The status of Marsh and Willow Tits in the UK

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ABSTRACT The population trends of Marsh *Parus palustris* and Willow Tits *P. montanus* in the UK are examined using data from ringing totals, from 1956 to 2001 inclusive. These data may represent the best long-term information available on trends in numbers. When corrected for differences in ringing effort, the figures show that Marsh Tits declined sharply after the mid 1960s, although the population now appears to be stable. Willow Tits have declined steadily and fairly constantly since about 1970, and this trend has not levelled out. The reasons for these declines are not understood and indeed may differ somewhat between the two species. Competition with other species of tits has been suggested as a possible cause, but conclusive evidence is lacking.

Marsh *Parus palustris* and Willow Tits *P. montanus* have been in the news in recent years because their numbers are thought to be in decline. In the latest list of Birds of Conservation Concern in the UK (Gregory *et al.* 2002) both species are listed in the Red category (indicating declines of 50% or more over 25 years, a statistic based on data from the BTO’s Common Birds Census). According to Gregory *et al.*, the Marsh Tit has declined by 50% and the Willow Tit possibly (some caution is necessary owing to small sample sizes) by as much as 80%. The decreases in breeding numbers are greater than the changes in range. The *New Atlas of Breeding Birds* (Gibbons *et al.* 1993) shows that Marsh Tits were recorded in 1,366 10-km squares in the 1968-72 census, but in only 1,133 in 1988-91, a decrease of 233 squares (17%). The comparable figures for Willow Tit are 1,220 and 1,100, a decrease of 120 squares (10%).

Both species seem to have always occurred at
medium to fairly low densities in most woodlands they inhabit. There have been few detailed studies in the UK to ascertain their normal breeding densities (Perrins 1979), but the Marsh Tit maintains territories which vary in size from about 1.5 ha in the most favourable habitats to 6 ha or more (Cramp & Perrins 1993). More recently, Shelley Hinsley (in litt.) has recorded average territory sizes of 5-8 ha and has shown that although Marsh Tits may occur in woods as small as 1.5-2.5 ha in summer, they seldom persist there through the winter (Hinsley et al. 1995; Hinsley et al. 1996). With even sparser evidence, the Willow Tit normally seems to require considerably larger territories than the Marsh Tit. Foster & Godfrey (1950) recorded territory sizes of 4.5-9.0 ha in southern England, but this was based on very small samples. Elsewhere in Europe, Willow Tit territories may be as large as 15 ha (Cramp & Perrins 1993). Such low densities, together with the fact that these large territories are not always strongly defended, make the birds difficult to census accurately.

Adults of both species are highly faithful to their territories, remaining in them even in hard weather when many individuals of the two commonest species of tits, Blue Tit *P. caerules* and Great Tit *P. major* wander widely and visit garden bird-feeders in greater numbers than usual. Indeed, it has been said that one can fairly safely assume that if a Marsh Tit is missing from its territory it is dead. One reason for this is that both Marsh and Willow Tits store food items and so if a bird leaves its territory, it foregoes access to this important food source.

**Methods**

The aim of this paper is to examine the population trends of Marsh and Willow Tits using data from ringing totals. These go back further than the Common Birds Census (CBC) data (which begin in 1962) and may provide the best quantitative information that we have on trends in numbers. The numbers of birds ringed in any year will reflect, in combination, a) the number of birds available to be caught, b) the behaviour of the birds (which may vary with weather, food supply, population and density), and c) ringing effort.

Ringing totals have not been widely used as a measure of population change (though see Ginn 1969 for some examples), in part at least because there are many potential biases in the data (Ginn 1969). Nonetheless, confining the comparisons to the totals of full-grown birds of five species of tits avoids many of these. Of those birds which are ringed, the great majority of full-grown individuals (i.e excluding nestlings) of these five species are caught by ringers as by-products of...
general ringing: few people go out to catch one or other of these species specifically. Almost all Marsh and Willow Tits are caught in mistnets under circumstances in which the three commoner species – Coal P. ater, Blue and Great – are also caught. It should be noted, however, that the reverse is not true: many of the last three species are captured in gardens, where the occurrence of Marsh Tits and, particularly, Willow Tits is low. By not using totals of nestlings, two potential biases are avoided: that there has been a proliferation of nestboxes during the period concerned (young birds are easier to extract from nestboxes than from natural nest-sites, so proportionately more young will have been ringed); and that Marsh Tits infrequently, and Willow Tits very rarely, use nestboxes (hence totals would favour Blue and Great Tits, which readily use nestboxes).

Here, I present the numbers of full-grown individuals of these two species ringed each year from 1956 to 2001 inclusive. These data cannot on their own be used as a measure of abundance, since the overall number of birds ringed each year increased markedly during this period, especially since the late 1950s with the advent of mistnets. I have assumed that the rising numbers of Coal, Blue and Great Tits ringed are indicative of the increase in general ringing effort. I have attempted to allow for this increase by plotting the numbers of Marsh and Willow Tits ringed as a proportion of the numbers of these three common species ringed. The data were taken from the BTO’s annual reports on Bird Ringing in Britain & Ireland (e.g. Clark et al. 2002).
Results

Figs 1a & 1b show the totals of full-grown Marsh and Willow Tits ringed in the UK from 1956 to 2001 inclusive. The patterns are somewhat different. The numbers of Marsh Tits ringed increased until about the mid to late 1960s, but have since remained fairly stable. In contrast, those of Willow Tits increased until the early 1980s, but have been declining steadily since then.

As mentioned, neither of these graphs allow for the fact that there has been a steady increase in overall ringing effort during this time. Figs 1c-1e show the numbers of full-grown Coal, Blue and Great Tits ringed. Each shows a fairly steady increase throughout the whole of the period under review and this, presumably, is largely indicative of the increase in ringing effort. The three species do not show consistent increases compared with each other, however. The main points to note are:

i) Coal Tit has become commoner in relation to both Blue and Great Tits. This increase was very marked from about 1960 until the early 1970s and then again during the 1990s; in between, the Coal Tit/Blue Tit ratio (fig. 2a) did not change much, while the Coal Tit/Great Tit ratio (fig. 2b) showed a marked decline, especially between 1978 and 1979 when it dropped by 40%.

ii) Blue Tit has become somewhat scarcer in relation to Great Tit (fig. 3), though with wide year-to-year variations in the ratio.

In an attempt to ‘correct’ the numbers of Marsh and Willow Tits ringed for variation in ringing effort, figs 4a & 4b show the numbers of these two species divided by the sum of Coal, Blue and Great Tits ringed in the same year. These graphs show that the patterns of decline of Marsh and Willow Tits differ somewhat:

Marsh Tits have declined sharply since the mid 1960s: the current level is about 25% of that in early years. This overall decline seems to have occurred in three distinct phases, as follows.

i) 1964-1972: a very sharp and almost linear decline, during which the relative numbers ringed dropped by 50%.

ii) 1973-1984: a slower decline of 25-30%. The decline during 1964-1984 is highly significant (T = 9.27, p<0.001), but that from 1973 onwards is not significant.

iii) 1985 onwards: no evidence of a decline. Indeed, there is a significant increase over this period (T = -2.57, p=0.18), but this is only because of the elevated figures in 2000 and 2001.

Willow Tits continued to increase until 1970 when, quite abruptly, they went into a steady and fairly constant decline which has brought them down to about 25% of their 1970 level. In contrast to Marsh Tit, there has been no sign of the decrease levelling off. The decline from 1970 is highly significant (T = 17.67, p<0.001).

Both species show a steady increase in relative numbers ringed in the earlier years, up to about 1965 in the Marsh Tit and 1970 in the Willow Tit. This increase, relative to the other three species, may have been because this was the period during which mistnets were introduced and became widely used, leading to the trapping of many more birds on farmland and in woodland as opposed to in gardens. One might expect, therefore, that the proportion of Marsh and Willow Tits ringed would have increased during this period.

In an attempt to check this, I used the ringing data for another woodland species which was not normally trapped before the advent of mistnets, the Eurasian Treecreeper *Certhia familiaris*. As expected, the numbers of this species that were ringed rose rapidly during the period 1956-1966 (fig. 5). As a proportion of the Coal+Blue+Great Tits ringed, it increased from 0.45% to 2.2% during these 11 years, with each year's
proportion being higher than that of the previous year. Unlike the case with Marsh and Willow Tits, however, the ratio of treecreepers to the three common tits shows no significant change since 1966. Nonetheless, the treecreeper data support the suggestion that the early rise in the proportion of Marsh and Willow Tits ringed, compared with the three common tits, may indeed have been due to the advent of mistnets.

**Discussion**

The rates of the decline of Marsh and Willow Tits shown here depend on the validity of making the correction for ringing effort. The method of correction used here cannot be precisely true, since the increases in the three common species used as a measure of ringing effort have not been exactly the same, and presumably the factors affecting their population sizes differ. Nevertheless, since the five tit species are nowadays caught largely in mistnets set in the same habitats, much of this netting must have the potential to catch these five species in roughly the proportions that they are present. Any biases in ‘catchability’ among the species should have remained constant. There may be biases in the behaviour of ringers, for example not ringing Blue Tits because of the increasing cost of rings from the mid 1990s onwards. Such biases would be hard to quantify, but seem likely to reduce the numbers of the common birds ringed in favour of the rarer ones; in other words, if there are such biases, then the decline in Marsh and Willow Tits will have been even more marked than is shown here.

It would have been good to have been able to use some measure of nesting, but the use of nestling totals was rejected on the grounds that the different species show markedly different tendencies to use nestboxes, where most nestlings are ringed. Blue and Great Tits show the highest tendencies to use nestboxes, followed by Coal Tits. Both Blue and Coal Tits, however,
them. Marsh Tits and, to an even greater extent, Willow Tits largely avoid using nestboxes, preferring natural sites; the latter normally excavates a new hole for itself each year in a rotten stump.

The possibility that most of the increases in the totals of the three commoner species have come about due to large increases in the populations of these species can be ruled out. Long-term studies (e.g. Perrins 1998), together with CBC results during 1974-1999 (Thewlis et al. 2001) and the BTO Garden Bird Feeding Survey data during 1970-2001 (Glue 2002) have shown that numbers of these three species have remained relatively stable over time, certainly when compared with the five-fold or greater increases in the totals ringed. Consequently, the ringing totals provide strong evidence for declines in both Marsh and Willow Tits, supporting the general belief that these two species have decreased markedly in the last 30 years or so. Indeed, the figures suggest that the decline of the Marsh Tit may have been much greater than the 50% reported by Gregory et al. (2002). That report is based on CBC data from 1974 onwards, whereas the data in fig. 4a indicate that the Marsh Tit had already undergone a marked decline before 1974. Siriwardena (2001) also noted that CBC records show the species to have been in decline since the mid 1960s.

The declines shown here, and those reported in the other studies cited above, raise the question of why this has happened. Siriwardena (2001 and in press) notes that the Marsh Tit has declined in all three habitat types covered by the CBC: wet habitats, farmland and woodland, while the Willow Tit

![Fig. 4a. Marsh Tit/Coal+Blue+Great Tit](image)

![Fig. 4b. Willow Tit/Coal+Blue+Great Tit](image)

![Fig. 5. Treecreeper/Coal+Blue+Great Tit](image)

being much smaller than Great Tits, may fail to find a suitable nestbox where boxes are at low densities or when breeding numbers are high, since Great Tits will normally out-compete

Figs. 4a-4b. The numbers of full-grown Marsh Parus palustris (4a) and Willow Tits Parus montanus (4b) ringed in the UK during 1956-2001, as a proportion of the total numbers of full-grown Coal Parus ater, Blue Parus caeruleus and Great Tits Parus major ringed in the same years.

Fig. 5. The numbers of full-grown Eurasian Treecreepers Certhia familiaris ringed in the UK during 1956-2001, as a proportion of the total numbers of full-grown Coal Parus ater, Blue Parus caeruleus and Great Tits Parus major ringed in the same years.
seems to have remained stable in its preferred wet habitats but declined elsewhere (Siriwardena in prep.). Hence the reasons for the declines of the two species may not be exactly the same. This would be in keeping with the results shown here in fig. 4, where the declines of the two species are not synchronised in time. Fig. 4a shows that the decline of the Marsh Tit started shortly after the CBC began, and that it has declined by some 60-70% since then. The rate of decline has slowed after the mid 1970s and the ratio to the three common species has either been constant or has even possibly increased slightly since the mid 1980s. Compared with fig. 4b, the CBC data for the Willow Tit are remarkably similar: both sets of figures show an increase until the early 1970s, since when they have been steadily declining.

Siriwardena (2001, in press, in prep.) considered the reasons for these declines. One is the possibility that the fall in numbers of Marsh and Willow Tits has been associated with increases of the commoner tits. Both species tend to be out-competed for nest-sites by the more dominant Blue and Great Tits. In the case of Willow Tits, which excavate their own hole each spring, this could be particularly serious since they take some time to excavate their cavity and will, at best, be late if they have to start again. On at least some occasions, they may lose a series of sites in succession and end up failing to breed; the more aggressive Blue Tit seems normally to be the culprit (Maxwell 2001). Siriwardena (2001) reported that he was unable to find convincing evidence to support the hypothesis that the decreases in numbers of Marsh and Willow Tits were associated with increases in the other species of tits. Indeed, from the CBC index, Blue Tits seem to have increased only slightly (9%) during the period 1974-1999 (Thewlis et al. 2001). Great Tits increased by some 29% in the same period, however, and they are dominant to Blue Tits in competition for nest-sites. So, even if there was no change in Blue Tit numbers, but Great Tits increased, the pressure on Willow Tit holes from Blue Tits might increase as more of the latter became excluded from other nesting sites by Great Tits. Furthermore, looking at CBC results over a slightly longer time period, from 1968 to 1999, Blue and Great Tits show a somewhat greater increase – by 27% and 58% respectively. When these trends are plotted out, they suggest that the steepest rise in numbers in these two species was in the late 1960s/early 1970s – at the time when the Marsh Tit decline was apparently most severe. If these trends are genuine, however, it does suggest that the steepest decline...
in the Marsh Tit, as shown in fig. 4a, may not have been quite so marked as the ringing data imply.

Clark et al. (2002) reported that an analysis of BTO Nest Record Cards showed no evidence for any decline in Willow Tit productivity since 1965 and a slight increase in Marsh Tit productivity since 1980. These measures are on a per nest basis, however, so they would not show a decline in breeding productivity per pair if a significant number of birds failed to breed at all, because birds which fail to lay eggs are not recorded within the Nest Record Scheme. Siriwardena (2001) showed that Marsh Tit survival rates had declined since the 1960s. It remains possible that nest predators have also reduced the proportion of successful nests. One nest predator, the Great Spotted Woodpecker *Dendrocopos major*, is a potential threat to these two species as it is easily able to open their nests (Wesolowski 2002). This species showed a marked increase in the mid 1970s, associated, it was thought, with the large increase in elms dying from Dutch Elm Disease; if this is the case, it is not clear why their numbers have remained stable since then, although the quantity of dead trees has presumably diminished greatly.

Siriwardena (2001) suggested that habitat deterioration may be at the root of the problem. One obvious major change in southern Britain is the very large increase in deer numbers. These are having a serious effect on the woodland understorey. Compared with the other tits, Marsh and Willow are birds which tend to live in these lower parts of the woods and hence may have been most affected by the increase in deer. Studies of the species in parts of Wales, where as yet the deer numbers are not so high, might be rewarding.

References


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**283.** Willow Tits *Parus montanus* may have suffered in some areas if nest holes are taken over by the more aggressive Blue Tit *P. caeruleus*, since the time needed to prepare a new site may have a significant impact on breeding success within a particular season.

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