

An objective method of quantifying the avian interest of an area by means of a weighted population index

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When considering the overall importance of an area for waterbirds, it may be appropriate to consider an assemblage of some or all of the species present. Since a simple summation of the numbers of species or of individuals may result in smaller numbers of scarcer species being swamped by more abundant species, it follows that it could be beneficial to use a method of summing the numbers of different birds that weights the numbers of each species by its population size. The concept of the Threshold Importance Unit (TIU) is described and is demonstrated with reference to work undertaken as part of the UK's Wetland Bird Survey (WeBS), both within well-defined sites and along open coastlines.

INTRODUCTION

Extensive surveys of the avifauna of Britain and Ireland are undertaken annually and throughout the year. The data thus gathered are used to generate population estimates and to describe species distributions in either qualitative (presence/absence) or quantitative terms (numbers or densities) at local, regional and national scales. The data are also used to designate and protect important sites by internationally recognised, objective criteria. For example, Stroud *et al.* (2001) sets out the rationale for the selection of the UK Special Protection Area (SPA) network. Such information is usually presented on a species by species basis but when weighing the relative importance of different regions (e.g. counties), sites (e.g. estuaries) or areas within sites there are many instances where it may be more appropriate to consider an assemblage of some or all of the species present. Typically, the overall bird interest of an area may be described by summing the number of species or by summing the number of individuals. For example, a site supporting over 20,000 waterbirds can be considered for selection as an SPA. Also, maps of UK breeding bird species diversity are presented within Gibbons *et al.* (1993), which sum the number of species present within each 10 km square of the UK national grid.

Although such existing methods have proven value, in most cases, birds are summed in such a manner so as to consider individuals of different species to have equal value. However, in many instances it could be considered that the presence of smaller numbers of scarcer species could be as notable in conservation terms as larger numbers of more common and ubiquitous species. For example, the wader assemblage of many UK estuaries based solely upon summing the individuals of all species would be dominated numerically by Dunlin *Calidris alpina*.

THRESHOLD IMPORTANCE UNITS

It follows that it could be beneficial to use a method of amalgamating numbers of different birds that weights the num-

bers of each species by its population size. We have therefore developed the concept of the Threshold Importance Unit (TIU). In order to demonstrate how TIUs might be used, we draw upon work undertaken as part of the UK's Wetland Bird Survey (WeBS) where this concept has already been applied to describe the relative numbers and distributions of waterbirds both within well-defined sites and along open coastlines. The method described is not entirely new (e.g. a similar technique was used to rank individual lakes within the Cotswold Water Park complex in southern England by Pollitt (1995) based on a methodology suggested by Williams (1980)), but we hope to set out the concept and techniques in a way that will be of value to other workers.

The population estimates for many coastal waterbirds in the UK are considered to be fairly accurate because individuals congregate in readily identified locations with distinct and discernable boundaries, principally estuaries, nearly all of which are covered by WeBS. This ensures that a high proportion of each population is monitored. Having counts and moving averages for a location invites comparison to the overall national or international population. For example, an average of 7,200 Oystercatchers on the Firth of Forth in Scotland represents 2% of the estimated 360,000 wintering in the UK (Musgrove *et al.* 2001). Within the conservation arena, both in the UK and elsewhere, the arbitrary value of 1% of the national or international flyway population is widely used to recognise important sites (Ramsar Convention Bureau 1988). Thus, a site supporting more than 1% of a national or international population would be deemed to support nationally or internationally important numbers of that species respectively. This comparison is important, as it is the presence of numbers that equal or exceed the 1% threshold that is frequently used to determine whether a site qualifies for legal designation. We suggest that a number of birds of a species equal to the 1% threshold for that species could be usefully termed one Threshold Importance Unit (1 TIU). Consequently, the abundance of a species at a given location can be described, not only in terms of the numbers of individuals present, but also in terms of the numbers of TIUs, by

