

Rook Survey 2009 Preliminary Results and Analysis

Summary

A comparison of the Cheshire and Wirral breeding distribution of Rook from the 1978-1984 breeding atlas and the 2004-2006 breeding distribution from the more recent county atlas indicated a contraction in range: Rooks were found in 22% less tetrads in the later atlas survey. In response, a count of the Cheshire & Wirral Rook population was undertaken in the spring of 2009 to investigate this observation.

2009 Survey: Key Findings

- Population of 7,747 to 8,340 pairs
- Down 3.5 – 10% on 1975 survey
- Rookery size reduced rather than numbers of rookeries or distribution
- Reduction not significant compared to normal year-on-year fluctuations
- Significant movement in rookery sites since 2004 - 06 atlas survey

The 2009 count indicates a population of 7,747 to 8,340 breeding pairs: the first figure is the number of nests counted and the second figure is an estimate that takes account of some uncertainties associated with the survey method. These values are between about 3.5 and 10% below the count from the last county Rook survey in 1975. The difference is associated primarily with a reduction in the average size of Rookeries rather than a decline in the number of Rookeries or the number of occupied tetrads. This modest reduction is not significant compared with the fluctuations observed from year to year in stable Rook populations.

The apparent contraction in range between the two atlas surveys seems to arise, in large part at least, from the greater mobility of Rook colonies between nesting sites than had previously been appreciated. Rooks forage over extended distances of 2 to 3km and relocation of nest sites across tetrad boundaries does not represent a major change when considered on that scale. The higher number of tetrads occupied in the 7-year survey period of the 1978-84 atlas could be accounted for by rook colonies moving between tetrads during the survey period and establishing more rookeries in new tetrads than observed during the shorter 3-year survey period of the recent atlas. The number of occupied tetrads would therefore be inflated above that occupied in any single year. No significant difference has been found between the number of tetrads occupied in the previous census of Rookeries in Cheshire and Wirral in 1975 and the number occupied in the 2009 survey.

In summary, within the limits of the accuracy of the survey methods employed, there is no evidence of a significant decline in the Cheshire and Wirral rook population or of a significant contraction of its range and distribution from 1975 to 2009.

Survey Method

The survey objective was to estimate the county rook population by counting all “apparently occupied nests” in Cheshire & Wirral. The primary focus was on tetrads identified as containing rookeries in survey work for the recent atlas in the 2004 to 2006 breeding seasons. These tetrads were allocated to surveyors and 93.5% coverage was achieved. By focusing on previously identified rookery sites, it was hoped that this approach would give a reasonable estimate of the population for a limited amount of effort. It was recognised that rookeries were not necessarily static and that some new ones might have been established since the atlas survey. Surveyors were therefore asked to look out for and count rookeries in other tetrads to cover this possibility.

Surveyors were asked to make at least one count, preferably around mid-April. However, counts any time between mid-March and the end of April were considered valid. In accordance with previous practice, groups of nests located more than 100m from another group were counted as separate rookeries and identified by their six-figure grid reference. In order to investigate the timing of nest building, an optional request was made for surveyors to make a preliminary count, preferably some time in March. Other additional and optional information requested from surveyors was the tree species used and the nature of the immediate surrounding environment.

Occupied Nest Count, Rookery Size and Population Estimate

In total, 7,747 apparently occupied nests were counted in Cheshire and Wirral during the 2009 survey. These nests were found in 344 rookeries in 217 tetrads. There were an average of 22.5 nests per rookery and an average of 35.7 nests per tetrad.

Of the 217 tetrads where probable or confirmed breeding was identified in the 2004-2006 breeding seasons, 203 are known to have been visited in this survey, leaving 14 tetrads for which there is no data. Based on the wider findings of the survey, it is estimated [1] that these tetrads are likely to have contained about 428 nests. Making allowances for nests in these tetrads, the Cheshire & Wirral Rook population is estimated to be around 8,175 breeding pairs. It has previously been estimated [2] that a rook population may contain around 10% non-breeding birds which would suggest the total population may be 17-18 thousand individuals.

Comparison with Findings from Previous Studies

Comparisons with previous studies have been made on an equivalent geographical areas basis, using the area defined by the tetrads adopted in both the previous Cheshire & Wirral atlases. The figure of 7,747 apparently occupied nests given above includes 5 rookeries in tetrads on the county border containing a small part of the county only and which are not included in the atlas surveys but it excludes rookeries in atlas tetrads which are just outside the county boundary. Taking account of these minor differences, a count of 7,642 apparently occupied nests in 341 rookeries with an average 22.4 nests per rookery is determined for the geographical area defined by the atlas tetrads. Making the same allowance outlined earlier [1] for the 14 tetrads not surveyed in 2009, an estimate of 8,070 apparently occupied nests in 360 rookeries is determined for this area. Making a correction for the estimated 2% undercounting due to early visits, the population is estimated to be 8,231. The 1975 survey [3] found a total of 8,646 apparently occupied nests in 340 rookeries with an average size of 25.35 nests per rookery. The 2009 results therefore indicate a total population that is less than 7% lower than that in 1975 and an average rookery size that is less than 12% lower.

1975 & 2009 Population Comparison for area defined by Atlas tetrads		
Year	1975	2009
Total breeding pairs	8,646	8,231
Number of Rookeries	340	360
Nests per Rookery	25.4	22.9

When compared with the fluctuations that have been reported [2,4] for Rook populations in other studies, a 7% reduction is not considered to be significant. Analysis of nest counts from a study of Rooks in Gloucestershire from 1933 to 1939 [2] shows that, on average, there was typically more than an 8% difference in the breeding population between any two consecutive years, with an increase in some years and a decrease in others. A similar picture emerges from analysis of counts from a study [4] of Rooks in Wirral and an adjacent part of Cheshire from 1944 to 1968 which indicates fluctuations of 10% from year to year are fairly typical during periods of general stability in the population. On that basis, and taking account of the uncertainties in the survey data, it is concluded that the 2009 results provide no evidence of a significant population decline since 1975.

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The number of Rookeries has evidently not declined since 1975 and the apparent slight increase found in this survey is not expected to be significant. The definition of separate Rookeries, on the basis of a minimum 100m separation of groups of nests, is somewhat arbitrary. Groups of birds that behave as a single colony during the breeding season, for example congregating to feed and displaying together, have been observed [5] to form several separate nesting groups at sites up to about 500m apart. The slight increase in rookeries in this survey may reflect a slight difference in the number of nesting groups within colonies rather than an increase in the number of colonies. Whether fluctuations in populations of colonial species are associated with changes in the numbers of colonies or changes in the colony size is an interesting question. For the Rook, it seems [5] that change in colony size may be the more significant factor and comparison of the findings of the 1975 and 2009 Cheshire & Wirral surveys is consistent with that suggestion.

Tetrad Distribution Comparisons

The primary stimulus for the 2009 survey was the apparent 22% contraction, on the basis of occupied tetrads, in 2004-2006 breeding distribution [6], compared with that found in the period 1978-1984 [7]. Distributions from the atlas surveys have been compared with those found in the 1975 and 2009 surveys.

Survey returns were received from 203 out of the 217 tetrads where probable or confirmed breeding was identified in the 2004-2006 breeding season atlas survey [8]. No rooks were found in 31 of these 203 tetrads, indicating a loss rate of about 15% between the atlas survey and the 2009 survey. However, rookeries were found in 45 tetrads that were not mapped in the recent atlas. It appears that a significant proportion of these are new rookeries but some occupied tetrads may have been overlooked in the atlas survey [9]. Whatever, it is evident that there has been some relocation of rookery sites at the tetrad level over the relatively short timescale between the 2004-2006 breeding seasons and 2009. Breeding was confirmed in 217 tetrads in 2009 and the total number of tetrads occupied in 2009 is estimated to be 229 when allowance is made [1] for the tetrads that were not surveyed in that year.

In the 1975 survey, an identical number of atlas tetrads, 229, were found to be occupied but only 125 (56.3%) of those tetrads were occupied in 2009.

The 1978-1984 breeding atlas reported confirmed breeding in 266 tetrads and probable breeding in another 12, significantly more than in the 1975 and 2009 surveys and the recent atlas survey. This higher count could be accounted for by the relatively extended 7-year period of the first atlas survey and the mobility of Rookeries on the tetrad scale from year to year which means that the number of tetrads reported as supporting rookeries in the period 1978 to 1984 could be inflated by more than 20% above the number occupied in any one year of the survey period. In comparison, it is interesting that the total number of tetrads with confirmed breeding in the 2004-2006 seasons and the 2009 survey, a period spanning 6 rather than 7 years, was 258.

Survey Comparisons: Tetrads with confirmed breeding	
Year	Tetrads
1975 Survey	229
1978 - 84 Atlas	266
2004 - 06 Atlas	213*
2009 Survey	229
2004 – 06 & 2009	258
*Possible underestimate – see note 9	

Rookery Site Comparisons with 1975 Survey

Although the survey results indicate some mobility in Rookery sites, there is also long-term continuity at a significant number of sites. Six-figure grid references are available for the 1975 rookery sites. Targeted visits are known to have been made to 127 of the 1975 Rookery sites in 86 tetrads. Rookeries were found to be present in 2009 at 41 (32.28%) of these 1975 sites. In addition, rookeries were found in the 2009 survey at a significant number of 1975 sites which were not specifically targeted. These findings suggest that up to about a third of rookery sites could be stable over a 35 year period or more. However, in the absence of specific information on occupancy in the intervening years, it is not possible to be sure if these sites have been in continuous use by breeding colonies from 1975 to 2009 or if colonies have disappeared from them and later returned during that period.

Timing of Nest Building

Preliminary and later final counts were reported for over 90 rookeries. These records indicate that nest building was essentially complete at the majority of Rookeries by the end of the first week in April. The final counts for a number of rookeries were made before this date and may have missed some nests that were built slightly later. The total nest count given earlier may therefore underestimate the true breeding population. To assess the extent to which this factor might affect the accuracy of the population estimate, preliminary count data was used to assess the increase in nest numbers during March and early April. On this basis, it was estimated that counts made on 15 March, for example, were likely to be about 23% less than counts after the first week in April. As the season progresses, the discrepancy decreases, for example to about 15% a week later on 22 March and to about 6% by 29 March.

The extent to which this factor might lead to population underestimates was assessed by estimating the likely number of nests that would have been missed in counts made early in the season. In practice, since the majority of counts were made after the first week in April, the size of any error is expected to be small and no greater than about 2%. Applying an allowance for this factor to the population estimate given earlier, the population of Rooks in Cheshire & Wirral is estimated to be 8,340 breeding pairs which is 3.5% less than the 1975 population estimate.

Trees used in Rookeries and their surrounding habitat

Rookeries were found in a wide range of tree types, with Oak (33%), Sycamore (22%), Beech (13%), Ash (11%) and Pine (8%) being the most commonly encountered species. Usage may reflect availability to some extent at least. Other tree species being used were Chestnut, Alder, Willow, Poplar, Lime, Birch, Larch, Yew, Maple and Wild Cherry. Many of these are sturdy trees of the type that Rooks might have been expected to use, but nests in trees such as Birch, Larch and Yew suggest that they can tolerate other tree types if required.

The most commonly identified surrounding habitat types identified were E1 – improved grassland (48%), E3 – mixed grass/tilled land (20%), F3 – human rural (12%), E4 – tilled land (7%), F2 – human suburban (5%) and E2- unimproved grassland (4%). For the remaining rookery sites, the surrounding habitats are mostly C code natural or semi-natural grassland habitat types.

The main habitats in Cheshire are identified [6] as 72% grass and arable, of which 38% is improved grassland and 21% arable, 8% woodland and 16% developed, with the remaining 4% being made up of estuarine and coastal, freshwater and heath or bog. Allowing for the fact that woodland is, by definition, excluded from the surrounding feeding habitat and that heavily developed urban areas are unlikely to provide suitable habitat, the relative proportions of the different surrounding habitat types recorded in the survey seem to be generally consistent with their availability.

References and Notes

- 1 If the observed average loss rate of occupancy of tetrads of 15% since the atlas survey period is assumed to apply, 12 out of the 14 tetrads occupied during the atlas survey that were not visited in 2009 would be expected to have contained rookeries, corresponding with 428 nests, assuming an average of 35.7 nests per tetrad.
- 2 W.B. Yapp, The Population of Rooks (*Corvus frugilegus*) in West Gloucester II, *Journal of Animal Ecology* 20, 169-172 1951
- 3 J.A. Ankers & D. Elphick, *Cheshire Bird Report 1981*, 59-64. *BTO Rookery Surveys 1975 & 1980 – Cheshire and Wirral Results*
- 4 M. Henderson, *Bird Study* 15, 206, 1968. The Rook Population of a Part of West Cheshire 1944-1968
- 5 L.R. Griffin & C.J. Thomas, *Proceedings of the Royal Society B (Biological Sciences)* 267, 1463-1467, 2000
- 6 *Birds in Cheshire and Wirral: A Breeding and Wintering Atlas*, David Norman on behalf of CAWOS, Liverpool University Press, 2008
- 7 *The Breeding Bird Atlas of Cheshire and Wirral*, J.P. Guest, D. Elphick, J.S.A. Hunter and D. Norman, Cheshire and Wirral Ornithological Society, 1992
- 8 Review of atlas data has revealed that the number of tetrads identified with confirmed breeding during the atlas survey (213) is slightly higher than reported in the atlas (205).
- 9 Some tetrads that were occupied during the atlas survey may not have been mapped due to the manner in which FY and RF codes were addressed for Rooks. These codes were not taken as evidence of confirmed breeding where they were observed due to the distances over which Rooks forage during the breeding season.