The Kestrel in Kent
A new population estimate
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The Kent Breeding Bird Atlas gave an estimate for the Kestrel population of 750-800 breeding pairs (Henderson & Hodge 1996). This was based on a notional one pair per occupied tetrad throughout the county, and appeared to be corroborated both by the average 21 pairs per hectad (100 sq.kms) found in neighbouring Sussex, and the breeding densities recorded in a recently-published long-term study in differing types of farmland (Village 1990). Andrew Village recorded the highest density of breeding Kestrels (32 pairs per hectad) on grassland, with lower densities on mixed farmland (19 pairs) and intensive arable (12 pairs). Since the 1996 estimate, there has been some concern that Kestrel numbers are in decline nationally, with the Common Birds Census showing a 28% decline over the period 1974-1999 (Baillie et al 2001), and regionally, with Breeding Birds Survey data for South East England 1994-2004 similarly showing a 31% decline over this shorter period. A more recent estimate tentatively suggested a revised Kent population of 650-700 breeding pairs (Clements 2000)

Although previous estimates appeared soundly based, I was intrigued to find out what the real situation was. During 2004 I surveyed a 90 sq.kms study area near Sittingbourne, (summarised in KOS News January 2005). In 2005, I concentrated on a 25 sq. kms study area in a different part of the county, but also carried out some follow-up work in and near the 2004 study area. The aim was to visit several widely differing farmland types in order to establish the breeding density in different habitats. The results are summarised below:

Location	**Farmland Type**	**Study Area (sq.kms)**	**Density (territorial prs per 100 sq.kms)**
Sutton Valence Area	Mixed Farmland/Low Weald	25	160
North Downs	Mixed Farmland/Woodland	45 (approx)	100
Sittingbourne Area	Intensive Arable/ Orchards	35 (approx)	25

Survey-work was carried out between April – July, with over eighty days spent on the field-work. At least two, more frequently three or four, visits were made to each tetrad. Breeding attempts were considered confirmed where Kestrels were seen copulating, often on or close to a nest, or food-carrying or recently-fledged juveniles were seen. Pairs were considered probably breeding where adult pairs displaying or calling was noted, but further proof was not recorded. In most cases this lack of proven breeding was due to difficulty of access to parts of the study area, or simply lack of time for a prolonged visit. Where Kestrel pairs appeared to be breeding in close proximity, much time was spent establishing that two separate pairs were present, and that one mobile pair was not being recorded twice. Breeding attempts, both confirmed and probable, were mapped on a 1:50000 OS Map. As shown in Figure 1, where nest-sites are abundant Kestrels are remarkably evenly spaced across good habitat, and it became possible to predict the likely location of neighbouring pairs.

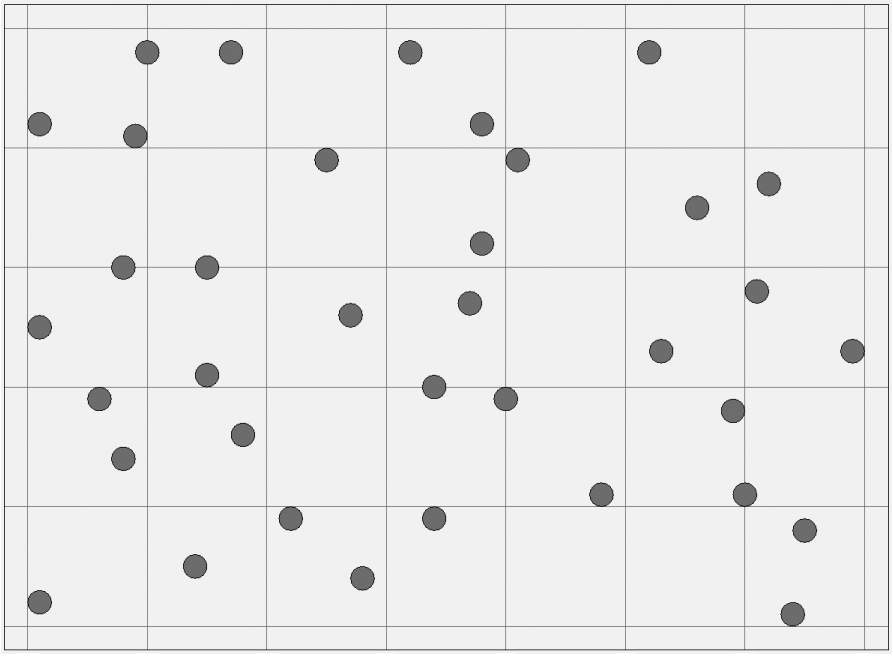

Fig 1: Kestrel Nest-sites in 35 Sq.kms Mixed Farmland Downland Habitat 2006.

Kestrel habitat in Kent could be divided into four broad categories, identifiable from OS Maps, where differing availability of prey resources and nest-sites resulted in major differences in breeding density. Prey resources were judged on the proportion of grassland in a category; nest-site availability on the density of mature trees within farmland. In both cases, field-size appeared to be a useful predictor of Kestrel density. Areas characterised by small average field-size were usually high in grassland or set-aside and often showed a high density of mature hedgerow trees. Farmland where fields were large often lacked possible nest-sites, so Kestrel pair spacing was more irregular and generally less dense. Average field-size was lowest in the Sutton Valence Study Area (approx. 19 fields per sq.km.) and highest in areas of Intensive Arable (approx. 7.5 fields per sq.km.)

Farmland Type	Approx.Total (sq.kms)	Nest-sites	Prey resources
Intensive Arable/Orchards	600	Poor	Poor
Mixed Farmland/Woodland	1900	Good	Medium
Mixed Farmland/Low Weald	300	Good	Good
Coastal Flatlands	500	Poor	Medium-Good

Intensive Arable/Orchards

A typical area lies to the North of the M2 between Sittingbourne and Faversham. Characterised by big fields, often with few hedgerow trees, this habitat provides low prey resources and wide gaps between suitable nest sites. Nevertheless, Kestrels are present in this landscape, hunting over the rough edges, paddocks and more unkempt corners, but at lower density than in the other farmland categories. While less time was spent in field-work in this habitat than in the high-density habitat, the area surveyed was populated at a density of around 25 pairs per hectad. A similar density seems likely for most of this habitat.

Mixed Farmland/Woodland

The largest category of farmland habitat, typified by the fragmented woodland and mixed arable and pasture of the North Downs. Similar habitat occurs on the Greensand Ridge and Wealden Ridge further South. While fields are often large, there is a higher proportion of grassland, and hence higher prey resources than in the Intensive Arable category. The fragmented woodland component provides both prey species and numerous nest-sites. Field-work on both the Greensand Ridge and the North Downs showed a spacing of approximately 1 km between nesting pairs, and hence a density of around 100 pairs per hectad. A separate survey by Phil Chantler in similar habitat in East Kent found nine pairs in approx. 11 sq.kms of farmland. Average nearest neighbour distance was approx. 1.1 kms, indicating a similar density to that found in my study areas.

Mixed Farmland/Low Weald

Characterised by small average field-size, few woodland blocks but abundant hedgerow trees and a high proportion of grassland, this farmland type is largely confined to a 10 km. wide belt between Tonbridge and Ashford. There were 40 Kestrel pairs in the 25 sq.kms study area north of the River Beult, and a high density is likely throughout this habitat.

Coastal Flatlands

This broad category includes all of Walland/Romney Marsh, the wetlands of the Stour Valley and all the flat farmland adjoining the Swale. While some of this habitat has been converted to arable crops, a substantial proportion of rough grassland and pasture remains. In general, food resources are high in this habitat. In early autumn on Sheppey, it is often possible to have 15-20 Kestrels in view at the same time, suggesting substantial prey is present. In my view, the limiting factor throughout much of this habitat is lack of nest-sites. On Sheppey, Kestrels utilise buildings, nest-boxes and old crow's nests on pylons and in hedgerows in an otherwise almost treeless landscape. Where survey-work was carried out in this habitat breeding pairs were spaced at approx. one kilometre apart. Overall density appears to lie somewhere between the Intensive Arable and Mixed Farmland categories.

Kent Population Estimate - Assumptions

Through study of the relevant OS maps it was possible to allocate the 3300 sq.kms of Non-urban Kent to the four chosen categories of farmland/land-use. Areas of wetland, woodland, heathland and other non-agricultural land are included in the farmland categories. While it was relatively easy to identify the Coastal Flatland and Mixed Farmland/Low Weald categories, the main problem was dividing farmland between Mixed Farmland/Woodland and Intensive Arable categories. Too much Intensive Arable farmland misidentified as high Kestrel density Mixed Farmland would tend to inflate the estimate. A well-wooded area where all the fields contain arable crops will tend to hold fewer Kestrels than an area of grassland with relatively little woodland. Sadly, such distinctions cannot be identified, even from a 1:50000 OS Map! The following assumed Kestrel densities were applied to the four categories:

Intensive Arable/Orchards - 25 pairs per hectad
Low Kestrel density in this habitat.

Mixed Farmland /Woodland - 75 pairs per hectad
Although a Kestrel density approaching 100 pairs per hectad was found in the study areas, a slightly lower figure was used for the estimate to accommodate any poorer habitat (and also several large areas of woodland) that were included in this broad classification.

Mixed Farmland/Low Weald - 100 pairs per hectad
An exceptionally high Kestrel density of 160 pairs per hectad was found in the study area. A lower figure allows for poorer habitat in some parts of this classification.

Coastal Flatlands - 50 pairs per hectad.
Higher density than Intensive Arable, but probably lower density than Mixed farmland. A compromise figure; Kestrel density was likely to be higher where many nest-sites were available, but there may be some areas with few nest-sites.

While Kestrels may be found nesting in urban areas within Kent, the numbers in such locations were thought to be insignificant compared to the main farmland areas, and are in consequence excluded from my calculations.

A Kent Kestrel Population Estimate

Farmland Category	**Approx. Area (sq.kms)**	**Density (Prs per hectad)**	**Total**
Intensive Arable/Orchards	600	25	150
Coastal Flatlands	500	50	250
Mixed Farmland/Woodland	1900	75	1425
Mixed Farmland/Low Weald	300	100	300
Urban	500	-	-
Total	**3800**		**2125**

Applying the actual Kestrel densities found in the study areas to the relevant categories resulted in a higher figure of 2805 pairs. The reality probably lies somewhere between these figures.

Discussion

My survey-work suggests that the Kestrel is present as a breeding species in Kent at a much higher density than previously thought. The current population was estimated to be somewhere between 2125-2805 breeding pairs. Such a figure, three or four times higher than the previous estimate, may be met with some scepticism, especially in light of BTO data suggesting substantial decline in recent years. Whether the current high density represents a decline from even higher previous density, or is a consequence of a recent increase remains uncertain. I considered it unlikely that I was simply recording an unusual high in Kestrel numbers linked to an explosion in vole numbers. Kestrels in South-east England take a varied diet of prey species and do not appear reliant on voles. Furthermore there is little evidence that vole numbers in the South-east are subject to the sort of fluctuations that occur further north. Parts of the North Downs study area were visited in both years of the study, revealing no visible reduction in numbers of Kestrel pairs.

It might be argued that the study areas, either by chance or design were areas of exceptional Kestrel density, surrounded by large areas of much lower density. In 2005, I chose two small study areas of similar habitat (mixed farmland with fragmented woodland) outside the 2004 study area and found comparable densities in both locations. All the evidence, supported by the regular spacing of breeding pairs throughout the habitat, suggests that these densities occur in similar habitats throughout Kent.

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