped and compared with NCC results for each species (Table 4).

The results for Dunlin and Ringed Plover were similar for both groups. However, Redshank were grouped far more often by WSG than NCC and Oystercatcher were recorded more as singles by WSG.

Table 1. Number of birds of all wader species assigned to different recording categories (see text) for NCC and WSG (A-E) teams in overlapping study sites. Figures are expressed also as percentages. Differences between NCC and WSG teams, significant by χ^2 -tests at $P < 0.005$, are indicated by *.

		Total	Pairs	Twos	1+1=Pair	Singles	Groups	"Twosomes"
NCC (Team G)	No individuals	361	246	0	8	94	13	254
	% of total		68.1	0	2.2	26.0	3.6	70.4
			*	*	*		*	*
WSG (Team A)	No individuals	556	168	100	62	140	86	330
	% of total		30.2	18.0	11.2	25.6	15.5	59.4
NCC (Team G)	No individuals	1295	726	32	122	325	90	880
	% of total		56.1	2.5	9.6	25.1	7.1	68.0
			*			*		*
WSG (Team B)	No individuals	1154	814	30	90	133	87	934
	% of total		70.5	2.6	7.8	11.5	7.5	80.0
NCC (Team G)	No individuals	859	636	12	18	132	61	666
	% of total		74.0	1.4	2.1	15.4	7.1	77.5
			*	*	*		*	*
WSG (Team C)	No individuals	1265	562	136	112	255	200	810
	% of total		44.4	10.8	8.9	20.2	15.8	64.0
NCC (Team G)	No individuals	492	334	0	26	87	45	360
	% of total		67.9	0	5.3	17.6	9.1	73.2
					*			
WSG (Team D)	No individuals	430	308	2	6	71	43	316
	% of total		71.6	0.5	1.4	16.5	10.0	73.5
NCC (Team G)	No individuals	561	396	8	28	106	23	432
	% of total		70.6	1.4	5.0	18.9	4.1	77.0
								*
WSG (Team E)	No individuals	433	278	8	12	109	26	298
	% of total		64.2	1.8	2.8	25.2	6.0	68.8

Table 2. Percentage difference in total breeding wader populations estimated by NCC and WSG observers in overlap sites (\sum absolute difference) / (\sum NCC estimated pairs).

	WSG Team				
	A	B	C	D	E
% Difference	42.5	35.2	57.5	16.7	21.4

Table 3. Mean percentage of total number of individuals in each recording category with standard deviation (N=5)

		Pairs	Twos	1+1=Pair	Singles	Groups	"Twosomes"
NCC (Team G)	$\bar{X} \pm s.d.$	67.3 \pm 6.75	1.1 \pm 1.07	4.8 \pm 1.07	20.6 \pm 4.7	6.2 \pm 2.3	73.2 \pm 4.12
WSG (Teams A-E)	$\bar{X} \pm s.d.$	56.2 \pm 18.17	6.7 \pm 7.48	6.4 \pm 4.16	19.8 \pm 5.97	11.0 \pm 4.51	69.3 \pm 8.34

Teams recording a lower proportion of 'twosomes' tended to arrive at higher population estimates than teams recording more single birds and groups. Sign tests (Siegel 1956) for all species in the overlap areas indicated that teams with lower proportions of 'twosomes' gave higher population estimates ($P < 0.001$ $n=34$). For Dunlin and Ringed Plover a large proportion of the estimated population was derived from registrations where only one of the pair was recorded (44.5% and 33.3% of records respectively (Table 5)).

DISCUSSION

NCC and WSG teams showed significant differences in detailed record interpretation when surveying identical areas at a similar time (Tables 1 and 4) but when the whole data set was examined (Table 3) there was broad agreement. Part of the difference between NCC and WSG estimates may be ascribed to differences in field experience. By the time of the WSG visit the NCC team had been in the field for 2½ months. The largest discrepancies in NCC and WSG recording methods came from comparisons with groups with the least experience of waders in Uist breeding conditions.

Table 4. Numbers of individual birds assigned to different recording categories by NCC and WSG teams for four species in overlapping sites. Figures also expressed as percentages. Differences significant at $P < 0.005$, by χ^2 -tests, indicated by *.

		Total	Pairs	Twos	1+1=Pair	Singles	Groups	"Twosomes"
<u>Dunlin</u>								
NCC (Team G)	No individuals	945	418	30	102	306	89	550
	% of total		44.2	3.2	10.8	32.4	9.4	58.2
WSG (Teams A-E)	No individuals	939	460	52	90	259	78	602
	% of total		49.0	5.5	9.6	27.6	8.3	64.1
<u>Oystercatcher</u>								
NCC (Team G)	No individuals	759	584	10	20	66	79	614
	% of total		76.9	1.3	2.6	8.7	10.4	80.9
			*	*	*	*		*
WSG (Teams A-E)	No individuals	858	482	90	74	137	75	646
	% of total		56.2	10.4	8.6	16.0	8.7	75.3
<u>Redshank</u>								
NCC (Team G)	No individuals	749	636	6	0	92	15	642
	% of total		84.9	0.8	0	12.3	2.0	85.7
			*	*	*		*	*
WSG (Teams A-E)	No individuals	1003	552	94	42	148	167	688
	% of total		55.0	9.4	4.2	14.8	16.7	68.6
<u>Ringed Plover</u>								
NCC (Team G)	No individuals	1115	700	8	80	264	63	788
	% of total		62.8	0.7	7.2	23.7	5.7	70.7
				*		*	**	
WSG (Teams A-E)	No individuals	1038	636	40	76	164	122	752
	% of total		61.3	3.9	7.3	15.8	11.8	72.4

Table 5. Number of estimated pairs where only one of the pair was recorded. WSG and NCC data combined.

	Dunlin	Oystercatcher	Redshank	Ringed Plover
No. of pairs estimated where only one bird of pair recorded (a)	550	253	288	463
Total estimated pairs (b)	1237	930	1021	1310
(a) as a percentage of (b)	44.5	27.2	28.2	35.3

These differences in detailed recording results appear to have had little effect upon population estimates. It should be noted, however, that where a team tended to record more single birds and/or groups it produced a higher population estimate than a team recording fewer of these categories. This may be due to the assumption in analysis that single birds were paired and that the partner was missed by the observer. The greatest proportions of estimated pairs with assumed 'absentee or overlooked' partners were found in Dunlin and Ringed Plover (Table 5). Clearly great care must be taken when surveying these two species because they are more liable to under/over-estimation when using the analysis method of this survey (Reed and Fuller 1983). However, nest searches and intensive observations on individually marked birds showed that the transect method used generally gave a good estimate of the breeding population; that under-estimation, rather than over-estimation, was more likely (Jackson and Percival 1983); and that the WSG approach is a valid way of assessing bird populations, and a good method for future surveys.

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