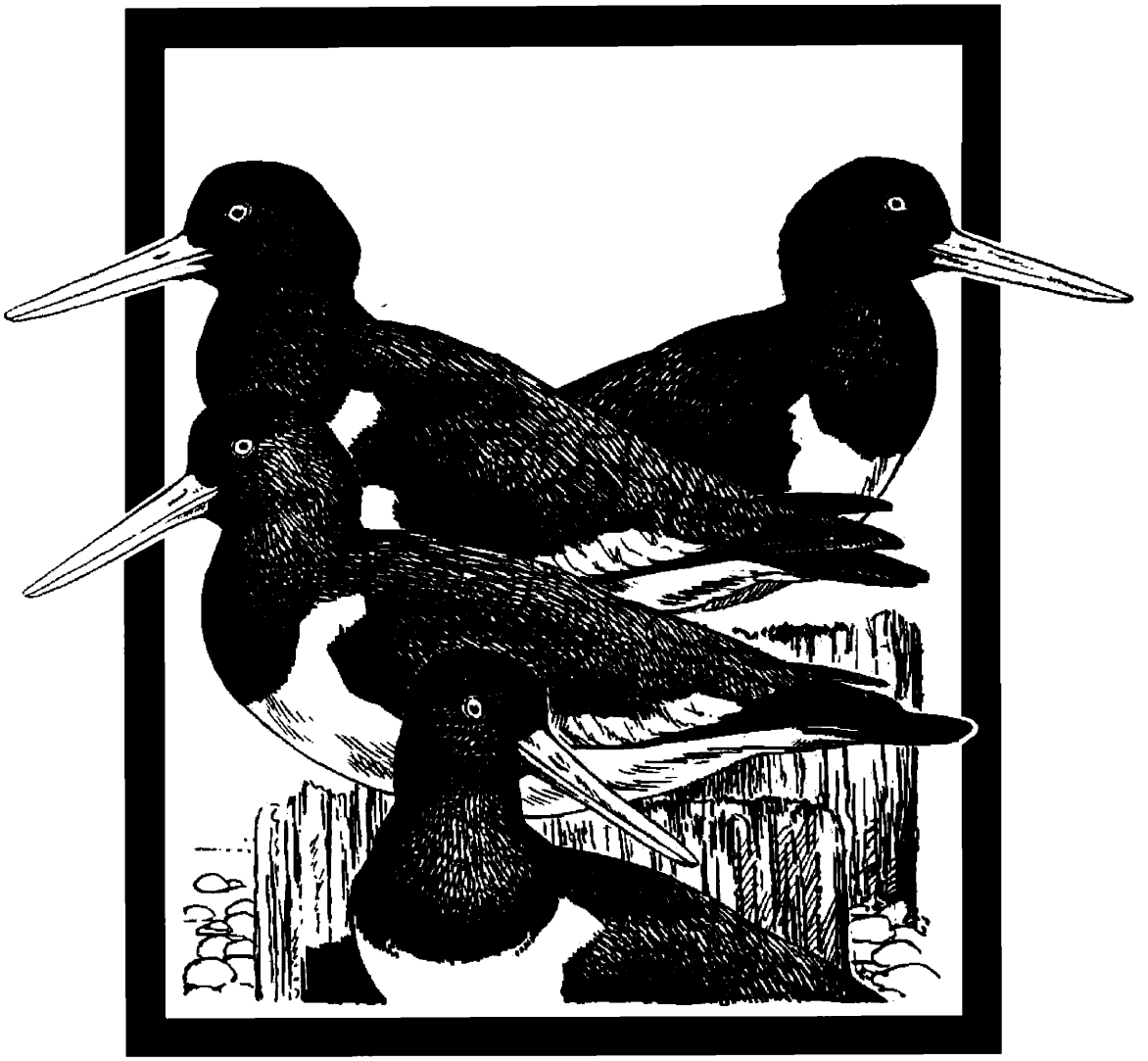
# Wader Study Group Bulletin



Volume 99, December 2002

# INTERNATIONAL WADER STUDY GROUP: Members of the Executive Committee



## CORRESPONDENCE

Except for that concerning the *Wader Study Group Bulletin*, all correspondence, including matters and proposals concerning colour-marking schemes, should be sent to the Group's official address: **Wader Study Group, The National Centre for Ornithology, The Nunnery, Thetford, Norfolk IP24 2PU, U.K.** All general enquiries should be sent to the General Secretary.

### Membership
All applications for membership, initial subscriptions and renewals, changes of address, matters relating to the circulation of the *Bulletin* etc. should be sent to the Membership Secretary.

### Projects
Matters and proposals concerning co-operative research projects and objectives should be sent to the Project Co-ordinator.

### Colour-marking Register
Matters and proposals concerning colour-marking schemes should be sent to the Colour-marking Register at the official address given above.

### Wader Study Group Bulletin
Correspondence concerning the *Wader Study Group Bulletin* should be sent to the Editor:

Humphrey Sitters, Limosa, Old Ebford Lane, Ebford, Exeter EX3 OQR, United Kingdom, e-mail: hsitters@aol.com

### Deadlines for notices and short-term items
1 January for the April issue
1 May for the August issue
1 September for the December issue

If correspondence between editor and author(s) is likely to be needed, material must be received well before these dates if material is to be included in the next issue

### Website of the International Wader Study Group
www.waderstudygroup.org

dividing the number of birds by the 1% threshold for that species.

The use of TIUs provides the basis for a powerful method to quantify the value of a location for an assemblage of birds. In the same way as a value for the total number of birds can be derived by summing the numbers of each species, a weighted total can be derived by summing the TIUs for each species, to give the "summed threshold importance units" (STIU). The result is a description of the value of the location for the suite of species present. It should be noted that 1% thresholds can be calculated at a variety of spatial scales (e.g. national or international). Therefore TIUs should only be summed when based on equivalent 1% threshold values. It should also be remembered that the use of 1% as a threshold value is entirely arbitrary. However, when using STIUs, it is unimportant whether 1%, 2% or, indeed, 100% of the population estimate is used, given that the aim is simply to weight the numerical contribution made by different species in a consistent manner. We simply retain the 1% level because it is a recognised standard.

## EXAMPLES OF THE USE OF THRESHOLD IMPORTANCE UNITS

An example shows how the calculation of STIUs can assist in our interpretation of the relative importance of sites. Consider two estuaries, A and B (see Table 1).

Overall, Estuary A supports 7,000 birds compared to 4,350 birds using Estuary B. However, by inversely weighting the counts of each species by its 1% threshold and then summing across species to derive the STIU, one can make a more objective comparison and gain a greater insight to the relative waterbird conservation interest at each site. The relatively high STIU value for Estuary B reflects its important population of Purple Sandpipers. A major advantage of the method is that it does not ignore the more common species, it just requires more of them to make an impact. It should be noted that, as described above, the method takes no account of the size of individual sites; for example, Estuary A may have an area 20 times that of Estuary B. Of course, the same is true of some other measures of overall avian value. For example, a very large estuary is far more likely to support 20,000 waterbirds than a smaller one simply by virtue of its size. In some circumstances, as in the examples given below, it may be useful to introduce a measure of STIU-density (e.g. STIU per hectare), in order to better compare like with like.

The use of TIUs need not be based on entire sites and can be scaled down to provide insight to the relative importance of different parts of a single site or scaled up to assess the relative importance of suites of sites or whole regions. Its use in these contexts is best illustrated by examples.

## USE OF TIUs AT THE LOCAL SCALE: AN EXAMPLE FROM WEBS LOW TIDE COUNTS

The WeBS Low Tide Count scheme describes the waterbird usage of estuaries at low tide based upon counts of birds on pre-selected sub-divisions (count units) of the overall site. The results are usually displayed as dot-density maps depicting single species across the site (see Musgrove *et al.* 2001 for further details). As examples, Fig. 1 depicts the distributions of Pintail *Anas acuta* (national 1% threshold = 280) and Dunlin (national 1% threshold = 5,300) as recorded by the WeBS Low Tide Counts on the Medway Estuary in southeast England during the 1996–97 winter.

**Table 1.** An example to demonstrate the calculation of STIUs.

| Species | 1% threshold | Estuary A | | Estuary B | |
|---|---|---|---|---|---|
| | | Count | TIU | Count | TIU |
| Wigeon | 2800 | 1000 | 0.36 | 0 | 0.00 |
| Oystercatcher | 3600 | 3000 | 0.83 | 2000 | 0.56 |
| Purple Sandpiper | 210 | 0 | 0.00 | 350 | 1.67 |
| Dunlin | 5300 | 3000 | 0.57 | 2000 | 0.38 |
| **Total birds** | | **7000** | | **4350** | |
| **STIU** | | | **1.76** | | **2.61** |

It is straightforward to sum the total number of all species (i.e. not only Pintail and Dunlin) for each section to give the combined distribution of all birds (Fig. 2a). However, this distribution is very similar to that recorded for Dunlin which, representing about 50% of the birds present, is the dominant species numerically.

Fig. 2b depicts the STIU map (actually STIU-density, with calculated values of STIU scaled up to provide a comparable level of shading to Fig. 2a). Those parts of the site that support high densities of waterbirds, including Dunlin, are evident on the map but the denser shading is found in the southeast, where the concentration of Pintail is of greater relative importance. The STIU representation has therefore identified objectively those parts of the Medway where those scarcer species are concentrated, whilst not ignoring concentrations of more numerous species. This approach is particularly valuable for site managers and conservationists. Previously, such areas within the estuary would have been identified largely on the basis of individual species distributions.

## USE OF TIUs AT THE REGIONAL SCALE: AN EXAMPLE FROM THE WEBS NON-ESTUARINE WATERFOWL SURVEY

The WeBS Non-estuarine Waterfowl Survey (NEWS) surveyed waterbirds along the open coasts of the UK. Unlike estuaries or inland wetlands, a particular problem in interpreting the data from NEWS is that clear boundaries for site definition are not readily distinguishable. Consequently, arbitrary stretches of coast are used to summarise bird numbers. The most successful representation of NEWS data to date has been based on counts summarised in terms of linear density (birds/km) and averaged across all counted coast within a 10 km grid square. In order to assess the relative importance of each grid square for each wader population, species counts were converted to TIUs/km and symbolised using pie-charts. To assess the relative importance of different grid squares the sizes of the pie-charts were scaled by the STIU (STIU/km). Fig. 3 shows examples for Orkney in Scotland, an area dominated by non-estuarine coast where estuarine species occur in relatively low numbers, and also for a coastal stretch between Cullen and Peterhead in northeast Aberdeenshire, an area important for non-estuarine species but where relatively large numbers of estuarine species also occur.

The STIU representation therefore identifies objectively those parts of the coast where species of greatest conservation importance are concentrated. We might expect there to be less of a contrast between the two alternative representations for Orkney than for many regions of Britain and Ireland

because the wader community in Orkney has a large non-estuarine component. Even so, the emphasis on conservationally important numbers in the STIU representation (Fig. 3(a)(ii)) identifies a more geographically extensive region of northern Orkney as being particularly important for Purple Sandpiper than the unweighted representation (Fig. 3(a)(i)). The usefulness of the STIU representation is particularly apparent for the coastal stretch of northeast Aberdeenshire. This area is especially important for non-estuarine species, but, when no weighting is used (Fig. 3(b)(i)), the relatively unimportant numbers of mainly estuarine species dominate even though their numbers are trivial compared to those of nearby estuarine habitat. When the STIU representation is used, however, (Fig. 3(b)(ii)) the importance of the area to Purple Sandpipers in particular is no longer obscured by the more common and ubiquitous species.

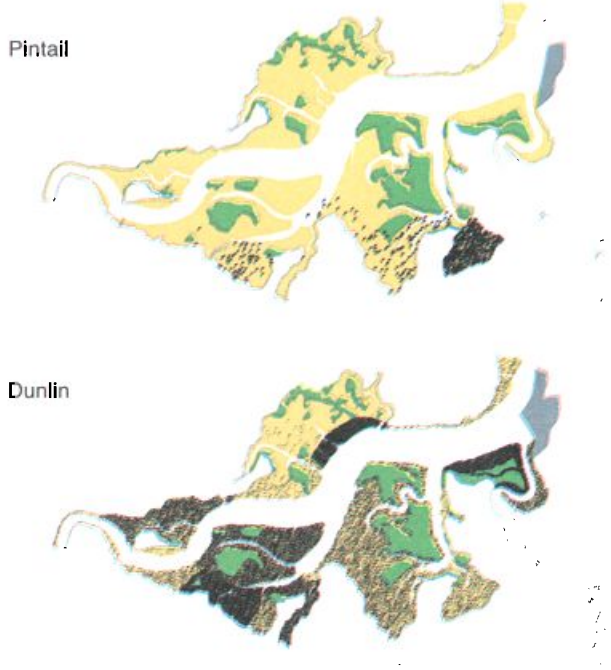



**Fig.1.** The low tide distribution of Pintail and Dunlin on the Medway Estuary (south-east England) during the 1996–97 winter.

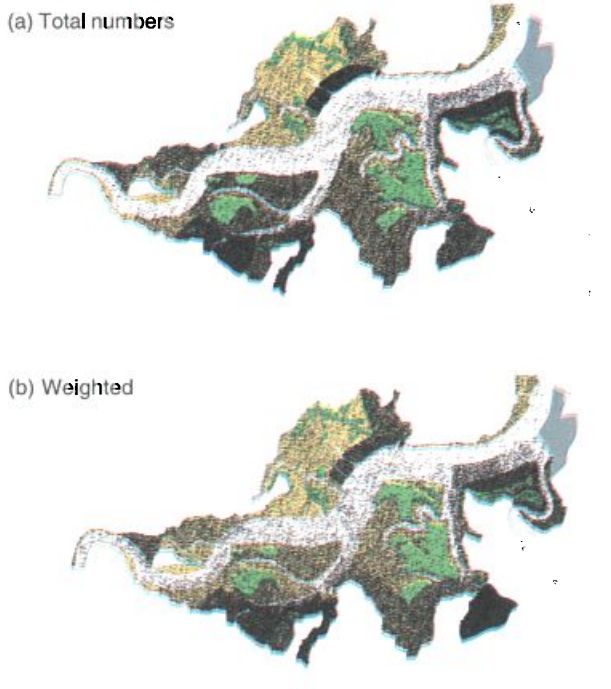



**Fig. 2.** The combined distribution of all waterbirds (not including gulls) at low tide on the Medway Estuary (south-east England) during the 1996–97 winter, displayed as a) summed numbers, and b) summed numbers of each species weighted by its 1% threshold.

## VERY SCARCE SPECIES: A PROVISO

STIUs might be improved by modifying the method for very scarce species which would otherwise have a disproportionately large influence on the resulting values. For example, the occurrence of a single Black-necked Grebe on a site (with a 1% threshold of 1 in the UK) would be equivalent to the occurrence of 3600 Oystercatchers. However, generally, the occurrence of a single grebe would not be considered of great conservation value, due to the inherent variability likely with small numbers. By convention, where the 1% threshold is less than 50 birds, 50 is used to represent 1% of the population estimate (Musgrove *et al.* 2001). This threshold could be used in calculating TIUs for scarce species, although this approach may lead to an under-estimation of the contribution of such birds.

## CONCLUSION

Although straightforward in concept and in application, the weighting of bird numbers in respect of their population size has much to offer, providing an objective method of quantifying the conservation importance of assemblages of waterbirds. Moreover the same method can be used for the birds of other habitats and species groups. However, its value is dependent upon the confidence that can be placed upon the relevant population-estimate. In Britain and Ireland, the method has particular relevance for waterbirds, both because the population sizes of the species involved are known to a relatively high degree of accuracy and because these islands are especially important to the East Atlantic flyway populations of many species (Musgrove *et al.* 2001). We see the method as providing useful insights to waterbird distributions for researchers, site managers and conservation professionals.

## REFERENCES

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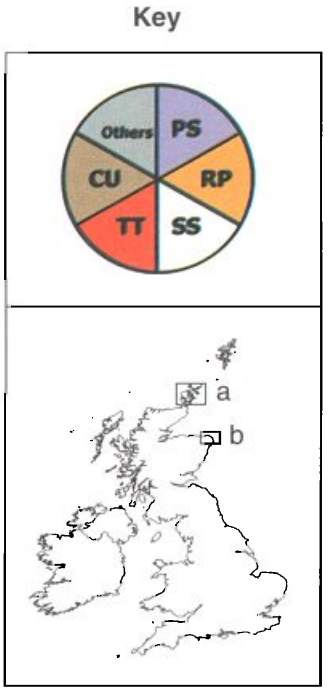
**Fig. 3.** Distribution of key non-estuarine waders in **a)** Orkney and **b)** north-east Aberdeenshire, Scotland, UK where:

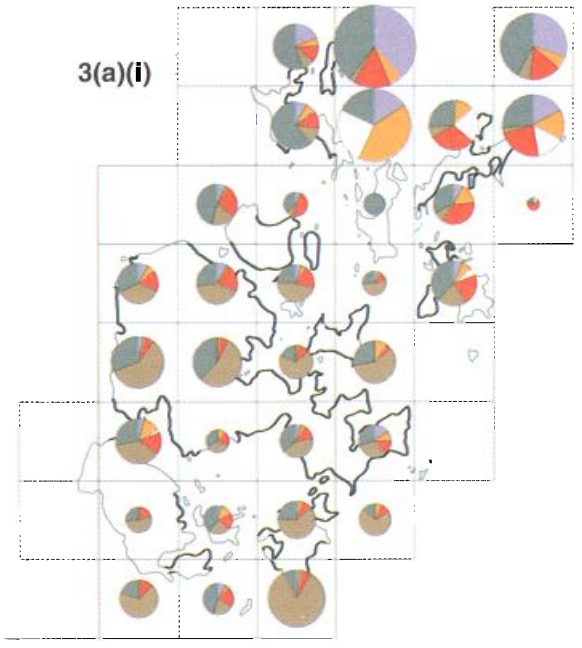
**i)** The proportion of the pie chart allocated to each species is based on the percentage of the total number of waders in that 10 km grid square comprised by that species. The area of each pie chart is scaled by the total number of waders/km such that a 10 km grid square with an average 250 waders/km would have a diameter equivalent to 10 km on the map.

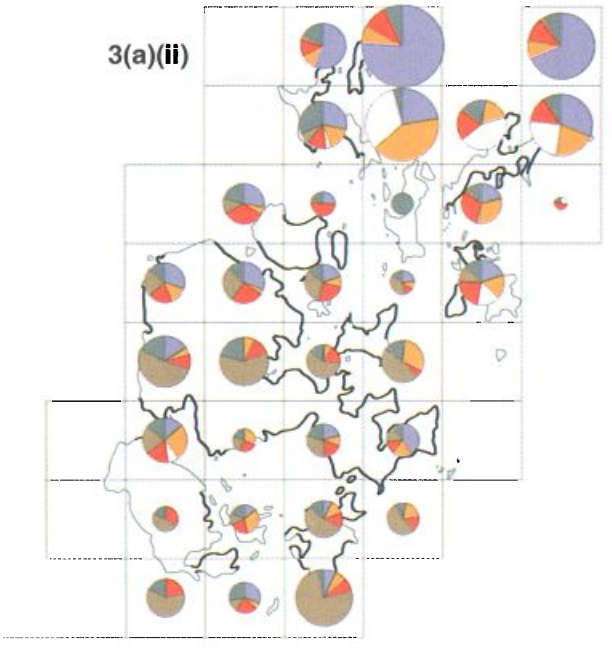
**ii)** The proportion of the pie chart allocated to each species is based on the percentage of the total STIU contributed by that species. Each pie chart is scaled such that a 10 km grid square with an average STIU of 0.4 TIUs/km would have a diameter equivalent to 10 km on the map. Because of the representation chosen for any given species the area between different pie charts can be compared directly.

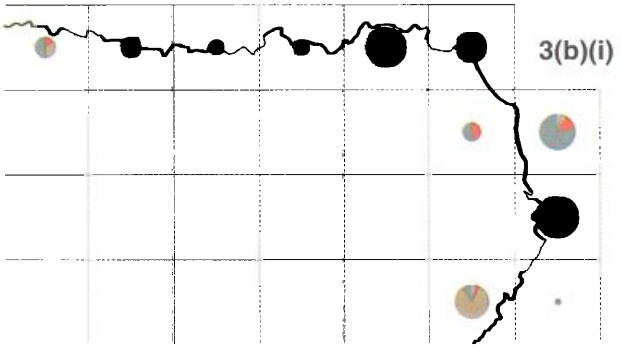
CU = Curlew *Numenius arquata*, PS = Purple Sandpiper *Calidris maritima*, RP= Ringed Plover *Charadrius hiaticula*, SS = Sanderling *Calidris alba*, TT = Turnstone *Arenaria interpres* and others = all other wader species or of numbers on (i).

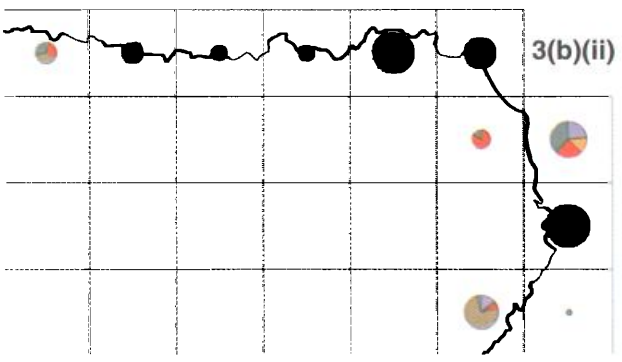
Coastline covered by the non-estuarine waterfowl survey is indicated in black, that not covered is indicated in grey.

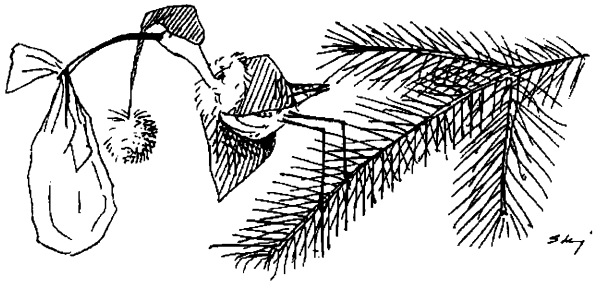




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