*North Munster Antiquarian Journal*, vol. 45, 2005

# Early Christian settlement and society: a multivariate statistical model for the Loop Head peninsula, Co. Clare.

**ROBERT M. CHAPPLE**
*19 Irwin Drive, Belfast BT4 3AR, Northern Ireland*

This paper examines the morphological and spatial characteristics of 255 ringforts on the Loop Head peninsula, Co. Clare. The approach of the research is essentially statistical and employs descriptive, bivariate and multivariate techniques. Taken in combination with the surviving early Irish laws and an intuitive approach to the landscape, these methods are used to define five classes of ringforts. Throughout, the opportunity is taken to critically examine the techniques and hypothetical model proposed by Stout (1991) for the south-west midlands. Following form this, an alternative model of Early Christian settlement for the peninsula is proposed.

## Introduction

The Loop Head peninsula is comprised of the civil parishes of Carrigaholt and Cross, which lie in the extreme south-west of county Clare, in the barony of Moyarta (Fig. 1). An analysis of the morphological and distributional characteristics of the ringforts of this area has already been published

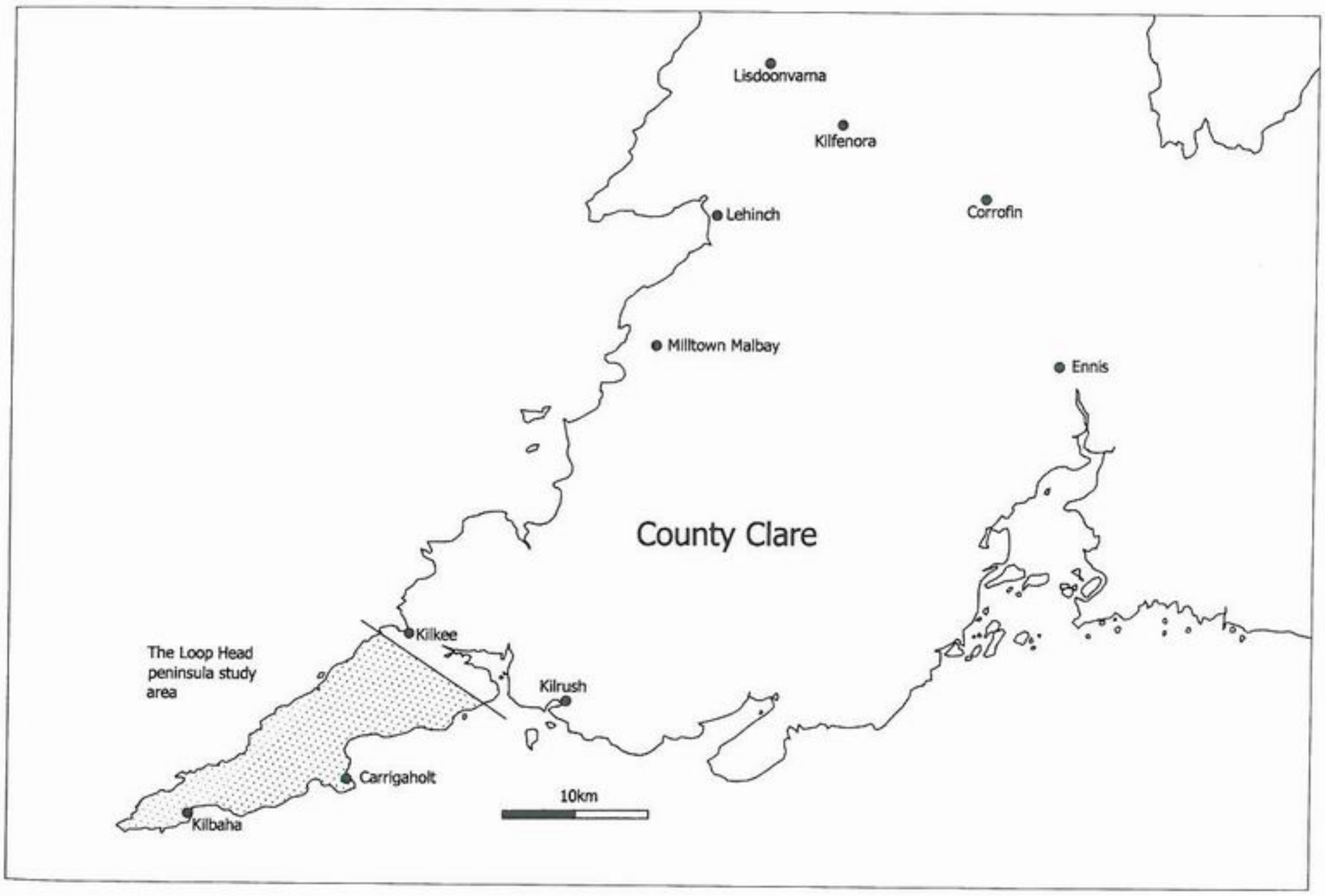


**Fig. 1** The location of the Loop Head peninsula study area.

(Chapple 2003).[1] The purpose of this paper is to move that analysis forward towards an understanding of the complexities of Early Christian settlement on the peninsula. The variables employed in the analyses are laid out and discussed individually and their importance in the overall settlement pattern is assessed. To gain a deeper understanding of this topic a number of statistical techniques are utilised. To these ends quantifiable components of site morphology, location and distribution were selected for analysis. The secondary aim of this research was the testing of the distributional model proposed by Stout (1991) for the south-west midlands and the evaluation of his conclusions in relation to a different study area. Similar to Stout, the underlying hypothesis here is that the studied ringforts are, in the broadest sense, contemporary and thus represent the distributional character of the area at the end of the Early Christian period.

**Variables employed in the analyses**

The *maximum internal diameter* (MID) was recorded for all surviving ringforts which were not so overgrown as to preclude accurate measurement. Stout (1991, 207) regards the size of this living area as indicative of the status of the occupants. MIDs for ringforts in the study area range from 21.50m – 49.82m, (mean=31.37m). The bulk of sites (74%) fall in the 20m-36m bracket, with an overall peak in the 28m-36m category (41%).[2]

The *maximum overall diameter* (MOD) was also recorded for all extant sites. These range from 27.12m-69.42m (mean=40.84m). The majority of sites (72%) fall in the 29m-46.9m bracket, with a peak in the 29m-37.9m category (30%). Bivallate ringforts make up only a small percentage of sites in the 29m-46.9m categories, the occurrence rising steadily as MOD increases.

The height of the surviving ringfort banks was measured relative to the modern ground level for all sites. The internal bank of bivallate sites and univallate sites (HB1) range from 0.20m-6.40m with a mean of 1.57m. The majority of sites (122) fall within the range of 0.20m-1.90m (79%) with a peak of 72 ramparts measuring between 1.00m and 1.9m (46%). The heights of the external banks (HB2) of the 22 bivallate sites fall in the range of 0.05m-3.50m (mean=0.13m), with the majority of heights falling below 1.49m (83%).

The *maximum depth of external fosse* was calculated for the 44 sites where it appears to be an original feature. In the cases of bivallate sites the intervening fosse between the banks was recorded, but not used in the statistical analyses as the presence of such a fosse appears to be a diagnostic feature of such sites (*cf.* Stout 1991, 207). Fosse depths range from *c*.0.01m, where the feature survives as little more than a marshy dip, to a maximum of 3.50m, the mean depth being 0.44m. The majority of surviving fosses (seventeen) are below 0.10m in depth. The original orientation of the entrance could be ascertained for only 17 sites. Of these the majority (11) were found to face east. Owing to their low numbers coupled with the difficulty of identifying genuine examples it was decided to omit this variable from further calculations.

Stout sees *slope* as an important factor for other locational attributes of ringforts, which he does not examine, including site intervisibility, drainage and soil quality (*op. cit.* 210). On the Loop Head peninsula ringforts are located on slopes ranging from 0.14° and 10.83° (mean=1.77°). Indeed, 66% (103 sites) are located on gradients below 2° (Fig. 2). This is broadly consistent with the results observed by Stout for the south-west midlands, where 54% of sites are located on gradients below 2°.

[1] This work is based on the author's MA thesis submitted to the National University of Ireland, Galway: Chapple 1998. Although more recent work on Irish ringforts has since been published, no attempt has been made to take account of it here.

[2] Comparisons with data from other surveyed areas will not generally be attempted here owing to restrictions of space. Instead the reader is directed to: Stout 1997; Chapple 2003.

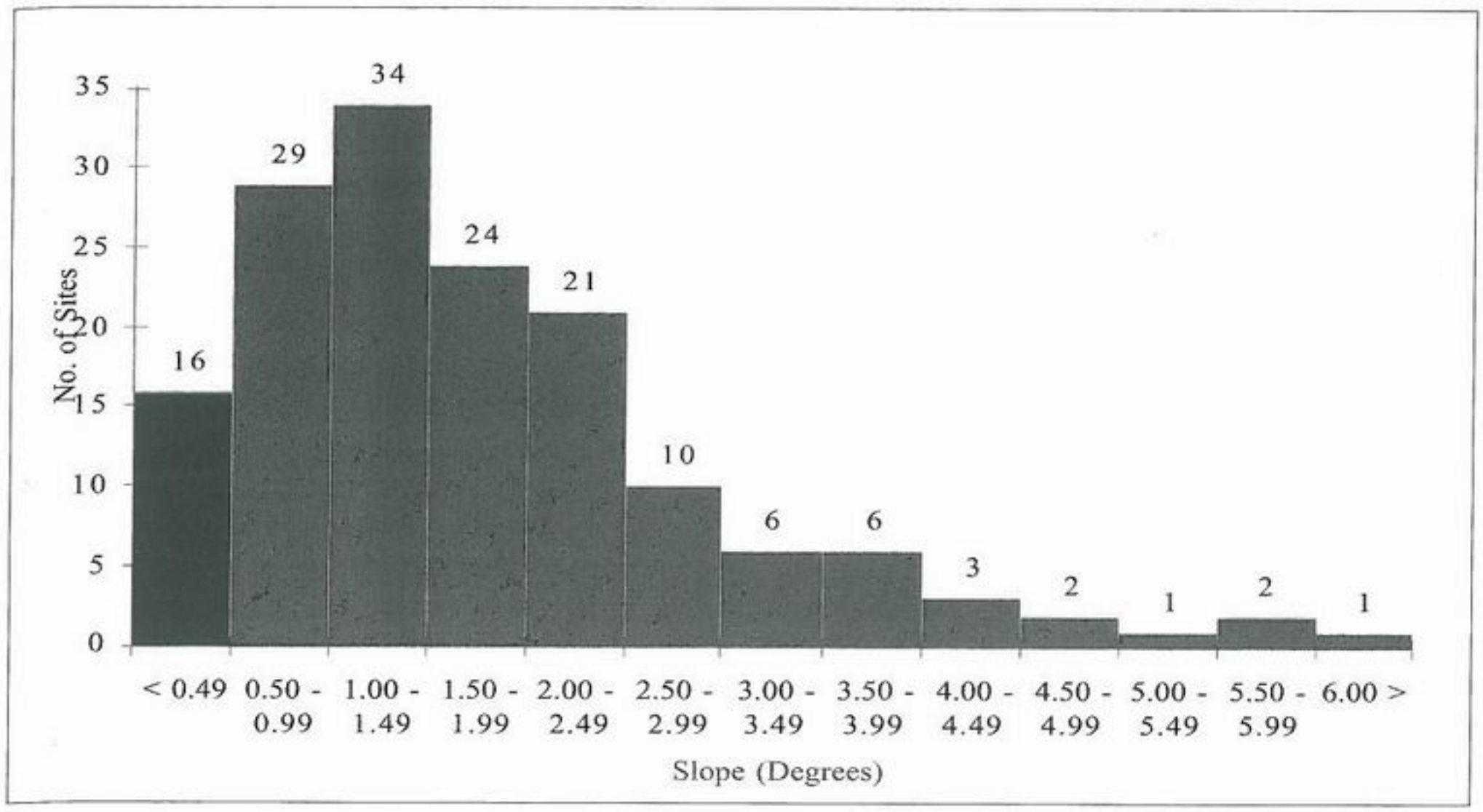


**Fig. 2.** Slope of land on which ringforts are situated.

The *aspect* of ringfort locations, the direction in which the land actually faces, displays a distinct preference (64% of sites) for locations which face from south-east to south-west. An examination of ringfort *altitude* indicates that 96% of all sites lie at altitudes of 200ft or below, with bivallate sites being divided relatively evenly between the 0m-30.48m (0ft-100ft) and 30.48m-60.96m (100ft-200ft) contours. In common with data from other areas, it may be suggested that this reflects the need for drainage and the desire for better views (Barrett 1972).

The *nearest neighbour distance* (NND) between all surviving ringforts and their nearest neighbour range from 43.75m – 1,370m. While the mean distance between sites is 318.67m, with 97% (151) under 1,000m, there is a strong preference for locating ringforts between 100m-400m (68%) of each other, with incidence decreasing rapidly on either side of this range.

The *centrality index* was calculated for each site to assess its position within the townland structure. Stout uses this variable on the assumption that 'the modern townland system may offer a rough indication of Early Christian land-holding patterns'. The sites in the study area display indices ranging from 0.00 (straddling the townland boundary), to a maximum of 0.85, near the centre, with a mean index of 0.33.[3] This result is similar to that returned by Stout and, when other factors are taken into consideration, is extremely close to a random dispersal of ringforts in relation to townland boundaries (1991, 212). As part of the centrality index calculation, the *distance to townland centre* was recorded. These measurements range from 93.75m – 6,060m, with 85% (131) measuring under 1,000m (mean=612.58m). As there is a lack of algebraic independence between these two variables the latter was omitted from the calculation of both the cluster analysis and principal components analysis (pers. comm. Prof. R. Wright). The implication is that where one variable is partially derived for the calculation of another, any statistical analysis that uses both together may introduce significant bias. Thus, it is this authors' opinion that Stout's use of both variables, potentially, introduced a degree of error into his calculations.

[3] A ringfort with a centrality index of 1.00 would be located at the centre of the townland.

Stout argues that the *distance to ecclesiastical centre* (DEC) may be viewed 'as a measurement of the relationship between a ringfort and its possible proto-urban central place' (*ibid.*). In this instance, the distances range from 26.50m-7,330m, with only 5% (seven) located within 1,000m of the nearest ecclesiastical site (mean=2,780m). This situation exists owing to monasteries being surrounded by 'exclusion zones' devoid of secular settlement which may be identified as ecclesiastically controlled estates predating ringfort building (Chapple 2003).

**Bivariate correlation**

The *product-moment correlation coefficient* (pmcc) method of bivariate correlation was first applied to the data (Fletcher & Lock 1991, 105). As it should be expected, there is little or no correlation between most sets of variables (Chapple 1998, 162). Weak, but statistically significant, positive correlations were observed between NND and sites possessing a more westerly aspect (r=0.21). This suggests that the more dispersed sites are located on west facing slopes; conversely it would appear to suggest that a non-westerly aspect was a preferred site location. Thus we may expect somewhat more dense settlement in these areas. An examination of the weak negative correlation of slope with the southerly aspect of sites (r=-0.20) indicates a marginal preference for low-lying land with a southerly aspect. A strong correlation may be observed between the degree of vallation with HB1 (r=0.40). This may indicate that the internal banks of bivallate sites were built to be somewhat larger than those of univallate examples. This is somewhat strengthened by the weak, but significant, correlation from the degree of vallation with MID (r=0.19) where bivallate sites are more likely to possess a larger internal space. There was, however, a positive correlation between MID with HB1 (r=0.28), the larger the site's internal area, be it univallate or bivallate, the higher the internal bank is likely to be. This is again reflected in the strong positive correlation of the MOD with HB1 (r=0.54) and HB1 with HB2 (r=0.54).

There is a strong negative correlation between MID with DEC (r=-0.41) indicating that sites with larger internal diameters are more likely to be located close to Early Christian monastic foundations. A weak, positive correlation exists between DEC and slope (r=0.21), suggesting that the slope of the land on which a site is located increases the further its remove from a monastic site. Thus, sites lying close to monastic foundations, and therefore the foundations themselves, are located on the flattest available ground. Weak but significant correlations are also observed between fosse depth and both HB1 (r=0.25) and HB2 (r=0.22). Low banks indicate, therefore, that the fosse has collapsed, or has been back-filled with material from the bank. However, as not all sites that may have originally had a fosse currently display one, this correlation is of little practical use.

To account for problems with the pmcc method and to allow comparison, Spearman's rank correlation coefficient (srcc) was implemented (Lock 1991, 80). There is little difference between the two tests of association. A weak but significant, negative correlation is evident between NND and slope ($r_S$=-0.26). As ringforts located on steeper slopes are further apart from their nearest neighbours, it may be seen that the more densely populated areas are located on the flattest available land in contrast to many locations in Ireland. A weak but significant, positive correlation exists between MID and HB1 ($r_S$=0.22).

Stout's analysis revealed a number of important factors which did not appear in the analysis of the Loop Head data. These include a correlation between MID and altitude, (*op. cit.* 212), and a negative correlation between altitude and NND. Thus large lowland sites were more widely scattered than smaller upland ones. Comparable results were not observed at Loop Head. The explanation for this lies in the topography of the peninsula which sees ringforts located at a maximum altitude of 300ft, though they extended to *c.*1000ft in the south-west midlands. Even at such an altitude the land is

gently rolling, with few steep slopes. Thus the peninsula did not present the Early Christian farmer with a landscape which necessitated a specific adaptation of the ringfort type to a higher altitude location.

**Nearest neighbour analysis**

The *nearest neighbour analysis* (NNA) for the Loop Head ringforts returned an R value of 0.77 which indicates that the studied sites show a high tendency towards a random distribution (Dice 1952; Clark & Evans 1954). Only a slight tendency towards clustering may be inferred (*ibid.* 447-8), with no movement towards the highly dispersed model. In effect this value expresses that the Loop Head ringforts are 0.77 times more dispersed than would be expected of a similar number of randomly spaced sites on the same landscape. This is broadly consistent with Stout's results in the south-west midlands (R=0.99), an almost perfectly random distribution (*op. cit.* 210). As he suggests, such a result should not be taken to suggest that the choice of site was carelessly, or lightly made. Instead it is reasonable to suggest that the variables by which the sites for ringforts were chosen are also randomly located across the landscape. Although the statistics indicate a high degree of randomness in the distribution, the degree of non random or 'clustered' placing on the landscape is of significance (Chapple 1998, 176). However, it must be appreciated that there are many factors which cannot be adequately considered and accounted for by NNA alone.

Many factors may have been taken into account by the Early Christian farmers which are not amenable to this form of statistical analysis. Further factors may include sampling bias and the survival rate of monuments (Hodder 1977, 230). Thus, a margin of error may be incorporated which becomes exacerbated over a large number of calculations resulting in a spatial pattern which is far removed from that of the Early Christian period.

One problem which is addressed by Stout is that of including bogland along with land at high altitude into the nearest neighbours analysis (*op. cit.* 210).[4] In the first instance the presumption is that ringforts would not be built on such land and thus would have ruled it out as a positive locational factor for the Early Christian farmer, presuming of course that this land was already bog during that period. Within the Loop Head area the majority of bogland (*c.*9,950m$^2$) has a largely patchy, coastal distribution. However, a large area of peat-land is centred on the townland of Breaghva (*c.*6,760m$^2$.) This zone is completely devoid of archaeological monuments of all types and periods. While Westropp (1909, 122) explains this deficiency on a linguistic basis (Breaghva, the place of the wolves, a deserted area), it may be comparable with evidence from other areas where ringfort builders appear to have avoided areas of peat.

From an examination of the 1st edition OS maps, it is obvious these areas of bogland are highly fragmented and occasionally constrained within field boundaries. Thus, even by the nineteenth-century, these areas appear to be in the process of reclamation and the figure of *c.*17,000m$^2$ could be regarded as a minimum of bogland for the Early Christian Period. Since ringforts were primarily family homesteads, a positive correlation should be expected between sites and areas of higher quality soil (Barrett *op. cit.* 86). As it is likely that the exact soil types have altered to an unascertainable degree all conclusions drawn from such data must be treated with a certain scepticism (Scarre 1982). However, in the absence of sufficient palaeoenvironmental data for the Loop Head Peninsula, one must rely on modern detailed soil maps (Finch *et. al.* 1971)(Fig. 3).

[4] Stout uses the figure of 304m (*c.*980ft) as a point of exclusion, above which ringforts do not occur in the south-west midlands. While this may be an important factor in Stout's analysis, it may be disregarded in relation to the Loop Head area as the land does not rise above *c.*140m (452.4ft).

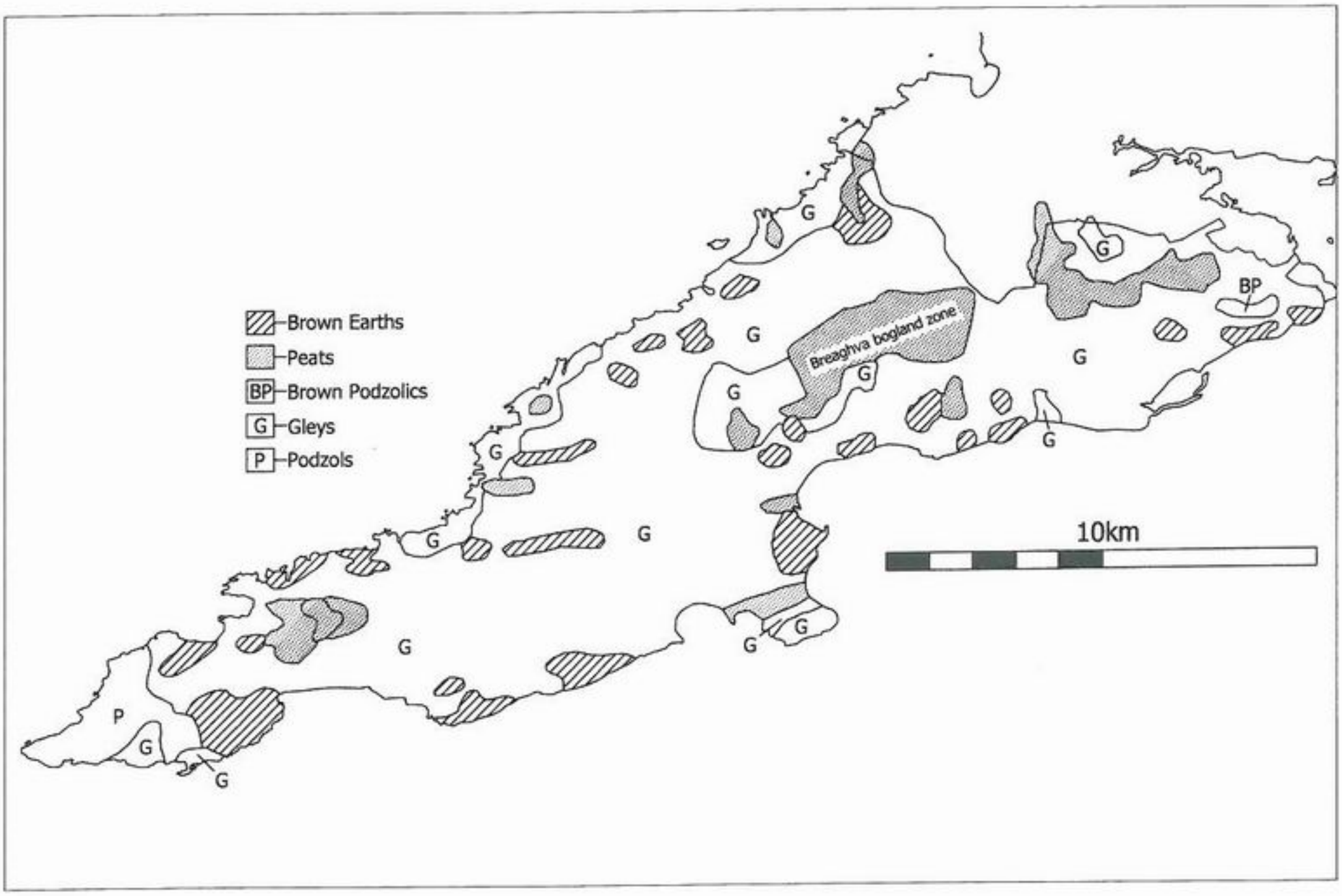


**Fig. 3** Extract from soil map of Co. Clare, after Finch *et. al.* 1971.

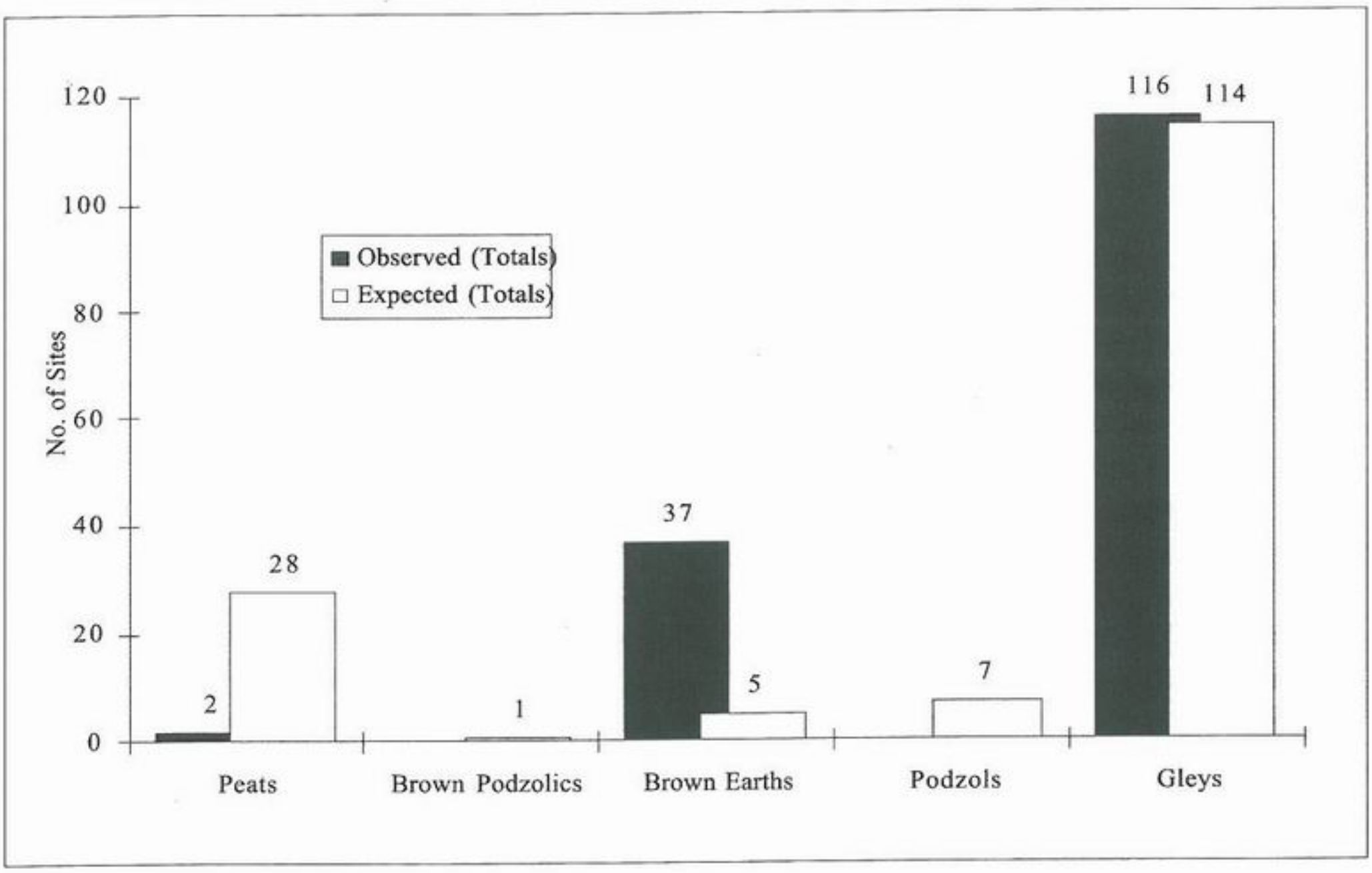


**Fig. 4.** Histogram of observed vs. expected occurrences of ringforts on the various great soil groups.

The relationships between ringfort distribution and the pattern of modern soils may be expressed as a histogram indicating both the observed and expected numbers of sites in relation each of the great soil groups (Fig. 4).[5] It is obvious that the gleys make up the largest group in the area (74% of the land) and they possess an appropriate number of sites. However, the brown earths which make up a much smaller area of the land, just 3%, have a much higher than expected number of ringforts (24% of sites). Conversely, the peats and podzols (19% and 4% of the land area, respectively) possess significantly fewer ringforts than would be expected (1% and 0%, respectively) if their distribution was purely random. In terms of suitability the podzols are very limited in application and are most suitable for stock grazing. Obviously, owing to their waterlogged nature and lack of productivity, such soils were avoided as locations for building ringforts. While the gleys are not a highly productive group, they comprise a large proportion of the land area. Thus, faced with little alternatives, Early Christian farmers utilised them to a large degree. The versatility of the brown earths is limited by a number of factors, though it retains a moderate to wide range of uses and is today commonly tilled in the absence of more productive alternatives (Finch *et al.* 1971). Considering the high number of ringforts on this type of soil, this would appear to be a tenable parallel for Early Christian land use in this region, involving the exploitation of this relatively poor soil as it was the most productive available. Brown Earths stand out as the only soil type where the demand for ringfort locations statistically outweighs the availability of land.

Many distributional studies of ringfort location underline a trend for site situation on areas of higher quality land (*e.g.* Fahy 1969a & b; Barrett 1972, 1980). Similar to Wexford, where the percentage of ringforts exceeds that of the available brown earths, it may be suggested that such soils are light and easy to till, thus making them an important consideration in site selection (Bennett 1989, 55). Barrett (1982, 88) has demonstrated a strong positive correlation between site location and higher quality brown earths and brown podzolics on the Cooley peninsula. These studies reveal that other types of well drained, productive soils were under-utilised for ringfort settlement. Although Barrett does not theorise as to why this should be so, Bennett suggests that as these soils lie below 30m they may have been too heavy to till.

The situation on the Loop Head peninsula, though producing similar results in terms of ringfort location, stems from a different source. It was noted that while many sites were located on gleys, they appeared to cluster around the edges of these more productive soils. The ringforts were re-categorised for proximity to such desirable land (Fig. 5).[6] Results indicate that the numbers of ringforts associated with gley soils and podzols may be markedly smaller than was first postulated. Consequently there are an increased number of ringforts whose siting was positively influenced by the close proximity of higher quality soils. It may be suggested that these soils were deliberately *not* chosen for ringforts in an attempt to conserve them solely for agricultural use. Although not statistically valid, such results serve to highlight a previously unexamined aspect of ringfort location warranting further study.

[5] These relationships were examined mathematically using the *chi-square test* and *Yates' continuity correction* which indicated a statistically significant association between ringfort distribution and the soils of the area which is much stronger than expected were the distributions wholly random.

[6] In this instance the decision was made to include any ringfort which was located within 500m of an area of such soil as having a positive influence on the choice of site. This distance was arbitrarily selected as one which could be conveniently reached on a daily basis and from which land could be easily policed and livestock secured in times of crisis.

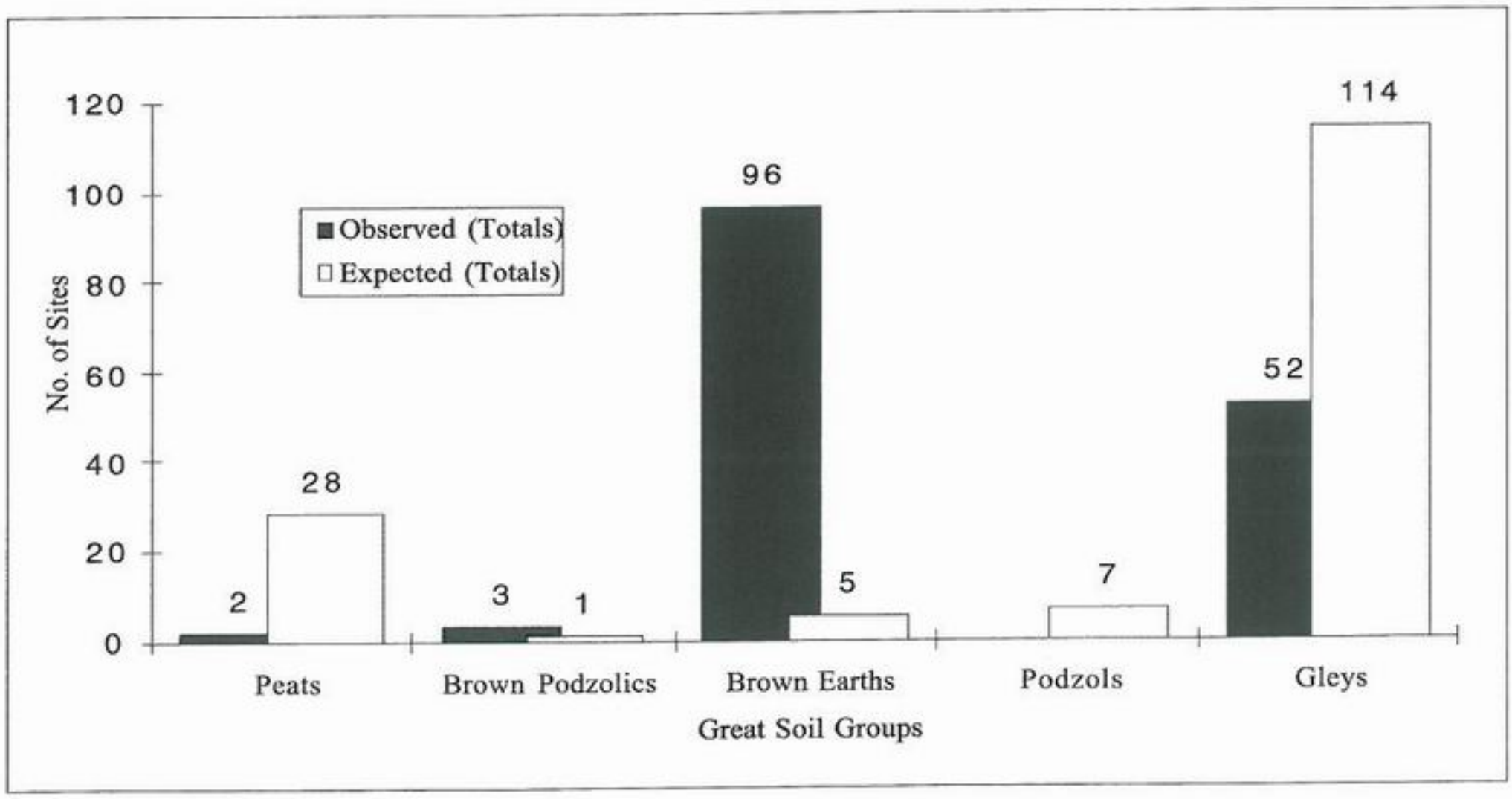


**Figure 5.** Revised histogram of observed vs. expected occurrences of ringforts on the various great soil groups, re-categorised to indicate site location within 0.5km of brown earths and brown podzolics.

**Cluster analysis**

*Cluster Analysis* (CA) was used to identify different groups of ringforts. The objective was to derive a system of classification to examine potential morphological and spatial relationships between groups. While a wide range of ringfort variables may be surveyed, when it comes to the question of analysing these data, variables usually remain relatively discrete and unassociated with each other. Thus, the attraction of CA is its ability to analyse all pertinent variables for a large body of data which is based on their intricate interrelationships. To provide results which allowed legitimate comparison to Stout's work, Ward's Method was employed (*op. cit.* 213. *cf.* Wishart 1970). However, the technical details of how the variables relate to the resulting clusters was not emulated as this aspect of dual interpretation would be much more efficiently addressed within the context of principal components analysis. Table 1 lists the 13 variables which were analysed for all 155 ringfort sites.[7] The number of significant clusters was determined using a 'computer intensive randomisation method' designed by Wright (pers. comm. Prof. R. Wright. *cf.* Manly 1991). These results indicated the validity of selecting two, twelve, five or seven clusters, in that order of significance. All other divisions of the data indicated a high probability of being randomly created. The selection of the five-cluster level for examination was taken in a somewhat arbitrary manner as the number of clusters was perceived as being neither too large nor too small for adequate discussion.[8] Having selected this level for detailed evaluation, it becomes necessary to investigate those variables which distinguish each cluster.

[7] For the purposes of this research, the calculation of CA and PCA *etc.* were undertaken by Prof. Richard Wright of MV Arch. Ltd., NSW, Australia.

[8] See Chapple 1998, 529-36 for a full listing of the ringforts which comprise each cluster

**Table 1**

*Variables used in the cluster analysis procedure*

| | | |
|---|---|---|
| Maximum Internal Diameter | Height of Bank 1 | Fosse Depth |
| Maximum Overall Diameter | Height of Bank 2 | Degree of Locational Slope |
| Aspect (East) | Centrality Index | Locational Altitude |
| Aspect (West) | Distance to Townland Centre | |
| Distance to Nearest Neighbour | Distance to Ecclesiastical Centre | |

**Cluster I (Ci)**

Ci is the largest single group within the study area and represents 57 ringforts (Fig. 6; Table 2). They appear to represent the 'typical' ringfort of this area, and as such would seem to be analogous to Stout's Cluster 3 sites (*op. cit.* 217-8). All sites are univallate and lie on below average slopes (mean=1.54°). Both their DECs (mean=*c*.2,250m) and NNDs (mean=247.17m) are below average for the entire *corpus*. Also, in terms of MIDs (mean=31.31m) and MODs (mean=37.97m), this group is below the average for the area. An important morphological variable for this cluster is the shallow average depth of the external fosse (0.04m). While Ci possesses fifteen sites with some evidence of an external fosse, the highest number for any group, they represent only 26% of the total number of sites in this cluster. Overall, these sites are rather nondescript, but provide the bulk of the *corpus* of ringforts from the peninsula.

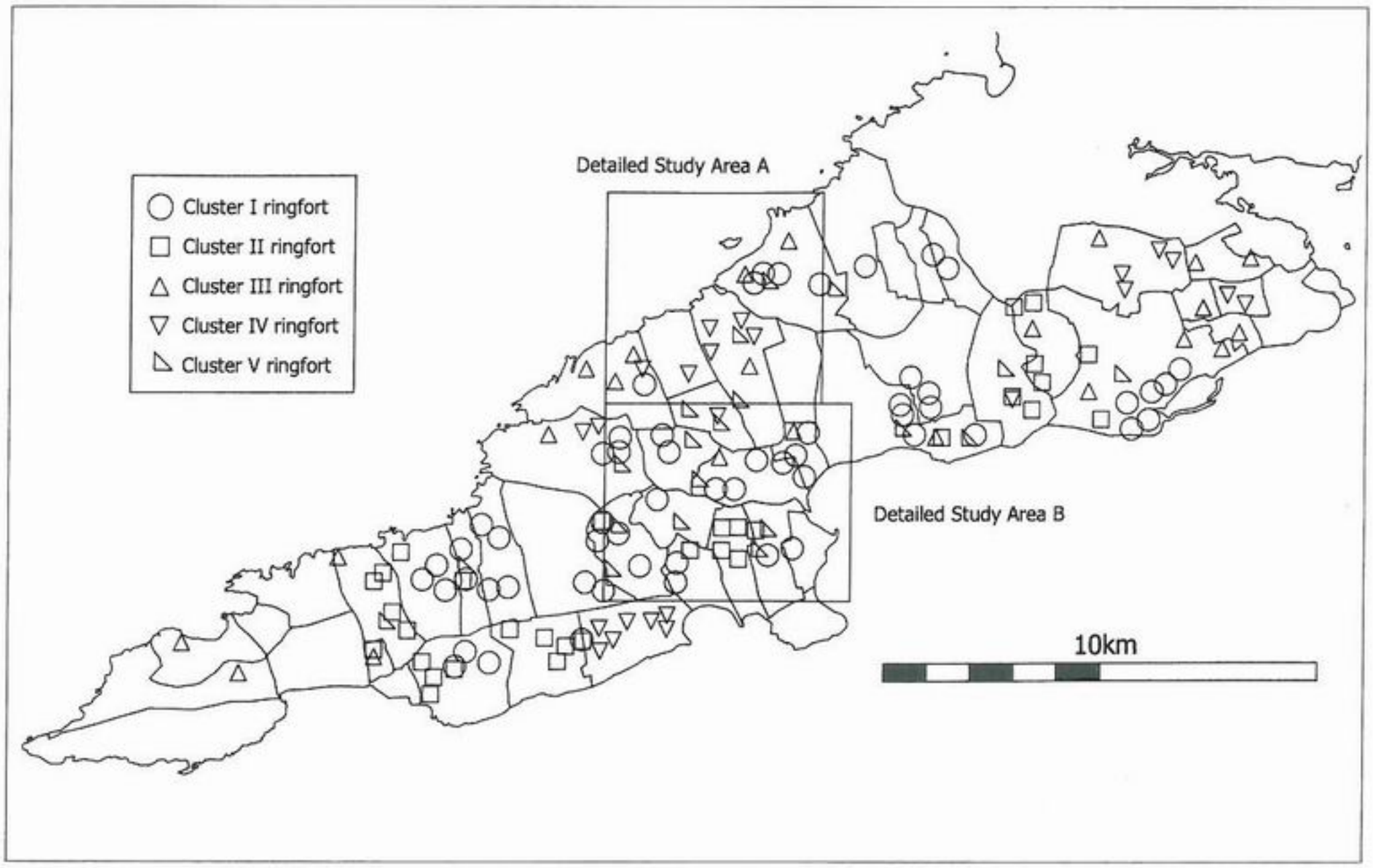


**Fig. 6** Distribution of Cluster I – V ringforts on the Loop Head peninsula.

**Table 2**

**Cluster I**: 57 Cases (37%)

| Variable | F-ratio | Cluster Mean | Variable | T-value | Cluster Mean |
|---|---|---|---|---|---|
| Vallation | 0.00 | 0.00 | Fosse Depth | 0.73 | 0.04m |
| Height Bank 2 | 0.00 | 0.00m | Nearest Neighbour | 0.59 | 245.17m |
| Fosse Depth | 0.28 | 0.04m | Overall Diameter | 0.48 | 37.97m |
| Height Bank 1 | 0.52 | 1.57m | Height Bank 1 | 0.44 | 1.57m |
| Nearest Neighbour | 0.53 | 245.17m | Ecclesiastical D. | 0.38 | 2779.57m |

Six ringforts in Ci (11%) appear to be raised internally. Similar attributes are also evident in other clusters, namely Cii (one site, 3%) and Cv (two sites, 10%). An examination of the locations of these sites indicates that on average they are built on land with a mean slope of 1.38°, markedly lower than the overall average for all sites, of 1.77°. These sites lie on the flattest available ground and this feature may have been deliberately incorporated in to the building of the sites to raise the internal area and thus prevent water-logging. However, whether this feature was an intentional act of construction, or the effect of natural accretion during the site's use, cannot be ascertained without recourse to excavation.

**Cluster II (Cii)**

The 32 ringforts represented in Cii are, perhaps, the plainest and ostensibly the least interesting of all the studied sites (Table 3). Their chief morphological characteristic is their univallate nature. A major feature is their average MOD of 35.18m, the smallest of all cluster averages. In this respect they are similar to Stout's Cluster 5 ringforts, but are dissimilar in that this group is located on low slopes (*op. cit.* 218-9). Both the average height of the principal bank is the lowest for any cluster, at 1.01m. These sites are also located at the lowest average altitude at *c*.24m. Aside from the bivallate sites of Cv, the ringforts in this group are also located on the lowest available slopes (mean=1.77°). Of this group, only five possess an external fosse (16%), suggesting that its absence is an important morphological consideration. One member of this group (ringfort **73** in Lissalougha) is the smaller of two conjoined ringforts, the only such pair in the area.

**Table 3**

**Cluster II:** 32 Cases (20%)

| Variable | F-ratio | Cluster Mean | Variable | T-value | Cluster Mean |
|---|---|---|---|---|---|
| Vallation | 0.00 | 0.00m | Fosse Depth | 1.24 | 0.02m |
| Height Bank 2 | 0.00 | 0.00m | Overall Diameter | 1.12 | 35.18m |
| Fosse Depth | 0.22 | 0.13m | Altitude | 1.07 | 78.91m |
| Overall Diameter | 0.48 | 35.18m | Height Bank 1 | 0.74 | 1.01m |
| Ecclesiastical D. | 0.54 | 2593.95m | Slope | 0.51 | 1.77° |

**Cluster III (Ciii)**

Ciii represents 23 ringforts and is the only group to be composed of both univallate and bivallate sites, as it contains two double-banked sites (Table 4). Ringforts in this group with the largest mean NND (*c*.621m), are the most isolated sites, and are thus diametrically opposed to Civ (mean=238m). The presence of a fosse appears to be an important morphological factor in this group as 13 sites (57%) possess one, the mean depth being 0.54m. DEC also appears to be an highly important element in this group, and the mean distance of *c*.3,670m is the second highest for any cluster. This cluster also possesses the second highest mean values for MID (32.14m), MOD (43.48m) and HB1 (1.97m). In this sense, Ciii ringforts are similar to Stout's multifunctional Cluster 1 (*op. cit.* 215-7). In general, the distributional character of this cluster may be described as peripheral with the bulk of these ringforts are found in the outlying regions of the study area.

**Table 4**

**Cluster III:** 23 Cases (15%)

| Variable | F-ratio | Cluster Mean | Variable | T-value | Cluster Mean |
|---|---|---|---|---|---|
| Vallation | 0.82 | 0.09 | Nearest Neighbour | -0.78 | 620.92m |
| Overall Diameter | 0.82 | 43.48m | Fosse Depth | -0.46 | 0.54m |
| Slope | 0.85 | 1.64° | Ecclesiastical D | -0.45 | 3674.18m |
| Altitude | 1.03 | 117.26m | Height Bank 1 | -0.28 | 1.97m |
| Internal Diameter | 1.06 | 31.86m | Overall Diameter | 0.82 | 43.48m |

Among the sites which comprise this group is the bivallate ringfort of Lismaguine (**65**). It has a relatively small MID of 24.6m, compared with its large MOD of 51.5m. It appears that its large overall diameter, coupled with its significantly smaller internal diameter, caused it to be clustered at the primary level with Lissyhunna (**85**), (MOD=44.87m. MID=37.6m). Lissyhunna appears to be close in type to Stout's Cluster 4 sites which he postulates were capable of being used as pounds for seized cattle, as the sites' large diameters would have allowed a multiplicity of functions (*op. cit.* 218). Westropp (1909, 126) suggests that 'the name seems to mean "pound fort," i.e., "fort for impounding cattle"'. While it may not seem logical that a bivallate ringfort should be paired with a univallate site, what is implied is that the underlying rational of the clusteration formula 'recognised' the statistical similarities between these two sites. The archaeological inference is that if a bivallate site is seen as an indicator of the elevated social status of the occupant, then so too must an impressive univallate one.[9]

Also included in Ciii is the most impressive univallate ringfort in the study area, Lisduff in Moveen West (**76**). This was paired at the primary level of the cluster analysis with the larger of the two conjoined ringforts in Lissalougha (**72**). The former site, while univallate, is arguably of as high a status as many bivallate sites, with its large MID of 40.7m and rock-cut fosse, which is up to 1.8m deep and 5.4m wide (Chapple 2003, Pl. 2). Lissalougha is a similarly high status univallate site, with

[9] Similarly, the second bivallate ringfort in this cluster (**19**) is a relatively unimpressive site with little to place it out of the ordinary, barring its double bank. However, it was paired at the primary level of CA with what appears to be a univallate site of high status (**31**). This site possesses an above average MID of 36.34m, with the bank measuring 3.9m at its greatest, along with a fosse whose maximum dimensions are 1.02m in depth and 6.65m in width.

an internal diameter of 30.75m and a fosse of up to 5.92m wide and 1.10m deep. The conjunction of this site with its less impressive neighbour appears to give weight to contention that it was a ringfort whose occupant was of relatively high status.

Cluster Analysis has revealed an intermediary level of ringfort status, one which incorporates the lesser double banked sites along with the premier univallate ringforts. This interpretation contradicts the strict, and largely simplistic, dichotomy that views bivallate sites as the upper echelon of society with all univallate ringforts as a homogenous lower level. While this view is broadly accurate, the actual situation is more complex. What emerges is that certain types of bivallate sites, notably those with little to mark them apart from ordinary ringforts except their double bank, are equatable in status with the larger, more imposing univallate sites. Thus, Stout's assertion (*op. cit.* 218-9) that such sites represent a secondary tier in Early Christian society, below the impressive bivallate sites of Cv but above the 'typical' ringforts of Ci, is supported.

**Cluster IV (Civ)**

Civ comprises 23 ringforts, all of which are univallate (Table 5). Closely related to this is their locational cohesion in being positioned, on average, on the highest available ground (51.52m) and steepest inclines (3.70°). This cluster also presents the highest average DECs (*c*.3,720m), similar to that for Ciii. Within this group, only eight sites have an external fosse, accounting for 35% of the ringforts. However, the majority of these are shallow and the mean depth is a mere 0.12m. In terms of slope and isolation from ecclesiastical centres, this group is similar to Stout's Cluster 5 (*op. cit.* 218-9).

**Table 5**

**Cluster IV:** 23 Cases (15%)

| Variable | F-ratio | Cluster Mean | Variable | T-value | Cluster Mean |
|---|---|---|---|---|---|
| Vallation | 0.00 | 0.00m | Altitude | -1.05 | 171.74m |
| Height Bank 2 | 0.00 | 0.00m | Slope | -1.00 | 3.70° |
| Nearest Neighbour | 0.51 | 238.32m | Nearest Neighbour | 0.68 | 238.32m |
| Fosse Depth | 0.60 | 0.12m | Ecclesiastical D. | -0.65 | 2779.57m |
| Height Bank 1 | 0.85 | 1.75m | Internal Diameter | 0.12 | 31.86m |

Three of the ringforts in this cluster (13%) appear to be partially built up on one side to compensate for the gradient of the land, thus providing a level interior surface. This observation is consistent with the majority of sites in this cluster being located at the higher settled altitudes and increased slopes. It may also be noted that only one other ringfort, in Ci, is similarly built up to compensate for the gradient.

**Cluster V (Cv)**

Cv is composed of twenty sites, is the smallest group of ringforts, and wholly composed of bivallate earthworks (Table 6). Slope and external fosse depths are important determinants for this cluster, the mean locational slope being 1.17°, the lowest for any cluster. Only three sites (15%) possess an external fosse making it an important cluster determinant and confirming Stouts view that bivallate

sites tend to lack outer fosses. While Stout's Cluster 2 ringforts are similar, they exhibit much smaller MIDs in comparison to their MODs. Ringforts in this group have both large mean MIDs (35m) and MODs (58m)(*op. cit.* 217). In both cases these are the largest for any clusters and may be paralleled with Stout's Cluster 4 (*op. cit.* 218).

**Table 6**

**Cluster V**: Cases (13%)

| Variable | F-ratio | Cluster Mean | Variable | T-value | Cluster Mean |
|---|---|---|---|---|---|
| Vallation | 0.00 | 1.00 | Overall Diameter | -1.17 | 58.05m |
| Slope | 0.39 | 1.17° | Slope | 1.15 | 1.17° |
| Fosse Depth | 0.42 | 0.06 | Height Bank 2 | -0.86 | 0.58m |
| Nearest Neighbour | 0.64 | 309.38m | Height Bank 1 | -0.57 | 2.90m |
| Ecclesiastical D. | 0.64 | 2467.81m | Internal Diameter | -0.40 | 35.40m |

Cv is generally dispersed throughout the study area with a slight concentration in the central section of the peninsula. The eastern range of this distributional pattern partially skirts the southern edges of the Breaghva and northern-Querrin 'bog-land zones' with one site on the western range of the Dough River valley. Two outliers are present to the west of the main concentration in the townlands of Quilty and Cloughaunsavaun.

**Principal components analysis**

While Stout's reliance on Alexander's formulae (1983) is largely justified, a more in-depth approach is available, which identifies the variables that influence ringfort morphology and location. Principal components analysis (PCA) provides an effective means of data analysis which allows important structural features in the data to be easily and clearly discerned.[10] Specifically, PCA provides a two-dimensional graphic representation of the data matrix which facilitates the examination of sites and their relationships to individual variables (Orton 1980, 56-7).[11] The resulting scattergram may be understood in that objects (ringforts) that lie in one area of the graph are characterised by those variables which are located in the same relative area (Fig. 7). The important *caveat* with this method of interpretation is that objects and variables represented near the centroid ('cross-hairs') of the scattergram are characterised by neither of the principal components and add little to the overall variability.

10 Although PCA quite accurately describes the groups produced by CA, obviating the need for Alexander's formulae, it may be argued that the former is of lesser value as it omits tests of statistical significance. To dismiss such objections a randomisation test was applied to the PCA results. For the purposes of the tests, each variable was taken and the actual values randomly reassigned to the ringforts. A new PCA was performed and the first and second pseudo-eigenvalues are noted. These two pseudo-eigenvalues are then taken as a measure of the tendency for the variables to correlate. In all PCA was applied 999 times, each time with the data set freshly randomised The results indicated that the actual eigenvalues were significantly larger than the pseudo-eigenvalues produced by the randomised data and on no occasion were they exceeded in magnitude by the pseudo-eigenvalues. Thus there is less than a 0.001% probability that the original results are due to random circumstance.

11 Since the data matrix for the Loop Head area ringforts includes measurements in both metrical units and degrees, it was considered most appropriate that the information be standardised, though not transformed (pers. comm. R. Wright). The first principal component produced an eigenvalue of 2.96 and accounted for 22.74% of the variability within the set. The second principal component produced an eigenvalue of 1.75 and accounted for 13.48% of variability.

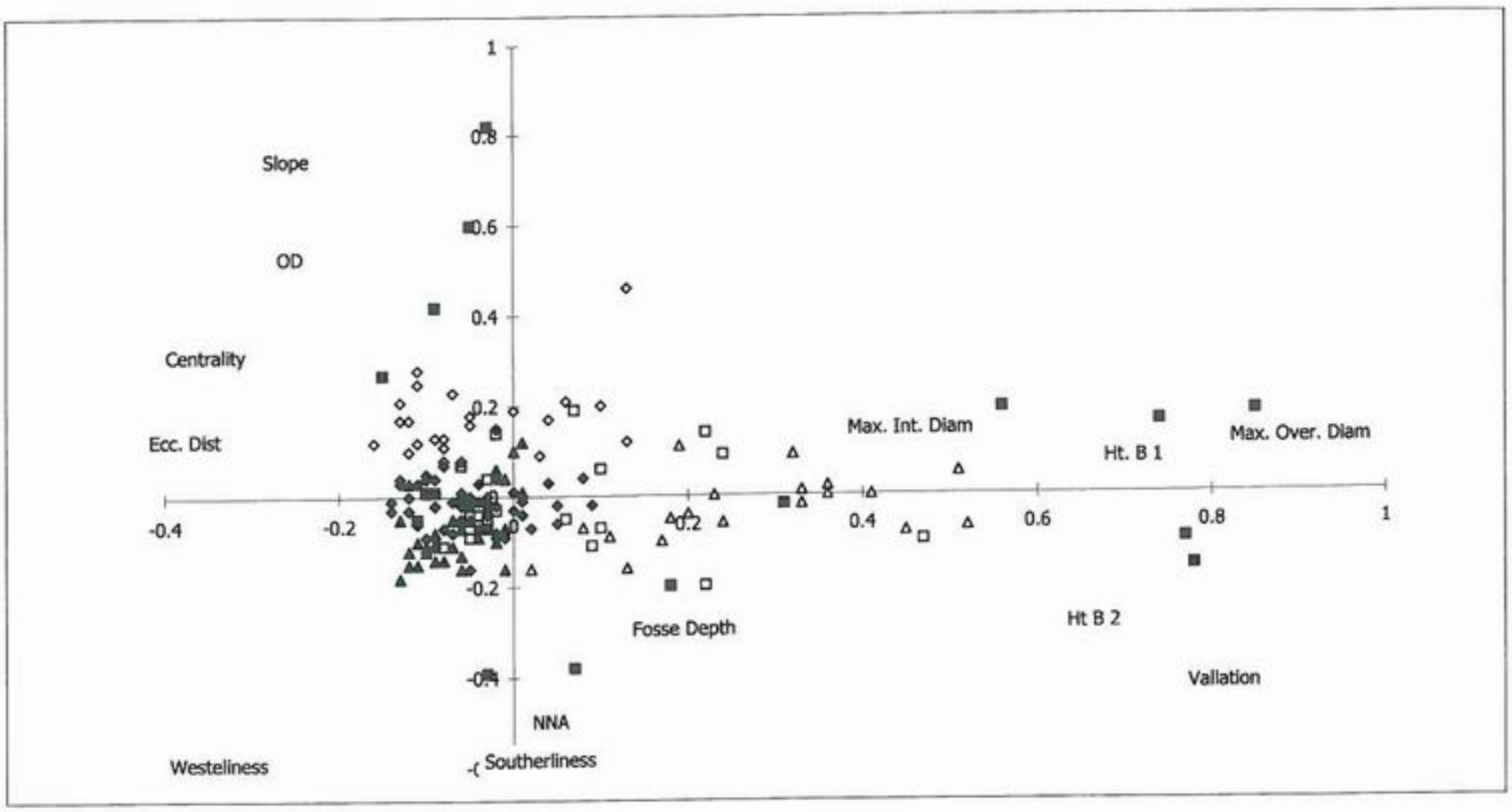


**Fig. 7** PCA scattergram for Loop Head area ringforts, recoded by cluster membership. Solid diamonds: Ci; solid triangles: Cii; open squares: Ciii; open diamonds: Civ; open triangles: Cv.

Thus ringforts which appear on the right of the scattergram (the first principal component) are characterised by high values for the variables of measurement and thus tend to be large ringforts. With the exception of the variable of vallation, none of the non-measurement variables are located in this region, meaning that the tendency to be bivallate is closely linked to increased size over all measurement variables. There is no extreme scatter of ringforts to the left of the diagram, though those which lie along this periphery are somewhat smaller in size and have a higher likelihood of being univallate. Size and vallation appear to bear little significant relationship to such non-measurement variables as slope, altitude, townland centrality, aspect along with both DEC and NND.

Examination of the second principal component (demonstrated in the vertical axis) indicates that the upper portion of the diagram characterises ringforts located on sloping ground with higher altitudes which tend to be more centrally located within townlands and which also display a marginally greater distance to ecclesiastical centres. The ringforts which lie in the upper part of this scattergram also show the greatest deviation from southerliness and westerliness in their aspect (*i.e.* these sites display the greatest propensity for location on northerly and easterly facing slopes). The locations of ringforts in this area of the scattergram also indicate a slight tendency to be in close proximity to their nearest neighbours. Thus, ringforts located in the lower portion of the vertical axis show a proclivity towards location on southerly and westerly slopes and have an increased likelihood to be more distant from their nearest neighbours. Such sites also tend to be located on more level ground and consequently at lower altitudes. They also tend to be less centrally located within the townland structure and be nearer to ecclesiastical centres.

When the data is recoded based on cluster membership the interaction of groups may be appreciated in a more holistic manner and the complexity of cluster formation and membership observed. This diagram (Fig. 7) demonstrates that Ci is not greatly characterised by any of the variables, the slight spread to the left of the scattergram indicating that these ringforts tend to be smaller and univallate. Cii is similar, though the emphasis of this group of ringforts is more towards location in low-lying areas and nearness to ecclesiastical centres. Of all the clusters these two show

most similarity and it may be argued that they should be merged. Ciii ringforts are somewhat more disparate in their distribution among the principal components. They range over the major characteristics from high to low and may be seen as the least compact and well defined of all the groups. Alternatively, Civ is a very well defined group in terms of the locational variables. It is principally defined by higher scores for the variables of altitude, townland centrality and DEC. Consequently these ringforts nearer to their neighbours and tend to be univallate and smaller in size. Cv is also distinguished by high scores for the measurement variables. Ringforts which lie in this area of the diagram tend to be bivallate. This cluster is also characterised by ringforts with greater fosse depths and are marginally more isolated from their nearest neighbours, though they tend to be closer to ecclesiastical centres.

In general terms, while the majority of clusters have been shown to be largely compact and well defined, a certain degree of overlapping is obviously present between all groups. It must be understood that CA and PCA observe the data in markedly different ways. Where there is statistically significant structure in the data the results of both analyses do tend to be similar, which is how the current situation should be interpreted.

**Detailed study area A**

While a generalised map of the distribution of ringfort clusters is sufficient to show basic patterns, it is unsuitable for the purposes of examining the relationships between individual ringforts and the landscape. In an attempt to gain a fuller understanding of these relationships a number of areas were selected to display the widest possible variety of terrains on the peninsula along with a comprehensive array of ringforts of various cluster types (Fig. 6).[12] Analysis of this nature cannot rely solely on information gleaned from maps, but must ultimately be tempered with the experience of intensive field survey where individual ringforts and the general landscape are known to the surveyor from long association and repeated visiting of the sites. Thus, the analysis took on a less statistical character to produce a fusion of both objective and intuitive methods.

Figure 8 represents an area of *c*.8,290m$^2$ along the northern coastline of the peninsula. The average density of ringforts in this area is 1.81/km$^2$. The most obvious features of this distribution is the location of ringforts on the sheltered southern slopes of both Moveen and Knocknagarhoon Hills and the avoidance of the lower land in the valley of the Lisheen River. Two major groups are separated by the north-west flowing Lisheen River entering the sea at Bealanaglass. Both groups are located on or in close proximity to small pockets of brown earths, the best land available in the area. Each grouping appears to have a high status Cv ringfort at its centre, possibly representing the homestead of a prominent local individual. In the case of the Moveen West group the Cv ringfort (**79**) is closely surrounded by three 'typical' Ci sites (**77-78 & 80**). However, the second grouping, centred on the Cv ringfort (**7**) in the townland of Carrownaweelaun, is surrounded at a slight remove by five lower status Civ ringforts (**4, 6-8 & 59**). Three of these ringforts (**4, 6 & 59**) display evidence of having been built up on their down-slope section to provide a level internal area, possibly in an effort to allow their close positioning to the area of higher quality soil to the west on Knocknagarhoon hill. It is possible that these poorly sited ringforts functioned as the homesteads of lesser status farmers along the outer edge of a circle of influence centred on the high status Cv ringfort (**7**). In the case of the Moveen West group of sites, the three Ci ringforts surrounding the main bivallate ringfort in the townland (**79**) are located on similar quality land and altitude as the high status Cv site. This would suggest the presence of an affluent community, which could support such a group of ringforts.

12 While the author's thesis selected five DSA's, only two will be presented here for the sake of brevity and to avoid unnecessary repetition.

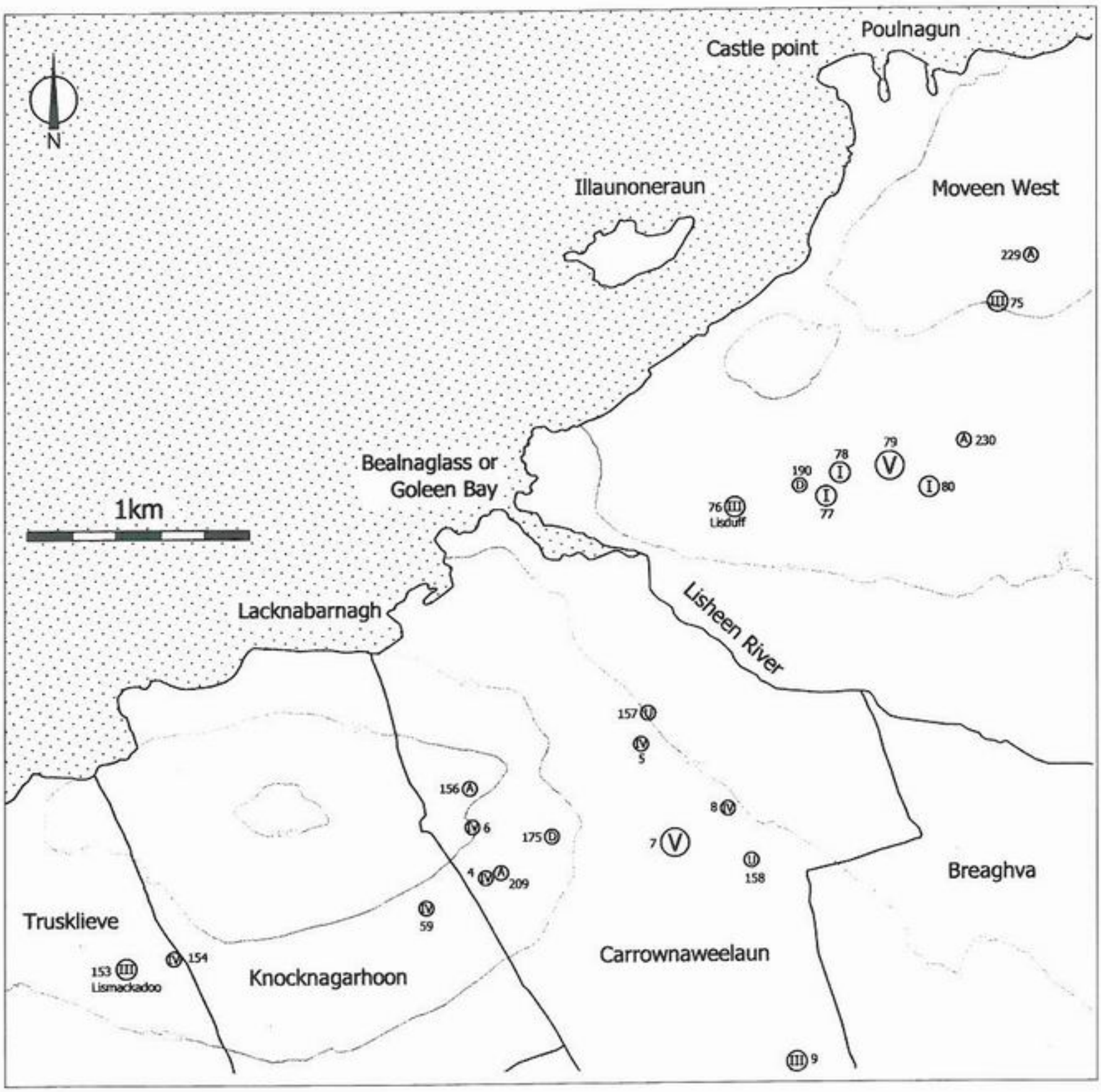


**Fig. 8** Detailed study area A. I-V: Cluster I – V ringforts; D: destroyed earthwork; U: unclassified earthwork; A: potential site from aerial photography.

'Multi-functional' Ciii ringforts are located on the peripheries of the two groups in this study area. In the Moveen West group the two Ciii ringforts are located to the west (**76**) and north-east (**75**) of the main group. In the Carrownaweelaun group the Ciii sites are located to the south (**9**) and west (**153**) of the main concentration. A short distance up-slope, to the north-west of the Ciii ringfort in Trusklieve, is a lower status Civ site (**154**) which may be similar in function to the other Civ enclosures in Carrownaweelaun and Knocknagarhoon. It would appear that Ciii ringforts acted in some form of quasi-militaristic role providing a buffer between areas with large 'high status' ringforts while still retaining their function as occupied homesteads. In the case of the Moveen West group both Ciii sites are located in prominent positions. Lisduff (**76**) stands on the end of a natural spur of high ground to the west of Moveen Hill overlooking the Lisheen River valley and the Carrownaweelaun group of sites to the south and south-west while **75** is in an elevated position which provides a satisfactory observation post for any activity to the east of the group, possibly overlooking grazing land in that area. The bivallate, Ciii ringfort in the central portion of Carrownaweelaun (**9**) may also be seen a territorial outpost, either of the Cv ringfort (**7**) in the northern portion of the townland or of the impressive Cv site of Carrownaweelaun, in the south of the townland.[13] The Ciii ringfort of

Lismackadoo (**153**) is located on the exposed western slopes of Knocknagarhoon Hill. It is undoubtedly peripheral to the overall distribution of ringforts on the peninsula, as are its two neighbouring Ciii ringforts (**151-2**). While Lismackadoo may be interpreted as being defensive to the Carrownaweelaun group, the others appear to be more likely defensive to the groups of ringforts dominated by the Cv ringforts to the south, in the townlands of Tullig (**208**) and Bellia (**1**). While these analyses are tentative in the extreme, it is of interest that these four 'multi-functional' ringforts should be peripheral to, possibly even demarcating the limits of, two apparently affluent groups of ringforts. This patterned group structure is repeated throughout the peninsula and appears to represent a socially cohesive unit on the parochial, or sub-*túatha* level.

**Detailed study area B**

Figure 9 represents an area of *c*.18,000m$^2$ with an average ringfort destiny of 2.27/km$^2$. This locality presents the greatest interpretational difficulties, one factor being the high number of 'high status,' Cv, ringforts, of which eleven survive, the largest concentration for any of the detailed study areas originally examined (Chapple 1998, 279).

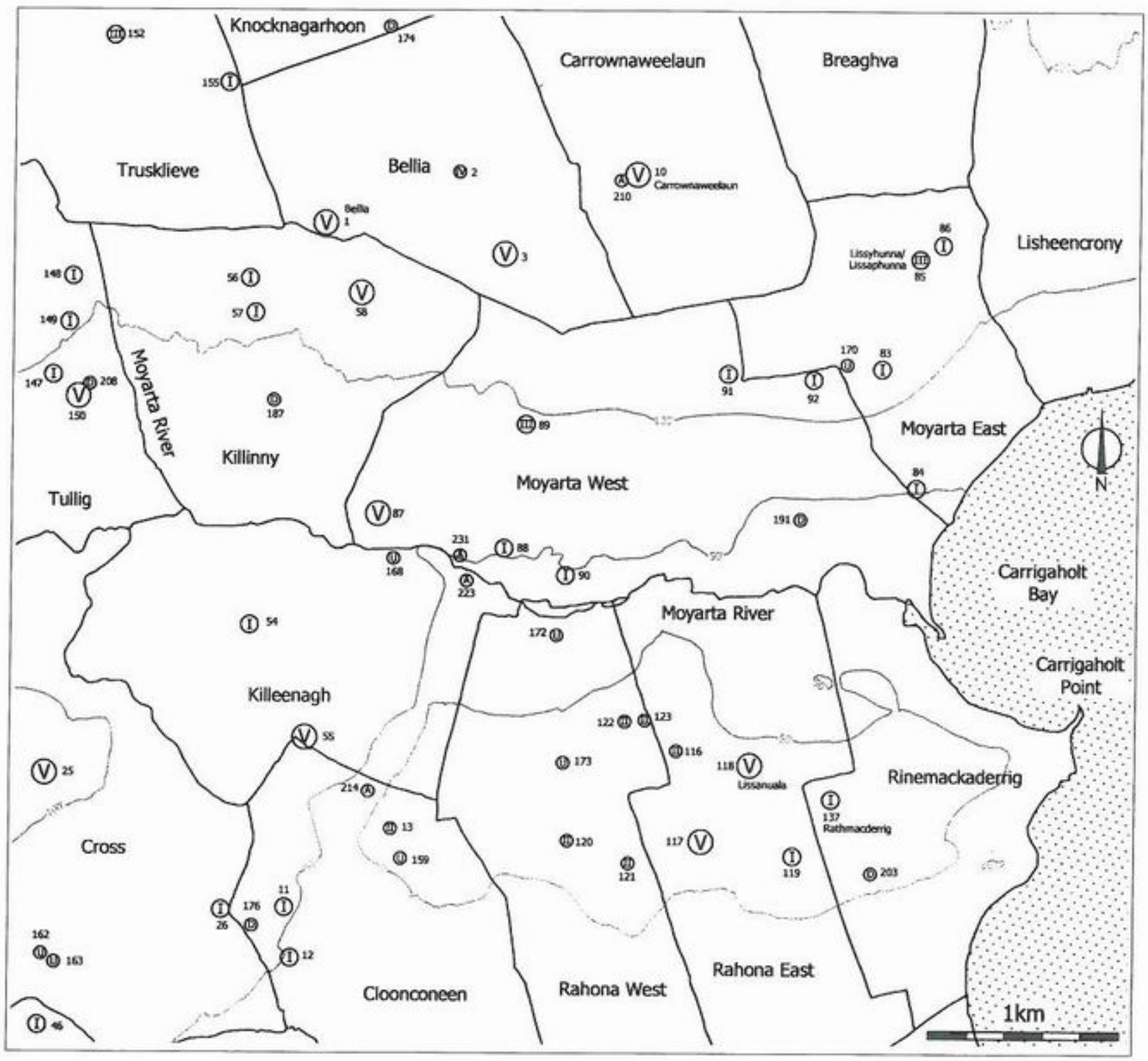


**Fig. 9** Detailed study area B.

13 It is also worthy of note that this site is positioned within 50m of the potential route across the northern portion of the 'Breaghva bogland zone' and within 250m of the cross-roads between this road and the potential north/south running route through Carrownaweelaun.

It is obvious that each of the two groups of ringforts in the townland of Cross is dominated by a high status Cv ringfort (parts not illustrated). The most southerly of the two groups, is centred on a Cv ringfort (**22**) located on the apex of a small hill. To the south-east and south-west are two Ci ringforts (**45** & **46**) which are located on lower, more southerly facing land. These ringforts, and possibly the two destroyed sites directly to the east (**162** & **163**), may have functioned as the holdings of lower status families, and clients of the occupant of **22**. The situation is broadly similar for the second group, centred on the Cv site **25**.

In the eastern portion of Tullig there is a further Cv ringfort (**150**) surrounded by a number of lesser status sites. To the north and north-west are two Civ ringforts (**145-6**) (not illustrated). Typically, their distribution is peripheral to the main group, though, despite their relatively exposed position they are located on a zone of brown earths and close to a postulated Early Christian road that runs through the area. This pattern is similar to the two Ci ringforts in Oughterard (**96** & **98**), which seem to eschew the benefits of a sheltered location in favour of proximity to zones of brown earths. The conclusion may be drawn that while a sheltered position with a southerly aspect may be favourable, the presence of higher quality soils is an overriding locational determinant. It is extremely difficult to assess the relationship between the multifunctional Ciii ringfort (**152**) in Trusklieve and any potential 'group' of sites centred on a Cv ringfort. Of greater importance, however, is its generally peripheral location that fits the observed pattern for sites of this type.

Both of the groups centred on the high status Cv ringforts of **117** and Lissanula (**118**) can be interpreted as a single high status ringfort located on sheltered ground at the centre of a collection of sites of lower social standing. The distribution of these lesser ringforts appears to have been influenced by the availability of higher quality soils and sheltered locations. However, other considerations may have played important roles in determining their location. Firstly there is the possible influence of the local Early Christian road network and, secondly, their proximity to ecclesiastical centres. In the latter instance, the Early Christian monastery of Kilcredaun lies to the south of the Rahona groups of ringforts (not illustrated). Similar to the analysis of other ecclesiastical centres on the peninsula, there appears to be a significant gap or 'exclusion zone' in the general distribution of secular sites in the vicinity of such foundations (Chapple 1998, 285-6; 2003). To the north of the complex, around the northern slopes of Kilcredaun hill, is a band of podzolised gleys and one of peat, both of which span the width of the promontory which forms Kilcredaun point. In this context it is difficult to differentiate between the potential positive determinant of proximity to ecclesiastical centres and the desire for location away from peats. Indeed, these topographical factors may have served as natural barrier between the distributions of secular and ecclesiastical sites and could have been deliberately chosen by a clerical faction on this basis. Despite the lack of the more productive brown earths in the vicinity of the Kilcredaun churches, their sheltered position is highly desirable as is their aspect, which allows the maximum benefit from the available sunshine. The coastal positioning of the complex also permits the potential exploitation of marine and inter tidal food resources along the shore and in the calm waters to the north of Kilcredaun point. Overall, the distribution of the Rahona groups of ringforts appears to conform to the general thesis of location at a remove from ecclesiastical centres. However, the desire for proximity to the better quality soils, location at a distance from peaty land and a sheltered position may have been additional factors in site location in this area.

A further group of ringforts is located along the north of the Moyarta River valley, centred around the Cv ringfort of Lissagreenaun (**87**). Lissagreenaun is located on the Kilrush series of gleys, just to the north of the Moyarta River, above the 15.24m (50ft) contour. This Cv ringfort is located approximately 100m to the east of a north-east to south-west running road which links a postulated

Early Christian route-way from Kilballyowen church to the north/south running road through Carrownaweelaun townland. Also worthy of consideration is the fact that the adjacent Moyarta River is certainly navigable by dugout canoe around the area of Lissagreenaun and may have acted as an important local artery of trade and communication. In such a context, this bivallate ringfort is positioned on a potentially significant cross-roads within the peninsula. The final ringfort to be considered in this group is a multifunctional Ciii site (**89**), located approximately 500m from the main body of earthworks. It is similar to others of this type as its positioning is peripheral to the main concentration of ringforts, to the south. Although the site is severely exposed to the west, its location has the advantage of providing unrestricted views in all directions, excluding some areas to the north. Similar to other Ciii ringforts, **89** is located in proximity to a possible Early Christian road.

Further to the east is a group of ringforts centred on the townland of Moyarta East. While there appears to be no high status Cv ringfort associated with this group, the unclassified earthwork **170** may have originally functioned in such a role. This site appears to have been a ringfort, possibly bivallate, but was given over for use as an ecclesiastical centre in the period after 1302 (Westropp 1912, 109, 111). The initial choice of this ringfort as a Medieval ecclesiastical site may indeed have been influenced by its high secular status. The site is located at the approximate centre of a small area of brown earths. The location is also desirable in that it is positioned on gently sloping land with a generally southerly aspect and is located within 10m of a road junction of possible Early Christian date. Directly to the west is a possible Early Christian road, leading east from the Ciii ringfort **89** itself linking with the potential route running south through the townland of Carrownaweelaun. To the north of site **170** is a road which skirts the western edge of the 'Breaghva bogland zone' and connects with the route which passes the northern edge of this zone. This route passes south from **170** to join the coastal route from Kilcredaun to Querrin. In this context, it is arguable that the location of this site is of the greatest importance and would have been a suitable position for a high status, bivallate Cv ringfort.

Two Ci ringforts (**91-2**) are found to the west of **170** and are located on either side of the possible route-way from the Ciii ringfort, **89**, to the west. Both Ci ringforts are located on the south facing slopes of the upper valley of the Moyarta River, above the 100ft contour. As with other groups, it is possible to interpret the Ci sites surrounding **170** (**83**, **84**, **91**, **92**) as the individual farmsteads of 'typical' social status during the Early Christian period. However, the final Ci ringfort in this group (**86**) may not necessarily be interpreted in this way. This site is located approximately 150m to the north-west of the Ciii ringfort of Lissyhunna (**85**) and Westropp (1909, 126) suggested that it might have acted as a cattle enclosure for its neighbour. While this is mere speculation, a number of points relating to its distributional characteristics are worth noting. In the first instance, it is located in proximity to a Ciii ringfort, a type which are almost exclusively found in relative isolation, and especially in the eastern half of the peninsula, usually overlooking open, unpopulated bogland. Indeed, had this Ci ringfort been absent from the landscape, one would have had no hesitation in arguing for **85**'s conformity to the general type. The only comparable sites on the peninsula are the Cv ringfort (**16**) and the nearby Cii site (**18**) in Cloughaunsavaun townland; and a Ciii ringfort in Lissalougha townland (**72**) and its conjoined Cii ringfort (**73**). Owing to the conjunction of the latter two sites, it seems reasonable to suggest the smaller performed as a stock enclosure. In this context, and in the absence of excavated data, it seems reasonable to concur with Westropp's view that this ringfort (**86**) was intended as a cattle enclosure.

Despite the apparent aberration in the distributional pattern, the Ciii ringfort of Lissyhunna (**85**) is otherwise relatively typical of its type in that it is located at a remove from the main group of sites and in close proximity to a postulated Early Christian road. In this instance, a road runs from 300m to

the east of the ringfort, along the possible edge of an ecclesiastical land holding centred on Kilcrony, joining the postulated Early Christian route from Kilcredaun to Querrin. Similar to the Ciii ringfort in Moyarta West (**89**), this site would appear to have been located at the terminus of a contemporary road. However, should this be a true reflection of Early Christian settlement in this area, the implications of such a distributional characteristic are difficult to interpret.

Similar to the unclassified earthwork **170**, Lissyhunna (**85**) is located at the centre of a small zone of Tullig brown earths. Directly contiguous to this area of soils, to the north-east, is a large area of peat which forms part of the 'Breaghva bogland zone.' In this context, it may be argued that the combination of the higher quality grazing of the proximal Tullig brown earths and the poorer fodder of the adjacent bogland could have allowed the inhabitant of this site to accrue a large dairy cattle herd, requiring a separate stock enclosure. Other, possibly less tangible factors may also have included a heightening of the individuals status owing to the proximity of this site to the ecclesiastically controlled land of Kilcrony.

The four remaining Cv ringforts in this detailed study area (**1, 3, 10 & 58**) are all located within 1,000m of each other and do not form the group nuclei expected from the analysis of other areas of the peninsula. The one possible exception to this discrete distributional pattern is the ringfort of Lisnagreeve (**58**), which possesses two 'typical' Ci ringforts (**56-7**) to the west of the site along with a destroyed earthwork (**187**) to the south-west. All three surviving ringforts are located above the 30.48m (100ft) contour, on the Kilrush gleys. In this instance it seems that the chief locational characteristic of Lisnagreeve is its proximity (*c*.175m west) to the postulated Early Christian route-way which runs east from the ecclesiastical centre of Kilballyowen. Approximately 200m to the north of Lisnagreeve, this road joins a further route which may also be of Early Christian date. This section of road effectively joins the postulated course which passes through the townland of Tullig to the main arterial route-way through the Loop Head peninsula. The ringfort of Bellia (**1**) possesses the same locational characteristics as the previous sites, though located at a slightly greater altitude. It is located 350m to the west and slightly further from the postulated main arterial road through this area. However, it is within 10m to the north of the possible west-north-west/east-south-east road that passes between this site and Lisnagreeve. This particular high status site appears not to be at the centre of any group of ringforts.

To the east of Bellia ringfort is a further Cv site (**3**), situated on the edge of a large zone of Abbeyfeale gleys, as opposed to the predominant Kilrush series. Again, this site, despite its apparent high status, does not appear to form the centre of any substantial group of ringforts. The only site of lower status in the vicinity is a single Civ ringfort (**2**) *c*.450m to the north-north-west. This small site is located further upslope, on the edge of the area of Abbeyfeale gleys mentioned above. The Cv site of Carrownaweelaun (**10**) is located near the centre of a large area of Abbeyfeale gleys on gentle, south facing slopes in the south of Carrownaweelaun townland. Once again, the site does not appear to form the centre of any substantial group. The only possible exception to this being a site known from aerial photography (**210**), *c*.100m to the southwest. The ringfort of Carrownaweelaun is also located approximately 180m to the west of the postulated north-west to south-east running route-way through the townland.

In other areas of the peninsula, where Cv ringforts form the nuclei of small groups, such locations on south facing slopes appear to have been favoured positions. In these situations proximity to areas of ecclesiastical land and zones of higher quality brown earths appear to have played an important determining influence. However, neither of these factors appears to have been in operation in this locality. The only remaining, locational determinant which may be advanced at this point seems to be the presence of the postulated roads of Early Christian date which run through this area. While the

topographical setting of these sites is largely favourable, it may be tentatively argued that it was their proximity to contemporary roadways, which afforded an increase in social status. From the currently available data it may be proposed that such a social elevation was sufficient to allow the construction of higher status, bivallate ringforts without the obvious support of a subservient grouping of lesser sites under the *túath* system. While it seems unlikely that this area was of any great importance on a 'national' scale, it may be that this locality represented a major focal point for the entire peninsula.

**Discussion of the distributional pattern**

From the foregoing analysis it is evident that the distribution of ringforts on the Loop Head peninsula is based on the complex interaction of a number of diverse variables. Among these is an apparent primary desire for location away from marginal or boggy land. However, such marginal land may have been used as rough grazing, perhaps equivalent to the *lethmachaire* (half plain) mentioned in the documentary sources. Nonetheless the paramount consideration in the siting of an individual ringfort had to be the retention of enough land to provide a viable farming enterprise, generally on gently-sloping, south-facing land sheltered from the prevailing winds. A further element in this process was the possible attempt to conserve valuable soil resources, often expressed in the construction of ringforts at a slight remove from these discrete areas of Tullig brown earths.

Other determining variables may have been of a more social nature. Chief among these appears to have been the association of lesser ringforts with earthworks of higher status. Although tentative, the interpretation of this feature is of a society formed into semi-nucleated groups, each of which presumably represented a cohesive social unit, centred on a single, bivallate ringfort. Warner's interpretation of the early literature would appear to corroborate an interpretation of a deliberate clustering of clients residences around their lord (Warner 1988, 67).

A desire for location close to ecclesiastical centres also appears to have played an important determining role. However, it appears from the analysis that the churches in this area possessed large land holdings, effectively creating 'exclusion zones' around these establishments (Chapple 2003). Similar patterns are observed in Brady's study of the barony of Morgallion and may arise from a higher level of arable farming being carried out on large estates around the monasteries (Brady 1983, 19-24). It is possible to see the ultimate origin of this distributional pattern in frontier settlements or 'pioneer foundations' in unpopulous territory. In this context, it may be suggested that the Early Christian ecclesiastical centres of the peninsula represent the earliest settlement in this area in a period following the 'Iron Age lull,' after *c*.400AD, and acted as *foci* for secular settlement at a slightly later date. Such a hypothesis fits well with other research indicating that ecclesiastical centres were regularly founded in deserted areas devoid of contemporary settlement (Doherty 1985, 52). A similar solution has been suggested for the low density of ringforts in the south of county Louth which are attributed to secondary settlement around sixth-century monastic foundations (Murphy 1992, 373). This ties in well with the only evidence of an Early Christian foundation date for any of the ecclesiastical centres on the Loop Head peninsula. Teampul Sheorlais, in Kilcredaun is believed to have been founded by St. Caritan, around 550AD (Westropp 1900, 167).[14]

Another factor determining ringfort location appears to have been the desire for proximity to route-ways through the peninsula. Work in other areas, combined with evidence from the early law texts, supports the thesis that high status ringforts may be located close to roads (MacNiocaill 1971, 85; Warner *op. cit.* 50; Stout 1991. But see Stout 1997, 102).

[14] In this context, the local tradition that this area was devoid of churches for some period after the introduction of Christianity may contain some truth.

**An hypothetical model of Early Christian settlement and society**

The forgoing has considered the relationships between individual ringforts, ringforts with their topographical setting, and social determinants in influencing settlement. The question of the place of the ringforts occupants in the Early Christian social structure is have yet to be examined. Following from this an hypothetical model of Early Christian settlement geography may be proposed, which may be seen as an alternative to that suggested by Stout for the south-west midlands (Fig. 10; Table 7).[15] It is derived from the observed physical distribution of ringfort groupings from the multivariate analyses, correlated with the schematised descriptions available from early Irish law texts. The alternative model presented here attempts to graphically summarise the functional and distributional characteristics of ringforts on the Loop Head peninsula.

A review of the Early Christian legal documents indicates that the form of idealised society depicted was a stratified one based on the *túath* system, where kings and lords occupy the upper echelon with free farmers or commoners below them (Binchy 1941, 109). In the current context, only the position of *rí* needs to be considered as an individual's inter-territorial role as *rí túaithe* or *ruire* is external to their position within their own *túath* (Stout *op. cit.* 229; McLeod 1986, 60). Stout notes that the perceived mobility in status and comparable powers of the higher grades indicates that there should be little difference between the physical distribution of ringforts belonging to the highest lordly grades of *aire forgill* and *aire ard* (*ibid.*).

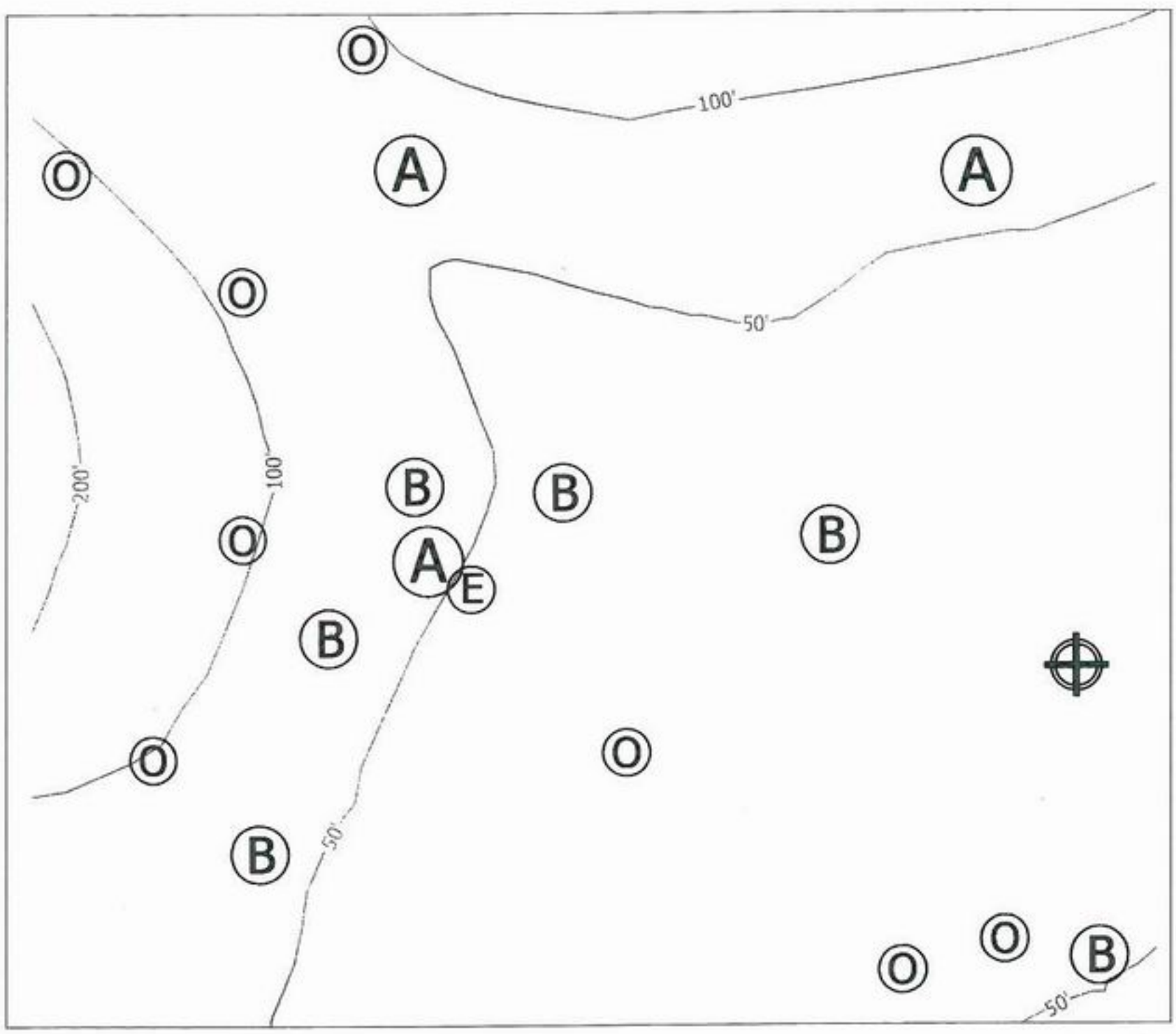


**Fig. 10** Hypothetical model of ringfort distribution for the Loop Head peninsula, based on field survey, multivariate analyses and early Irish law texts (not to scale).

[15] Ringforts of the *aire* grades are marked 'A' while those of the *ócaire* and *bóaire* grades are marked 'O' and 'B', respectively. Possible cattle enclosures are marked 'E' and ecclesiastical centres as '+'.

| Table 7. **Tabulation of cluster groupings with postulated grade from the early Irish laws.** | | |
|---|---|---|
| **Cluster group** | **Stout 1992 equivalent** | **Postulated grade** |
| Cluster V | Cluster 2 | *Aire déso* and higher grades |
| Cluster III | Cluster 4 | *Aire déso* (*aire échta*) |
| Cluster I | Cluster 3 | *Bóaire* |
| Cluster IV | Cluster 1 | *Ócaire* (+ some *bóaire*) |
| Cluster II | Cluster 5 | *Ócaire*/cattle stockade |

McLeod's analysis of the physical location of ringforts on the landscape indicates the position of the *aire déso* on the periphery of a settlement core as his social status appears to have been determined by his function in inter-territorial disputes as a military leader (McLeod *op. cit.* 50, 54; Binchy *op. cit.* 70; McCone 1986, 7-8). Thus, one should expect to find the ringforts of the *aire déso* on the periphery of territorial units. In the context of the present study, the territorial units in question are interpreted as the 'micro' holdings related to each ringfort 'group' as opposed to the 'macro' unit of the *túath*. As previously discussed, multifunctional Ciii ringforts are the furthest removed from their nearest neighbours and their inclusion of a number of bivallate sites plus the most impressive univallate ringforts would seem to suggest their higher status. These sites are furthest away from ecclesiastical centres, but are located close to Early Christian route-ways of date, many of which have linked monastic foundations.

While the early literature makes no reliable references to the positioning of ringforts within lordly land holdings, a certain amount of information may be gleaned about the sites themselves. Stout's analysis of *Críth Gablach's* description of the ringfort of a *rí túaithe* argues that the MOD for the high status site described would have been *c*.51m (*op. cit.* 232). The closest parallel to be found on the Loop Head peninsula are the bivallate Cv ringforts whose mean MOD is *c*.58m. However, the large internal area, in comparison to the defences, which this description implies, bears a number of similarities to the Ciii ringforts. In the south-west midlands Stout parallels the overall diameter with his Cluster 2 ringforts, and the high internal diameter to his Cluster 4 ringforts (*ibid.*). On the Loop Head peninsula the large internal diameter of *c*.43m for the idealised ringfort of the legal texts is closest to the Cv sites (mean=*c*.35m). However, this figure is only 3.26m greater than the mean overall internal diameter for the Ciii ringforts. Thus, the Early Christian legal sources appear to describe an aristocratic residence with parallels to both the multifunctional Ciii and high status Cv ringforts. In this context these two cluster groups may be tentatively ascribed to the higher lordly grades within Early Christian society. In the first instance, the ringforts assigned to Ciii may be seen to be analogous to the position expected of the residence of the *aire déso*/*aire échta*, and it may be reasonable to presume that the bivallate Cv ringforts are of a similar or higher social stratum, belonging to individuals of the *aire déso* grade and above.

Analysis of *Críth Gablach's* description of the 'ramparts of vassalage' indicates that the hypothetical thickness of the banks of a high status ringfort would have been 9.14m (Stout *op. cit.* 234). While this measurement corresponds broadly with the postulated higher status sites in the south-west midlands, the situation on the Loop Head peninsula is somewhat different. In the first instance, the closest mean bank thickness to that derived from the laws within the study area are the univallate, Civ ringforts which appear to be of low status (9.30m). The mean for the higher status Ciii and Cv

ringforts, respectively, exceed this dimension by 2.2m and 7.51m. Obviously, the surviving thicknesses of these banks may be the result of expansion due to a number of factors, both human and natural. However, the fact that the Ciii and Cv groups of ringforts exceed the dimensions specified for the residence of a *rí túaithe* would appear to strengthen their hypothetical position as one high on the social scale.

Thus, the model envisions a high status, bivallate Cv ringfort. It is the residence of an *aire déso* or higher lord and is located at the centre of a semi-nucleated group of lesser sites. It forms the social centre of secular life and is located on well drained, gently sloping ground. The site also has good access to one or more local arterial roads and is located in proximity to what may be interpreted as a large, ecclesiastically controlled land holding, itself conveying value and status on the surrounding sites. The presence of large monastic land holdings account for this relatively long distance to the religious foundations themselves. It is likely that all or part of this land was rented out to the sons of the aristocratic classes and land-less freemen, many of whom may have been direct relatives of the noble. The possibility that the resident of the central site was of a higher social stratum than that of *aire déso* may be demonstrated by the number of lesser ringforts surrounding his earthwork.

Around the edges of this group are the more isolated residences, probably of an *aire échta*, the more militaristic form of the *aire déso* grade. These lordly residences are more defensively sited at a somewhat higher altitude and appear to be positioned so as to overlook, and possibly protect open ground or local route-ways through the area. Both of these nobles would have had a number of clients of the *ócaire* and *bóaire* grades. If equated with Ciii earthworks, these are generally more substantial sites with large internal diameters provided a protective, or even defensive role for the other within the group. While Stout's analysis places these sites chiefly along the boundaries between *túatha*, in areas of potential strife, the Loop Head peninsula, possesses no apparent borders with other *túatha*. In this context these ringforts appear to have taken up a possible secondary defensive role between individual groups of ringforts.

From the description given in *Críth Gablach* of an individual *bóaire*, Stout assigns his Cluster 3 ringforts to that grade (*ibid.*). As discussed above, the Ci ringforts of the peninsula are best equated with the Cluster 3 sites of the south-west midlands in terms of location and morphology. As the surviving laws do not contain even hypothetical dimensions for the types of earthwork inhabited by this class of landed freeman, the identification of the Loop Head Ci ringforts with those of *bóaire* rank must be seen as extremely tentative.

Similarly, the early sources provide no indication as to the form or dimensions of the ringfort expected of an *ócaire*. However, the implications of the law tracts are of a class of restricted means, near the bottom of the social scale, working a single *tír cumaile* of land. Stout sees this situation as concordant with the probability of limited investment on land leased from the aristocratic grades, of *aire déso* and above (*op. cit.* 235). The early texts lend support to this postulation, listing the various numbers of *ócaire* clients appropriate to each grade. These range from a single *ócaire* client for the *aire déso* to six clients for the *aire forgill*. Stout suggests that:

> This indicates status in an indirect way in that all the land of the *aire forgill* and the *aire ard* was allotted to *ócaire* clients. In contrast an *aire túise* seems to have farmed one-quarter of his land, with an *aire déso* being directly involved in agricultural production on two-thirds of his property. In spatial terms this would locate the farmsteads of the *ócaire* in close proximity to the more prominent members of Early Christian society, in contrast to the economically and spatially independent *bóaire* (*ibid.*).

In the south-west midlands, this situation is reflected in the spatial relationship between his high status Cluster 2 ringforts and the apparently lowly Cluster 5 sites. This conclusion cannot, however, be drawn in its entirety from the evidence of the Loop Head peninsula. First it is necessary to examine the points of comparison between the two areas. There seems little reason to doubt that the Cv ringforts represent the residences of the aristocratic grades. As all of these sites are bivallate enclosures it appears sound to parallel their morphology with the 'ramparts of vassalage' associated with individuals of high status in the laws. The Ciii group of ringforts also appear to be of relatively high status as they contain a small number of bivallate ringforts and the most impressive of the univallate earthworks. While it cannot be stated with any certainty, their impressive remains, coupled with their location on the peripheries of semi-nucleated groups of ringforts may indicate both an elevated social position and a protective or defensive function. Such morphological and locational features fits well with the situation postulated for the grades of *aire déso* or *aire échta*.

It is further down the social scale that other aspects of Stout's normative model are less well suited to the present evidence. Following his analysis the Loop Head Ci ringforts, possibly attributable to the *bóaire* grade, should be located at a discrete distance from the high status, bivallate Cv sites. While this is often the case, his model suggests that such ringforts be found exclusively at this remove. Within the study area, this is patently untrue as Ci ringforts are, if anything, more likely to be found in close proximity to Cv earthworks. The same model also predicts that Cii and Civ ringforts, the least substantial and most poorly located sites, should be in much closer proximity to Cv earthworks than they appear on the landscape. The simplest solution to this apparent conundrum is to reverse the postulated roles for the Ci and Cii/iv ringforts. However, such an approach is completely untenable if the hierarchical nature of Early Christian society as described in the legal texts is to be accepted. While the laws do not make any specific comment on the ringforts of the non-*nemed* freemen, the expected residence of a *bóaire* should be larger and more elaborate than one inhabited by an *ócaire*. Thus, Stout's model, while appropriate to the south-west midlands, cannot be adopted for the Loop Head peninsula without serious modification.

In the main, Stout's assertion that the ringforts of the *ócaire* classes should be located in proximity to those of the lordly grades must be rejected for this area. Instead it may be suggested that if indeed land was granted as all, or part of a fief to this grade, the sites chosen were not located close to those of the nobility. Such a situation may be rationalised in an alternative manner. In the first instance it may be seen that implicit in Stout's model is the association of *ócaire* sites specifically with those of the *aire forgill* as such an individuals land holding was completely divided up among the lower grades. Based on the present conditions of the area and the results of the multivariate analyses, it may be suggested that this area was relatively poor during the Early Christian period and may have lacked both the necessary natural and human resources required to elevate an individual to such a position as *aire forgill*. Thus, if the Cv ringforts are interpreted as belonging to the lower grades of *aire* it would be quite reasonable, and within the parameters outlined by the laws, to have the habitations of the *ócaire* located at a distance. As such grades of nobility were engaged in the management of their own farms they would, presumably, have exploited land adjacent to their own ringforts. Thus, any fiefs of land given as part of clientship would be located at a greater distance from an aristocratic habitation. Thus, it would appear reasonable that the land farmed by the noble would be among the best available in the vicinity, and that the area leased by an *ócaire* would be positioned on land which was less desirable, both in terms of agricultural capacity and as a location for habitation. While such an interpretation does not conform to Stout's analysis, it remains a valid interpretation and is consistent with the information provided by the early Irish laws.

It also appears that where lesser ringforts appear in close proximity to bivallate, Cv, earthworks

they are as likely to be of Ci as Civ/Cii types. It may be hypothesised that where land was granted as part of the fief to a client it was as likely to be to an individual of the *bóaire* grade as an *ócaire*. It must also be restated that the cluster groupings produced through the multivariate analyses are tentative only. Indeed, while they do appear to provide a broadly interpretable hierarchical structure they are not absolute categories and a certain amount of 'cross-over' may exist between them. In essence, when dealing with the ringforts assigned to Clusters Ci, Cii and Civ they may not so easily and absolutely be attributed to either of the free, non-*nemed* grades. Obviously, this presents difficulties in the production of exact assignations of single cluster groups to individual grades. However, as has been stressed throughout, the processes involved are exploratory in nature and by no means definitive, instead what is presented is merely the *probability* that Ci ringforts may be interpreted as those of the *bóaire* grade. Similarly, those sites assigned to Cii may be tentatively described as those corresponding to the expected habitations of an *ócaire*. Owing to the unimpressive nature of many ringforts in this category it is possible that a number functioned as cattle enclosures. These may have been either directly associated with larger earthworks or, in the case of upland sites, possibly used for summer grazing. It is less clear to what grade the Civ ringforts should be assigned. Indeed, the examination of the CA results through PCA indicates a high degree of overlap between Cii and Civ which is suggestive of similar group characteristics. In archaeological terms the implication is that these sites may be most reasonably interpreted as relating to the *ócaire* grade. However, owing to this 'cross-over' some of theses sites, specifically the larger and more locationally advantaged, may be reasonably interpreted as those of the *bóaire* grade.

In this instance the model predicts that a number of lesser earthworks, chiefly of middle status Ci and Cii types surround the Cv ringfort. These may correspond to the residences of *bóaire* clients. They are located on the same type of gently sloping ground with access to areas of the more productive brown earths as the lordly residence. Other Ci/*bóaire* ringforts are located at a significant remove from the Cv earthwork and appear to have operated as relatively independent and affluent farming enterprises. A number of small Cii and Civ ringforts are located on higher ground and at a remove from the central site and may be equated with those of the *ócaire* grade. Such ringforts are less sheltered from the weather, many with westerly and northerly aspects. Even when located near better quality soils the exposed nature of the land largely detracts from its agricultural capabilities. Owing to their lower social status and the limited return that the *aire* could expect on his investment, the *ócaire* appear to have been given such marginal land and located in such relatively poor areas. Given the prevalence of boggy land in parts of the peninsula these areas were avoided for habitation, though they could well have been utilised as rough grazing, especially during the dryer summer months. These non-*nemed* freemen may have owed allegiance through clientship to up to three adjacent lords, receiving a fief from and paying annual rent to each. Cii ringforts located in very close proximity to Cv earthworks may also have functioned as cattle stockades for the larger sites.

The combined morphological, locational, statistical and legal analyses undertaken by both Stout and the present writer indicates that a number of valid hypothetical, though divergent interpretations of Early Christian settlement geography may be drawn. In the absence of a country-wide series of closely dated excavations, it may be suggested that the observed differences may be attributable to regional variations in landscape and chronology: variations which gave rise to differences in the relative wealth of the two areas. Further distinctions may be related to the form and flexibility of the application of early Irish law. While this suggestion is purely speculative, such a situation may well result in substantial differences between the idealised form of society portrayed in the laws and the actual pattern of distribution on the landscape.

An important element in this model is that of the monastic establishment. These sites are located

on generally flat ground and at lower altitudes, and always in close proximity to route-ways. From the foregoing analysis it has been suggested that these sites are largely of sixth-century origin and represent 'frontier settlements' or 'pioneer foundations' in unpopulous and possibly heavily wooded territory (See Chapple 1998, 305; 2003). In this way they would have easily and quickly accrued large land holdings and subsequently acted as 'central places' in terms of their spiritual and economic roles along with the formation of a secular focus for settlement. Contemporary sources indicate that from the eighth-century onwards many of these sites took on the character of proto-urban centres, including the function of trading posts (Doherty 1982, 302-3).

**Conclusions**

The 'alternative' model of Early Christian settlement presented here is markedly more conservative than that normative model suggested by Stout (1991, 239), due to the 'cross-over' between cluster groupings. Among the main difficulties in attempting to produce such a model are the very *corpus* of laws themselves, as they do not provide the complete morphological and locational information necessary to produce a workable model of Early Christian settlement. Indeed, the evidence provided by the legal tracts for site positioning and makeup is so slight that the relict distribution of ringforts may be interpreted in a number of ways and still conform to these sources. The abiding problem remains as to what status individual occupied which class of ringfort. In this respect the multivariate analyses have proved themselves to be of great, but not definitive use. The rather simplistic dichotomy between bivallate and univallate ringforts as a measure of social status has been upheld, though with certain additions and *caveats*. From the analyses it appears that a genuine differentiation may be made between various forms of univallate ringforts. Broadly speaking these relate to a division between the larger, locationally favoured sites and the smaller, less impressive and poorly positioned earthworks. The tentative conclusion that may be drawn is that these may be divided between the *ócaire* and *bóaire* grades. Further, the most impressive single-banked ringforts appear to be of a separate class, possibly equatable with individuals of the lordly grades. However, the *caveats* include the many gradations in the sizes of univallate ringforts which make the definition between one 'type' of site and another and their subsequent assignation to the Early Christian grades of non-*nemed* freemen extremely difficult. With regard to bivallate ringforts, the early sources are at least clear that double-banked enclosures are an index of heightened social position. The derivation of the Ciii ringforts through multivariate analysis raises an interesting point as they combine some minor bivallate ringforts with the most impressive of the univallate earthworks, all unified by their general segregation from centralised groupings around a single double-banked enclosure. In the forgoing discussions of distribution they have been paralleled with the lordly grade of *aire déso* and as such may imply a blurring of the strict distinction between nobility and commoners, based purely on the number of ringfort banks. The problems of 'cross-over' may exist here too as the characteristics of a relatively substantial univallate ringfort located at a distance from its neighbours also has parallels in Stout's definition of the *bóaire* as an 'economically and spatially independent' farmer (*op. cit.* 235). Further, Stout's differentiation between individual grades of nobility on the basis of the number of subservient clients is difficult to reproduce for the Loop Head peninsula. Thus, while the residences of high-ranking individuals may be positively identified, actual differentiations may be too tenuous to be applied in the field. Ultimately, while the application of multivariate analyses are in themselves worthwhile tools they are limited by certain factors which curtail their effectiveness. Among these factors is the potentially unreliable nature of data gleaned from field-survey, as surface remains do not always give an accurate reflection of site morphology and thus relative site importance.

Also, the lack of useful information contained in the early legal texts makes understanding of both

micro and macro settlement-structures difficult. In this way, multivariate techniques are useful for outlining the hierarchical nature of Early Christian society and settlement characteristics, albeit in very broad strokes. However, the ability to produce definitive, archaeologically-viable categories is beyond the scope of these computer-based procedures. Thus, while the production of a settlement model containing the detail required to be verifiably historically and archaeologically accurate is unattainable, it may be regarded as a valuable and informative starting point for further research.

**References**


Alexander, R. 1983 'A study of some cryptogamic plant communities on the pillow lava band rocks of Cader Idris, Gwynedd'. Unpublished Ph.D. Thesis, Chelsea College, University of London.

Barrett, G.F. 1972 'The Ringfort: a study in settlement geography with special reference to southern Co. Donegal and the Dingle area, Co. Kerry'. Unpublished Ph.D. thesis, The Queen's University, Belfast.

Barrett, G.F. 1980 'A field survey and morphological study of ring-forts in southern county Donegal', *UJA*, 43, 39-51.

Barrett, G.F. 1982 'Ring-fort settlement in county Louth: sources, pattern and landscapes', *CLAHJ*, 20, No. 2, 77-95.

Bennett, I. 1989 'The settlement pattern of ringforts in Co. Wexford', *JRSAI*, 119, 50-61.

Binchy, D.A. (ed.) 1941 *Críth Gablach*. Dublin.

Brady, N. 1983 'An analysis of the spatial distribution of early historic settlement sites in the barony of Morgallion, county Meath', Unpublished BA dissertation, University College, Dublin.

Chapple, R.M. 1998 'A statistical and spatial analysis of ringfort distribution and morphology on the Loop Head peninsula, Co. Clare', Unpublished MA thesis, National University of Ireland, Galway.

Chapple, R.M. 2003 'Ringfort morphology and distribution on the Loop Head peninsula, County Clare', *NMAJ*, 43, 53-73.

Clark, P.S. & Evans, F.C. 1954 'Distance to nearest neighbour as a measure of spatial relationships in population', *Ecology* 35, 445-53.

Dice, L.R. 1952 'Measure of the spacing between individuals within a population', *CLVBUM*, 55, 1-23.

Doherty, C. 1982 'Some aspects of hagiography as a source for Irish economic history', *Peritia* 1, 300-28.

Doherty, C. 1985 'Monastic towns in Ireland', in H.B. Clarke & A. Simms (eds), *The comparative*

*history of urban origins in non-Roman Europe*, 45-76. BAR 255, International Series, Oxford.

Fahy, E.M. 1969a 'Historical geography of west Cork before the twelfth century A.D', Unpublished Ph.D. Thesis, University College, Cork.

Fahy, E.M. 1969b 'Early settlement in the Skibbereen area', *JCHAS,* 74, 14 -56.

Finch, T.F., Culleton, E. & Diamond, S. 1971 *Soils of county Clare*. Dublin.

Fletcher, M. & Lock, G.R. 1991 *Digging Numbers. elementary statistics for archaeologists*. Oxford.

Hodder, I. 1977 'Some new directions in the spatial analysis of archaeological data at the regional scale (macro)', in D.L. Clarke (ed.), *Spatial archaeology*, 223-351. London.

Lock, G. 1991 'An introduction to statistics for archaeologists', in S. Ross, J. Moffett & J. Henderson (eds), *Computing for archaeologists,* 57-95. Oxford.

MacNiocaill, G. 1971 'Tír Cumaile', *Ériu*, 22, 81-6.

McCone, K.R. 1986 'Werewolves, Cyclops, Di Berga and Fianna: juvenile delinquency in early Ireland', *Cambridge Medieval Celtic Studies,* 12, 1-22.

McLeod, N. 1986 'Interpreting Early Irish Law: status and currency (part 1)', *Zeitschrift für Celtische Philologie*, 41, 46-65.

Manly, B.F.J. 1991 *Randomisation and Monte Carlo methods in biology*. London.

Murphy, D. 1992 'The distribution of Early Christian monastic sites and its implications for contemporary secular settlement in county Louth', *CLAHJ*, 22, 364-86.

Orton, C. 1980 *Mathematics in archaeology*. Cambridge.

Scarre, C.J. 1982 'Settlement patterns and landscape change: the Late Neolithic and Bronze Age of the Marais Poitevin area of western France', *PPS*, 48, 53-73.

Stout, M. 1991 'Ringforts in the South-West Midlands of Ireland', *PRIA*, c 91, 201-43.

Stout, M. 1997 *The Irish Ringfort*. Dublin.

Warner, R.B. 1988 'The archaeology of Early Historic Irish kingship', in S. Driscoll & M. Nieke (eds), *Power and politics in Early Medieval Britain and Ireland*, 47-68. Edinburgh.

Westropp, T.J. 1900 'The churches of county Clare, and the origin of the ecclesiastical divisions in that county', *PRIA*, 21, 100-80.

Westropp, T.J. 1909 'Ring-forts in the barony of Moyarta, county Clare, and their legends. Part II.-

Westropp, T.J. 1909 'Ring-forts in the barony of Moyarta, county Clare, and their legends. Part II.- Kilkee to Carrigaholt', *JRSAI,* 39, 113-26.

Westropp, T.J. 1912 'Carrigaholt (Co. Clare) and its Neighbourhood. Part IV: Loop Head', *JNMAS*, 2 (3), 134-48.

Wishart, D. 1970 *Clustan statistical programme guide*. Unpublished Computer Manual.

**Acknowledgements**

This work could not have been completed without the help of many people, more than can easily be named here. However, some individuals deserve special mention for their assistance and great kindnesses. In particular I would like to thank Dr. Finbar McCormick, QUB; Prof. Etienne Rynne; Dr. Matthew Stout; Prof. John Waddell, NUIG; and Prof. Richard Wright, MV Arch. Ltd. A final word of thanks must go to my wife, Jeanne, for her relentless encouragement without which the author's innate laziness would have prevailed.