Abstract: Techniques for determining whether patterns of points are random, clustered, or dispersed are well established; however, when the magnitude of the attribute at each location is also important, the situation is more problematic. The concentration of polychlorinated biphenyls (PCBs) in the livers of Eurasian sparrowhawks Accipiter nisus and common kestrels Falco tinnunculus has been determined for birds from all over Great Britain for several decades and forms a unique database. When mapped, there appears to be clusters of high values in some parts of the country. If these clusters are truly significant, then they may indicate pollution hot spots and possibly help identify undocumented sources of contamination. What constitutes a cluster is open to debate. We know something about the foraging behavior of birds of prey, but we do not know how many pollution sources (hot spots) there are, how long they persist, or over what area they may disperse PCBs. We used a Monte Carlo simulation approach to determine whether the visually prominent clusters of high PCB residues were significant features or merely illusions. The five largest nonoverlapping clusters (defined in terms of the total PCB concentration) were identified at a range of spatial scales. In addition to the total concentration and the number of observations, the weighted centroid of the clusters and which individual birds were involved were also recorded. This enabled us to determine the scale over which the candidate hot spot was stable. Comparing the magnitude of the observed clusters with those from the trial simulations determined the probability of nonrandomness in the original data set (at each spatial scale). Results showed that some clusters do exist but, in the majority of cases, apparent clusters identified by eye could not be considered an actual aggregation of high concentrations following spatial analysis.

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