

NUMBERS, DISTRIBUTION AND HABITAT PREFERENCES OF WADERS WINTERING ON THE ISLES OF SCILLY

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Most of the coastline of the Isles of Scilly (England) was surveyed for the 1984/85 Winter Shorebird Count. A total of 2 825 waders was recorded. Turnstones *Arenaria interpres* (936), Oystercatchers *Haematopus ostralegus* (583), Sanderlings *Calidris alba* (326) and Ringed Plovers *Charadrius hiaticula* (312) were the most abundant species recorded. There were internationally important numbers of Turnstones, and nationally important numbers of Sanderlings and Ringed Plovers recorded. Tresco and St. Mary's supported most waders, whilst Samson held the highest densities. The attractiveness of each island varied according to species, and each species showed preferences for particular coastal habitat types.

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INTRODUCTION

The Isles of Scilly, comprising over 140 islands and rocky stacks, lie approximately 45 km west-south-west of Land's End, Cornwall, and are thus fully exposed to the rigours of the Atlantic Ocean. Ornithologically, the islands are renowned for the diversity and rarity of bird species recorded there, and consequently the islands are visited by many hundreds of birdwatchers at certain times of the year. The occurrence of rare bird species on the Isles of Scilly is thus well documented; however, there is relatively little published information on the commoner bird communities of the islands, especially outwith the breeding season. Indeed, with reference to the waders, Robinson (1976) wrote that "little is known of the wintering populations".

During the 1984/85 winter, the shoreline of the Isles of Scilly was surveyed for the national Winter Shorebird Count (WSC), a project jointly organised by the British Trust for Ornithology (BTO) and the Wader Study Group (WSG). The aims of the WSC were to document the numbers of waders wintering on all the UK's non-estuarine shores, to highlight important areas for waders and to examine habitat preferences. Full methodology and the total numbers of waders recorded during the WSC were reported by Moser & Summers (1987).

This short paper aims to: (a) examine the numbers and distribution of wader species recorded on Scilly for the WSC; (b) make comparisons between the islands surveyed; (c) assess the overall importance of the Scilly Isles for wintering waders; and (d) examine habitat preferences of the main species present.

STUDY AREA AND METHODS

Fieldwork for the WSC on Scilly took place on five dates during winter 1984/85: 15 December (Samson), 27 December (St. Agnes and St. Mary's), 6 January (Bryher and Tresco), 26 January (St. Martin's) and 28 January (Tean, St. Helen's and Northwethel). Unfortunately, there was no coverage of Annet, the Western Rocks and many of the smaller islands (Figure 1). Sections of shore were visited close to low-tide and the numbers of each wader species recorded. Section boundaries corresponded to

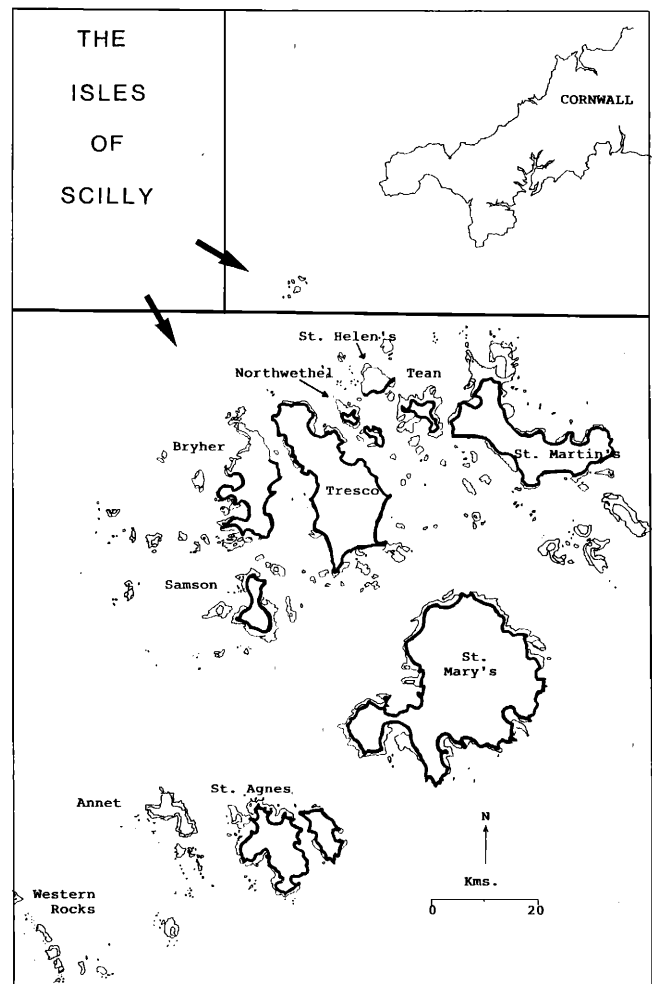


Figure 1. The location of the Scilly Isles and its main islands. The shoreline surveyed for the Winter Shorebird Count (WSC) is shown as a thick line.

changes in habitat, classified according to both dominant substrate type (bedrock, boulders or sand) and shore slope (flat, moderate or steep). Section lengths were measured along the high water mark from 1:50 000 Ordnance Survey maps.

The importance of the islands for each species was assessed by calculating total birds present and expressing these as a percentage of the British and European/west African populations of each species. By convention, an area is considered nationally or internationally important if it regularly holds at least 1% of the national or international population of the species, respectively (cf. Salmon et al. 1989). As Bryher and St. Helen's were surveyed only partially and other islands were not surveyed at all (see Figure 1), the grand totals probably provide conservative estimates of the total populations of each species.

To make comparisons of the abundance of waders between islands the counts were converted to linear densities (numbers/km). This removes the direct effect of differences in shore-length between islands. The amount of each habitat was calculated for the islands as a whole and for each island separately. Habitat preferences of the main species of waders present (those with total populations exceeding 100) were examined for all islands together using the following equation (Jacobs 1974):

$$D = (r-p)/(r+p-2rp)$$

where r equals the proportion of the species in a given habitat and p equals the proportion of the Isles of Scilly comprising that habitat. Negative values of the index (D) indicate avoidance of, and positive values preference for, a given habitat; a value of -1 represents total avoidance and one of $+1$ total selection.

RESULTS

Of the 59 km of shore surveyed, bedrock (granite) or sandy shores dominated, and most shores were flat or moderate in slope (Table 1). Steeply sloping shores were uncommon. Shore composition varied greatly between islands (Table 2). On St. Mary's, Samson and the Tean-Northwethel group, bedrock-dominated shores were approximately twice as common as sand-dominated shores. Bryher and St. Martin's, however, consisted mainly of sandy beaches. The beaches of St. Agnes and Gugh were predominantly bedrock and boulders, and Tresco was dominated by boulders and sand.

A total of 2 825 waders of 14 species was counted during this survey (Table 3). Of these, the numbers of Turnstone *Arenaria interpres* (936) are above those needed for the islands to qualify as international important, whilst the totals of Sanderling *Calidris alba* (326) and Ringed Plover *Charadrius hiaticula* (312) are similarly of national importance. In addition, the total count of 106 Purple Sandpipers *Calidris maritima* was not far short of national importance.

Table 1. Proportions (%) of coastal habitat types on the Isles of Scilly. A total of 59 km of shore was surveyed.

Slope	Bedrock	Boulders	Sand	Totals
Flat	0.8	3.4	37.1	41.3
Moderate	35.3	14.5	3.2	53.0
Steep	3.7	2.0	0.0	5.7
Totals	39.8	19.9	40.3	100.0

The highest numbers of waders were recorded on Tresco and St. Mary's (Table 4). These are the two largest islands, but by far the highest density of waders (125 birds/km) was recorded on the smallest island, Samson. The Tean-Northwethel group and St. Martin's supported the lowest numbers and densities.

Turnstone

Turnstones were much the most abundant species recorded (Table 3) and widely distributed across the islands (Figure 2). They occurred at high densities on St. Agnes and Gugh (18 birds/km) and particularly on Bryher (31 birds/km) and Samson (40 birds/km) (Table 4). On the Tean-Northwethel group and on St. Martin's Turnstones were noticeably scarcer. Turnstones avoided the harder substrate types on Scilly and preferred sandy beaches (Table 5).

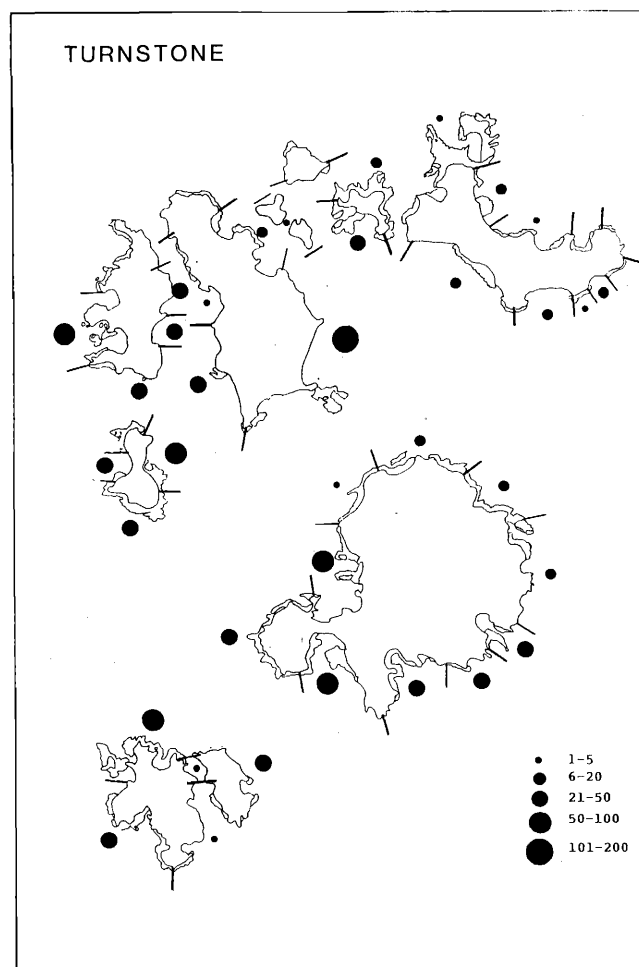


Figure 2. The distribution of wintering Turnstones on the Isles of Scilly in midwinter 1984/85.

Oystercatcher *Haematopus ostralegus*

A total of 583 Oystercatchers was recorded (Table 3) and they were widely distributed amongst the islands (Table 4, Figure 3). Densities were similar between islands and ranged from approximately 8-13 birds/km (Table 4). Oystercatchers slightly favoured boulder- and sand-dominated beaches (Table 5).

Table 2. Lengths and proportions (%) of coastal habitat types on the surveyed islands of the Isles of Scilly.

	Shore length km	Bedrock %	Boulders %	Sand %
St. Mary's	16.9	62	0	38
St. Agnes & Gugh	8.4	56	42	2
Samson	3.7	68	0	32
Bryher	4.5	0	27	77
Tresco	10.7	0	47	53
Tean, St. Helen's & Northwethel	4.9	69	0	31
St. Martin's	9.9	25	20	55

Table 3. Relative importance of the Isles of Scilly for wintering waders during December to January, 1984/85.

	Total numbers	% of British population	% of European population
Oystercatcher	583	0.2	-
Lapwing	5	-	-
Ringed Plover	312	1.4 *	0.6
Grey Plover	111	0.5	-
Golden Plover	25	-	-
Turnstone	936	2.1 *	1.3 *
Curlew	181	0.2	-
Bar-tailed Godwit	55	0.1	-
Redshank	49	-	-
Knot	10	-	-
Dunlin	118	-	-
Sanderling	326	2.3 *	0.3 *
Purple Sandpiper	106	0.7	0.2
Greenshank	8	2.0 a	-

- indicates a value of less than 0.1%.

* denotes numbers of national or international importance.

a) Where 1% of the British wintering population is less than 50 birds, 50 is normally used as a minimum qualifying level for national importance.

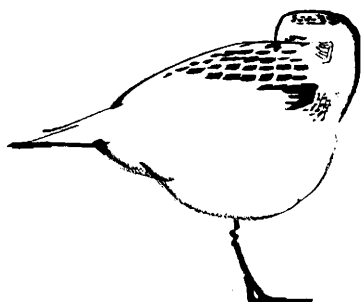


Table 4. Counts and linear densities (numbers/km) of waders on the Isles of Scilly, winter 1984/85. Densities are in parentheses but are omitted where the value is less than 0.1 birds/km.

	St. Mary's	St. Agnes & Gugh	Samson	Bryher	Tresco	Tean, St. Helen's & Northwethel	St. Martin's
Oystercatcher	147 (8.7)	111 (13.2)	44 (11.9)	50 (11.1)	109 (10.2)	48 (9.8)	74 (7.5)
Lapwing	1	0	0	1 (0.2)	3 (0.3)	0	0
Ringed Plover	42 (2.5)	15 (1.8)	90 (24.3)	77 (17.1)	52 (4.9)	4 (0.8)	32 (3.2)
Grey Plover	11 (0.7)	11 (1.3)	16 (4.3)	30 (6.7)	29 (2.7)	9 (1.8)	5 (0.5)
Golden Plover	0	25 (3.0)	0	0	0	0	0
Turnstone	219 (13.0)	148 (17.6)	149 (40.3)	138 (30.7)	198 (18.5)	39 (8.0)	45 (4.6)
Curlew	20 (1.2)	15 (1.8)	44 (11.9)	20 (4.4)	25 (2.3)	34 (6.9)	23 (2.3)
Bar-tailed Godwit	1	3 (0.4)	9 (2.4)	0	40 (3.7)	0	2 (0.2)
Redshank	8 (0.5)	15 (1.8)	8 (2.2)	3 (0.7)	10 (0.9)	5 (1.0)	0
Knot	0	0	0	0	0	0	10 (1.0)
Dunlin	0	0	36 (9.7)	24 (5.3)	58 (5.4)	0	0
Sanderling	168 (9.9)	17 (2.0)	21 (5.7)	0	105 (9.8)	4 (0.8)	14 (1.4)
Purple Sandpiper	3 (0.2)	47 (5.6)	43 (11.6)	0	0	1 (0.2)	12 (1.2)
Greenshank	2 (0.1)	0	2 (0.5)	1 (0.2)	1 (0.1)	0	2 (0.2)
Totals	622 (36.8)	407 (48.5)	462 (124.9)	344 (76.4)	630 (58.9)	144 (29.4)	219 (22.1)

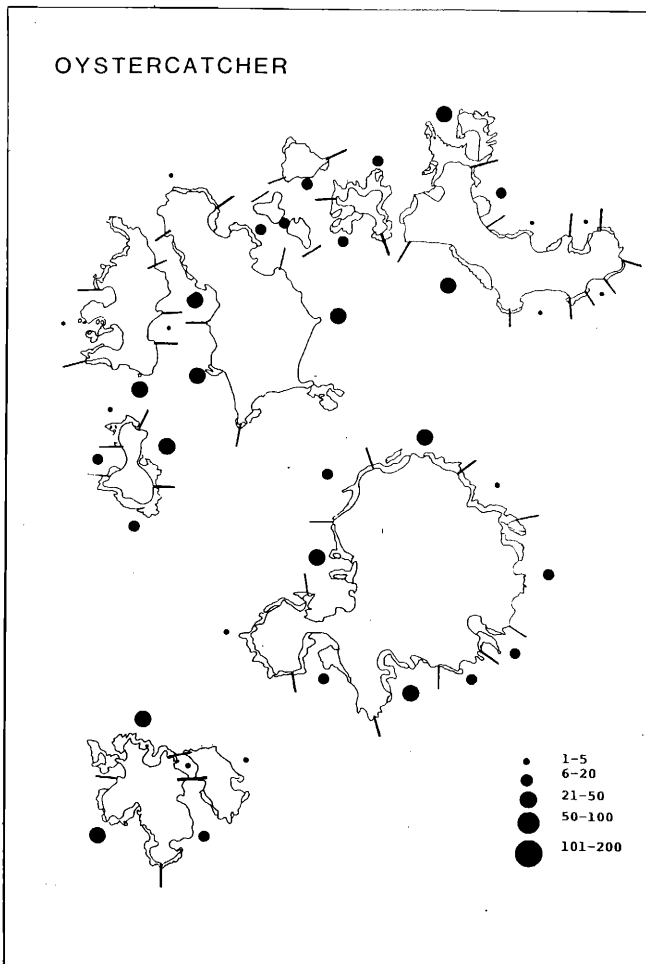


Figure 3. The distribution of wintering Oystercatchers on the Scilly Isles in midwinter 1984/85.

Table 5. Habitat preferences of the main wader species wintering on the Isles of Scilly, 1984/85. Positive values indicate preference for, and negative values avoidance of, a particular habitat type (see methods).

	Bedrock	Boulders	Sand
Oystercatcher	-0.3	0.2	0.1
Ringed Plover	-0.8	-0.4	0.8
Grey Plover	-0.6	0.4	0.2
Sanderling	-1.0	-0.6	0.9
Purple Sandpiper	-0.8	0.6	0.0
Dunlin	-1.0	-0.5	0.9
Curlew	-0.4	0.1	0.3
Turnstone	-0.4	-0.2	0.5

Sanderling

Approximately 84% of the 326 Sanderlings recorded (Table 3) were found on St. Mary's and Tresco (Table 4). Furthermore, they were largely concentrated into just one section of shore on each of these islands. Elsewhere, Sanderlings were scarce, though small flocks were recorded on St. Agnes, Samson and St. Martin's (Table 4, Figure 5). None were recorded on Bryher, St. Helen's or Northwethel despite a large proportion of the habitat there being sandy beaches, the preferred habitat of Sanderlings (Table 5). Sanderlings avoided other coastal habitats.

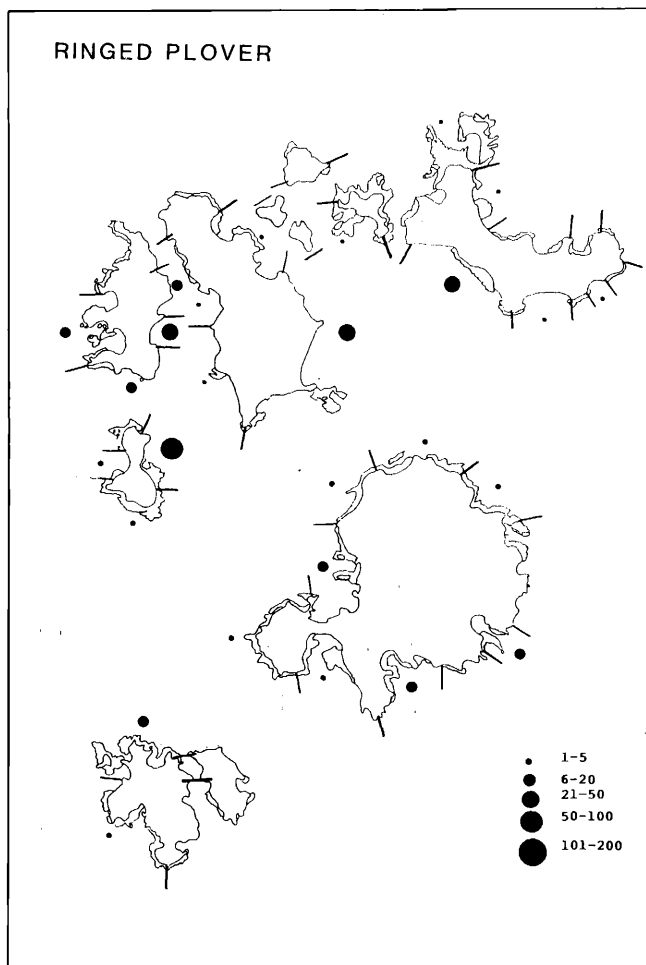


Figure 4. The distribution of wintering Ringed Plovers on the Scilly Isles in midwinter 1984/85.

Ringed Plover

The fourth most abundant wader species recorded (Table 3). Ringed Plovers were widely dispersed (Figure 4) but most abundant on the islands to the north and west, particularly Samson, Bryher and Tresco (Table 4, Figure 4). Samson and Bryher also supported by far the highest densities (17-24 birds/km). Ringed Plovers strongly avoided bedrock and boulder beaches (Table 5) but favoured sand-dominated shores.

Curlew *Numenius arquata*

The 181 Curlews recorded (Table 3) were widely distributed amongst the islands (Table 4) but were recorded at highest density on Samson. Elsewhere, they were generally recorded at low density (1-7 birds/km). Curlews preferred sandy beaches and tended to avoid bedrock and boulder shores (Table 5).

Dunlin *Calidris alpina*

The 118 recorded (Table 3) were confined to just three of the islands surveyed, Samson, Bryher and Tresco (Table 4). They were absent from bedrock-dominated shores (Table 5) and also avoided boulder beaches, preferring sand-dominated shores.

Grey Plover *Pluvialis squatarola*

The 111 Grey Plovers recorded (Table 3) were mainly on Bryher and Tresco (Table 4), islands where bedrock shores are absent (Table 2). The density of Grey Plovers was relatively low (1-7

birds/km). Boulder-dominated and sand-dominated shores attracted the most Grey Plovers (Table 5) and bedrock shores were strongly avoided.

Purple Sandpiper

Most of the 106 birds recorded (Table 3) occurred on the west and east coasts of Samson (Figure 5, Table 4) and on the north coast of St. Agnes. Here they occurred at relatively high densities (6-12 birds/km) though elsewhere the density was generally very low (Table 4). Overall, Purple Sandpipers favoured boulder beaches and apparently avoided bedrock (Table 5).

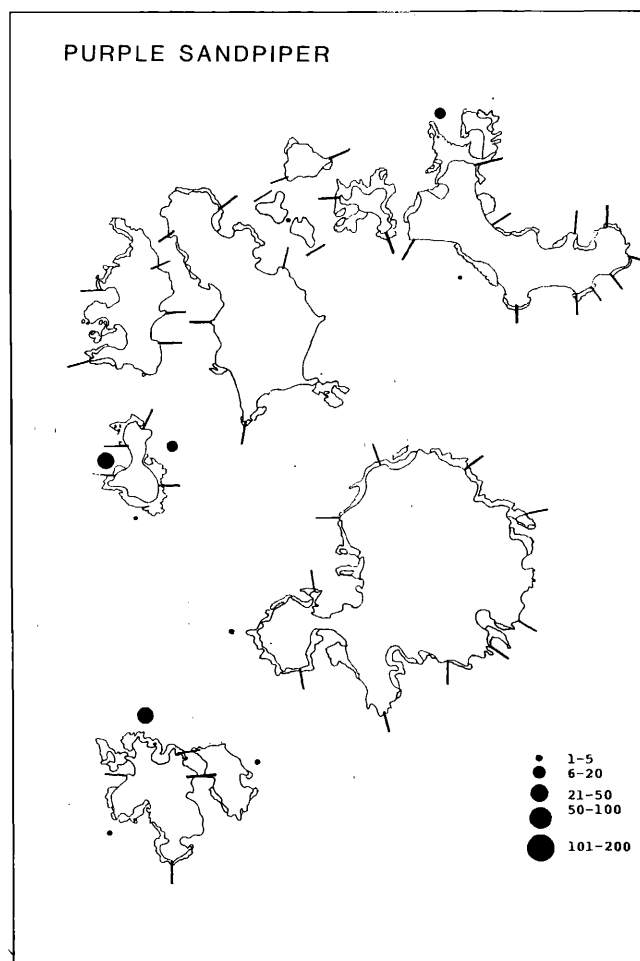


Figure 5. The distribution of wintering Purple Sandpipers on the Scilly Isles in midwinter 1984/85.

Other species

The six other wader species recorded occurred in very small numbers (Table 3). Knot *Calidris canutus* were confined to St. Martin's, Golden Plover *Pluvialis apricaria* to St. Agnes and Gugh and Bar-tailed Godwit *Limosa lapponica* were mainly located on Tresco (Table 4). Lapwing *Vanellus vanellus*, Greenshank *Tringa nebularia* and Redshank *T. totanus* were widely but sparsely distributed.

DISCUSSION

It is important to recognize the limitations of the assessment of the wader populations of the Isles of Scilly reported here. The numbers of most species recorded during the WSC on Scilly

probably represent minimum estimates since there were gaps in coverage and difficulties in counting rocky shore waders at low tide. The former is certainly true for the Purple Sandpiper, as their previously known favoured areas on Annet and the Western Rocks were not covered for this survey. Indeed Robinson (1976) estimated the Isles of Scilly wintering population of Purple Sandpipers to be around 250, over twice that recorded for the WSC and greater than the number required for national importance. Furthermore, far greater numbers of certain species (e.g. Ringed Plovers, Golden Plovers, Lapwings) may be present during periods of cold weather, as was noted by Penhallurick (1969), when the birds seek the comfort of the relatively mild winter climate on Scilly than further north and east. Also, the assessment here is based on a single winter only and takes no account of other times of the year. Large autumn and spring concentrations of waders are known to occur on Scilly (e.g. Robinson 1976) and the numbers then are sometimes far greater than those recorded in winter. The importance of Scilly during passage periods and during cold weather, must thus be considered in any overall assessment of the islands' wader populations.

There are considerable differences in the numbers and density of each species between the islands of Scilly, not all of which are easily explicable in terms of the preferences of each species for particular habitats. The relatively low abundance and limited distribution of a number of wader species on Scilly (e.g. Dunlins and Purple Sandpipers), when so much apparently suitable habitat exists, is difficult to explain but has not gone previously un-noticed - "most Purple Sandpipers occur from Annet westwards" (Robinson 1976).

Overall, the preferences of each species for particular coastal habitats on Isles of Scilly were similar to those recorded elsewhere, for example in N. Ireland (Moser & Prys-Jones 1988) and in Shetland (Summers *et al.* 1988). However, Turnstones were recorded predominantly on sandy beaches on the Isles of Scilly but utilised a variety of shore types more equally in N. Ireland and Shetland. This could mean that many Turnstones were overlooked on rocky shores during the counts on Scilly, but were not missed on sandy beaches, giving the impression of a strong preference for the latter habitat. Alternatively, Turnstones on Scilly may exhibit true avoidance of the moderately sloped, but perhaps more exposed, bedrock shores, where feeding conditions may be difficult for them.

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