A century of wader studies? Not quite, but it should be!

D.W. YALDEN

School of Biological Sciences, 3.239 Stopford Building, Victoria University of Manchester, M13 9PL, UK, e-mail: d.w.yalden@man.ac.uk

Yalden, D.W. 2003. A century of wader studies? Not quite, but it should be! *Wader Study Group Bull.* 100: 212–215.

Long-term studies of waders are essential for a proper understanding of their population dynamics and therefore their conservation. This is clearly an accepted principle so far as counts of wintering birds are concerned, but it needs to be applied equally to breeding populations. To validate and interpret the changes, detailed short-term studies may be required, but long-term, perhaps less intensive, counts are needed to document the impact of long-term changes in habitats and human factors. These lessons are illustrated by reference to studies in the English Peak District of Common Sandpipers *Actitis hypoleucos* and Eurasian Golden Plovers *Pluvialis apricaria.*

INTRODUCTION

Waders are relatively long-lived, slowly breeding animals compared to most others of similar size, and the severity of changes in population size therefore take several years to become evident. They also seem to show marked site fidelity, and the continued return of established pairs may mask a long-term decline. The Common Bird Census and Breeding Bird Survey of the British Trust for Ornithology cover rather few waders, because of their concentration on woodland and farmland, and their concentration in the better-populated parts of Britain (the Lapwing *Vanellus vanellus* is an obvious exception – Peach *et al.* 1994). The Waterway Bird Census offers a rather better coverage of waders, because several are associated with wetter riparian habitats, but the total population of pairs/territories of waders that they count is still small, and dedicated surveys might be more revealing. I summarise here some of the long-term lessons that emerge from two wader studies in the English Peak District, and suggest that they teach lessons that might not emerge from intensive studies.

GOLDEN PLOVERS

When I moved to Manchester from Surrey, I knew nothing of the fauna of the Peak District, but was rather surprised that no one else knew very much either, or, perhaps more accurately, little of what they knew had been written down. Surveys by 1-km square of a number of species, including Golden Plover and Dunlin *Calidris alpina,* followed (Yalden 1974). This highlighted the increasingly intrusive nature of the Pennine Way long-distance footpath along a ridge of prime breeding habitat, and led to an annual count in late May each year in the 6 km^2 of moorland neighbouring this path. The area counted was divided, naturally, into one section that was relatively quiet and another, the ridge along which the path ran, that seemed destined to become increasingly damaged. Golden Plovers are very secretive, like most waders during incubation, but are very vocal once their chicks have hatched, usually around 15 May, making a census in late May useful (though it needed intensive studies, weekly censuses over 2 breeding seasons, to validate this (Yalden & Yalden 1991)).

Counts during the first 14 years showed a high population (average 20.3 pairs, n = 6) in the early 1970s dropping to low populations during 1978–1985 (average 8.5 pairs, n = 6). 1980 and 1984 were exceptions because the moors were closed to the public for several weeks during exceptionally dry Mays to minimise the risk of serious moorland fires. In those years, the number of pairs increased to 24 and 17 respectively (Fig. 1). The long-term decline in Golden Plover numbers, and their recovery in the two quieter years, strongly implicated recreational disturbance in the decline (Yalden 1986). However, the sudden and temporary recoveries suggested a behavioural (rather than demographic) response to the tranquillity of the two dry years, because the slow rate of reproduction could not produce the trebling of the population from 1979 to 1980 (8 to 24 pairs) that was recorded. It led also to a 3-year contract (1986–88) from the Nature Conservancy Council to investigate this further. The sensitivity of Golden Plovers to recreational disturbance was amply confirmed and the level of disturbance was well-documented (Yalden & Yalden 1989, 1990). However, the population did not decline, as we expected, but increased. An attempt to investigate this anomaly at the time was inconclusive. Meantime, the damage to the vegetation led to the laying of 4 km of stone path along the moor to channel the disturbance onto a narrow line, and May counts continued. A decade later (1995–1997) another detailed study gave an opportunity to re-examine both the new levels of disturbance and the impacts on the population. After a series of very mild winters, the population was as high as ever, and the analysis of the changes over 24 years in combination with weather data from separate stations to represent the breeding and wintering grounds showed that a combination of density-dependence and winter weather provided the best explanation for year to year changes in numbers (Yalden & Pearce-Higgins 1997). Severe winters in 1981 and 1986 evidently exaggerated the effects of the reduced disturbance in 1980 and 1984. Changes in distribution within the study area, and between this moor and others nearby, do seem to depend on features of the habitat, both the vegetation and the levels of disturbance. The surfacing of the Pennine Way has channelled most walkers, and their dogs, onto the surfaced path, making the increased level of recreational disturbance more predictable and avoid-

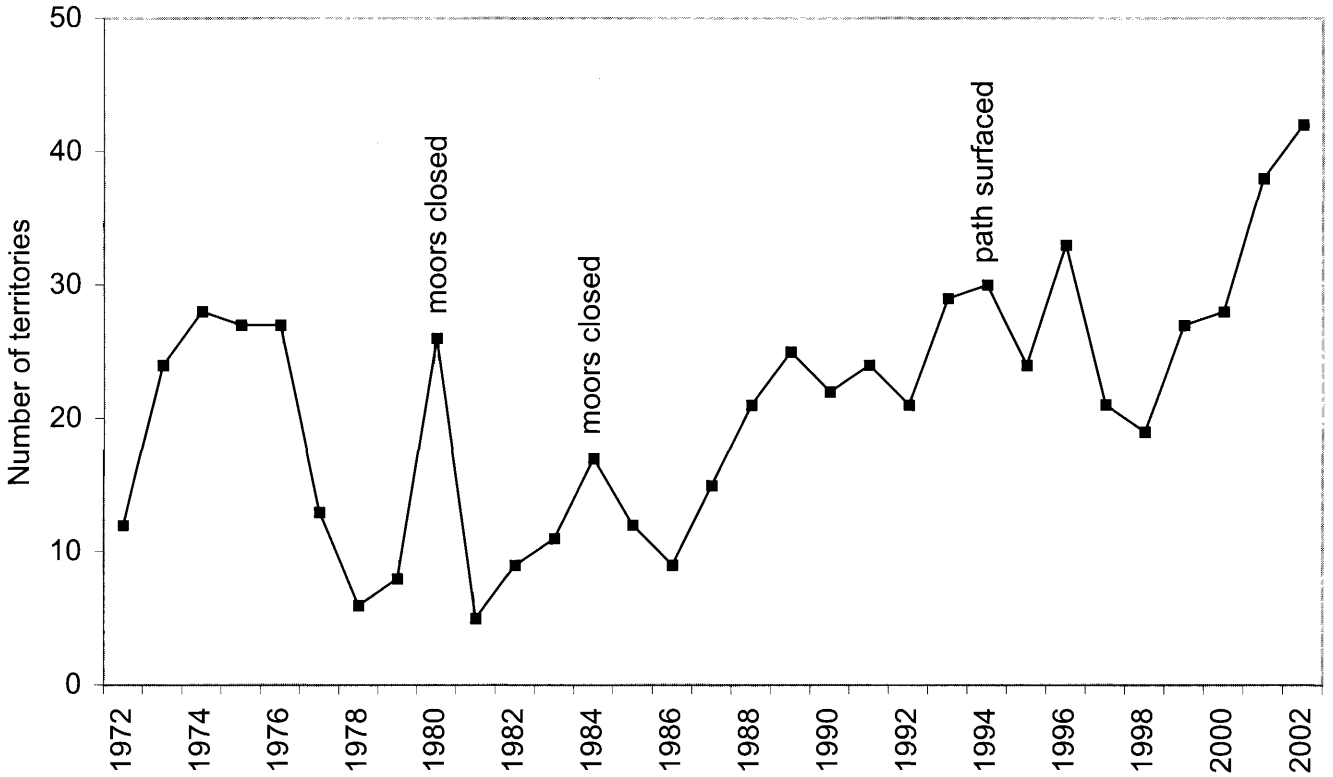

Fig. 1. Number of territories of Golden Plovers recorded in a late May census each year from 1972 to 2002 on the Snake Summit – Mill Hill study area, Peak District, Derbyshire, U.K.

able for the birds (Pearce-Higgins & Yalden 1997). They are now using areas nearer the path that they had previously forsaken (pers. obs.).

COMMON SANDPIPERS

Studies of the local Common Sandpiper population also began with a distribution survey, allied with a colour-ringing study of the best riverine population that the distribution survey revealed (Holland *et al.* 1982a, 1982b). Severe snowfalls in late April 1981 reduced the population by a third, and it took 8 years to recover to near its previous level (Fig. 2). In this case, colour-ringing of the population has continued so that by the end of each breeding season, 70–100% of the breeding adults are ringed. Their subsequent return in later years, their territory and mates, and their success in hatching a clutch and rearing young have been recorded, though the number of young often remains uncertain (Holland & Yalden 1994). An analysis of the first 13 years of study to 1989 showed clearly that survival was correlated with late April minimum temperatures (Holland & Yalden 1991), and also demonstrated the limitations placed by low reproductive output on the rate of population recovery. Another severe late April snowstorm in 1989 produced another slump in population, but further decade of subsequent data did not show a comparable recovery; rather, the population slumped further before increasing to no more than the (low) 1989 level. Adult survival is as good as ever, but no longer correlates with late April minimum temperatures. The now fewer pairs seem to breed as well as ever, but recruits have always come mostly from elsewhere, and the median natal dispersal range is 3.3 km, enough to take most of our potential recruits outside our study area (Holland & Yalden 2002). We remain uncertain whether poorer reproductive output has affected these sources of recruits, or if changes in the wintering grounds have resulted in poorer survival of first year birds.

DISCUSSION

The importance of long-term studies of breeding waders was highlighted by Thompson & Thompson (1991), who reviewed the extant coverage of all the species of the western Palaearctic. They noted that for only 9 species had population dynamics been studied for more than 5 years, and lifetime reproductive success had been studied for none. Their own study of Greenshanks *Tringa nebularia* had then extended over 27 years, and they noted several constraints that equally afflict us – notably, uncertainty of the source of recruits, and the difficulty of ascertaining fledging success rates for such cryptic nidifugous young with any certainty. The general lessons they suggested for wader studies remain as valid as then, particularly in assessing correctly the long-term population changes and the effects of sudden as well as long-term changes. Their specific suggestions that 5 species in particular merit long-term comparative studies has been partially followed; studies of Eurasian Dotterel *Charadrius morinellus* (Whitfield 2002), Lapwing (Thompson *et al.* 1994, Peach *et al.* 1994) and Pied Avocet *Recurvirostra avocetta* (Hill 1988) in Britain have been published, and our local Common Sandpiper study has been shadowed by a similar study in Scotland (Dougall *et al.* 1999) – though we could wish for something similar from its Scandinavian heartland). The difficulties of studying breeding Eurasian Curlews *Numenius arquata* long-term seem to have defeated everyone.

The lessons highlighted by these Peak District studies are numerous and at different levels. Short-term studies (e.g. 3--year

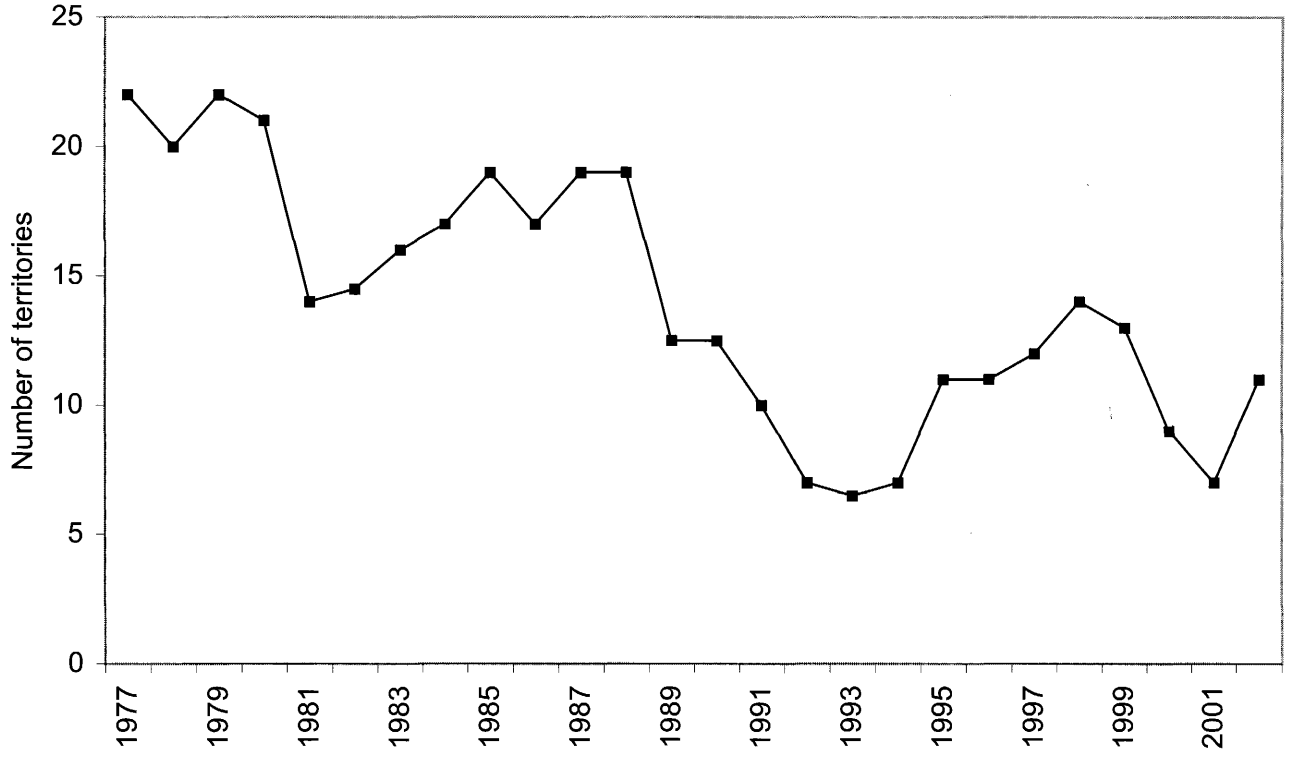

Fig. 2. Number of territories of Common Sandpipers in the River Ashop study area, Peak District, Derbyshire, U.K., each year from 1977 to 2002.

research contracts or Ph.D. studentships) could not hope to encounter the range of weather conditions that these birds have encountered over the 30 and 25 years, respectively, that they have so far lasted. Major changes, like the resurfacing of the Pennine Way, are not changes of the sort that could be readily mimicked in such a study, and in any case it takes several years for a population, as well as populations of its food supply, to react to such changes. Thus the conventional experimental approach (one year to document the initial condition, a year to wreak some changes, a year to determine the effects of the experimental change) is simply not feasible.

It is often remarked facetiously that it is important to know when to stop such longer-term studies. It would have been sensible to stop the Common Sandpiper study in 1989, when the population had gone through and recovered from a drastic natural perturbation, and when, indeed, the last of the original 1977 cohort died. That would have left in place our certainty that late April weather was the major determinant of survival rates and therefore of population size. It would have left us certain of the high degree of philopatry in this, as in most other waders. However, we saw a number of well established and successful breeding adults desert the population during 1992–1995. It seems likely that, in the face of insufficient recruits or mates, Common Sandpipers' normally strong philopatric behaviour may weaken and, having first checked their old territories (noted in several cases), they move elsewhere. If the Golden Plover study had stopped in 1986, the notion that recreational disturbance was the most significant determinant of their population size would have remained. It does still appear to be a factor in determining local distribution, but it is evident that, with a large enough moorland area, they can find ways of accommodating to disturbance.

The greatest scientific value of such long-term but less intensive studies is that they provide a crucial base for more intensive investigations when the opportunity or financial support allow them, and may well themselves be invaluable in suggesting respectable hypotheses to test. The Golden Plover counts represent one day's field work each season, about 9 hours of moorland walking. The Common Sandpiper studies have now developed into a semi-professional study involving 3 full days a week (weekends and Wednesdays) during the breeding season, but they too were essentially weekend part-time studies during the first decade. This sort of long-term commitment is difficult to support by full-time research grants, but ideally suited to part-time, weekend, or amateur study. While not necessarily as revealing as, and certainly not superior to, the usually shorter full time research project, the field of wader study is broad enough to encompass both, to their mutual benefit. It is a field well provided with other examples. The comparative documentation of the population dynamics of Oystercatchers *Haematopus ostralegus* (Goss-Custard *et al.* 1995) provides an excellent example of the marriage of full time and part time population studies, the latter providing the breadth of coverage across its range that a full time research study would struggle to provide. The Wader Study Group and its *Bulletin* have performed brilliantly in bringing these together. Here's to the next century!

ACKNOWLEDGEMENTS

I am grateful to Dr P.K. Holland, Dr J.W. Pearce-Higgins and Mrs P.E. Yalden for their collaboration and support and I thank Dr Jeremy Greenwood for commenting on an earlier draft of this article.

REFERENCES

Dougall, T.W., Mee, A. & Yalden, D.W. 1999. Recent fluctuations in a Common Sandpiper breeding population. *Scott. Birds* 20: 44–45.

Goss-Custard, J.D., Clarke, R.T., Briggs, K.B. *et* 15 *al.* 1995. Population consequences of winter habitat loss in a migratory shorebird. I. Estimating model parameters. *J. Appl. Ecol.* 32: 320–336.

Hill, D. 1988. Population dynamics of the Avocet *Recurvirostra avosetta* breeding in Britain. *J. Anim. Ecol.* 57: 638–669.

Holland, P.K. Robson, J.E. & Yalden, D.W. 1882 a. The breeding biology of the Common Sandpiper *Actitis hypoleucos* in the Peak District. *Bird Study* 29: 99–110.

Holland, P.K. Robson, J.E. & Yalden, D.W. 1882 b. The status and distribution of the Common Sandpiper *Actitis hypoleucos* in the Peak District. *Naturalist* 107: 77–86.

Holland, P.K. & Yalden, D.W. 1991. Population dynamics of Common Sandpipers *Actitis hypoleucos* breeding along an upland river system. *Bird Study* 38: 151–159.

Holland, P.K. & Yalden, D.W. 1994. An estimate of lifetime reproductive success for the Common Sandpiper *Actitis hypoleucos*. *Bird Study* 41: 110–119.

Holland, P.K. & Yalden, D.W. 2002. Population dynamics of Common Sandpipers *Actitis hypoleucos* in the Peak District of Derbyshire – a different decade. *Bird Study* 49: 131–138.

Peach, W.J., Thompson, P.S. & Coulson, J.C. 1994. Annual and long-term variation in the survival rates of British lapwings *Vanellus vanellus*. *J. Anim. Ecol.* 63: 60–70.

Pearce-Higgins, J.W. & Yalden, D.W. 1997. The effect of resurfacing the Pennine Way on recreational use of blanket bog in the Peak District Natiional Park, England. *Biol. Cons.* 82: 337–343.

Thompson, P.S., Baines, D., Coulson, J.C. & Longrigg, G. 1994. Age at first breeding, philopatry and site-fidelity in the Lapwing *Vanellus vanellus*. *Ibis* 136 : 474–484.

Thompson, P.S. & Thompson, D.B.A. 1991. Greenshanks *Tringa nebularia* and long-term studies of breeding waders. *Ibis* 133 *suppl* 1: 99–112.

Whitefield, D.P. 2002. Studies of breeding Dotterel *Charadrius morinellus* in Britain in 1999. *Bird Study* 49: 237–249.

Yalden, D.W. 1974. The status of the Golden Plover (*Pluvialis apricaria*) and Dunlin (*Calidris alpina*) in the Peak District. *Naturalist* 930: 81–91.

Yalden, D.W. 1986. The status of Golden Plovers in the Peak Park, England, in relation to access and recreational disturbance. *Wader Study Group Bull.* 46: 34–35.

Yalden, D.W. & Pearce-Higgins, J.W. 1997. Density-dependence and winter weather as factors affecting the size of a population of Golden Plovers *Pluvialis apricaria*. *Bird Study* 44: 227–234.

Yalden, D.W. & Yalden, P.E. 1991. Efficiency of censusing Golden Plovers. *Wader Study Group Bull.* 62: 32–36.

Yalden, P.E. & Yalden, D.W. 1990. Recreational disturbance of breeding Golden Plovers *Pluvialis apricaria*. *Biol. Cons.* 51: 243–262.